temperature in the brain of o°·36 C., without any change in the temperature of the muscles or of the rectum being observed. In a curarised dog, the intervention of the muscles being thereby excluded, the action of the cocaine may produce a rise of as

the magnet was in oscillation, the force increasing, and reaching a maximum at 13h. 43m., after which it began to decrease, the minimum being reached at oh. 15m. on the 14th. Further abrupt movements occurred at 4h. 30m. on the 14th, the oscil-
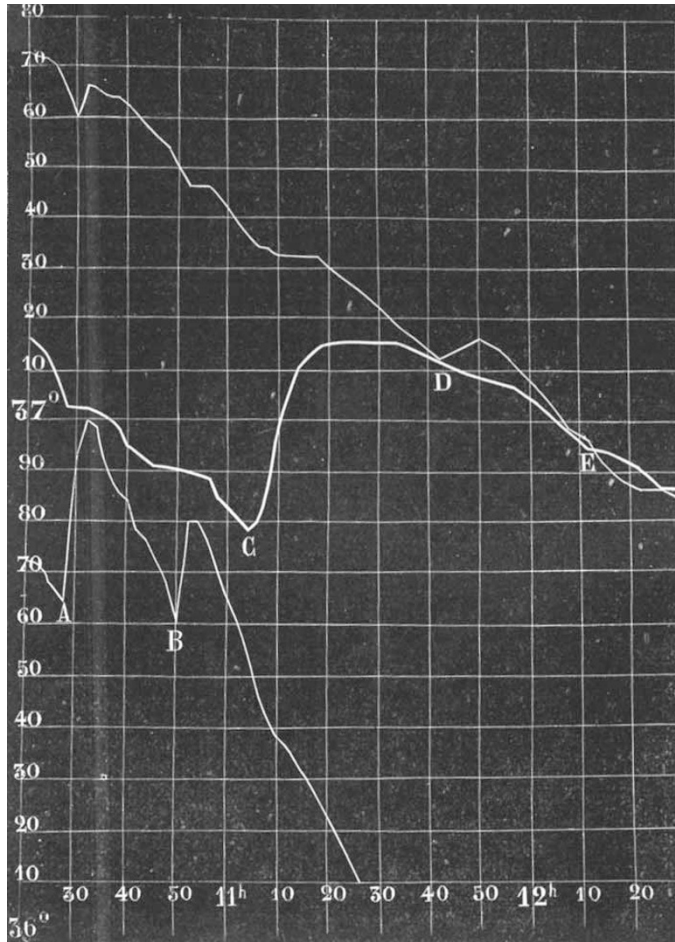

FIG. 3.—Dog rendered insensible with chloral. The upper line represents the temperature of the rectum, the middle (thicker) line that of the brain, the lower line that of the muscles of the thigh. A and B, electric stimulation of the muscles; C, injection of 10 centigrams of cocaine int the saphena vein; D, E, spontaneous variations in the temperature of the rectum.

much as 4° C. in the temperature of the brain, the author having observed a rise from 37° to 41° C. This shows that in arranging the calorific topography of the organism a high place must be assigned to the brain.

THE MAGNETIC STORM OF FEBRUARY IN MAURITIUS.

A T a meeting of the Meteorological Society of Mauritius, that took place on April 7, Mr. Meldrum read a short paper on the sun-spots, magnetic storm, cyclones, and rainfall of February 1892. The photographs of the sun that he exhibited, which were taken at the Royal Alfred Observatory from February 5 to 18, showed the very large group of spots, their approximate latitude on the 9th being from 6° to 16° south. Leading on to the occurrence of the great magnetic storm which began at 8h. 55m. on the 13th, he states that its commencement was distinctly recorded on the three curves, the horizontal force suffering the greatest disturbance. Up to 14h,

lations, as shown by the curves, being very numerous, but at 19h. the magnets became more steady, and were quiet by 3h. on the 15th. The ranges obtained at the Mauritius Observatory were the largest ever recorded there.

