Sea Temperature.—The temperature of the sea surface, which fell below the normal at the close of the previous year, continued in defect during the first three months of the year under notice, except in the south-western portion of the North Atlantic, where it rose above the normal after the middle of February. The temperature then increased so quickly that in less than a month the 70° isotherm was charted 8° to the east of its average limit for March. In the more northern portions of the ocean, the surface temperature, although in defect until after March, rose from the middle of February until April, and in that month the charted results exhibited, for the most part, an excess of temperature over the North Atlantic generally. The abnormally warm water, of equatorial origin, that was advancing north-eastward, and had been most noticeable in the south-western Atlantic in March, and between the 40th and 50th parallels of latitude in the following month, reached the north-eastern Atlantic in May, flooding the coastal waters off our southern shores, while a decided reduction of surface temperature was taking place in other parts of the ocean.

At the end of May, and in the beginning of June, the 70° isotherm had retreated 6° to the west of its average limits for those months, but a slight temporary recovery of temperature was observed between the 40th and 50th parallels up to the middle of the latter month, when under the cooling influence of the Labrador Current the surface temperature rapidly declined; the 60° isotherm in August having retreated as much as 13° of longitude to the west of its average limit. In the south-west arm of the ocean the temperature rose during June and July, reaching the average towards the close of the latter month, when it declined, but recovered in September. It again declined during the two months that followed, in the latter of which it became considerably in defect; and, although the sea surface temperature increased in the second half of November, it continued to be below the normal to the end of the year.

To the north-eastward the isotherm of 60°, and subsequently that of 55°, indicated a decided defect in surface temperature to the end of the year: albeit fluctuations are shown which harmonise with the temperature of the surface water to the south-westward, as indicated by the 70° isotherm.

For the zone between South Greenland and the Orkneys sufficient data are wanting for the purpose of comparison with normal results, until March, when the surface temperature is shown to have been slightly above the normal. It declined during the following two months, when it stood 1½° below the normal; but it rose to, and remained, ½° below the normal in June and July; fell under the influence of the East Greenland Current in August; recovered somewhat in the month following; and exhibited similar fluctuations as those which obtained in August and September during the two remaining months, for which sufficient data are available.

The air temperature over the British Isles during the summer and autumn of 1912, in contrast with that prevailing during the same seasons of the previous year, is found, therefore, to have been below the normal in June to November inclusive, except at the northern station in July and October and at the south-western station in November, at which places it rose slightly above in the respective months. It was above the normal in February to May inclusive, except at Valencia, when the excess did not obtain until March; equal to, or nearly equal to, the normal in January, and above in December; at Valencia above in November also.

There appears to be no justification for the assumption that important changes have taken place in the circulation of the North Atlantic during historic times. The velocity and volume of the Gulf Stream exhibit modifications that are non-periodic as well as seasonal—modifications that may occur during any month in any year. When the Stream is abnormally active, its resistance to the Labrador current is probably carried farther north than usual, with the result that its north-easterly branch pursues its course in higher latitudes than obtains normally, and its relatively warm saline waters penetrate to the north-westward of their average limits. When, on the other hand, the Gulf Stream is weaker than is usual, according to the season, the converse happens; the north-easterly branch of the Stream commences its new course after its collision with the arctic current, in lower parallels than those in which it commonly starts, and, possibly, the easterly branch is augmented at the expense of the former; so that the influence of the Stream may be restricted in two ways.

In connection with an investigation undertaken at the Meteorological Office, having for its object a comparison of the changes in the strength of the trade winds of the Atlantic[2] with average results, and of changes in the surface temperature of the North Atlantic with normal values, there was found to be some evidence to prove that departures from the average strength of the two trade winds during a series of months and at times during even so short a period as one month, were roughly reflected in deviations from the normal through the agency of the equatorial current and Gulf Stream in the average distribution of surface temperature in the North Atlantic in the corresponding series of months or month, as the case may be, of the succeeding year, notwithstanding the existence of many other causes affecting the temperature of the surface water, which must tend towards masking the appearance of such connection.

Proof may, therefore, be claimed, resting on a chain of evidence, that many of the climatic changes to which our islands are subject owe their origin to modifications in the trade winds of the Atlantic, communicated through the agency of the equatorial current and its giant offspring the Gulf Stream.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Mr. F. E. E. Lamplough, of Trinity College, has been appointed an additional demonstrator of chemistry for the five years ending September 30, 1919.

