

BRISTOL.—From the prospectus for session 1877-78 of University College we are glad to see that that institution is rapidly attaining a position to afford a complete education both in literature and science. The chairs of chemistry, experimental physics, and botany are now filled up, and as the other branches of physical science are down in the programme of the coming session, no doubt professors for them will soon be appointed. The medical school in connection with the University is now fully organised, and we are confident that ere very long Bristol will become one of the chief centres of University education in the kingdom. A very satisfactory report has been presented to the London Clothworkers' Company on the chair of Technical Education founded by funds provided by them.

A NORTHERN UNIVERSITY.—At a recent meeting of the Leeds Town Council a deputation from the Yorkshire College of Science waited upon them to urge them to take steps to obtain Government sanction to found a university for the northern counties of England. This step was undertaken in consequence of the action of Owens College to obtain a charter for the erection of that institution into a university. The Leeds Town Council drew up a memorial to the Privy Council, in accordance with the prayer of the petition, and the Parliamentary Committee was instructed to watch the further progress of the matter.

SYDNEY.—The University of Sydney has applied to the Colonial Government for an increase of endowment from 5,000*l.* to 9,000*l.* With this increased income the university would add, among other subjects, to its present course, all the education necessary for the medical profession, a complete course of natural philosophy, coupled with mechanics and engineering, the addition of organic chemistry and metallurgy to the chemical school, and biology. The salaries attached to these chairs would be 1,000*l.*, with assistants at 250*l.* each. The proposal is still under the consideration of the government, but we cannot doubt, if they have the best interests of the Colony at heart, they will grant the petition of the University.

SCIENTIFIC SERIALS

American Journal of Science and Arts, July.—Contributions to meteorology, being results derived from an examination of the United States Weather Maps and other sources, by E. Loomis.—Germination of the genus *Megarrhiza*, Torr, by A. Gray.—The absorption of bases by the soil, by H. P. Armsby.—Double-star discoveries with the 18½-inch Chicago refractor, by S. W. Burnham.—Relations of the geology of Vermont to that of Berkshire, J. D. Dana.—On certain new and powerful means of rendering visible the latent photographic image, by M. Carey Lea.—On the possibility of transit observation without personal error, by S. P. Langley.—Observations of comets made at the Litchfield Observatory of Hamilton College, by C. H. F. Peters.—On complex inorganic acids, by W. Gibbs.

† *Annalen der Physik und Chemie*, No. 6, 1877.—On the electric currents which arise in the flow of liquids through tubes, by M. Edlund.—On metallic reflection, by M. Eisenlohr.—Contributions to an adequate determination of the plane of vibration of polarised light, by M. Ketteler.—On electric induction on non-conducting solid bodies, by M. Wüllner.—On the thermo-electric properties of gypsum, diopside, orthoclase, albite, and periclone, by M. Hankel.—On the magnetic behaviour of nickel and cobalt, by M. Hankel.—On the relation of friction of gases to temperature, by M. Puluj.—On electric smoke figures, by M. Antolik.—Apparatus for determination of the focal distance of spherical lenses and lens systems, by M. Meyerstein.

Bulletin de l'Académie Impériale des Sciences de St. Pétersbourg, t. xxiii., No. 4.—Eighty-six silver coins with Pehlewy inscriptions, by M. Dorn.—Observations of planets at the Academic Observatory of St. Petersburg; determination of the inclination of the orbit of the planet Neptune to the ecliptic, by M. Sawitsch.—Influence of depressor nerves on the quantity of the lymph, by M. Veliky.—Influence of temperature on the galvanic resistance of Siemens wires, by M. Lenz.

Archives des Sciences Physiques et Naturelles, July.—Cretaceous fauna of the Rocky Mountains, by M. Delafontaine.—On chemical equivalents and atomic weights as bases of a system of notation, by M. Marignac.—Observations on some fossil plants of South Tesson and on the deposits which contain them, *à propos* of the glacial controversy, by M. Sordelli.—On

the relations between the intensity of irritation of the sciatic nerve, the height of the muscular contractions, and the time elapsing between irritation and contraction, by M. Lautenbach.

Reale Istituto Lombardo di Scienze e Lettere, Rendiconti, Vol. x. Fasc. VII.—Two new parasitic mycetes on vines, by M. Cattared.—On a cause little estimated in pathogenesis of some female diseases, by M. de Giovanni.—The molecular velocity of gas and the corresponding velocity of sound, by M. Brusotti.

