A Temple of Science.

DEDICATION OF A NATIONAL BUILDING AT WASHINGTON.

THE new building of the U.S. National Academy of Sciences and National Research Council (Fig. 1) was dedicated on April 28, in the presence of a large and representative assembly. Owing to repeated delays in the construction of the building, due to strikes and other causes beyond the control of the building committee, the date of its completion could not be certainly fixed in advance. For this reason the National Academy was forced to give up its intention to invite European and other academies and societies to be represented at the opening ceremonies.

In order to provide a suitable building for the National Academy of Sciences and the Research Council, the Carnegie Corporation of New York gave five million dollars to the Academy in 1919. The greater part of this sum, however, is to constitute a permanent endowment in the hands of the Academy for the maintenance of the building and the support of the work of the Research Council. The building itself has cost about 1,450,000 dollars, and the land on which it stands was purchased by the National Academy of Sciences for 185,000 dollars, raised by subscription.

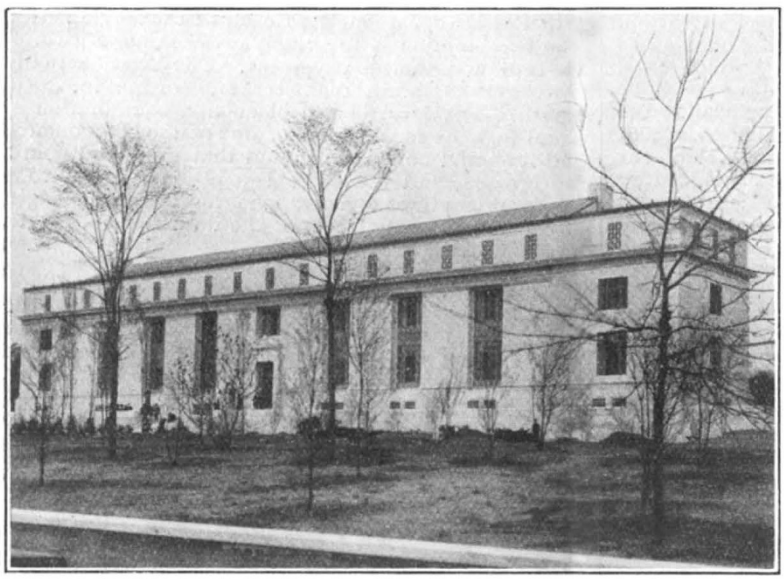

FIG. 1.—New building of the U.S. National Academy of Sciences and National Research Council.

The main floor of the building contains a library, reading room, small lecture room and meeting room, and a central auditorium, surmounted by a dome about sixty feet high, surrounded by seven exhibit rooms. On the second and third floors are offices, occupied by the Academy, the Research Council, and certain closely related bodies.

The architect of the building, Bertram Grosvenor Goodhue, has adopted a simple classical design, richly embellished with appropriate sculptural and mural decorations. The massive bronze entrance doors, by Lee Lawrie, admirably depict eight episodes in the history of science, from Aristotle to Pasteur. The marble pseudo-pediment above the doorway portrays the sculptor's conception of the elements with which science deals—earth and cloud through the various forms of the animal and vegetable kingdoms to man, surmounted by the sun, the source of warmth and light. In a series of six large bronze panels (Fig. 2) filling the space between the upper and lower windows on the chief façade, Lawrie has represented the outstanding founders of science from Greek to recent times. Other sculptural work by the same artist includes elaborate grilled screens of bronze and glass at either end of the entrance halls, figures of Night and Morning in the central hall, a portrayal of the development of the art of writing from cave man to medieval scribes on the chimney piece of the library, and other beautiful details throughout the building.

The four arms of the cruciform central auditorium are vaulted to support a pendentive dome. The walls to the centre of the arches are of acoustic tile, and the dome is of the same material, elaborately decorated with emblems and figures symbolic of the sciences, the whole richly coloured and gilt by Miss Hildreth Meiere. The figures in the pendentives represent the elements of the Greeks—Earth, Air, Fire, and Water—while the soffit arches bear the insignia of Alexandria, the great academy of antiquity, and of the three historic national academies of Europe: the Accademia dei Lincei of Rome, the Académie des Sciences of Paris, and the Royal Society of London. The inscriptions encircling the dome are: "Ages and Cycles of Nature in Ceaseless Sequence Moving," near the apex, and the following characterisation of the various aspects of science in the zone at its base: "To Science, Pilot of Industry, Conqueror of Disease, Multiplier of the Harvest, Explorer of the Universe, Revealer of Nature's Laws, Eternal Guide to Truth."

