Eddy, or tailless, and the Hargrave, or box kites, and the instrument sent up with them is the aluminum baro-hygro-thermograph, constructed for Mr. Rotch, proprietor of the observatory, by Richard *freres*, of Paris. The altitudes reached are determined in three distinct ways: by theodolites, by the angle and length of the kite-line, and by the pressure as recorded by the barograph. During the summer of 1895 the maximum altitude reached by the instrument in the kite-flying at Blue Hill was 2,500 ft. above sea level, but this has been far exceeded during the present year, the height of one mile having been passed on six occasions. On July 20th a height of 6,596 feet above sea level was reached. At a short distance above the earth a cloud was encountered, in which the relative humidity rose to 100%, while after a further ascent of about 2,500 feet, which must have been the thickness of the cloud, the air was found to be much drier.

All kite-flying records were broken on August 1st, when the recording instrument was raised to a height of 7,333 feet above sea level, or considerably over a mile above the general level of the country. Five Eddy kites were used. The temperature at the maximum altitude was 20° less than at the observatory, and the records of the relative humidity aloft showed variations of from 30% to 80%.

Scientific kite-flying, although one of the very newest developments of meteorology, has now passed the experimental stage, and the results obtained from these investigations at Blue Hill are attracting attention the world over.

R. DeC. Ward.
Harvard University.

SCIENTIFIC NOTES AND NEWS.

A BRITISH NATIONAL PHYSICAL LABORATORY.

At the recent meeting of the British Association Sir Douglas Galton read the report of the committee on the establishment of a national physical laboratory. This report enumerated the present facilities afforded by the government, by educational establishments and by private societies, for aiding research in Great Britain. These sources are chiefly the £4,000 per annum given by the government for research purposes and administered by the Royal Society; the Royal Society donation fund, derived from its surplus income; the contributions made to research by the British Association; the investigations carried on at the Royal Institution, which afford magnificent examples of private munificence in aiding science; the City and Guilds of London Institute; the Royal Commission of the 1851 Exhibition, which devotes £6,000 a year to research scholarships; research committees of various scientific societies; the Clarendon Laboratory at Oxford and the Cavendish Laboratory at Cambridge; the laboratories at Edinburgh, Glasgow and Aberdeen; the Victoria University and the larger colleges not yet incorporated into universities. There were, however, investigations of particular types which lay outside the range of effort possible either to an individual or to a great teaching institution. These were (1) observations of natural phenomena, the study of which must be prolonged through periods of time longer than the average duration of life; (2) testing and verification of physical instruments and preservation of standards; (3) the systematic and accurate determination of physical constants and numerical data which may be useful either for scientific or industrial purposes. A laboratory for such purposes would aid and not compete with laboratories for more general physical research, and if England was to keep pace with other countries it was essential that it should be started and maintained by government. After detailing the functions and management of the proposed new institution on lines similar to those of the very successful German Reichsanstalt, the report recommended that government should be asked to vote a sum of £20,000 to £25,000 for building and an annual grant of £3,000 for maintaining such a national laboratory. An appendix gave the cost and annual expenses of the German institution, which amounted to £200,000 and £15,000 respectively.

RECENT GEOGRAPHICAL EXPLORATIONS.