Cyclones were not absent during this month. One lasted from the 11th to the 14th, and another from the 25th to the 28th, while a third was also experienced on the 21st and 22nd, about 550 miles south of Mauritius. The rainfall for February, as shown by returns from the numerous stations, was from 4·30 to 16·96 inches above the average for periods of 7 to 29 years. At Antoinette the fall for the month amounted to 12·53 inches, while that at Cluny came to 34·37 inches. St. Aubin and Nouvelle France came in for a considerable quantity of rain, the falls in the 24 hours ending at 8 a.m. on the 13th reaching the figures 5·00 and 18·20 inches respectively. Referring lastly to the magnificent displays of aurorae that have been observed both in Europe and America, he mentions that, although at Mauritius the sky was overcast, under similar conditions with respect to solar activity and terrestrial magnetism, a great display was visible in 1872; Mr. Meldrum,

in his concluding remarks as to whether "there is a causal connection between solar activity (as indicated by outbursts on the sun) and magnetic disturbances, auroras, cyclones, and rain-fall," remarks that with regard to the two former there can hardly be any doubt, but with regard to the two latter he is of opinion that a very close connection does exist, there being a considerable preponderance of evidence in its favour.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—*Annual Abstract of Accounts.*—The abstract of accounts of the University for the year ending December 31, 1891, has just been published. It exhibits both the accounts of the Curators of the Chest and the financial position of the University institutions. The receipts show an income of £66,986 12s. 9d., against £65,175 17s. 2d. last year. The principal sources of internal income include estates £9978 12s. 8d., the University Press £5000, University dues £11,153 5s., examination fees £5659 1s., degree fees £9600. The Proctorial fines amount to only £313, nearly £100 less than last year. In connection with the present agitation against Proctorial jurisdiction this item is interesting. The total payments amounted to £64,557 6s. 3d. There was transferred to capital account £2225 16s.4d., and a balance carried forward of £203 10s. 2d. In this item of expenditure, we find institutions and public buildings cost £19,085, the largest item under this head being the Bodleian Library £7772 4s. 4d., while the Taylor Institution absorbed £2245. The expenses in connection with lectures in large towns amounted to £729 11s. 8d., and the interest and sinking fund on loans for University purposes came to £6157 8s. 4d.

The loans account shows that the amounts remaining to be paid are £36,000 at 4 per cent. on the £60,000 New Schools Loan, and £7666 13s. 4d. at 2¾ per cent. on the £10,000 Physiological Laboratory Loan.

The University and the County Councils.—The report on the peripatetic teaching in scientific and technical subjects carried on in various country districts under the supervision of the Oxford Delegates for University Extension, acting in concert with the Technical Instruction Committees of County Councils during last winter, has just been published. The report states that the Oxford Delegates for University Extension were requested by the representatives of eight County Councils in England to provide for the delivery of 227 courses, embracing 2271 lectures, on chemistry, agriculture, geology, botany, veterinary science, physiology, and hygiene. These courses have been regularly attended by more than 10,000 persons in all grades of society.

The relations between the University Extension Committees of the different Universities and the County Councils, in reference to the matter of technical instruction, has now become so important, that a Conference was summoned last week, under the presidency of the Provost of Queen's College, to consider this connection, and to profit by the experience already gained, an experience, which in some cases extends over two years. It was felt that there are certain mistakes, inevitable in the commencement of any large scheme, which might be advantageously removed, so as to promote greater harmony, and possibly more economy in the fuller development of the scheme. Many organizing secretaries and others interested in the scheme attended the Conference, which extended over two days.

