

of its class, second to none in the United States, embracing the publications of the principal scientific and technical societies of the world. An extensive collection of patent literature has been brought together indispensable to inventors and manufacturers. It is worthy of mention that in 1922 the library received a unique and valuable collection of books and pamphlets on windmills, inclusive of treatises on the subject printed in German and Dutch in the seventeenth and eighteenth centuries, and a book of 400 views of windmills in all parts of the world. As a means of fostering the mechanic arts, the holding of exhibitions was very early encouraged, and for many years kept in view. A notable one was the Electrical Exhibition of 1884, held under the direction of the Institute and by Act of Congress made international in character.

The Journal of the Institute in its present form is an octavo of about 150 pages, published monthly, and it consists in large part of reports of lectures delivered before the Institute and its sections, together with selected original communications from specialists. Mention may be made of a paper by Dr. F. W. Aston, on "Atomic Weights and Isotopes," being a summary of a series of lectures delivered before the Institute in 1922. A series of lectures was also given in 1923 by Sir J. J. Thomson, on "The Electron in Chemistry." Here it is convenient to record that the Institute now publishes annually a "Year Book," which we may say is one of the most concise and distinctive issues of the kind that we have seen.

Various honorary awards of medals and premiums are made by the Institute, some of which are of old standing, and highly valued, such as, for example, the Elliott-Cresson, Potts, and Longstreth medals. The most recent foundation is the Franklin gold medal (with diploma), instituted in 1914, and allotted annually to those workers in physical science or technology, without regard to country, whose efforts, in the view of the Institute, acting through its Committee on Science and the Arts, have done most to advance a knowledge of physical science and its applications. The latest recipient of this gift was Sir Ernest Rutherford.

Under new rules, adapted to modern requirements, the Institute conducts investigations, through its Committee on Science and the Arts, on the soundness

and practicability of inventions, discoveries, and improvements in physical processes or devices, submitted to it. During the past twenty-five years nearly 1000 applications have received adjudication.

In 1921 the Institute received a bequest from Henry W. Bartol, a life member, of 1,208,468 dollars for research. Agreeably therewith a "Bartol Research Foundation" was established for the purpose of conducting researches relating to fundamental problems in physical science, particularly those in the field of electricity, and for the investigation of specific problems of a scientific nature which may arise in the industries. An arrangement was made to build a laboratory wherein to engage in these objects, but unfortunately up to the present nothing has reached fulfilment, owing to the high cost of building construction. It is a trust which we may be sure will eventually become operative.

The principal events of the Centenary programme comprise, on the first day, an assembly at the Franklin Institute, and an academic procession to the Walnut Street Theatre, where the Mayor of Philadelphia will deliver an address of welcome, and addresses will be given by Dr. W. C. L. Eglin, president of the Institute, and Prof. Elihu Thomson, honorary chairman of the Centenary Celebration Committee. On September 18 the chief fixture is a lecture on "The Natural and Artificial Disintegration of Elements," by Sir Ernest Rutherford. The morning of September 19 will be taken up by the unveiling of a tablet in connexion with the Bartol Research Foundation. Addresses will afterwards be given by Dr. Arthur D. Little, of Cambridge, Mass., on "The Fifth Estate," and by Prof. Jacobus, advisory engineer, the Babcock and Wilcox Co., New York City, on "Stimulation of Research and Invention." Garden parties, and fraternal hospitality in the shape of banquets to the delegates and guests, have all been provided for in unstinted fashion. A list of speakers at the sectional meetings has been drawn up. These include Sir Charles Parsons, Sir William Bragg, Prof. E. G. Coker, Prof. A. A. Michelson, Prof. Zeeman, and Prof. F. Haber.

NATURE proffers its heartiest congratulations to the Franklin Institute on the occasion of the Centenary, and its earnest hopes for future development and prosperity.

T. E. J.

Current Topics and Events.