The Special Board for Biology and Geology has approved a grant of 100*l.* from the Balfour Fund, made by the managers to Mr. George Matthai, of Emmanuel College, in aid of his research entitled, "A Revision of the Meandroid Astræidæ."

EDINBURGH.—Important changes are imminent in regard to several of the chairs in the University. At the present moment three chairs are vacant owing to the resignations of Prof. Niecks (music), Prof. Donald Mackinnon (Celtic), and Prof. Geikie (geology). Prof. James Geikie became professor in 1882 in succession to his brother, Sir Archibald Geikie, who was its first occupant. During the last twenty years, since the subject was included in the recognised curricula for degrees in arts and science, it has gained in importance, and attracts every year large numbers of students of pure science and of engineering, agriculture, and forestry. It must assume a still greater importance when the new degree in mining has been

[2] "The Trade Winds of the Atlantic Ocean."

fully established. Prof. Geikie's contributions to the literature of geology are of the highest value, and in his translations of Heine's lyrics he has shown literary gifts in quite another direction. It is believed that, freed from the official duties of a university chair, he will be able to carry out further literary work which he has had in his mind for some years. The filling up of the vacancy created is in the hands of the Crown. The music chair is in the patronage of the University Court, and the chair of Celtic language and literature in the patronage of the curators.

LONDON.—A resolution was adopted by the Senate on June 17 requesting the Vice-Chancellor to inform H.M. Government that the Senate, having considered various sites which have been suggested for the headquarters of the University, is of opinion that it is undesirable to proceed further with such consideration unless, and until, H.M. Treasury intimate its willingness to provide accommodation more suitable in situation, more convenient in character, and on terms not less advantageous as regards tenure, etc., than those attaching to the present occupation at South Kensington.

Official information has been received that the Government cannot contemplate the diversion of Somerset House, which has been suggested as a possible headquarters for the University, from its present purposes.

Prof. A. W. Crossley, F.R.S., has been appointed to the University chair of chemistry, tenable at King's College.

Following the resignation of Prof. J. M. Thomson, Prof. H. Jackson has been appointed head of the chemical department at King's College, with the title of Daniell professor of chemistry in the University.

The D.Sc. degree in chemistry has been granted to Mr. A. J. Ewins, South-Western Polytechnic Institute and Goldsmiths' College; and to Mr. R. T. Colgate, Mr. E. H. Rodd, and Mr. E. E. Walker, of the City and Guilds College; and the D.Sc. degree in botany to Mr. H. F. Wernham, an external student.

At the meeting of the council of the East London College, held on June 22, it was announced that the Court of the Drapers' Company had resolved to defray the cost of the erection and equipment of the new chemical laboratories of the college. The cost will amount to approximately 15,000*l.*, and it is hoped that the laboratories will be available for the use of students at the commencement of the new session in October next.

DR. H. J. S. SAND, of University College, Nottingham, has been appointed lecturer on chemistry at the Sir John Cass Technical Institute, London, E.C., in succession to the late Dr. Harry Burrows.

AT the Convocation of McMaster University, Toronto, held on May 6, the honorary degree of Doctor of Laws was conferred upon Mr. David Hooper, late economic botanist of the Botanical Survey of India, and curator of the industrial section, Indian Museum, Calcutta.

THE trustees of the Beit Scientific Research Fellowships, founded and endowed by Mr. Otto Beit, in September, 1913, have elected three fellows for the ensuing year, namely, Mr. R. S. H. Boulding, Mr. L. H. Parker, and Mr. L. N. G. Ramsay. The fellowships are tenable at the Imperial College of Science and Technology, South Kensington. Mr. Boulding is a post-graduate student in engineering at the City and Guilds (Engineering) College, and the joint author of a paper on the shape of the pressure wave in electrical machinery. Mr. Parker is a research student in chemistry at the Imperial College, joint author of a paper on the interaction of sodium amalgam and water, and author of papers on the action of variously treated waters on sodium amalgam, and reactions by trituration. Mr. Ramsay is an assistant in zoology at the University of Aberdeen, and the author of "Note on the Oviposition of Rhyssa," "Polychæta (Nereidæ) of the Scottish National Antarctic Expedition," "Ornithology of the Scottish National Antarctic Expedition," and other papers.