Two principal subjects were under discussion, first, the provision of summer courses of instruction in Oxford, Cambridge, and other University towns for teachers in elementary schools; secondly, the methods of organization of peripatetic teaching in regard to hours of lectures, classes, cost, and local management. In connection with the first point, it was announced that Oxford, Cambridge, and the Yorkshire College, Leeds, would be prepared to offer accommodation to students this summer; the Victoria University has, however, made no such provision. The method of procuring instruction in practical agriculture and experimental farming occupied much of the attention of the meeting, and much stress was laid upon the importance of securing the co-operation of farmers to look after the experimental stations.

On the matter of peripatetic teaching, it was felt by some that no very great assistance could be expected from the elementary teacher, and that reliance must be placed upon the teacher supplied by the Universities, in some cases advantageously supplemented by the teachers in secondary schools.

Not the least important feature in the Conference was the

anxiety displayed by all present to urge on to the utmost of their power the great work of the dissemination of technical and scientific instruction, influenced solely by disinterested motives for the public service.

CAMBRIDGE.—Prof. Bonney, F.R.S., Fellow of St. John's College, will this year deliver the Rede Lecture in the Senate House, on Wednesday, June 15, at noon. The subject is "The Microscope's Contributions to the Earth's Physical History."

The Adams Memorial Committee have issued a circular inviting contributions towards the erection of a monument to the late Prof. J. C. Adams in Westminster Abbey. These may be paid to one of the treasurers (Dr. Searle, Master of Pembroke, and Prof. Liveing), or to one of the secretaries (Dr. Porter, Master of Peterhouse, Dr. Donald MacAlister, St. John's, and Dr. Glaisher, Trinity), or to the account of the Adams Memorial Fund at Messrs. Mortlock's Bank, Cambridge. We do not doubt that the invitation will meet with a generous response from the admirers of the great astronomer.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, April 28.—"On a Decisive Test-case disproving the Maxwell-Boltzmann Doctrine regarding Distribution of Kinetic Energy." By Lord Kelvin, Pres. R.S.

The doctrine referred to is that stated by Maxwell in his paper "On the Average Distribution of Energy in a System of Material Points" (Camb. Phil. Soc. Trans., May 6, 1878, republished in vol. ii. of Maxwell's "Scientific Papers") in the following words :—

"In the ultimate state of the system, the average kinetic energy of two given portions of the system must be in the ratio of the number of degrees of freedom of those portions."

Let the system consist of three bodies, A, B, C, all movable only in one straight line, KHL :

B being a simple vibrator controlled by a spring so stiff that when, at any time, it has very nearly the whole energy of the system, its extreme excursions on each side of its position of equilibrium are small :

C and A, equal masses :

C, unacted on by force except when it strikes L, a fixed barrier, and when it strikes or is struck by B :

A, unacted on by force except when it strikes or is struck by B, and when it is at less than a certain distance, HK, from a fixed repellent barrier, K, repelling with a force, F varying, according to any law, or constant, when A is between K and H, but becoming infinitely great when (if at any time) A reaches K, and goes infinitesimally beyond it.

Suppose now A, B, C to be all moving to and fro. The collisions between B and the equal bodies A and C on its two sides must equalize, and keep equal, the average kinetic energy of A, immediately before and after these collisions, to the average kinetic energy of C. Hence, when the times of A being in the space between H and K are included in the average, the average of the *sum of the potential and kinetic energies of* A is equal to the average kinetic energy of C. But the potential energy of A at every point in the space HK is positive, because, according to our supposition, the velocity of A is diminished during every time of its motion from H towards K, and increased to the same value again during motion from K to H. Hence the average kinetic energy of A is less than the average kinetic energy of C !

This is a test-case of a perfectly representative kind for the theory of temperature, and it effectually disposes of the assumption that the temperature of a solid or liquid is equal to its average kinetic energy per atom, which Maxwell pointed out as a consequence of the supposed theorem, and which, believed to be thus established, has been largely taught, and fallaciously used, as a fundamental proposition in thermodynamics.

It is, in truth, only for an approximately " perfect " gas—that is to say, an assemblage of molecules in which each molecule