Fasc. XII.—XIV.—On more economical composition of electromotors capable of a given effect, by M. Ferrini.—Experimental researches on heterogenesis (second paper), by MM. Cantoni and Maggi.—On the existence of monera in Italy, by M. Maggi.—On a particular reaction of saliva, by M. Solera.—On the state of sulphur in milk and on the normal existence, in vaccine milk, of sulphates and sulphocyanates, by M. Masso.—On a Selachian recently caught in the Mediterranean, by M. Pavesi.—On a new differential function in the theory of elliptic functions, by M. Brioschi.—On differential equations, by M. Casorati.—Quali-quantitative researches on carbonic anhydride, by M. Pollacci.—*Résumé* of meteorological observations at Milan in the Brera Observatory in 1876, by M. Frisiani, jun.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, June 21.—“The Relationships of the Nerve-cells of the Cortex to the Lymphatic System of the Brain.” By Bevan Lewis, F.R.M.S., Pathologist and Assistant Medical Officer at the West Riding Asylum. (Communicated by Dr. Ferrier, F.R.S.)

The anatomical relationships of the nerve-cells of the cortex to their immediate environment, and especially to the surrounding lymphatic structures, is a subject of such weighty importance to the pathologist and physiologist that too much consideration cannot well be paid to what must necessarily be involved in the solution of those mysterious problems connected with the statics and dynamics of the brain. The author of this paper has detailed the results of personal investigations, in which he has been able to confirm the observations of Obersteiner.¹ He alludes to the confusion on this subject traceable in the writings of several English histologists, some of whom, whilst recognising the existence of peri-cellular spaces, do not attempt an explanation of their significance, others openly express their dubiousness with regard to their import, whilst a limited class regard them as morbid productions due to the atrophy and shrinking of the nerve-cell. His attention was first attracted to their significance by (a) “the presence in certain morbid conditions of numerous nuclei arranged in definite directions around the nerve-cell, (b) the presence of undoubted lymph-corpuscles in clear spaces around the nerve-cells, and (c) the appearance of peri-cellular spaces in healthy brain occasionally when the cells appeared perfectly normal, and certainly not atrophic.”

This disposition of nuclei (a) is most strikingly evident around the nerve-cells of the third layer, and around the still larger cells found at a lower level in the ascending frontal and parietal convolutions of man which have been termed “giant-cells.” These “giant-cells,” the hypertrophied cells of some writers, are stated by Mr. Lewis to be undoubtedly normal, and to a great extent constant, elements in these regions. In order to appreciate the significance of this arrangement of nuclei, the non-nervous elements of the cortex are considered, allusion being made to the proliferation of connective elements so frequently met with. These latter are shown not to be free nuclei, but to have a delicate investment of protoplasm around them. The non-nervous cellular or nuclear elements are described as disposed in three definite situations: (a) irregularly in the neuroglia network; (b) regularly around the nerve-cells; (c) following directly the course of capillaries.

In the two last positions they are shown to be connected with the lymphatic channels and sacs surrounding the blood-vessels and nerve-cells, and the author regards them as originating in the endothelial elements of these structures. The spindle-cells of the deepest cortical layer in the frontal region are said to be peculiarly prone to the growth around them of these attendant satellites. He continues: “The recognition of these

¹ “Ueber einige Lymphräume im Gehirne” (Sitzb. d. k. Akad. d. Wissensch., 1. Abth., Jan, Heft, 1870).

connective and endothelial elements, and the varying conditions imposed upon them by their distinct functional endowments is of essential import when we are dealing with the morbid brain." The peri-cellular sac is then described fully, as well as its varied contour dependent upon the form of the inclosed cell, method of preparation, thinness of section, and the various physiological and pathological conditions existing before death. The close proximity of a capillary to these sacs was invariably observed, and on close examination a connection betwixt the peri-vascular and peri-cellular sheaths was clearly seen. Sections of the cortex in new-born animals were then described, in which a linear arrangement of the cells along the peri-vascular sheaths was observed, each nerve-cell being separated by a clear space from the surrounding neuroglia, the peri-vascular sheaths in the kitten being widely distended. The nerve-cells in these cases were pyriform, and apparently connected to their limiting sacs by a narrow stalk-like process. The writer next dwells briefly upon the developmental bearing of these facts. With regard to the explanation afforded by some observers of the significance of these spaces in senile atrophy, it is shown that whilst the large size and defined contour may be due to shrinking of the degenerated protoplasm of the nerve-cell, "yet the important point is to recognise these spaces as natural structures in an unnaturally distended condition, for their large size appears to me to be due not only to wasting and recession of the inclosed cell, but to a large accumulation of lymph, the lymphatic channels, peri-cellular and peri-vascular, being in a distended condition throughout." It is next shown how readily the lymph current may be obstructed in its flow towards the pia-mater, and how seriously such conditions would affect the nutritive and depurative changes proceeding in the lymph-sac—changes of so vital an importance in the maintenance of the functional activity of nerve-cells. The methods employed in this investigation by Mr. Lewis, include ordinary chrome hardening, the teasing process described by him in the *Monthly Microscopical Journal*, and the examination of films of cortex obtained by his new freezing microtome. His paper is illustrated by six drawings of the microscopic structure of the cortex.