AN anonymous donor has made a gift of 10,000*l.* to the general endowment of the Royal Technical College, Glasgow, on condition that another sum of 15,000*l.* is promised within a year. A good beginning is thus made to the endowment of the college for, or towards, research purposes, which are specifically mentioned in the letter announcing the gift, and it is hoped that other benefactors will come forward to increase the funds available for the furtherance of research to such an extent as to place the college in a position in this respect comparable with that of like institutions in the United States and Germany. During the last couple of years, for example, the Massachusetts Institute of Technology has received gifts amounting to more than one and a half million pounds; and the benefactions to university and technical education in the United States reach nearly five million pounds a year. No college completely fulfils its function unless it can make suitable provision for research and retain the services of men and women capable of undertaking it. We hope, therefore, that the sum of 10,000*l.* promised to the Royal Technical College will be a nucleus which will attract to itself many similar gifts until it grows to a substantial sum for the promotion of technical education in its best sense, namely, the creation of new knowledge.

NEW buildings for the Hartley University College, Southampton, were opened by Lord Haldane on June 20. In the course of his address, Lord Haldane said the four universities in Scotland to which the democracy sends the children have sent out all over the world a large number of young men and a good many young women who have been able to help themselves to the cream because of superior skill in getting at it. The old notion that capital is a monopoly of the few and that the working classes never can get access to it has all gone. The real monopolist is the man who has got a trained brain. It is the workman who is educated who gets the best wages. The new class that is growing up is an educated class, and if the democracy wishes to get its share in the new things that are going, then the democracy will have to take advantage of the chances of education. To insist on equality of opportunity in education is the great way to solve the problem of labour and capital. Later, Lord Haldane said:—"I have never known a town or city develop its university without finding something quite new and different come to it. Places that do that add a cubit to their stature. I am not in the least afraid of the invasion of German arms, but I am very much afraid of the invasion of people who have been trained in the German universities and schools. It is time we woke up if we are to keep the position we hold in commercial supremacy."

As a result of the debate in the House of Commons on Friday last on the report stage of the Children (Employment and School Attendance) Bill, it may fairly be said that Lancashire as represented by its textile industry blocks the way of any advance in respect of measures having for their object the satisfactory education of the children of the nation. It will neither consent to the permissive extension of the school age until fifteen by local authorities, nor

