his product in such manner that it would be of maximum benefit to the public. Furthermore, he has left his invention in the position where another might patent it and use the patent to the detriment of the public. Every valuable medical invention should be protected by a patent, and this patent should be licensed only to reputable manufacturers who agree to abide by rigid restrictions as to the quality and maximum sales price of the patented product which they produce. In fact, it would probably be helpful if the medical profession would have a central committee which would protect by patents inventions of the profession, and which would develop these patents in such manner that the public received the greatest benefits therefrom. If the doctor feels that the development of his patent involves too much trouble he should at least obtain the patent and dedicate it to the public, thereby preventing any one else from patenting his invention and using the patent to the detriment of the public.

SCIENCE AND SOCIETY

By Dr. F. R. MOULTON

PERMANENT SECRETARY, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

INTRODUCTION

AT the meeting in Indianapolis next December the first of a series of "conferences" (symposia) on "Science and Society" will be held under the auspices of the association. Since these five conferences form an integrated whole and in certain other respects differ somewhat from those heretofore organized by sections of the association and by its affiliated societies, their scope and purpose will be briefly described.

These conferences will systematically cover the broad subject of the effects of the impact of science upon human beings, both as members of society and as individuals. In these discussions the whole range of science will be involved. At one extreme, there will be the physical sciences and technology; at the other, the social sciences and the organization of society. These conferences together will constitute a synthesis of the interrelations of science and life. In this rapidly changing and disturbed world no greater theme can engage the serious attention of high-minded men.

The outlines of the conferences which follow this introduction will make clearer than any general description their scope and character. Outlines of four of the five conferences are here presented together because their full significance would not readily be perceived from reading first one and then another at intervals of six months as they will appear in the programs of the association. Although the fifth conference is described only by the title "Science and Human Beings," it is clear that in certain respects it will be the climax of the series, for man himself is the object of our highest and ultimate interest.

It is hoped that this project will receive the approval and hearty cooperation of the members of the association. It is hoped, too, that it will be followed by many other conferences and series of conferences that will somewhat similarly range across the boundaries that divide up the domain of knowledge into separate subjects. At the same time, comprehensive symposia on limited subjects of the types that have become distinguishing characteristics of the meetings of the association should by all means be continued. For example, the symposium on cancer at the Atlantic City meeting by the Section on Medical Sciences was of the highest order of excellence and usefulness, as have been many other symposia organized by various sections. If, without ceasing to make such penetrating examinations into special subjects, the association from time to time can undertake surveys and syntheses of broad fields, it will better serve science and society.

FOREWORD TO CONFERENCES

The purposes of this projected series of five conferences, to be held at successive meetings of the association, are: first, to investigate and present in a systematic and comprehensive way the effects of science and its applications upon society and upon human beings as individuals; and, second, to indicate the ways in which economic, social and political institutions affect scientific developments.

It is recognized in a general way that science is by far the most important influence to which the human race has ever been subject. Even within the short interval of a hundred years science has transformed the whole environment and outlook of man. By placing great forces and new techniques at his command it has enormously increased his ability to satisfy his physical wants. In his economic and social relations, it has changed him from a largely self-sufficient individual into one essentially dependent on the remainder of the world. On the intellectual side, it has provided him abundant leisure and unparalleled facilities for cultivating his mind, given him new conceptions and powers, and opened up new vistas for further exploration.

At the same time, however, the rapidity with which

epoch-making scientific discoveries have been made in recent decades has given rise to problems of far-reaching importance. The impact of new scientific discoveries on processes of wealth-production has at times created serious economic and social maladjustments; and the fear has frequently been expressed that science and technology may even come to be the master rather than the servant of mankind—if, indeed, they may not lead to the destruction of society.

Reciprocally, changing economic conditions and imperfections in the operation of the economic system react upon the development of science. Moreover, confused and conflicting views with respect to the present and future of science and its applications pervade public discussions and thus lead to governmental regulations and controls often inimical to science and society.

It is for the purpose of providing a more adequate conception of the significance of science in social and human developments that this series of five conferences has been organized. It is intended that they shall be factual and quantitative, rather than speculative and vaguely general.

They will present existing facts and conditions in historical perspective and will also look in some measure toward the future. As a whole, they should afford a comprehensive and realistic picture of the importance of the supremely important interrelations of science and society.

No other organization appears so well qualified to sponsor conferences on this broad subject as the American Association for the Advancement of Science—for the association, through its 16 sections and its 162 affiliated societies, covers the whole range of pure and applied science. It is able, from its own membership, to enlist the cooperation of specialists from all the fields of the natural and the social sciences. Moreover, its age, its large membership and its facilities for publication make the association the most influential medium for bringing the results of such an inquiry to the thoughtful consideration of the public.

