In another continent, the Scandinavian countries, and notably Denmark, might be in a position to play a comparable part. Such a concrete demonstration of respect and reverence for life, regardless of creed, colour, or political system, might well contribute to a growing feeling of confidence among nations, and a special confidence in those nations which might elect to give initiative to or participate in a world-wide study of this kind.

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THE INTERNATIONAL SCIENCE HALL AT THE BRUSSELS EXHIBITION

THE exhibition in the International Science Hall at the Brussels Universal and International Exhibition is designed to show the aims, methods, and results of pure scientific research in the fundamental sciences, with a special emphasis on developments since the last World Exhibition was held in New York in 1939. The exhibits are restricted to four main topics of research—the atom, the crystal, the molecule and the living cell—and are arranged in the main body of the hall in four overlapping sections, one for each of these subjects. The growth of science from the earliest times to the present day is illustrated in the entrance hall.

The scope of the exhibition is perhaps best indicated briefly by a list of the headings under which the exhibits are described in the catalogue. In "The Atom" section these are: atoms and nuclei, isotopes, radioactivity, neutrons and fission, nuclear reactors, accelerating machines, elementary particles, cosmic rays, cloud and bubble chambers and nuclear plates, solar energy and thermonuclear reactions. In "The Crystal" section they are: the crystal lattice and lattice defects, the determination of crystal structures, crystal growth, dislocations and diffusion, phase changes, mechanical properties, electrical and magnetic properties, optical properties and crystal surfaces. In "The Molecule" section the main headings are: chemical bonds, molecular energy states, structural properties, techniques of separation (including thermodiffusion and chromatography), catalysis and kinetics, surface phenomena, colloids, radiochemistry, general chemistry and macromolecules. Finally, in "The Living Cell" section, the exhibits are concerned with the chemical constituents of cells, genetics, radiobiology, viruses, bacteriophage and bacteria, protozoa and fungi, photosynthesis and vegetable cells, animal cells and embryology.

The idea of staging an international exhibition of pure science as part of the Brussels Exhibition was due entirely to the Belgians, who have also provided the hall, the essential organization and a large number of the exhibits. Fourteen other countries, Austria, Czechoslovakia, the Federal German Republic, France, Holland, Israel, Italy, Portugal, Spain, Switzerland, the United Kingdom, the U.S.A., the U.S.S.R. and Yugoslavia, have also contributed to it. The overall plans were made by a committee of scientists from all the participating countries under the chairmanship of Prof. Robert van Cauwenberghe, and the exhibits were selected and co-ordinated by four sub-committees with the Belgian scientists, Profs. M. de Hemptinne, W. Dekeyser, G. Smets and P. Bordet, as chairmen respectively for the Atom, Crystal, Molecule and Living Cell sections. The individual exhibits, of which there are about five hundred, have been devised by leading scientists in the contributing countries, generally with the assistance of professional designers.

One of the principal objects of the organizers is to show that pure scientific research is a truly international activity. A great deal has been done, therefore, to avoid attracting attention to the differing nationalities of the contributors and to emphasize the aims and methods they have in common. The exhibits are arranged strictly according to their scientific content without regard for their country of origin; they are more or less uniform in design and the names and countries of the scientists responsible for them are displayed for the most part in an unobtrusive manner. Naturally enough, the exhibits do not all conform exactly to the recommended standard pattern, but there is certainly enough general uniformity of design for the organizers' main aim to be realized, and the few exhibits that are markedly different add a necessary touch of variety to the whole.

It is hoped that all sections of the public will visit and profit by this exhibition, and exhibits have therefore been provided both for laymen and for specialists. In addition, the Belgians have made a special introductory film in which most of the concepts necessary for an understanding of the exhibits are introduced in simple terms for the benefit of visiting non-scientists. This film is shown at regular intervals during the day in a special cinema inside the hall, every seat of which is equipped with ear-phones on which the film commentary can be heard in any one of the five languages, French, Flemish, English, German and Spanish. There are two smaller cinemas in which programmes of the best scientific films made by all the contributing countries are shown.

The exhibits in the hall are of three main types. Those of the first kind are intended to supplement the film in introducing the fundamental ideas and principal experimental techniques of modern research to visitors with little or no scientific training. These exhibits include, for example, atomic models, explanatory models of instruments such as the cyclotron, a demonstration of diffraction phenomena and their use in crystal structure analysis, an explanation of chemical bonding and an account of the Mendelian laws of heredity vividly illustrated in a collection of birds and animals. The exhibits of the second type are historical and show by means of original documents and models and replicas of famous apparatus the development of important experimental tech-

niques and the performance and significance of crucial experiments. Among them may be noted the account of Becquerel's discovery of radioactivity in uranium, a model of the laboratory in Cambridge where Cockcroft and Walton first split the atom without the use of natural radioactivity, and a replica of the remarkably simple apparatus with which Hahn and Strassmann first recognized nuclear fission.

