water evaporated after the creation of the inland sea. He has found this information in the experiments made at the Bitter Lakes traversed by the Suez Canal. At the time of the filling-up of the Bitter Lakes, a waste-weir was constructed intended to regulate the introduction of the water of the Mediterranean. From July 7 to 14 the weir was wrought with only a small number of sluices raised, and the level of the lakes remained stationary. The introduction had been regulated to about 3,540,942 cubic metres, or, in round numbers, 4,000,000, cubic metres per day. This figure, then, gives the quantity of water absorbed by evaporation which, according to the extent of surface, produced a lowering of the level of from ·003 m. to ·0035 m. during twenty-four hours, and that in the hottest month of the year. All the observations made since that time have given essentially the same results, and we must admit, with the engineers of the Suez Company, a general mean of ·003 m. per day, or 1 m. per year. M. Roudaire has added, as a conclusion to be drawn from this bearing on his project:—"The basin of the chotts and the Isthmus of Suez being situated nearly under the same latitude, and possessing a climate absolutely analogous, we must admit that the evaporation which will be produced on the inland sea will be the same as that which has been observed on the Bitter Lakes. The figure ·003 m. is the general mean of the year. The observations which we have made in the chotts with Piche's evaporometer have proved to us that this figure is at least doubled during the sirocco."

Not only would the vapour of water thus diffused through the air serve as a reservoir for the heat emanating from the earth or the sun, but it would have still another mode of action for effecting climatic modifications. The air and its vapour brought into contact with the elevated and therefore cool parts, the Aurès mountains, and other mountains of Algeria, would have their temperature lowered on account of that cause, and the effect would be increased by the radiation of the vapour of water into space; for that radiation would operate almost without check at a height where the air from above, and therefore less dense, is cold and dry. Under the influence of this double cause the moisture would be condensed into rain or snow, and would serve to feed the watercourses which would permanently flow in the beds at present dry during a great part of the year. We should see issuing from the ground, from the same cause, sources which do not now exist. The moisture, discharging itself along the lines of watercourses, would extend its influence on the two slopes of the mountains to countries at a distance from the chotts. We can perceive by calculations the volume and the weight of the masses of water set in motion by evaporation, that these considerations are not chimerical. The 13,230 square kilometres give 39,690,000,000 kilogrammes of water per twenty-four hours, raised by evaporation, *i.e.*, 39,690,000 cubic metres. It will be seen that there is here something to form sources and feed streams or rivers. M. Roudaire has calculated that the quantity of vapour diffused in air whose barometric pressure is ·760 m., and the temperature 12° C., would cover the surface of Tunis and Algeria with a layer of half-saturated air, 24 metres in height. Let us remark that this calculation includes only the quantity of vapour formed during twenty-four hours. The south wind known as the *sirocco*, at present so destructive because it is exceedingly dry, would produce on the surface of the lakes an evaporation much greater than that mean, and would, moreover, lose many of its hurtful effects. In fact, this same wind, which destroys the vegetation of Algeria, has a fertilising influence on the territory of France, because of the moisture with which it becomes charged in crossing the Mediterranean.

Advantages so considerable, which would result from the introduction of the water of the sea into the chotts, explain and justify the perseverance with which M. Roudaire has pursued the idea without allowing himself to be arrested by any of the difficulties which have presented themselves. The greatest of the difficulties, M. Favé thinks, proceeds from the fact that the Chott El-Djerid, the nearest to the Gulf of Gabès, has not, like the others, the bottom of its basin below, but above, the level of the sea. The surface of the ground is undulating; it rises to 20 metres, or even more, at certain points, and descends to zero at other points. M. Roudaire has estimated, somewhat vaguely, that the mean height of the bottom may be about 6 metres above sea-level. Notwithstanding this obstacle, M. Roudaire does not renounce the hope of being able to make the water of the sea reach the Chott El-Djerid in order to turn it afterwards into the other two chotts. He believes he has found a support for this in the nature of the bottom, or, to speak more exactly, in the existence of a water-bearing bed situated at a small depth below the ground.

The Commission, of which M. Favé is the mouthpiece, without pronouncing definitely on the project of M. Roudaire, sufficient data for this not being forthcoming, strongly recommend that active steps be taken to obtain more accurate measurements and other data. The facts which he has adduced they think sufficient to justify serious attention being paid to his proposal, and recommend that the thanks of the Academy be accorded to M. Roudaire for his valuable labours. To these recommendations the Academy agreed.

We should state, however, that MM. Dumas and Daubrée, members of the Commission, are not able to give their entire consent to the recommendation of M. Favé's report. They think that the obstacles to the accomplishment of the scheme are much more serious than have been estimated, and regard the industrial and climatic results anticipated as, to a considerable extent, hypothetical. M. de Lesseps, however, gives his entire concurrence to the scheme of M. Roudaire, and believes in its practicability and the favourable results that would follow its realisation.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

SCIENCE AND ART DEPARTMENT.—The Committee of Council on Education have just issued an important circular on instruction in practical chemistry and in physics. My Lords direct that §§ XLV. and LXXI. of the Science Directory be cancelled and that the following rules be substituted:—1. Payments of 1*l.* 10*s.* and 1*l.* for the first and second class in the elementary stage, and of 4*l.* and 3*l.* for the first and second class in the advanced stage and honours, will be made on the results of instruction in practical chemistry. They will be claimable according to the same rules, and subject to the same deductions on account of previous success as the ordinary payments. These payments will be made on condition—(*a*) That there be a good laboratory—being a room, or part of a room, exclusively devoted to the purpose of the study of practical chemistry—properly fitted with gas and water supply. (*b*) That the student on whom the payment be claimed have received twenty-five lessons at least in laboratory practice since his last examination, each lesson being an attendance of at least one hour and a half's duration on a separate day. (*c*) That a register of the attendance of the students at the instruction in practical chemistry be kept duly posted up from day to day. 2. *Elementary Stage.*—In this stage the knowledge of the students will be tested by special questions set with the ordinary examination paper; but no payments will be made if the laboratory be not furnished with all the apparatus necessary for the individual practice of each student in practical chemistry, and if systematic instruction in practical chemistry be not given. Any student on whom it is intended to claim payments in this stage may be called on by the Inspector of the Department, when visiting the laboratory, to repeat some of the experiments, specified in the Science Directory in the syllabus for the first stage of inorganic chemistry, which he has had an opportunity of witnessing. 3. *Advanced Stage and Honours.*—The results of the instruction in these stages will be tested by a special examination in qualitative analysis to be held on a Saturday during the ordinary May examinations, and lasting, for the advanced stage from 6 P.M. to 10 P.M., and for honours from 2 P.M. to 10 P.M. Payments can only be claimed in these stages provided—(*a*) That the laboratory be fitted up with a separate working place for each student. (*b*) That each student be provided with a complete set of apparatus and chemical tests (as enumerated in Science Form No. 402) kept separate, and in good working order, on the shelves, and in the cupboard or drawers at his own table. (*c*) That the laboratory be also furnished with apparatus for general use, consisting of at least the articles of which a list will be found on Science Form No. 402. From the reports of the examiners and of the inspectors it appears that instruction still continues to be given in physics without a sufficient amount of apparatus to illustrate the teaching of these experimental sciences. My Lords cannot allow examinations to be held in schools where instructions of such a superficial and perfunctory nature is given. They therefore direct that in 1878 no classes be examined which are not furnished with apparatus at least sufficient to illustrate some of the more important experiments; which apparatus the teacher may be called upon by the Inspector of the Department to show his ability to use.

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 pericline, 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 Tessin and on the deposits which contain them, *àpropos* 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).