IN an introduction to his address as President to the Geographical Section of the British Association, Major Darwin summarized recent geographic work, referring first to the feat accomplished by Nansen. It is not merely that he has gone considerably nearer the North Pole than any other explorer; it is not only that he has made one of the most courageous expeditions ever recorded, but he has established the truth of his theory of Polar currents, and has brought back a mass of valuable scientific information. Besides the news of this most remarkable achievement, the results of a considerable amount of useful exploratory work have been published since the British Association met last at Ipswich. With regard to other Arctic Expeditions, we have had the account of Lieutenant Peary's third season in Northern Greenland, from which place he came back in September last, and to which he has again returned, though without the intention of passing another winter there. In October the Windward brought home more ample information as to the progress of the Jackson-Harmsworth Expedition than that communicated by telegram to the Association at Ipswich, and on her return from her remarkably rapid voyage this summer she brought back the record of another year. As to geographical work in Asia, Mr. and Mrs. Littledale returned safely from their explorations of the little known parts of Thibet; the Pamir Boundery Commission under Colonel Holdich has collected a great deal of accurate topographical information in the course of its labors; Dr. Sven Hedin continues his important researches in Turkestan; and the Royal Geographical Society was glad to welcome Prince Henry of Orleans when he came to tell about his journey near the sources of the Irrawaddy. As to Africa, the most important additions to our knowledge of that continent are due to the French surveyors, who have accurately mapped the recently discovered series of lakes in the neighborhood of Timbuktu, Lake Faguibine, the largest, being found to be 68 miles in length; Dr. Donaldson Smith has filled up some large blanks in the map of Somaliland; and Mr. and Mrs. Theodore Bent have investigated some interesting remains of ancient gold workings inland of the Red Sea. In other parts of the world less has been done, because there is less to do. Mr. Fitzgerald has proved for the first time the practicable character of a pass across the Southern Alps, thus supplementing the excellent work of Mr. Harper and other pioneers of the New Zealand Alpine Club; and Sir W. M. Conway has commenced a systematic exploration of the interior of Spitzbergen, a region to which the attention of several other geographers is also directed.

THE UNIVERSITY SCIENTIFIC MAGAZINE.

THE universities and technical colleges have, of late years, been publishing scientific magazines under the auspices of and sometimes directly by, their scientific and technical college departments. In most cases they are conducted and managed by students as private ventures, but usually securing a considerable proportion of their contributions from members of the college faculty and from the alumni; in some instances they are controlled wholly by members of the faculty or the alumni.

There has just come to hand a copy of the *University Scientific Magazine*, published by the Engineering Society of the University of Tennessee, at Knoxville. This is a good example of the class. It contains, within the compass of about forty pages, a number of valuable articles, interesting both as original contributions to science, and as exhibiting the progress of scientific work at that institution and in this field.

Dr. Perkins discusses the experimental work of Hertz on the electro-magnetic theory of light. Prof. Wait takes up the distribution of titanium, which he finds in vegetable ash, and, in another article, the oxidation of silver by lead-oxide. An excellent biographical sketch of Dr. Perkins, with a good portrait, add variety and interest to the issue. A note by Giddersleeve on the zinc deposits of Tennessee gives an excellent idea of the extent and importance of the mineral deposits of the State and indicate that it may become an important zinc-producer. The report on a test of an isolated gas engine electric lighting plant shows the character of the work in engineering. It shows further that, for

above 30 lamps, the gas may be profitably burned in the gas-engine. Mr. Reynders gives an account of experiments with a differential Watt-meter indicating the probably frequent existence of errors in such work. Mr. Ferris makes a valuable contribution to the draughtsman's department in a collection of alphabets, for use in marking drawings with the pen, which have special value as illustrating the practice of a number of distinguished and successful manufacturing and other firms, whose draughtsmen have reduced the production of such alphabets to a most efficient state.

There are few phases of modern scientific and technical college work which have better exhibited the progress made on that side of education, in the last decade or two, than the appearance and progress of these scientific journals. Each measures, in greater or less degree, the standing of its source of publication; although, as a matter of course, care must be taken to distinguish between the periodicals published by students and those issued more formally and under the more practiced hands of professors and alumni. R. H. T.

INORGANIC CHEMISTRY.

Prof. Olszewski has published in the Bull. Acad. Sci. de Cracovie for June an account of his unsuccessful attempts to liquefy helium, and a translation of the paper is given in *Nature* of August 20th. In the first experiment the helium was cooled by liquid oxygen boiling at 10 mm. pressure; in the second by liquid air under the same conditions. At the temperature of — 210° and 140 atmospheres pressure no sign of condensation occurred, and on allowing the gas to expand until the pressure was reduced to twenty atmospheres and in some cases to one atmosphere, the gas remained perfectly clear, and not the slightest trace of liquid could be detected. Prof. Olszewski calculates the temperature reached by this expansion to be — 263.9° and that therefore the boiling point of helium is at least 20° lower than that of hydrogen. He also points out that helium is an ideal gas for a gas thermometer for very low temperatures.