The remaining exhibits, those of the third type, which far outnumber the rest, are concerned with the methods and results of the latest research. They include a great deal of working apparatus—in the Atom section, for example, there are two working nuclear reactors—and many of them are concerned with quite advanced ideas. The general level of difficulty in fact approaches that of the exhibits at a Royal Society conversazione. It is scarcely fair to single out any of these exhibits for special attention, but some account of the Russian exhibits may interest the many people who are unlikely ever to visit the U.S.S.R., and it will also serve to indicate the standard attained by the exhibits in general. They are characterized by large frameworks standing on illuminated bases of metal and glass and carrying diagrams and models in fluorescent paint and neon lights which illustrate the subject of the exhibit. These centre-pieces are designed to attract attention to the exhibits, the serious contents of which generally consist of the latest apparatus, usually in working order and operated by a resident staff of scientists and technicians, and accounts of the results obtained by its use. Thus in the Crystal section the Russian exhibit on crystal structure determination by means of X-ray and electron diffraction consists of an array of crystal structure models mounted on a characteristic centre-piece, alongside an elegant apparatus for electron diffraction studies of single crystals from the Crystallographic Institute of the Academy of Sciences in Moscow. In the Molecule section the exhibit on chain reactions by Prof. N. N. Semenov, who shared with Sir Cyril Hinshelwood the 1956 Nobel Prize for Chemistry, has for its central feature an elaborate panel in which the course of various reactions is illustrated by means of automatically controlled lights. This is surrounded by apparatus used in the study of such reactions, including a mass-spectrograph for the study of free radicals, a high-speed camera for the study of explosions and an apparatus for the study of reactions under high pressures.

The British contribution of more than fifty exhibits in all parts of the hall was organized by Sir Lawrence Bragg, at the Royal Institution, with the special co-operation of Prof. C. F. Powell and the United Kingdom Atomic Energy Authority in the Atom section, Prof. E. R. H. Jones in the Molecule section, and Prof. Alex. Haddow in the Living Cell section. The individual exhibits were arranged by scientists throughout the country with the help of many university and government laboratories and industrial organizations. Most of them were designed in general accordance with the standards recommended by Gunther Hoffstead.

The British exhibits in the Atom section include models of the Cockcroft–Walton laboratory, the 7-GeV. proton accelerator now being built at Harwell and the Harwell tandem generator. They also include a modern mass-spectrometer shown in comparison with a replica of the 1937 Aston mass-spectrograph from the Cavendish Laboratory, and an exhibit illustrating the discovery of mesons in cosmic rays. In the Crystal section they include accounts of the structures of collagen, deoxyribonucleic acid and vitamin B_{12}, determined by the methods of X-ray crystallography, together with a description of the tertiary structure of the protein myoglobin, also determined very recently by these methods. Also included are exhibits on neutron diffraction investigations, the growth of crystals and the nature of crystal surfaces and dislocations as they are observed directly by electron microscopy. In the Molecule section they illustrate polar molecules, electron magnetic resonance, chromatography, insulin, vitamin B_{12} again, reaction kinetics, conformational analysis and radiochemistry. The British exhibits in the Living Cell section include accounts of proteins, cell division, 'lamp brush' chromosomes, the human chromosome number, the function of deoxyribonucleic acid, radiobiology, the structure of viruses, the malaria parasite, the mechanism of muscle contraction, the fine structure of *Amoeba proteus* and the effects of vitamin A on cells grown in tissue culture. The film programmes shown daily in the small cinemas include a high proportion of British films on loan for the duration of the exhibition from a number of laboratories, film libraries and film makers.

The International Science Hall has now been open to the public rather more than two months and a large number of people have visited it. Many of them agree that although it is more than usually successful in presenting science at a popular level, it is most successful as a science exhibition for scientists. Visitors who have had no scientific training are often overawed by the scope and complexity of the exhibits, despite the many ingenious efforts that have been made to explain them. The people likely to profit most from visiting the Science Hall are undergraduate scientists and specialists, who will find there a review of the latest research in physics, chemistry and biology provided by leading authorities in each subject, and also a striking demonstration that science is best learned as a whole rather than divided into separate subjects that become increasingly less self-contained as knowledge advances. The exhibition closes on October 19.

D. C. PHILLIPS

ANTARCTIC RESEARCH

THE idea of holding an informal symposium on Antarctic research in New Zealand during February 1958, following the relief of Antarctic stations, was first discussed by the members of the United States and New Zealand National Committees for the International Geophysical Year. Conceived as a meeting between American and New Zealand field scientists, its scope was broadened at the 1957 Paris conference to include all nations with a working interest in the Antarctic. The confluence of several expeditions at Wellington was rather demanding in view of the exigencies of Antarctic operations but, through the goodwill of all and some sacrifice on the part of many, about seventy scientists from