A striking decorative feature of the central auditorium is a mural painting, by Albert Herter, of Prometheus lighting his torch at the chariot of the sun, thus bringing fire (typifying knowledge) to earth for the benefit of mankind, inscribed below with a quotation from the "Prometheus Bound" of Æschylus.

Other mural decorations by Herter will include the arms of eight historic universities—Bologna, Paris, Oxford, Cambridge, Heidelberg, Leyden, Harvard, Yale—in the reading room, and Abraham Lincoln, Joseph Henry, Louis Agassiz, and other founders of the National Academy in the meeting room.

The purpose of exhibits in the building is to illustrate current or fundamental phenomena of Nature and the progress of scientific research. Some, which are permanently installed, are arranged to show such phenomena as the changing spots on the rotating sun, the variations in the earth's magnetic field, and the records of earthquakes, wherever they occur. Others, which can be operated by the visitor, reveal the exquisite structure and gorgeous colours attending the formation of crystals in polarised light, the interference fringes with which Michelson measured the length of the standard metre and the diameter of giant stars, and the effects of electric discharges in rarefied gases. Still others, to be changed from time to time, are to illustrate recent discoveries and advances in science.

At the dedication ceremonies, the chair was occupied by Prof. Michelson, and the Bishop of Washington opened them with an invocation. He was followed by Mr. Coolidge, president of the United States, and succeeding speakers included Dr. J. C. Merriam, president of the Carnegie Institution; Dr. Vernon Kellogg, permanent secretary of the National Research Council, and Mr. Gano Dunn, chairman of the Building Committee. The building owes its existence chiefly to the conception and tireless devotion of Prof. G. E. Hale, and tribute was paid to him by more than one speaker during the dedication. The opening was marked by two tragic events, which were felt very keenly by all who participated in it. One was the death three days before of the architect, Mr. Bertram Grosvenor Goodhue, of New York, and the other was the sudden death, on the speakers' platform, of Dr. Ernest Fox Nicholls, the distinguished physicist.

We are glad to be able to give the subjoined extracts from some of the speeches.

MR. CALVIN COOLIDGE, PRESIDENT OF THE UNITED STATES.

If there be one thing in which America is pre-eminent, it is a disposition to follow the truth. It is this sentiment which characterised the voyage of Columbus. It was the moving impulse of those who were the leaders in the early settlement of our country, and has been followed in the great decisions of the nation through all its history. Sometimes this has been represented by political action, sometimes by scientific achievements. On this occasion, the emphasis is on the side of science.

By science I mean the careful assembling of facts, their comparison and interpretation. Of those who are entitled to high rank in both our political and scientific life, perhaps Benjamin Franklin was the earliest and one of the most conspicuous examples. But it is the same spirit that has moved through all our life, which makes it particularly appropriate that our national Government should be active in its encouragement of the searching out of the truth in the physical world, and applying it to the well-being of the people, as it is interested in the searching out of the truth in the political world, with the same object in view.

President Washington, in his farewell address to the American people, said: "Promote, then, as an object of primary importance, institutions for the general diffusion of knowledge. In proportion as the structure of a government gives force to public opinions it should be enlightened." It was the first president of the United States who saw the necessity of research in this country. Jefferson, our third president, was himself a research worker by natural gift, and loved the problems which gave him a broader knowledge of our national surroundings. The beginning of our government, therefore, had to do with the inception of scientific research in the United States.

American science may be divided into five periods—the Jefferson period, that of Silliman, the Agassiz period, the present period of co-operative research when no one dominates, and the future for which definite foundations are being laid.