In the *Chemical News* Profs. Ramsay and Collie describe their attempts to separate argon and helium into two parts by fractional diffusion through porous pipe clay. In the case of argon the heaviest fraction gave a density of 20.01 and the lightest 19.93, showing the apparent homogeneity of the gas. In the case of helium the density of the gas first passing was 1.874 and of the gas remaining in the apparatus was 2.133. Repeated fractionations did not change these figures. From this it would appear that helium contains two constituents with densities respectively 2.366 and 1.874 or of 2.133 and 1.580, according as the lighter or the heavier fraction is the mixture. The spectrum of both gases was the same, and the revolutionary question is raised as to whether all the molecules of an elemental gas necessarily have the same weight.

Dr. A. Angeli has described in a recent number of the *Gazetta Chimica Italiana* salts of a new oxyacid of nitrogen of the formula $H_2N_2O_3$, formed by the action of ethyl nitrate on an alchoholic solution of free hydroxylamin. The sodium and the barium salts are fairly stable when dry, but in solution decompose readily on boiling with evolution of nitrogen monoxid. The same gas is given off when solutions of the salts are treated with acids. The acid appears to be a nitro-hydroxylamin (NH. OH. NO_2), but is bibasic, the sodium salt having the formula $Na_2N_2O_3$. This compound possesses considerable interest from a theoretical standpoint, in view of the great extension in recent years of the chemistry of nitrogen in its combinations with hydrogen and oxygen. J. L. H.

GENERAL.

The British Association has approved the recommendation of the Council that on the occasion of the meeting of the Association at Toronto the President, Vice-Presidents and officers of the American Asssciation be invited to attend as honorary members for the year, and, further, that all fellows and members of the American Association be admitted members of the British Association on the same terms as old annual members—namely, on payment of £1, without the payment of an admission fee.

The ninth annual meeting of the Geological Society of America will be held in Washington, December 29–31, 1896. It is announced that

details of the meeting will be communicated to the fellows of the Society in a circular to be issued about November 1st.

DR. J. WALTER FEWKES, of the Bureau of American Ethnology, has just returned from a remarkably successful collecting season in New Mexico and Arizona. Three ancient villages (Homolobi, Chevlon and Chaves) were explored and extensive excavations were made, more than fifty boxes of pottery and other relics being brought to light and shipped to the National Museum. The collection is remarkably rich, not only in the number of pieces, but in the high grade of the ware and the elaborate symbolic decoration painted on most of the vessels. Dr. Fewkes' collection of last year, in the same region, was the finest ever made in America up to that date; yet this year's collection is twice as large and no less instructive in its symbolism and associations.

THE Public Works Department of the Government of Bengal has just issued a most valuable 'List of Ancient Monuments in Bengal, revised and corrected up to August 31st, 1895' (Calcutta). The particulars given are the name of the monument, the district and locality in which it is placed, the history or tradition regarding it, its custody or present use, its state of preservation, and suggestions for its conservation and references to particulars describing the monument.

MR. A. TREVOR BATTYE has arrived in England after his explorations of Spitzbergen. He believes that the crossing of Spitzbergen by Sir Conway Martin will lead to great saving of life, because a route has now been laid down by which a crossing may be effected in a few days to the west, where the water always opens early in the summer. This point is Advent Bay, where a wooden house has lately been erected, in which it is hoped supplies of food may be kept against future emergencies.

Nature states that it was announced, at a banquet given to Dr. Nansen, September 10th, that a Nansen fund had been formed for the advancement of science. Subscriptions to the amount of 210,000 kroners had already been received.

CAPT. PEARY has telegraphed to the New York *Sun* a detailed account of his expedition on the steamship 'Hope,' which arrived at North Sydney, Cape Breton, on September 26th. The trip was without special event. It was not found possible to secure the large meteorite, as the apparatus was broken in the attempt to dislodge it from the frozen ground. Of the scientific parties, that under Prof. R. S. Tarr was landed at Melville Bay, that of Prof. George H. Barton near Disco Island, and that of Prof. Alfred Burton at Omanak, and accomplished the scientific work that they had planned. The contents of over a hundred cases will, through the interest of its President, Mr. Morris K. Jesup, enrich the collections of the American Museum of Natural History with much valuable material. The past winter in Greenland has been one of unusual severity, and the summer has been marked by much wind and an unusual amount of exceptionally heavy ice, particularly along the west side.

