very little has thus far been accomplished in discussing its variations of temperature month by month throughout the year; indeed, the region between the 50th and 60th parallels, from our islands across to Labrador, has been almost wholly neglected. Some years ago, the Meteorological Office published mean results for four months; the Deutsche Seewarte has made a separate discussion of each of a number of 10°-squares; and the Copenhagen Institute annually supplies information for the far north, mainly on the routes from Denmark to Iceland and Greenland. These are the principal contributions to our knowledge of Atlantic sea temperature.

The Meteorological Council has now made a new departure in this matter. In connection with the publication of the monthly pilot chart of the North Atlantic and Mediterranean, the cooperation of the captains and officers of the Mercantile Marine has been enlisted to promptly supply daily records of sea temperature during their voyages. A gratifying response resulted in the return of more than 2500 ocean temperatures for the month of January last, and 2750 for February. This mass of valuable information has been grouped in spaces of 2° of latitude by 2° of longitude and means obtained. The results between 30° and 60° N. form the new feature of the pilot charts. Those for January appear on the April chart, and those for February on the May chart. In addition to the means, the variations from the averages of a long series of years are also shown, and lines are drawn separating the regions of excess and of defect. Generally speaking, in January the water was a degree or two colder than usual from Ireland down the face of the Bay to Portugal and thence westward across the Atlantic, while further north, from about the 20th meridian westward, the values were nearly all in excess. In February nearly the whole area was colder than during the preceding month, but compared with the February normals the region of excess was much more extensive than in January. The relatively cold water south-westward from the British Isles had, however, expanded westward to about 30° W. Close inshore the fall of temperature was very marked—off Eastbourne, for instance, it was 44° in January, an excess of 3°, while in February it was only 37°, a defect of 3°. Here we have the commencement of an investigation which, if continued, and improved as may be found necessary, should be fruitful of the most useful results. At present, with only the bare ocean results presented to us, it is not easy to explain what effect should be produced ashore. We know that the air temperature over the British Isles during last January was above the average to the extent of about 2°, while February was nearly 4° too cold, the coldest month for seven years. What part did the temperature of the ocean play in influencing the mildness of the one or the coldness of the other month?

With only these first charts before us, it is obviously impossible to form a just conception of the very complicated problem which requires solution. We must wait for a consecutive series of such charts and examine closely the variations disclosed month by month at sea and on land. It may be that the effect produced on our air temperature by the changes in that of the sea to the westward and south-westward is an indirect and not a direct result. The prevalence of winds from particular quarters for any length of time, and the cold or warm ocean surface currents which they set up, the movements of weather systems, &c., must be borne in mind. From the monthly pilot charts it is clear that at times the Gulf Stream fails to reach our shores owing to the existence of a stronger opposing flow. It has been advanced by Dr. Emil Lesshaft, in his paper "Der Einfluss der Wärmeschwankungen des Norwegischen Meeres auf die Luftcirkulation in Europa" (*Meteorologische Zeitschrift*, Band xvi.), that the paths followed by atmospheric disturbances are associated with the temperature of the sea water, and if that should prove to be the case we must consider first of all the temperature of the Atlantic and the march of weather systems, and then the effect the latter produce on our climate. The permanent Atlantic anticyclone maintains its position over a part of the ocean where there is only a slight variation of sea temperature, but its outer limits expand or contract enormously, at times stretching northward as far as Iceland and Greenland, especially in the month of May, when a broad belt of Arctic water flows southward beyond our western coasts. With our present knowledge we can only conjecture as to the causes of these variations, but the information about the sea temperature now becoming available may, perhaps, help us to arrive at a better idea of the forces at work. As the observations become more numerous, would it be possible to issue weekly results of sea temperature?

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

ON Thursday next, June 5, the Sir John Cass Technical Institute, Aldgate, will be formally opened by the Right Hon. Lord Avebury, F.R.S.

WITH the object of creating interest in science teaching and nature-study in Southampton and the district, a conference will be held at the Hartley College, on June 14, together with an exhibition of home-made and other simple scientific apparatus. It is felt that much useful work is being done, the character of which is not generally known, and that teachers should be afforded an opportunity of comparing methods and becoming acquainted with that which the experience of others has proved to be of value. A preliminary meeting was held on May 10, when Dr. H. E. Armstrong, F.R.S., gave an address on the chief points to be borne in mind in early lessons in science. As he has often remarked before, science must not be taught so much on account of its matter as for training in scientific methods of work and reasoning. What is desired is that habits which characterise the true worker in science should become general habits, with the object of developing the practice of the best mental faculties.