The Jefferson period began even before Jefferson's term as president. Palæontology in the United States had its beginning in the publication in 1797 of Jefferson's paper on Megalonyx or great claw. The first large palæontological laboratory in this country was in the East Room of the White House, where Jefferson arranged his fossils for study.

The Silliman period covers largely the first half of the last century. During this time the National Institution for the Promotion of Science and Art was established in the national capital, which promised to be a rival to the American Philosophical Society in Philadelphia. Meanwhile, the American Association was started. Also, in this period, an ex-president of the United States was concerned in the founding of an institution for research. John Quincy Adams in his own handwriting amended the Bill to establish the Smithsonian Institution, giving it the broad scope which it has to-day.

The third period, that of Agassiz, again brings a president forward in the promotion of science. Abraham Lincoln, deeply interested in the welfare of the American people, confessed that up to the time when he became president and talked with Joseph Henry, then head of the Smithsonian Institution, he was inclined to view the Institution as a rather useless government luxury, but he said, "It must be a grand school if it produces such thinkers as he." Later on in 1864, when the very foundations of the nation were shaken with civil war, the same president looked from the executive mansion on the Smithsonian building which was burning, and remarked to some military gentlemen present: "Gentlemen, beyond is a national calamity. We have no time to think of it now; we must attend to other things." It was in these days of strife that a senator from Massachusetts, Henry Wilson, later vice-president, put through the two houses of Congress a bill incorporating the National Academy of Sciences in the United States of America. President Lincoln signed the bill. Just how much the war influenced the recognition of necessity for such a body is not known, but war problems were assigned to the Academy and acted on. Since then many government scientific questions have been referred to it by the president, members of the Cabinet, and committees of Congress, and the Academy members have lent themselves to the work of solving these problems, knowing that their only compensation would be the knowledge that they had served the Government of the United States to the best of their ability.

The period of individual work in science continued in America up to the time of the War. Then

FIG. 2.—Bronze panel, one of a series of six, between upper and lower windows on the chief façade.

a change came over the established methods of warfare. Instead of individual fighting individual, it was masses against masses. Scientific problems in research for the solution of war matters could not, therefore, be solved by one man, but must be worked out by those interested in the same field. Realising this fact, and knowing of the many experts in the various fields of science covered by the Academy, a request was made to President Wilson by the Academy to call the leading scientific men of America for service under the guidance of the National Academy of Sciences and to organise a body to solve problems which required co-operative research. Thus began the National Research Council, and later the Council of National Defence requested it to act as the department of research of that body.

After the armistice was signed, the president of the United States, appreciating the value of what had been done, requested the National Academy of Sciences to reorganise the National Research Council under its charter, on a permanent peace basis, and with this request, co-operation in scientific research was given a firm foundation. Upon the assumption of this added responsibility, it was found that the old quarters of the Academy at the Smithsonian Institution were not adequate. A number of philanthropists who recognised what splendid work could be done if ample space and facilities were available, contributed a sum sufficient to secure the lot on B Street, between 21st and 22nd, and C Streets. The Carnegie Corporation of New York then donated the building, which may be termed the Temple of Science in America. It is not a place of mystery, but one to lead the public in thinking deeply and seeing how research can explain fundamental problems.

Nothing with more promise than the fifth period, that of the future of American science, could come to the American people. The scientific man is rending the earth to reveal its secrets. Truth must prevail for the betterment of mankind, and with the energy that the men of science are putting into the problems of research, Diogenes would certainly have a chance to lay down his quarter-staff and lantern and rest, if he would turn his search in their direction.

This magnificent building now being dedicated to science predicts a new day in scientific research. A new sun is rising. It is destined to illuminate the scientific world by illuminating this hall.

One of the most important possibilities for service of the National Academy of Sciences in the future lies in its opportunity for inspiring the people of America to insistence upon having the truth, and nothing but the truth, regarding everything that touches our life as a nation. It is always to be borne in mind that while the peculiar relation of the Academy to the Government of the United States may concern the conduct of specific researches, the example of dignified emphasis upon the truth as reached by correct thinking in every department of research, and in its practical applications, may be a contribution of inestimable value to the whole people.

It is for this purpose that the Government sets its stamp of approval upon this effort, and joins in dedicating this building to the betterment of the human race by achieving a clearer knowledge of the truth.