Plan of the Conferences

Each of the conferences will consist of five sessions. At each session not more than two papers will be presented. Since only about an hour and a half will thus be required for any session, it is hoped that conflicts with other programs of major importance may be largely avoided. Although five conferences, held at successive meetings of the association, will be required to cover the broad subject outlined, each conference is so organized as to be a complete unit in itself, and it is planned to publish the papers given at each conference in a volume of convenient dimensions.

The first conference of the series will be held at the Indianapolis meeting of the association in December, 1937. The address of the retiring vice-president of the Section on Social and Economic Sciences will constitute the first session of the conference. This address is intended to serve as an introduction, not only to the first conference, but to the entire series of conferences. The papers in the succeeding sessions of the first conference will be contributed by eminent authorities, selected because of their particular competency to illuminate the various aspects of the problem under consideration.

The tentative titles selected for the five conferences are as follows:

Conference I. Fundamental Resources as Affected by Science
Conference II. Standards of Living as Affected by Science
Conference III. The Economic System in Relation to Scientific Progress
Conference IV. Government Policies in Relation to Scientific Progress
Conference V. Science and Human Beings

Dr. Harold G. Moulton, president of the Brookings Institution, upon invitation of the council of the association, has agreed to organize the entire series of conferences, thus ensuring unity in conception and continuity in administration.

SCIENCE AND SOCIETY

A series of conferences to be held
under the auspices of the
American Association for the Advancement of Science
(Tentative Outline)

First Conference (December, 1937)

Fundamental Resources as Affected by Science

Session I. Controlling Factors in Economic Development

This paper will be given by Harold G. Moulton as a retiring vice-presidential address. Its major purpose will be to serve as a general introduction to the whole series of conferences. It will therefore emphasize the combined and interrelated influence upon economic progress of the development of science and the evolution of economic, political and social institutions.

Session II. Natural Resources

Paper 1. Agricultural and Forest Resources

Paper 2. Mineral Resources

The primary purpose of the papers on these subjects should be to show the ways in which the applications of science to agriculture, forestry and mining have served to amplify and to increase the productivity of these basic natural resources.

Session III. Power and Capital Resources

Paper 1. Power Resources

The development and use of various forms of power—steam, oil, electric, etc.—during the past century has revolutionized the processes of pro-

duction. The purpose of this paper should be to set forth in a systematic way the developments which constitute the power revolution and to indicate its bearing upon man's mastery of the physical world.

Paper 2. Capital Resources

This paper should stress the significance of capital, that is, plant and equipment, in increasing man's ability to provide for his wants. Attention should be directed not only to the expanding size of productive establishments and organizations but also to the increasing size and efficiency of productive instruments.

Session IV. Human Resources

Paper 1. Man Power

This paper should be devoted to an analysis of the changing rates of growth and changing age distribution of the population and the bearing thereof upon economic expansion, productivity and living standards.

Paper 2. The Utilization of Human Resources

This paper should be devoted to a discussion of the problems involved in increasing the efficiency of human resources. It should cover such questions as the distribution of population between rural areas and urban centers, migrations, the selection and training of personnel for given tasks, education, health conditions, etc. The focus would be upon labor as a factor in production. (Note that the Fifth Conference would be devoted to a discussion of the effects of science upon human beings as members of society.)

Session V. The Application of Science to Business

Paper 1. Scientific Methods in Business Organization

Paper 2. Research Laboratories and the Spirit of Science

These two papers should be devoted to an analysis of the problems involved in continuously promoting the application of science to the problems of business. The first paper should discuss the application of scientific methods in connection with all phases of business activity. It would be concerned with such problems as those usually included under such headings as Industrial Engineering, Scientific Management, etc. The second paper should stress the importance of conducting basically important scientific investigations by industries and the influence of research laboratories in promoting the scientific point of view throughout industrial enterprise.

SECOND CONFERENCE (JUNE, 1938)

STANDARDS OF LIVING AS AFFECTED BY SCIENCE

Session I. The Progressive Improvement of American Living Standards

This first paper should serve as a general introduction to the Second Conference. It should review the history of living standards in the United States, attempting to measure as accurately as possible the improvement in the economic position of the American people, giving attention both to working hours and values produced. If space permits, an analysis also should be made of the varying standards of living among the different groups in the body politic.

Session II. The Development of Steel and Non-ferrous Metals

Paper 1. Production and Uses of Steel and its Alloys

Paper 2. Production and Uses of Non-ferrous Metals

In both of these papers attention should be given not only to the relation of the metal industries to productive efficiency but also to consumptive satisfactions.