THE three hundredth anniversary of the publication of Francis Bacon's famous "De Dignitate et Augmentis Scientiarum" was fittingly celebrated at the seventy-eighth meeting of the American Association for the Advancement of Science at Cincinnati by a symposium of five papers, which have recently appeared in *Science*. Special interest attaches to the first of these by Prof. Mark H. Liddell, of Purdue University, outlining Bacon's scheme for a College of Research. His plea for the proper organisation of research is preceded by an attack on the neglect of science in the university of his day. "If any man thinks pure science an idle pursuit he fails to realise that from thence is all applied science supplied." Bacon accuses the college professor of his day of lacking in virility, and attributes this in part to the

smallness and meanness of his emoluments. He also accuses the universities of their failure to produce facilities for research "in the way of laboratories, botanical gardens and other instrumentalities of investigation," and insists that "research is the intelligence department of organised knowledge," and hence must be properly financed. So Bacon comes to his own programme for the regeneration of learning by research, along two broad lines: one to provide the scientific method for the *magna instauratio*, the other the material and personnel to make it effective. The former of these he achieved in 1620 with the publication of the "Novum Organum." The second object, the provision of the College of Research (Bacon called it a College of Inventors), was never realised, but his own memorandum,

originally drafted in 1608, clearly outlines his intentions. Bacon contemplated a building equipped with libraries, laboratories, furnaces, vaults, and workshops, together with a hall of fame for statues of the great men of science, past, present, and future. There were to be rules for the conduct of studies and research, and money allowances for travelling expenses and for apparatus. There was also included a scheme for the recording of results in cipher until the time for publication was deemed appropriate. Finally, the scheme provided not only for the due rewarding of valuable research, but also for the removal of members whose work was fruitless.

ORNITHOLOGISTS have recently been hearing a good deal of the International Museum of Comparative Oology at Santa Barbara, California. We have now before us the first number of the *Journal* of this Museum, edited by the director, W. L. Dawson, and entitled *The Comparative Oologist*. Throughout, the claim is made that oology is an independent science of considerable importance—once indeed we are told that "Oology is the science of one half of the biologic process"; but the *Journal* itself enables us to see how much weight is to be attached to these claims. We will content ourselves with one passage, in which the editor informs us that the shell of a bird's egg has been formed in the ovary, "that innermost sanctuary of life"! and therefore enables us (how is not stated) to penetrate into the mysteries of "the reproductive stream itself." Numerous other quotations could be made to show that Mr. Dawson, while admirably qualified to write of generalities in a high-faluting style, appears to be unfamiliar with elementary facts concerning his special subject-matter. We wonder what men like Dr. R. Ridgway, Dr. Shufeldt, Mr. Oberholser, or the Rev. F. Jourdain will feel when they see themselves associated with the highly original avian anatomy and physiology of the sort we have quoted. We may also quote from the rules: "Any person of scientific integrity, having attained the age of 18, who is interested in the pursuit of oology as a science or in the collecting of birds' eggs (italics ours) may become a 'Scientific Member' of the Museum." That is what many had supposed: now we know it. But the Museum cannot have it both ways. It can be a centre for egg-collectors, patrons of what is an amusing and interesting sport if not carried (as unfortunately sometimes happens) to the pitch of mania. Or it can be an institution for the scientific study of egg-shells, from which we may doubtless expect some, though not very much or very valuable, new knowledge. But it must not think that it can use science as a cloak for mere collecting; and that is precisely what, with its present rules and organisation, it appears to be trying to do.

THE subject of chemical apparatus and plant production generally received special consideration in the recent address of the retiring chairman (Mr. L. M. G. Fraser) of the Chemical Plant Manufacturers' Association. The improvements in the construction of plant have been along well-defined lines, the aim being to produce a better article at a lower