IT is reported in the daily papers that Dr. Lewis Swift, of Echo Mountain, Cal., discovered on September 20th a small, bright comet near the sun, one degree east of it. On September 21st the object was north of the sun and fainter.

THE French Congress of Medicine will be held at Montpellier in 1898, during the Easter holidays, under the Presidency of Prof. Bernheim, of Nancy. The annual Congress of French Alienists and Neurologists will be held at Toulouse in 1897.

SIR JOHN ERIC ERICKSEN died at Folkestone on September 23d at the age of seventy-eight years. Ericksen was an eminent English surgeon and the author of many works on surgery and physiology. He was at the time of his death emeritus professor of surgery and consulting surgeon to University Hospital, a fellow of the Royal Society and many other scientific and medical associations and had been President of the Royal College of Surgeons.

A DESPATCH from Jiminez, Mex., says that Emile Renbaugh, a German naturalist, who had been spending the summer in the Sierra Madre Mountains, has been killed by accidentally falling from a cliff.

GEORGE F. H. MARKOE, a chemist and pro-

fessor in the Massachusetts College of Pharmacy, has died at Boston.

THE late Enoch Pratt has made the Shepherd Asylum for the Insane at Baltimore his residuary legatee provided that it should change its name to the Enoch Pratt Hospital. The bequest is valued at $3,000,000.

THE will of the Rev. Lucius R. Page of Cambridge, Mass., leaves $2,000 to Tufts' College for the foundation of a scholarship and $10,000 to the town of Harwich for the establishment of a public library, to which his library and collection will be given on the death of his widow.

THE *Journal of Physical Chemistry*, whose establishment under the auspices of Cornell University we recently announced, will be supported by a gift from Mr. E. G. Wyckoff of $1,000 a year for five years.

AFTER an interval of four years the American Institute Fair will be held in the Madison Square Garden, New York, on September 28th. A large amount of machinery and a number of technical processes will be exhibited in operation.

PROF. FUERTES, Director of the College of Civil Engineering at Cornell University, is in correspondence with the Spanish authorities in Cuba, having been asked to take into consideration plans for improving the sanitary condition of Havana.

THE Paris Academy of Moral and Political Sciences has awarded the Bordin prize of 2,000 fr., the subject for which was this year Kant's Ethics, to M. Cresson, professor at Besançon.

GINN & Co. announce for publication this fall a 'Star Atlas,' by Winslow Upton, professor of astronomy and Director of the Ladd Observatory, Brown University.

TWO parts of the extensive *Handbuch der Anatomie des Menschen*, edited by Prof. Karl von Bardeleben, have now been issued by Gustav Fischer. The first part of the first volume, chiefly concerned with the spinal column and containing 92 pages and 69 illustrations, is by Prof. J. Disse. The work will be completed in eight large volumes.

THE Report of the Commissioner of Education for 1893–4 gives interesting statistics concerning the number of books and manuscripts in the university libraries of Europe. Germany stands first, its twenty libraries containing as many as 5,850,000 volumes, over 3,000,000 more than the libraries of Italy, which takes the second place. Great Britain, Austria and Russia have each more than 1,800,000 volumes, Sweden and Norway and Spain have 790,000 and 726,000 respectively. It is worthy of note that, of the eight countries where statistics have been collected, France, which in the number (sixteen) of its libraries surpasses every other country, Germany and Italy excepted, should have the smallest total number of books (692,200 volumes), the largest library (142,300 volumes) being at Paris; and that in Great Britain, which has only nine university libraries, containing 1,849,600 books, more than 1,000,000 of these are about equally divided between Oxford and Cambridge. It should, however, be remembered that the large public libraries, such as, for example, the British Museum in England and the Bibliothèque Nationale in France make up in part for deficiencies in the universities. The four largest libraries are Strasburg (704,076 volumes, with an annual appropriation in 1894 of $16,363); Leipzig (504,683 volumes, appropriation $9,520); Oxford (530,000 volumes, appropriation $41,531) and Cambridge (506,500 volumes, appropriation $9,520), while the libraries at Göttingen, Heidelberg, Munich, Vienna and St. Petersberg each contain more than 400,000 volumes.