THERE are many signs that the movement for reform in the teaching of mathematics will have a decided influence upon the scope and character of elementary geometry in schools. Several public examining bodies have lately had the subject under consideration, and changes in the direction of reform are likely to be instituted. The regulations just issued for the Oxford Local Examinations next year contain an announcement referring to the examinations in geometry which will have a very decided effect upon the scope and method of the subject in secondary schools. The notice reads as follows:—"Questions will be set so as to bring out as far as possible a knowledge of the principles of geometry, a smaller proportion than heretofore consisting of propositions as enunciated in Euclid. Any solution which shows an accurate method of geometrical reasoning will be accepted. No question will be set involving necessarily the use of angles greater than two right-angles. Geometrical proofs of the theorems in Book ii. will not be insisted upon." It is evident from this announcement, and the deliberations of other examining bodies and teachers, that Prof. Perry selected the right "psychological moment" for directing attention to the irrational ways of approaching geometry in schools and the need for recognition of work better adapted to modern needs. As both examiners and teachers are in general sympathy with his desire to get rid of artificiality in mathematics, we may expect that the time will come when geometry will not be commenced, as it is in many schools to-day, by learning Euclid's definitions, postulates and axioms and reading propositions, but by the intelligent use of compasses, protractor and scale.

IN introducing the Education Vote in the House of Commons on Monday, Sir John Gorst directed attention to some of the changes and developments which have taken place in the administration of the Board of Education. Schools of science and other secondary day schools inspected by the Board are to have block grants instead of payments by results of examination, the grants being assessed every three years. By this system, it is hoped that all inducement to cram will be removed. Both in the administration of the Parliamentary grant and in the inspection of schools the Board of Education will aim at encouraging originality and variety. The hope was expressed that the time would be far distant when those who had to administer the public funds of this country and to carry out the provisions of the Act with regard to secondary schools forgot the enormous danger of interfering to produce uniformity of system, and that they would give every encouragement to variety and independence. Referring to the Royal College of Science—one of the two Government colleges in London which are entirely under the management of the Board of Education, the other being the Royal College of Art—Sir John Gorst said:—"The vote for this school, which is a very advanced science school, has been increased in the present year by 1000*l.* for the purpose of enabling work to be continued—begun by Sir Norman Lockyer—respecting the relation of certain precedent phenomena in the sun observed through the spectroscope to the subsequent rainfall in India and Australia. No certain law has yet been established, but if the research is successful it will have enormous beneficial economic effects, both for India and Australia."

Other subjects referred to were the educational work of the Victoria and Albert Museum, the new advisory spirit in which the inspection of schools is to be carried on, and the provision by local authorities of a better system of training teachers than at present exists.

TWO pamphlets referring to the purpose and programme of the Faculty of Commerce of the University of Birmingham have been received. The Faculty will begin its work in October next and there will be matriculation examinations on June 2 and September 15. In the course of his prospectus, Prof. Ashley remarks that the object of the work to be carried on by this department of the University is the education, not of the rank and file, but of the officers of the industrial and commercial army: of those who, as principals, directors, managers, secretaries, heads of departments, &c., will ultimately guide the business activity of the country. The Faculty represents the first serious attempt to provide training of this kind, though every year shows the need of it. Prof. Ashley points out that the marked acceleration of the speed of industrial and commercial change, the application of science to machinery involving more frequent changes in manufacturing processes, and the extension of means of communication, call more and more for mental flexibility, alertness and adaptability on the part of traders. But such qualities are certainly not likely to be stimulated by early absorption in the subordinate routine of a particular occupation. There is, however, some chance of promoting them by courses of instruction which shall accustom the future trader to survey a wide range of industrial undertakings, to watch the development of the world's great markets, and to estimate the resources and capabilities of other nations. The curriculum which has been drawn up for the three years' course leading to the degree of Bachelor of Commerce in the University of Birmingham comprises studies which fall mostly into four main categories:—(1) languages and history; (2) accounting; (3) applied science and business technique; (4) commerce. The purpose of the scientific subjects included in the course is not to make men scientific experts. Its aim is (*a*) to make their business more interesting to them; (*b*) to enable them to follow the general movement of technological progress, and to realise the directions in which changes of process are probable or possible; (*c*) to show them when they ought to call in an expert, and how much weight they should attach to his opinion.

SCIENTIFIC SERIALS.

Journal of Botany, May.—Mr. Rudolf Beer describes a rare and remarkable conidia-bearing fungus, *Coemansiella Alabastrina*, which has only been recorded twice before. The conidiophore begins like Eruotium, but the sterigmata are few in number and grow out forming a circlet of arms; from each of these a series of conidia is cut off on the upper side. The conidia are fusiform and pointed at both ends. Chlamydospores and other conidial bodies were obtained in the culture, but no traces of perithecia were observed.—Mr. Pugsley has devoted considerable attention to the British "capreolate" Fumitories and submits the following classification:—Subsection 1. *Eucapreolatae.* Bracts as long as pedicel; pedicel recurved; fruit pendulous, narrow at the base. (1) *F. capreolata*, L. (=*F. pallidiflora*, Jord.). (2) *F. purpurea*, Pugsley, which refers to certain English plants named as *F. Boraei*, Jord., but differing from Jordan's original discription. Subsection 2. *Murales.* Bracts shorter; pedicels erect; fruit without a neck. (3) *F. muralis*, Sond. (includes *F. Boraei*, Jord.). (4) *F. confusa*, Jord.—Dr. Rendle describes three new species of Convolvulus from South Africa, a Convolvulus, and two Ipomæas which we regret to find are named after the collectors instead of receiving distinctive names.—Mr. G. C. Druce gives a list of Anglesey and Carnarvonshire plants and Mr. J. Hunter records North Donegal mosses.