working cost and with greater safety. Examples were given indicating lines of progress, and reference was made to (1) the more economic output of grinding machines, (2) the simplification of emulsion formation, (3) the increased usefulness of filter plant and the development of the stream line filter, (4) the distillation of special liquids with less risk and greater economy and the more efficient fractionation in still columns, (5) improved mechanical crystallisers and mixers, (6) the more thorough understanding of furnaces, and (7) the control of temperature. The better utilisation of metals and alloys and the more intimate knowledge of the action of heat on substance are regarded as factors which have helped progress. The separation of ashes from coke and unburnt coal by means of electromagnetic separators is now being carried out on a commercial scale. Recent developments in electrolytic cells were also noted, and the need for further investigation on the electrolysis of certain inorganic substances indicated. Mr. Fraser is hopeful that, with experience from similar work in other directions, plant could be properly designed to meet new needs. Many general questions bearing on plant construction were touched upon, such as the power factor in the movement of bulk materials, the study of the thermal efficiency of fuels and the interchange of heat, the general freedom from breakdown of machinery and the automatic control of operation. Improvements so far achieved have enabled many difficulties to be overcome, and future plans can be laid with greater confidence.

Two series of coloured postcards have recently been issued by the British Museum (Natural History), one depicting the migrant bird visitors of spring, the other those of winter. A separate card is devoted to each species, and in many instances, to an excellent "close-up" view of the bird in its normal surroundings, there is added a more distant view which indicates with great success the features that catch the eye "in the field." The colouring is very faithful to life, and the artistic effect of each card delightful. Each series is offered in sets of five cards for 1s., the cards being numbered in the order in which the birds usually arrive in Great Britain. Thus the first set in the spring series contains wheatear, ring-ouzel, chiff-chaff, sand martin, and swallow; and that in the winter series, snow-bunting, redwing, brambling, fieldfare, and hooded crow. Accompanying each set is a printed leaflet in which the breeding and migration habits of each species are set out. In addition to giving much pleasure to all bird-lovers, these cards should prove of great value to teachers in supplementing lessons in Nature study, especially in urban schools and in those which have not the good fortune to possess a natural history museum.

THE number of new periodicals dealing with various aspects of natural science which have been started in Japan in the last few years, is clear evidence of the attention now being given in that country to the investigation of its own natural resources; for most of the journals contain papers dealing with products occurring in Japan or which are being imported into

Japan for use. One of the most interesting of these journals is *Acta phyto-chimica*, now in its second year, which is published by the Iwata Institute of Plant Biochemistry at Tokyo, and edited by Prof. Shibata. In it have been published already a number of important papers, including those of Asahina and Fujita on anemonin, and a detailed résumé by Asahina on his work on *Evodia rutæcarpa*, which has resulted in the isolation of two new alkaloids, evodiamine and rutæcarpine. The structures of these bases have been determined, and shown to be related to those of harmine and harmaline, familiar to British chemists through the work of Perkin and Robinson. No less interesting is the series of papers by Shibata and his collaborators on natural flavone colouring matters. In the current number of the journal (volume ii. No. 1), Prof. Asahina and several of his students have an important paper on the ketone of the essential oil of *Elsholtzia cristata*, Willd., which is shown to be a furan derivative, and is only the second substance of this type thus far found among the thousands of known components of essential oils, the other being Semmler's carlina oxide.

A REPORT of the administration of the Meteorological Department of the Government of India in 1923-24, by Sir Gilbert T. Walker, Director-General of Observatories, now retired, has recently been issued. Reference is made to retrenchment of expenditure and to its interference with effective weather warning. The main curtailment of expenditure was effected in telegraphic charges. The issue of the Calcutta, Bombay, and Madras reports was restricted to periods of 10½, 6, and 9 months respectively, and the number of stations reporting was greatly curtailed. Four cyclonic storms were formed in the Bay and one in the Arabian Sea. In May, a severe cyclone was experienced in the Bay, in which the S.S. *Okara* was lost. The loss of this vessel has led to certain changes in the method of broadcasting important weather information, more frequent weather warnings being issued. In connexion with the upper air work, which centres round the Agra Observatory, out of 36 "instrument balloons" sent off during the year, there were 21 recovered. Pilot balloon work was started at Bombay and Peshawar. An extension of meteorograph flights is contemplated so as to obtain observations to heights of 12 miles or more, and to participate in the important work undertaken in other countries. Radio weather messages are received from ships and greatly supplement the coast observations in the warning of cyclones. For the "Rainfall of India," observations are received from nearly 4000 stations. Seismological observations are recorded at several places in India and are forwarded to the Seismological Committee of the British Association.