ACCORDING to the report in *The Lancet* M. A. Lachenal's inaugural address before the International Congress of Criminal Anthropology at Geneva was a brilliant review of the three previous Congresses—that at Rome having startled the lay and especially the legal world with the thesis that there are born criminals and that there exists a criminal type anatomically determined; while its successor at Paris strengthened this position by insisting not only on the anatomical, but still more on the physical 'conditions precedent' of crime, which conditions, so interpreted, yield 'a biological and moral portrait' set in the social background in which the criminal lives. At Brussels the juristic view of the question intervened, and while admitting a 'natural history of crime'

sought to furnish an eclectic theory of the phenomenon in which biology and law were equally represented. To-day in Geneva the discussion is resumed and, whatever modifications these provisional solutions of the problem may yet undergo, their effect must be to impress both parliaments and people with the necessity of 'raising a penal system which, without confounding the prison with the hospital, will recognize a moral clinique as well as a repressive code,' and so tend to 'eliminate the elements which are unfit for social life and dangerous to humanity.'

PROF. L. H. BAILEY'S *Nursery Book*, first published in 1891 by The Rural Publishing Company, has now been thoroughly revised and re-cast and published by The Macmillan Co. as the third volume of the Garden Craft Series. The book contains a strictly scientific treatment of 'seedage,' 'separation and division' 'layerage,' 'cuttage,' and 'graftage,' together with an extended nursery list, filling 191 pages. The author has incorporated in this edition a paper read before the Peninsular Horticultural Society in 1892, in which it is argued that while grafting is not suitable to all plants it is not a devitalizing process for those on which it can be adopted. The wide sale of Prof. Bailey's book shows that practical gardeners are able to appreciate a scientific treatise on their art.

DR. D. WALTER has published in the *Naturwissenschaftliche Rundschau* experiments on the diffuse reflection of the Röntgen rays, made in the State Laboratory of Physics at Hamburg. More than twenty elements were used, the reflecting surfaces being separated from the photographic film by a thin sheet of black paper, while the rays passed through the glass. The amount of diffuse reflection was in relation to the position of the elements in the periodic system, being the greatest for the silver group, and decreasing on both sides. The decrease in passing from the silver to the platinum group was considerably larger than the increase from the copper to the silver group. No reflection could be detected in the case of the diamond. The angle of incidence of the rays made no difference, nor did it matter whether or not the surface was polished, but the order of the substances was different when the surface was not parallel to the film.

WE learn from *Kantstudien* that a new life of Kant by Dr. M. Kronenberg is about to be published by Beck, of Munich, and that Prof. Fr. Paulsen has in preparation a volume on Kant for *Frommanns Klassikern der Philosophie*. Volumes in this series on Fechner by Prof. K. Lasswitz, on Hobbes by Prof. F. Tönnies, and on Kierkegaard by Prof. H. Höffding, have already been published.

THE *Revue Scientifique* states that M. Vallot has this year entertained at his meteorological observatory four Frenchmen, three Swiss, one German, one Italian and one American. M. Vallot generously entertains all meteorologists who wish to make observations at this station, which is the highest in Europe, being 4,385 m. above the sea and only 427 m. from the summit of Mt. Blanc.