Bulletin of the American Mathematical Society, vol. viii. (2) No. 7, April.—S. E. Slocum, on the transformation of a group into its canonical form. A discussion of the Lie group defined by $X_1=\delta/\delta x_2$, $X_2=x_2\delta/\delta x_2+\delta/\delta x_1$.—O. Dunkel, some applications of Green's theorem in one dimension. The theorem thus designated is an integral relation deduced from a linear differential equation and its adjoint. Some applications follow.—V. Snyder, on the forms of quintic scrolls.—E. V. Huntingdon, simplified definition of a group. This interesting paper defines a group as an assemblage of elements satisfying the three postulates: (1) Given any two elements a, b, there is an element x such that $ax=b$; (2) there is an element y such that $ya=b$; (3) if a, b, c, ab, bc, and either $(ab)c$ or $a(bc)$ are elements of the assemblage, then $(ab)c=a(bc)$. A finite group requires the additional postulate that the assemblage shall contain only n elements.—L. P. Eisenhart, on isotropic congruences.

SOCIETIES AND ACADEMIES.

LONDON.

Physical Society, May 23.—Prof. S. P. Thompson, president, in the chair.—Mr. T. C. Porter showed a lecture experiment on the ebullition of rotating water. If the water in a beaker, having approximately vertical sides, be caused to rotate about an axis concentric with the vertical geometrical axis of the beaker, it is obvious that in any horizontal section of the water the pressure is least in the centre and increases from the centre outwards. If the temperature of the water is just below boiling point and heat is supplied to it whilst it is rotating steam is formed only in the region of least pressure, and a gaseous core is produced. The rotation can be given to the water by stirring it with a glass rod covered with a piece of india-rubber tubing, and maintaining the stirring motion during the act of withdrawal of the rod. Some curious phenomena are shown by the column of steam, if the water is first stirred and then left to come to rest whilst the heating is continued. At first there is a markedly concave surface to the water in the beaker, and the column of steam is practically continuous from base to summit. After this stage pulsations set in. Pulsations can also be produced by stirring cold water in a beaker-shaped jar, having a small hole in its bottom through which a stream of air-bubbles can be blown. The forms of the steam columns in some cases present a likeness to those of solar prominences, and Mr. Porter suggested that the immediate cause of the latter might be the diminution of pressure on the sun's surface at, or near, the centre or centres of depressions caused by violent cyclonic disturbances in the solar atmosphere.—Mr. C. V. Boys exhibited a small heat engine in which rotating water evolved steam without ebullition.—A paper by Mr. J. A. Erskine on the conservation of entropy was read by the secretary. Heat energy may be expressed as the product of two factors—a quantity factor, entropy, and an intensity factor, temperature. The conservation of entropy holds in thermodynamics when dealing with reversible processes, and is analogous to the conservation of other quantity factors such as momentum, moment of momentum, and electric quantity. The author shows the completeness of the analogies by considering Carnot cycles carried out on electrostatic and hydraulic engines. Prof. Wiedeburg has proposed to extend the doctrine of the conservation of entropy to irreversible processes by introducing a new quantity analogous to electric resistance.—A paper by Sig. G. Giorgi on rational units of electromagnetism was read by Mr. Price. Mr. Price prefaced the reading of the paper by saying that both Prof. Fleming and Prof. Fessenden had advocated a partial change of units which would leave the most important ones unchanged, and the method employed by the author was similar to that adopted by Prof. Fessenden. The author starts with a set of three equations, which contain explicitly the four concrete units of E.M.F., M.M.F., electric current and magnetic current, together with that of activity, and considers them as fundamental in electromagnetism. Two fundamental units are required to express these quantities, and their product must reproduce the mechanical unit of activity. If the watt is assumed as unit of activity, there are two units ready made, the volt and the ampere, which satisfy the condition and may be considered fundamental. All concrete units in electricity and magnetism can be expressed in terms of these and the second as unit of time. In order to complete the system, a unit of length is required. The metre and kilogramme are consistent with the watt, and putting them together with the units enumerated in the paper, the author has built up an absolute metre-kilogramme-second system which comprises electric, magnetic and mechanical measures in a consistent frame.

Chemical Society, May 15.—Dr. W. H. Perkin, F.R.S., vice-president, in the chair.—The variation with temperature of the surface-tensions and densities of liquid oxygen, nitrogen, argon and carbon monoxide, by Messrs. E. C. C. Baly and