THE *Marine Observer* for September, published by the Meteorological Office of the Air Ministry, has recently been received. It is prepared under the supervision of Captain L. A. Brooke Smith, the Marine Superintendent. The publication is essentially a vehicle for supplying to seamen valuable meteorological data of interest for voyages in all navigable

seas; numerous incidents are given from the meteorological logs kept for the Office, and mariners are invited to contribute information of interest if not regular observers. The current number contains an article on "The Origin of Tropical Revolving Storms" by Capt. D. Brunt, Superintendent of the Army Meteorological Services. A large amount of wireless weather information is given, a special chapter in the issue for each month dealing with a different branch of meteorological information; the September number deals with "wind and set and drift of current." Specimen charts show currents and winds experienced in home waters, cyclone tracks are given for various oceans, a map shows recent ice in the North Atlantic, and notices are given of recent derelicts and floating wreckage. The August number contained a discussion on the "Hong Kong Typhoon, Aug. 18, 1923," by Commander J. Hennessy, the Nautical Senior Professional Assistant; also an article on fog by Mr. H. Keeton. A list of contents would be a useful addition to future issues.

THE first conference of Special Libraries and Information Bureaux was held on September 5-8 at High Leigh, Hoddesdon, Herts. The objects of the conference were outlined at the opening session by Dr. R. S. Hutton, director of the Non-Ferrous Metals Research Association, and Mr. J. G. Pearce, director of the Cast Iron Research Association. It has long been felt that many diverse agencies concerned with the treatment of information have problems in common, and need an opportunity to establish mutual co-operation and assistance, and to determine their relationship to the press, and to the great municipal and national libraries and other institutions. The conference, which was highly successful, provided abundant evidence of the interest in this field of work, and in order to ensure continuity of interest, without forming another association, a standing committee of the conference was appointed with power to consider matters in the interests of those engaged in directing or operating Special Libraries, and to convene a further conference at some future date. This committee is representative of a wide range of institutions, and has already held its first meeting. The most striking feature of the conference was the keenness displayed by a large number of highly diversified interests, including scientific, technical, industrial, wholesale and retail commerce, railways, political, agricultural, governmental, universities, press, medical, sociological and banking. This diversity served to emphasise the common interest of all these agencies in receiving, treating and distributing documentary material.

THE thirty-fifth annual general meeting of the Institution of Mining Engineers will be held at the Conference Halls of the British Empire Exhibition on Thursday and Friday, October 2 and 3. Sir John Cadman will relinquish his third term of office as president on October 2, when he will be succeeded by Dr. J. S. Haldane, Director of the Mining Research Laboratory and honorary professor in the University of Birmingham.

M. MENGES, whose recent book was noticed briefly in *NATURE* of July 19, p. 85, writes to suggest that we misinterpreted him. In reply we would explain that the phrase "proposes in some measure to revert to the older 'classical' conceptions" was not intended to throw any doubt on the novelty of his ideas. It was only intended to indicate that his theory approximates more nearly to classical than to relativity theories.

At the opening session of the annual autumn meeting of the Institute of Metals, held at the Institution of Mechanical Engineers, London, on Tuesday, September 9, Prof. T. Turner referred in his presidential address to the growing needs of the Institute in view of the steadily increasing membership, the growth of the library, and the greater use by members of the facilities which are provided. Additional funds are required if the work is to be maintained and extended; and the alternative to a further increase in the annual subscription is an endowment, the proceeds of which would be available for providing the necessary additional accommodation and assistance. Prof. Turner was able to announce a gift of 1000*l.* towards such an endowment. This donation is the largest single gift which the Institute has received, and the Council will shortly take into consideration the question as to how far, and in what manner, it may be made the basis of a larger scheme.

Two junior assistants are required by the Research Department, Woolwich, for analytical work in connexion with Internal Ballistics problems. Candidates must possess first-class honours in mathematics. Written applications, with copies of testimonials, must be sent to the Chief Superintendent, Research Department, Woolwich, S.E.

