

requisite, and research became the business of a government department. Outside of the great firms which maintain progressive chemical staffs, the firms in numerous industries have been encouraged and assisted to co-operate in the betterment of their manufactures by the application of the methods of science, and from these associations and the organisations dealing with national problems begins to flow a stream of communications indicative of useful work accomplished. Nor is the foundation of it all neglected, for encouragement is given to workers in the academic field to follow out their ideas, whithersoever they may lead them, in accordance with the truth that "research

in applied science might lead to reforms, but research in pure science leads to revolutions."

It is important to be able to record an advance in securing an interchange of information among government departments, and between their work and that of the universities, a matter which before the War was unsatisfactory, as it was mainly personal and sporadic. It is also a hopeful sign that, although the knowledge and appreciation of the methods and capabilities of science are still generally wanting, there have been signs of late years that these matters are coming to engage the attention of those who guide the policy of the State.

### Centenary of the Franklin Institute.

ON March 30, 1824, the Governor of the State of Pennsylvania signed an Act incorporating the Franklin Institute for the Promotion of the Mechanic Arts. The centenary of its foundation will be observed in Philadelphia on September 17, 18, and 19, by celebrations reminiscent of the rise, growth, and continuity of purpose of a remarkable institution, now, after many inevitable vicissitudes, rooted deeply in the national life of the United States, at the same time commanding the allegiance of men of science in most other countries. Accordingly, delegates representing several of the universities of Great Britain, as well as scientific societies, will join those from Canada, France, Holland, and Germany in united expression of congratulation. To have wrested "secrets of excellent use" from Nature marks and cements the common bond.

When we direct our minds back to the Institute's initial year, 1824, it serves us to recall that here, in England, we had Sir Humphry Davy—at the height of his fame—installed as president of the Royal Society, whilst round about that period many special scientific organisations were springing into being. Among such were the Horticultural Society (1804), Geological Society (1807), Institution of Civil Engineers (1818), the Royal Geographical Society (1830) and the British Association (1831).

The Franklin Institute was established to meet the need for an institution similar to that founded in London in 1799 (the Royal Institution) by Benjamin Thompson, Count Rumford. The founders had before them, also, the history and objects of the Anderson College of Glasgow, where Dr. George Birkbeck had lectured on mechanics and applied science with inspiring zeal and successful issue. The initial tentative effort was due to two Philadelphians, Samuel V. Merrick and William H. Keating, the latter then chosen by the University of Pennsylvania to occupy a new Chair of Chemistry in its Application to Agriculture and the Mechanic Arts. They discussed a project—one of them, by the way, had been told he was wasting his time—but they were bent upon going forward. They called in two others as colleagues, and the four—all young men—using the Philadelphia Directory, selected from it the names of some 1500 citizens, inviting them by circular letter to attend a meeting on the evening of February 5, 1824, to discover and talk over plans. The meeting was a success, not a little to the surprise of its conveners, approbation of the purpose

in view, namely, that of assisting the knowledge of physical science and its diffusion in the arts and sciences, being expressed freely. Later, an election of officers took place, and the promoters chose a name for their offspring. Certainly none could have been more fitting than that of "Franklin Institute," both for immediate testimony and posterity's keeping. There seems to have been no dissension. The glamour of the great "printer-philosopher" was with them in the city where he had worked, and hence homage was rendered. The original scheme prospering, in twelve months' time the corner-stone of a marble-fronted building, destined as a home, was laid (we are told "in ancient and Masonic form by the Grand Lodge of Philadelphia, in the presence of the Society") on June 8, 1825, and completed in 1826. Upon the first floor (to-day) are located the lecture room, laboratories, and offices. The second floor is occupied by the library, whilst the third is devoted to the Museum of Models and Historical Apparatus.

Membership of the Institute is open to men and women, without regard to distinction of race, nationality, or religion, the only requirements for admission being good character and interest in its work. The artisan and the professor meet within its walls upon an equal footing, and it is to this happy blending of "Science with Practice" that the particular usefulness, past and present, of the Institute must be ascribed. General meetings are held once each month, except during the summer. At these, inventions and discoveries, important engineering projects and notable achievements in all fields of scientific progress, are presented, exhibited, or discussed. Many epoch-making inventions have been shown in their experimental stages at these meetings—for example, the phonograph, electric arc, the typewriter, liquid air apparatus, and telegraphy improvement devices. The average membership for the period 1912-1922 was 1380, and in view of the greater interest now manifested in the Institute's work, special efforts are to be made towards an enlargement of its roll.

Three permanent features of the Institute's activities are the maintenance of a reference library, the holding of exhibitions, and the publication of a Journal for the diffusion of knowledge on all subjects connected with science and the useful arts. All three formed part of the original plan of the founders, and the efflux of time has added materially to their importance. We gather from a recent report referring to the library that it is,

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,