Session III. The Scientific Utilization of Coal and Petroleum

Paper 1. Coal and its Derivatives

Paper 2. Petroleum and Natural Gas

The purpose of these papers should be to show the ways in which the applications of science have increased the efficiency and widened the uses of these resources. It would differ from the paper on Mineral Resources in the preceding conference in that it would give more specific attention to the particular products here considered.

Session IV. Applications of Science in the Textile Industry

Paper 1. The Transformation of Raw Materials into Finished Products

This paper should explain the ways in which scientific developments have increased the efficiency of production and improved the quality and serviceability of the product.

Paper 2. Chemical Equivalents of Textiles

This paper should discuss the ways in which chemistry has created textile substitutes.

Session V. Scientific Developments in Transportation and Communication

Paper 1. Transportation

A review of the significance of science in transportation development, with special emphasis upon the potentialities of further scientific advancement, particularly in the fields of rail and air transportation.

Paper 2. Communication

A review of scientific developments in telegraphy, telephony, radio and other forms of communication; and a discussion of their economic significance, actual and potential.

THIRD CONFERENCE (DECEMBER, 1938)

THE ECONOMIC SYSTEM IN RELATION TO SCIENTIFIC PROGRESS

Session I. Free Enterprise and Scientific Development

This paper should serve as an introduction to the Third Conference. Its principal purpose should be to explain the essential elements of the so-called system of free enterprise, including the operation of the price and profit mechanism; show how this

system has promoted the development of large-scale business organizations; and indicate the ways in which the system of free enterprise has stimulated the development of science and its application to business enterprise.

Session II. The Monetary and Credit System

Paper 1. The Significance of Money

The purpose of this paper should be to set forth the various functions performed by money and the factors upon which a satisfactory monetary system depend.

Paper 2. The Significance of Credit

This paper should discuss the development of both short-term commercial credit and long-term investment credit, and indicate the functions performed by the various types of financial institutions and agencies which comprise the financial system as a whole.

Session III. Fluctuation in Business Activity

Paper 1. Factors Affecting the Long-run Trend of Prices

This paper should discuss both monetary and industrial factors affecting the secular movement of commodity prices.

Paper 2. The Business Cycle

This paper should constitute a review of the history of cycles, with an account of the varied explanations of the cause of business oscillations; and indicate the ways in which such fluctuations stimulate and retard the application of science to industry.

Session IV. Economic Requirements for Progress

Paper 1. Factors Affecting Productive Efficiency

This paper should be devoted to a consideration of the significance of a continuous expansion of capital and of the impediments which retard the introduction of improved methods and processes in production.

Paper 2. Distributing the Benefits of Progress

This paper should analyze the mechanisms and processes by means of which the benefits of increasing productivity are disseminated among the masses of the people.

Session V. The Scientific Approach in Economics

Paper 1. Potential Contributions of the Natural Scientist to Economic Analysis

This paper, to be presented by an engineer or physicist, should indicate the ways in which methods developed in the natural sciences might be more extensively utilized in the solution of economic problems.

Paper 2. Scientific Methods in Economic Investigation

A discussion by an economist of the utilization of scientific methods in economic analysis. Attention should be given to the extent and character of the aid that may be obtained through cooperation with natural scientists.

FOURTH CONFERENCE (JUNE, 1939)

GOVERNMENT POLICIES IN RELATION TO SCIENTIFIC PROGRESS

Session I. The Changing Rôle of Government in Economic Enterprise

This introductory paper should briefly survey the relation of government to economic enterprise (a) in the Middle Ages, (b) under the so-called *laissez-faire* system of the nineteenth century, and (c) under present-day conditions. It should outline the manifold ways in which the government to-day attempts to assist, regulate and control business activities, as well as those which are designed to restrain or curb business activities.

Session II. The Patent System

Paper 1. The History of Patent Rights

A summary history of patented appliances and devices, together with a discussion of the influence of business fluctuations upon applications for patents.

Paper 2. An Appraisal of the Patent System

An analysis of the efficacy of the existing patent system, including a discussion of business policies which affect the prompt utilization of new patents.

Session III. Government Credit and Business Enterprise

Paper 1. The Expansion of Governmental Enterprise

A survey of the expansion of governmental activities over the past thirty years, in both the United States and other countries. The study should indicate the variety of activities in which the government engages and point out the factors which appear to be responsible for the developments which have occurred.

Paper 2. Governmental Enterprise and Taxation

This paper should analyze the growth of public indebtedness in relation to the growth of producing and tax-paying power. Some forms of governmental activity produce revenues, while others do not. The central purpose of this paper should be to reveal the extent to which the *burden of taxation* has been increased by the expansion of non-revenue-producing government enterprise.