WE have received from Messrs. Boots their list of special research chemicals. We note that the number of these has increased considerably, and that a great majority of the compounds are manufactured or purified in Messrs. Boots' own laboratories in Nottingham. As manufacturers and distributors of fine chemicals, Messrs. Boots are in a position to supply, in a state of considerable purity, many of the intermediates and raw materials which are of interest to workers engaged in chemical research.

Two useful catalogues of second-hand books offered for sale by Messrs. Bowes and Bowes, Trinity Street, Cambridge, have reached us. One (No. 422) is of a miscellaneous character dealing with works of biography, sport, travel, English topography, general literature, and of foreign origin. The other catalogue (No. 423) contains particulars of nearly 3000 works relating to mathematics, pure and applied; including physics, astronomy, meteorology, electricity, engineering, assurance, insurance, etc. The catalogues are obtainable from the publishers upon request.

Our Astronomical Column.

STATISTICS ON STELLAR VELOCITIES.—One of the chief factors in the rapid progress made in recent years regarding stellar distribution and motion has been the substitution of accurate statistical methods for the haphazard investigations of earlier times, which were often based on incomplete material. The *Astroph. Journ.*, June 1924, contains two important statistical papers by Prof. F. H. Seares.

The first deals with stellar velocities, and demonstrates the soundness of Schwarzschild's assumption that the logarithms of the tangential velocities (*i.e.* the velocities deduced from observed proper motion, after correcting for the sun's velocity), for any assigned absolute magnitude, conform very closely to the Gaussian error-curve, sometimes designated "the cocked hat." A similar conclusion is reached for the radial velocities.

The second paper seeks to find a formula for the relative numbers of stars of different absolute magnitudes. The well-known difficulty is present that the extreme dwarfs are invisible unless their distance is small, so that it is impossible to test any region except that adjacent to the sun.

Kapteyn and van Rhijn deduced the mean parallax formula $\log \pi = -0.690 - 0.0713m + 0.645 \log \mu$, m being apparent magnitude and μ proper motion. This is shown to agree well with observation for stars for which M is brighter than 8 mag.; but the number of absolutely faint stars is far greater than that indicated by the formula.

The paper emphasises the urgent need of obtaining more parallaxes of these faint stars.

THE THERMOPILE USED FOR MEASURING STAR MAGNITUDES.—Allusion has already been made in this column to the use of the thermopile for measuring the total absorption by a star-image of a beam of light passed through a photographic plate. The method

has the advantages of being free from personality and of giving the integrated effect of the whole image independently of the distribution of density in different parts of it. It is thus available in reflector plates to a considerable distance from the centre of the plates in spite of the winged character of the images. Groningen Kapteyn Lab. Publ., No. 32, contains an investigation by J. Schilt which confirms the accuracy and convenience of the method. It has been applied to several of the Cape Phot. Durchm. plates with good results, also to some plates taken with the 60-inch reflector at Mount Wilson.

Stars of determined magnitudes are used for calibrating the curves derived from the thermopile readings; these are taken from the investigations of Seares (Mount Wilson), Chapman and Melotte (Greenwich), and Dziewulsky (Potsdam). It is suggested that the method may usefully be applied to the magnitudes of stars in the Durchmusterung of selected areas.

SOLAR APEX AND VELOCITY.—*Astr. Nach.* 5312 contains a paper by B. Fessenkoff and C. Ogradnikoff on the solar apex and velocity as deduced from the radial velocities of stars of type B. This method of deducing the apex is a useful check on the method from proper motions. The latter is very sensitive to the effect of systematic errors in the older catalogues, as Kapteyn pointed out. The B stars were selected as being of high mass and small peculiar motions.

Four solutions are given, according to the assumed K effect or the shift of spectral lines arising independently of radial motion. They do not differ very largely *inter se*; in that adopted as most probable, K is taken as corresponding to an apparent recession of 3.15 km./sec. According to this, the sun is moving towards R.A. 265.8°, N. Decl. 31.9° at a speed of 21.7 km./sec.