THE Committee of the British Association on Zoological Bibliography and Publication make the following recommendations: (1) that each part of serial publication should have the date of actual publication, as near as may be, printed on the wrapper, and, when possible, on the last sheet sent to press. (2) The authors' separate copies should be issued with the original pagination and plate-numbers clearly indicated on each page and plate, and with a reference to the original place of publication. (3) That authors' separate copies should not be distributed privately before the paper has been published in the regular manner. The Committee further asks for cooperation in the following rules of conduct upon which the best workers are agreed, but which it is impossible to enforce, and to which it is difficult to convert the mass of writers. These are: (4) That it is desirable to express the subject of one's paper in its title, while keeping the title as concise as possible. (5) That new species should be properly diagnosed and figured when possible. (6) That new names should not be proposed in irrelevant foot-notes or anonymous paragraphs. (7) That reference to previous publications should be made fully and correctly, if possible in accordance with one of the recognized sets of rules for quotation, such as that recently adopted by the French Zoological Society.

ACCORDING to *Natural Science* the Geological

Society of South Africa, which was founded last year for the purpose of preserving the records of the earlier geologists who have written on South Africa, as well as of promoting discussion and investigations on the more recently discovered portions of the colony, has lately come into possession of a most valuable collection of manuscripts and papers, written principally by the late Mr. Andrew Geddes Bain and Mr. G. W. Stow. Among these are the original drawings on a large scale, colored, of all the sections taken across the country by the late Mr. Stow, and also the numerous papers, including lectures, read before various scientific societies by the father of South African geology, Mr. Andrew Geddes Bain. The Society is at present discussing the advisability of erecting a permanent building, to be used as a museum and meeting room; upon its walls the drawings of Mr. Stow would be exhibited. Mr. David Draper, the secretary of the Society, is at present on a short visit to England.

WE have already noticed among the numerous international congresses meeting this year, the Congress of Hydrology, Climatology and Geology, held at Clermont-Ferrand, Puy de Dôme, from September 28th to October 4th. Among the subjects proposed for discussion in the Section of Hydrology are: The therapeutic action of various mineral waters; what is thermal treatment? carbonic acid and alkaline bicarbonates in mineral waters, and their therapeutic action; legislation relative to mineral waters, and sanitary police of thermal stations; collection, sterilization and bottling of mineral waters. In the Climatological Section the subjects for discussion include such questions as the influence of altitude, of light, of dust in the atmosphere, etc. The list of excursions includes visits to Royat, Châtet Guyon, Vichy, Néris, Bourboule, Mont Dore and Saint Nectaire, and ascent of the Puy de Dôme, and other expeditions.

UNIVERSITY AND EDUCATIONAL NEWS.

THE first volume of the Report of the Commissioner of Education for 1893-94, presented on June 20, 1895, has but just been issued by the government printing office. The volume contains, in addition to the usual statistics of American schools and universities, extended reports of the condition of education abroad, and a number of papers on special subjects. It appears that there are now 476 colleges and universities in the United States in addition to 156 colleges for women only and 63 colleges of agriculture and the mechanic arts. In the 476 colleges and universities there were 10,897 professors and instructors, 60,415 collegiate students, 3,026 resident graduates and 21,265 professional students. A much larger percentage of the population attend college in the New England States than in New York, New Jersey and Pennsylvania, and some of the Western States have a large representation. Thus while for each 100,000 of the population there are in New York 117 students in college and in Pennsylvania 94, there are in Oregon 184 and in Nevada 197.

THE main building of Mt. Holyoke College, at South Hadley, Mass., was destroyed by fire on September 27th. The loss will probably amount to $200,000, but there was that amount of insurance on the buildings. The building of the Northern Illinois College, at Fulton, was destroyed by fire on September 26th. The loss is estimated at $100,000.

THE State Veterinary College, located at Cornell University, for which the State has provided $250,000 for buildings and $30,000 annually, will open with more than two hundred students.

THE Polytechnic school, the establishment of which, at Peoria, Ill., by Mrs Julia Bradley, we announced sometime ago, will be affiliated with the University of Chicago, two of the seven trustees being members of the University. Mrs. Bradley will support the school during her life and at her death the entire estate, estimated at over $2,000,000, will be bequeathed to it.

SEVERAL universities report a large increase in the freshman class this autumn. 350 freshmen have been admitted to the University of Pennsylvania, which is an increase of 134 over the class of last year. The Sheffield Scientific School has this year a class of 180, as compared with 150 last year.

AT the Teachers' College, New York, Dr. James Newcombe has been appointed lecturer