Session IV. Government Credit and Economic Stability

Paper 1. The Problem of Fiscal Stability

This paper should build upon the materials assembled in the preceding session, focussing attention upon the present condition of government budgets in the United States and other leading countries.

Paper 2. Fiscal Stability and Monetary Stability

This paper should analyze the relation of fiscal stability to monetary stability and the bearing of both upon the conduct of business enterprise.

Session V. The Scientific Approach in Government

Paper 1. Political Organization and the Scientific Spirit

An analysis of the way in which our political organization and legislative and executive procedures affect the scientific approach to government prob-

lems, together with a discussion of the extent to which governmental agencies engage in and promote scientific investigations.

Paper 2. The Future of Science in Relation to Government

A discussion of the problems involved in introducing the scientific spirit into governmental organization and enterprise and of the ways in which scientific bodies might contribute toward this end.

Fifth Conference (December, 1939)

Science and Human Beings

(Outline not as yet prepared)

SCIENTIFIC EVENTS

DEDICATION OF THE NEW BUILDING OF THE COLLEGE OF MEDICINE OF SYRACUSE UNIVERSITY

The new building for the College of Medicine of Syracuse University will be dedicated on November 22. It is the fourth unit in the plan started in 1935 to construct a hospital and educational center adjoining the campus. Units completed are the Syracuse Memorial Hospital, a state psychopathic hospital and the communicable disease hospital. These institutions are affiliated with the College of Medicine. The cost of the new building was $825,000. It includes six large student laboratories for physiology, bacteriology, chemistry, pathology, anatomy and pharmacology in addition to research laboratories for members of the faculty. There is an auditorium on the first floor, seating 400 persons.

The building is of English Georgian design and was planned by the late James Russell Pope and by Dwight James Baum, of New York City. It conforms in architecture with the building of the Maxwell School of Citizenship and Public Affairs. The latter building is to be dedicated ten days before the medical building.

Dr. Ray Lyman Wilbur, president of Stanford University, will be the principal speaker at the dedication exercises. Other speakers will be Dr. Henry A. Christian, of Harvard University, who will represent the practice of medicine, and Dr. Edward S. Godfrey, Jr., commissioner of the State Department of Health, who will represent the field of public health. Alumni of the College of Medicine will meet in the new building on November 20 and the building will be open for public inspection on Sunday.

President Roosevelt laid the cornerstone for the new building in 1936 and it was constructed from funds from a Public Works Administration loan. The College of Medicine is 103 years old, having been established at Geneva in 1834. It was moved to Syracuse as a division of the university in 1871.

RESEARCH GRANTS OF THE PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE

Dr. Arno Viehoever, director of the Gross Laboratory for Biological and Biochemical Research of the Philadelphia College of Pharmacy and Science, has announced the receipt of two research grants.

The first of these is a fellowship established by Merck and Company, manufacturing chemists of Rahway, N. J. The research is to be carried out under the direction of Dr. Viehoever with the assistance of Dr. I. Cohen of the laboratory staff. The Gross Laboratory, which developed and improved the technique in the evaluation of potent drugs, using the minute transparent laboratory test animal, Daphnia, will apply this method to work with the factor in wheat germ oil, Vitamin E.

Simultaneously with the award of this grant, the college, through Dean Charles H. LaWall, announced the establishment of a graduate fellowship for study and research under the program embraced by the Gross Laboratory. This grant, personally established by Dr. Joseph Rosin, vice-president and chief chemist of Merck and Company, includes all fees and a stipend for a student pursuing work leading to a graduate degree. Students, preferably those who have earned baccalaureate degrees in chemistry, should communicate with Dr. J. W. Sturmer, dean of science, who may be addressed in care of the college.

The Gross Laboratory, at which the research will be carried out, was established in 1934. It is supported by William H. Gross, of Philadelphia. The laboratory is situated at 4212 Kingsessing Avenue, near to the other buildings of the institution. Researches in this laboratory are devoted to the advancement of biological and biochemical knowledge.

CONFERENCE ON THE PHYTOHORMONES

A conference on the subject of phytohormones was held at the International Institute of Intellectual Cooperation, Paris, on October 1 and 2. This meeting, which was organized by the International Institute of Intellectual Cooperation and the International Union of Biological Sciences, is the first of a series that will be held in the course of the coming months to discuss a variety of questions such as "The New Vitamins," "The Nomenclature of Genetics," "The Double Electric Layer," etc., subjects included in the plan of work of the International Council of Scientific Unions, which acts as a Committee of Scientific Advisers to the institute.

The meeting was held under the chairmanship of Professor P. Boysen Jensen and discussed the following reports:

Chemistry of Phytohormones and Other Growth Substances, Professor F. Kögl.

Phytohormones in the Different Plant Groups, Professor Niels Nielsen.