DR. JOHN C. MERRIAM, VICE-PRESIDENT OF THE NATIONAL ACADEMY OF SCIENCES.

The ceremonies in which we participate to-day bring to us, in what seems like sudden fruition, the results of the vision, the plan, and the hopes of many years. Knowing as we do that the joy in recognising advance is itself essential to progress, this would seem the natural time to halt for a moment of pure pleasure in contemplating the attainment. But more important to us than mere appreciation of accomplishment is the realisation that this is also a time at which we should consider with the utmost care what those newly established conditions mean in terms of further opportunity. We must not fail to realise that these pleasures of possession have intimate relation to responsibility for that which we have helped to create, as also for the new and great possibilities of service now opened. So while this is first a day of rejoicing that possessions have been secured and ideals have been realised, it is most of all a time for earnest consideration of the great things this advance may mean for the Academy and for the people of to-morrow.

In viewing the future responsibilities of the Academy to the Government, we may not interpret this relation to mean merely the possibility of assistance in specific problems or researches as they may happen to arise either in relation to national defence or in other connexions. There can be no doubt that this body was chartered with the understanding that it would have always in mind the interests of the people in whatever ways science can contribute to meet their needs or support their ideals. Though it is clear that the Academy represents expert knowledge in the sciences only, it is important that its vision of ultimate service reach over all phases of the nation's life and thought, ranging from defence to assistance in securing those guarantees of comfort and health in body and spirit which make good citizenship and happiness possible.

Now, for the first time, we are to have a home, with all this means, as a place in which to live and to work. It seems clear, as one of its responsibilities, the Academy, with its relatively small membership, comprising all of the sciences, should look forward to its general and special meetings here as exceptional opportunities for bringing the whole range of scientific inquiry to bear upon new discoveries or upon great investigations in progress. Even more important than the general meetings will be the possibilities of those frequent intimate conferences of small groups brought together for discussion of special topics, in which, with a minimum of formality, the more fundamental discussion of the great problems is made possible.

The bringing of the National Research Council into being on the foundation of the Academy Charter has extended greatly the possibilities for stimulation and organisation of research. In occupying its quarters in the new building, the Academy will come into a relation to the Council which will bring out more clearly than at any earlier time the significance of the organisation which it has brought into existence. The invitation to a large group of the national scientific societies of this country to participate in the work done through the National Research Council has developed a wide range of relationships of the greatest importance. The responsibilities and opportunities which present themselves to the Academy in connexion with future problems of the Research Council must be reckoned as among the most important which will now come closely to our vision.

In the future development of our foreign relations in scientific work appears also one of the very great opportunities for national service. There is good reason for believing that the possibility of some of the surest ties to be formed between the nations lies in the discussion of scientific and intellectual questions, in which international co-operation is directed specifically toward search for the truth without reference to its immediate economic or political bearing.

Along with those relationships of the Academy which have been considered, there is also open to this

body, as to other scientific agencies, an exceptional opportunity and responsibility for aiding in steadying the thought of the people by interpreting in some measure the meaning of the rapid advances now being made in scientific understanding of man and his environment. With the continuing growth of knowledge we see the universe increase in complexity and extend itself vastly in space and time. It is to be expected that adjustments in our scientific data will bring into continuous review much that pertains also to the fundamental philosophic and religious thought forming so important a part of the world's thinking. We should never blind ourselves to the fact that the people have philosophies now, and always will have them, and that consciously or subconsciously they have religious beliefs, also. Abundant national disasters, some of which we have seen in recent decades, have demonstrated fully that there is nothing more deadly than bad national philosophy, especially if it translate itself into terms of economic or political policy. Such beliefs never arise from attainment of the truth, but always from the lack of it.

The Academy will always be conservative in holding fast such knowledge as may seem securely founded, but it will never look with favour on the defence of any view merely because it has been held. The attitude of the Academy as representing truth-seeking and truth-accepting should have a continuous influence in stabilising thought. Though we may never be advocates of philosophic or religious systems, we should assist in that interpretation of the shifting panorama which the world seems to present when viewed through the eyes of science; and we should help to keep false assumptions from serving in the place of truth.