to the abolition of by-laws which permit a child to leave school so early as twelve, and in the rural districts even earlier, to work as a half-timer. In view of the factious opposition the Bill has evoked, it is clear that only a Government measure will meet the necessities of the case and provide for the raising of the whole-time school age until the age of fourteen, and for the continued effective education of the pupil on leaving school, and within the normal working hours, until at least the completion of his seventeenth year. Only by measures of this kind can the great expenditure on elementary education be justified and its fruits assured. Nothing short of this will enable the country to maintain its position amongst civilised nations. The remarkable industrial and commercial advance of Germany has been secured under conditions of an extended whole-time school age far beyond those prevailing in this country, together with provisions for continued compulsory education within the normal hours of employment on leaving school up to the age of eighteen, of the most effective character. The measures proposed in the Bill have had the strong support of the Manchester Chamber of Commerce and of the Manchester and Salford Trades and Labour Council, and of experienced educationists and social reformers. No so-called industrial exigencies ought to stand in the way of the welfare of the children.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 18.—Sir William Crookes, president, in the chair.—Sir D. **Bruce,** Major A. E. **Hamerton,** Captain D. P. **Watson,** and Lady **Bruce**: (1) Trypanosome diseases of domestic animals in Nyasaland. *Trypanosoma caprae,* Kleine. Part III. —Development in *Glossina morsitans;* (2) trypanosomes found in wild *G. morsitans* and wild game in the "fly-belt" of the Upper Shiré Valley; (3) the food of *G. morsitans*; (4) infectivity of *G. morsitans* in Nyasaland during 1912 and 1913.—Dr. C. W. **Andrews**: A description of the skull and skeleton of a peculiarly modified rupicaprine antelope, *Myotragus balearicus,* Bate. *M. balearicus,* Bate, is a peculiarly modified rupicaprine antelope, remains of which were discovered by Miss D. M. A. Bate in cavern deposits in Majorca and Minorca. The dentition is very remarkable. Instead of having three incisors and a canine on each side of the mandibular symphysis, as is usual in the Bovidæ, the canines and the two outer pairs of incisors are wanting, while the median incisors are enormously enlarged rodent-like teeth, growing from persistent pulps. The premolars are reduced in number and the molars have very high crowns. The feet are remarkable for the shortness and stoutness of the metacarpals and metatarsals, which are quite similar to those of the Takin (Budorcas). The animal seems to have been adapted for climbing on steep crags and cliffs, and probably lived on very hard vegetation.—E. T. **Halnan** and F. H. A. **Marshall**: The relation between the thymus and the generative organs, and the influence of these organs upon growth. With a note by G. U. **Yule.**—H. E. **Roaf**: The vapour pressure hypothesis of contraction of striated muscle. Two objections have been urged against muscular contraction being due to movements of water from one portion of the muscle fibre to another. These are: (1) that an osmotic model of muscle cannot cause a sufficient degree of shortening; and (2) that the movement of water would require a longer time than the muscle takes in contracting. The extent of contraction possible for an osmotic model and the time required for this contraction has been calculated for structures of the dimensions of frog's sartorius. It is found that the extent of contraction can be explained by the osmotic model, and that the time required is less than 0·03 sec., and frog's sartorius requires at least 0·04 sec. for complete contraction.—A. N. **Drury**: The validity of the microchemical test for the oxygen place in tissues. Experiments were made to show that the microchemical test with rongalit white, used by Unna to fix the position of the oxygen place in tissues, could be obtained on a surface entirely free from oxygen. A further extension of the work showed that the condensation of a solute on to a surface is markedly influenced by the previous treatment of, or by the gas condensed on, that surface.—Prof. J. S. **MacDonald**: Man's mechanical efficiency. The rate of heat-production, Q, associated with cycling at a uniform rate but with varied performances of mechanical work, is expressed in the following form, $x+Ey=Q$, where x represents the heat-production associated with the uniform rate of movement, y the rate of work-performance. It is shown that E varies inversely with $W^{2/3}$. It follows that, putting on one side x, the energy-transformation entailed by the movements *per se,* the additional energy-transformation required for any definite rate of work-performance is less the greater the weight, W, of the worker; and the mechanical efficiency measured in this fashion varies directly with $W^{2/3}$. It is also shown, however, that x varies approximately with $W^{3/2}$, and thus that the energy-transformation associated with the mere production of movement is much greater the greater the weight.—Dr. A. **Holt**: The colouring matters in the compound Ascidian, *Diazona violacea,* Savigny.—Prof. W. B. **Bottomley**: Some accessory factors in plant growth and nutrition. Plant growth-stimulating substances are formed in sphagnum peat when it is incubated with a liquid culture of certain aerobic soil bacteria for a fortnight at 24° C. These substances are soluble in water and in alcohol, and are active in very small amounts, two applications of water-extract of 0·18 gram treated peat doubling the size of *Primula malacoides* seedlings over untreated plants in six weeks' time. They appear to be similar to so-called accessory food substances essential for nutrition of growing animals, first studied in connection with the deficiency diseases beri-beri and scurvy. The production of these substances appears to be associated with formation of soluble humates in peat by bacterial action. They are not formed when peat is treated with alkalies. Cultures of *Azotobacter chroococcum* grown with extract of "bacterised" peat gave an increase of 18 milligrams of nitrogen in eight days, whilst extract of chemically-treated peat gave no increased fixation. The active substance is precipitated from aqueous solution of alcoholic extract of "bacterised" peat by phosphotungstic acid, and can be further separated by decomposing with baryta, reprecipitating with silver nitrate and decomposing with hydrogen sulphide. Wheat seedlings in sand culture with Detmer's complete food solution gave an increase of 22·7 per cent. with the phosphotungstic fraction, and 17·7 per cent. with the silver fraction. Water-culture experiments with wheat seedlings in Detmer's solution prepared from pure salts in physiologically pure distilled water showed that these substances are essential for assimilation of inorganic food constituents.—Prof. H. B. **Dixon,** C. **Campbell,** and W. E. **Slater**: A photographic analysis of explosion-flames traversing a magnetic field. The authors have carried out a suggestion made by Sir J. J. Thomson that the explosion-wave in gases should be photographed on a rapidly moving film while it traverses a strong magnetic field, to determine whether the emission of electrons in front of the wave "prepares the way" by ionising the gases. Using a very powerful magnet lent them by Sir E. Rutherford,