PARIS

Academy of Sciences, August 13.—M. Peligot in the chair.—The following papers were read:—Communication from the Bureau des Longitudes on new operations of astronomical geodesy, by M. Faye. This relates to the astronomic-telegraphic junction of Paris with Neuchatel, Geneva, and Lyons.—Engraving representing the aureola of Venus as seen from the Island of St. Paul, by M. Mouchez. The phenomena is given at three different stages.—A general law of geometric curves concerning the common intersection of each point of a curve and the tangent of this point, in questions of geometrical positions or enveloping curves, by M. Chasles.—New considerations on the localisation of cerebral centres regulating the co-ordinated movements of written language and articulated language (continued) by M. Bouillaud. He replies to some recent objections by Dr. Fournié against localisation of speech in the left cerebral hemisphere.—On the reproduction, by photography, of the rice-grains of the solar surface, by M. Janssen. He has succeeded in this in his solar photographs of thirty centimetres by means of a very short exposure, combined with strong development.—On an example of reduction of Abelian integrals with elliptic functions (continued), by Mr. Cayley.—On the best conditions of employment of galvanometers, by M. du Moncel. He gives an experimental verification of some mathematical deductions.—Note on the central obturator inflamer, by M. Cosson. The state of dryness of the powder seems to have (other things equal) an exceptional importance for the author's apparatus. The Pyrenees mark the true line of separation between the eocene and miocene portions of the tertiary epoch, by M. Leymerie.—A message of sympathy was sent to M. de Lesseps on account of his recent accident.—The system of Sirius, by M. Flammarion. The orbit calculated for the companion of Sirius differs from the orbit observed; the latter crossed the former in 1869 (having left it in 1862) and going beyond it, has followed quite a different curve, wider and less eccentric. M. Flammarion supposes that either the companion will accelerate its motion and return to the west in 1892, or that there is another disturbing body nearer and more rapid, not yet discovered.—Remarks, *à propos* of M. Faye's communication on the relation between the sun-spots and variation of the magnetic declination, by M. Wolf. The anomalies of the one class of phenomena are reproduced in the other, a

strong evidence that both are produced by the same cause.—On the equation of Riccati, by M. Genocchi.—Note on the curves which have the same principal normals, by M. Niewenglowksi.—On the slipping (*patinage*) of the wheels of locomotives, by M. Rabeuf. The phenomenon is much more general and complex (he finds) than is commonly supposed. The slipping is almost *nil* in ascending an incline, and very pronounced in descending. It increases rapidly with the speed, but appears to be greater, with equal velocity, on descents than on ascents. In descents it varies between 13 and 25 per cent. Its suppression, if possible, would realise a corresponding economy in fuel and wear of machinery.—The régime of the winds, and evaporation in the region of the Algerian chotts, by M. Angot. It is shown from figures that the winds favourable to M. Roudaire's project (*viz.*, south, south-west and south-east) are to the unfavourable winds in the ratio of 1 to 9.4. Their vapours would be almost wholly carried towards Sahara instead of Algeria. The average layer of water estimated as removed in twenty-four hours from the projected sea is about 6 mm. This would raise to seventy-eight millions of cubic metres the quantity required to be brought by the canal of communication daily to keep the lake-level constant.—On the vapour of hydrate of chloral, by M. Troost. A second method (for determining equivalent in volume) consists in first vapourising hydrate of chloral, then introducing into the vapour a body capable of removing part of the free vapour of water it may contain (pure neutral oxalate of potash was used completely dehydrated in a stove at 100°). This method led to the same conclusion as the first, *viz.*, that hydrate of chloral exists in the gaseous state, and so that its equivalent corresponds to eight volumes.—Note on some properties of sulphide of cadmium, by M. Ditte.—On some general properties of metallic sulphides, by MM. de Clermont and Guiot. The decomposition (here proved) of sulphides by water at 100° with formation of metallic oxide and sulphuretted hydrogen, is thought a fresh reason for regarding hydrogen as a metal; it displaces true metals in these reactions, and forms a more stable sulphuretted compound.—On some points of the organisation of Bryozoa, by M. Joliet.—On the fecundation of Echinoderms, by M. Giord.—Pyrophosphates in therapeutics; their mode of action, by MM. Pacquelin and Joly. Pyrophosphates, far from being reconstitutive, as commonly supposed, are purely foreign bodies for the system, and their ingestion can only increase its expenditure in the work of elimination, which their presence necessitates. Any reconstitutive value attached to them is probably due to impurities.—On the physiological action of Pau Pereiro (*Geissosperrmun larve*, Baillon), by M.M. Bochefontaine and De Freitas. The active principle is a paralyzing poison, which appears to abolish the physiological properties of the central grey nervous substance, and especially of the grey bulbomedullary axis.—On anthracic bacteridies, by M. Toussaint.

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