DR. VERNON KELLOGG, PERMANENT SECRETARY OF THE NATIONAL RESEARCH COUNCIL.

The National Research Council was born of the National Academy of Sciences in strenuous days of war, even as the Academy itself was born during the throes of an earlier great conflict. Both came into existence for a first purpose of bringing science intensively to the aid of the nation in a time of terrible emergency. Science, which has been said to know no political boundaries, yet has its nationalistic phase. Scientific men also may be patriots.

Because of the rôle played by science during the War, and the even more important rôle it will inevitably play in the next great war—if such war must come—various philosophers and humanitarians have lifted their voices to decry science as an agent of evil and a promoter of human capacity to do grievous things. They charge against it not only its rôle in war, but also its rôle in the industrial revolution which has made too many men slaves of machines.

It is true that science has been used to do sad work. It is true that science can be used to make of the next war an earthly horror almost beyond conception. But is science to be held responsible if we choose to have war rather than peace? Let us put the responsibility where it justly falls: on governments and on ourselves. Because science can convert, in a day or two, a factory for the production of beautiful dyes, pleasant perfumes, and disease-destroying drugs into a factory for the production of high explosives and poisonous gases, is science to be judged an enemy of humanity? Scientific men will never make this conversion unless you ask them to. They hope from their hearts that they will never again have to do this.

It is the other side of the picture that science prefers to have shown. It asks to have recognised the many contributions it has made to the well-being and happiness of mankind. It directs attention to its steady endeavour to satisfy the insistent demand of man to know the world he lives in, that he may live in it more comfortably and confidently and with more interest; to know the wide reaches of the universe that his mind and soul may understand humility and yet know exaltation. Science moves with constant acceleration in its work of increasing human knowledge, adding to human capacity and expanding human existence. By the very cumulation of knowledge more knowledge is made more rapidly possible. In the early days of prehistoric man before picture-making and writing, man could not cumulate knowledge, or, at best, but slightly and slowly. But with the perfecting of means of communicating knowledge from one group to another and from one generation to another, the advance and cumulation of knowledge can proceed rapidly and ever more rapidly. In the present quarter century more knowledge of the order of Nature has been gained than in any quarter century before. One cannot dream too wildly of the possibilities of the future.

Let science, then, with all encouragement, play undisturbed its glorious peace-time rôle of bettering the lot of individuals, adding to the resources of nations, and widening man's understanding of Nature and of himself. Let it go on in its great beneficences: conquering disease; ameliorating the wearing struggle for food and the cruel rigours of heat and cold; annihilating distance; reaping benefits from the oceans and forests, and bringing plants and animals to the service of man's sustenance and comfort. Let it continue to convert astrology into astronomy, alchemy into chemistry, guess-work into exact knowing. Let it use imagination to the limit—imagination is no less necessary to science than to the seven arts—but let its dreams be tested in the light of day. Let it prove all things, discover truth, and teach truth and the way of its discovery. Let it attend, undistractedly and unwearyingly, to its great effort to make our land a better land for our children and our children's children to live in, and the human future broader and better than the human present.

Annual Inspection of the Rothamsted Experimental Station.

THE annual meeting of the Society for Extending the Rothamsted Experiments was held at the Rothamsted Experimental Station, Harpenden, on Wednesday June 18, when about 70 members of the Society and guests attended at the invitation of Lord Bledisloe, chairman of the Lawes Agricultural Trust. Among those present were Mr. Noel Buxton (Minister of Agriculture), Lord Salisbury, Earl de la Warr, Sir Thomas Middleton, Mrs. and Miss Muller, Dr. K. Fisher (Headmaster of Oundle), and the members of the Lawes Trust Committee. Both Mr. Lloyd George and Mr. Stanley Baldwin were compelled to cancel their acceptance owing to other public business.

As in previous years, arrangements were made for the visitors to see something of the work of the Station, both on the experimental fields and plots and in the laboratories. There are more than 500 experimental field plots on the farm and 12 separate departments in the laboratories, so it is impossible in the course of a single day's visit to see more than a small section of the work.

The Rothamsted field plots fall into two groups: