sible to carry out the reaction on the large scale at the temperatures required under the very high pressures indicated by the calculations.

In 1906 measurements under pressure were for the first time carried out by Nernst and Jellinek (these are not referred to by Haber), and in 1908 Haber in conjunction with Dr. Le Rossignol began experiments at higher pressures. The work of Le Rossignol (a British subject) is spoken of with great approbation, although his part in the achievement of success has perhaps not always received full credit in some quarters. The technical chemists were still unfavorably inclined towards the process, although practical yields had now been reached. By the use of new catalysts the temperature was lowered to 500-600° under a pressure of 200 atmospheres. In 1913 the process was taken up by the Badische Gesellschaft, but an account of the main scientific results was also published. The work of Dr. Bosch speedily led to the successful introduction of the synthetic ammonia process, and in the period 1913-1920 the capacities of the German factories rose from *nil* to 35,000 tons per annum in 1914, 850,000 tons in 1918 and 1,500,000 tons in 1920.

INTERNATIONAL SCIENTIFIC COOPERATION

THREE committees appointed by the Commission on International Intellectual Cooperation of the League of Nations held sessions in Paris at the end of December, namely, the committee on bibliography, the committee on matters pertaining to universities and the committee delegated to study into the question of intellectual ownership.

A report in the *Journal* of the American Medical Association states that the committee on bibliography is engaged in the coordination of bibliographic enterprises undertaken in the various countries, with a view to avoiding duplication of effort and assuring to scientists and investigators the advantages of a complete bibliography easily accessible. The committee on university matters is dealing with various questions relative to the organization of the international congress of universities. The committee, however, recognizes the fact that political conditions will not permit the convening of such a congress at present. But it is possible to take up at once an extended inquiry into the best means of bringing about a cooperation between the universities. Opportunity is offered also for the discussion of kindred questions, such as the publication of an annual catalogue containing a list of all the courses given in the universities of the world, and the creation of a bureau of information pertaining to universities.

The committee on intellectual ownership is studying more particularly the question of the extension of authors' rights in the field of science, so as to secure to the individual scientist and the field of science represented by his country a more adequate participation in the benefits arising from the utilization of his discovery. At present the system of patents protects only the inventor of the industrial application of a scientific discovery. The mathematician, the physician, the chemist and the biologist, whose scientific discoveries made possible the invention, derive no benefit either for themselves or for their laboratories from the utilization of their works. At the instance of the chairman, M. Bergson, the committee delegated M. Ruffini, professor in the University of Turin, to draw up a plan which, subject to the approval of the commission on intellectual cooperation and the council of the League of Nations, might be used to establish the juridical principles for international protection of scientific discoveries. Such a plan might serve later as the basis for drafts of laws which, with the necessary modifications, might be presented to the parliaments of the various countries. With this object in view, M. de Torrès y Quevedo, of Madrid, was designated to study the possibilities of applying, in a practical way, the juridical principles and the suggestions for legislation contained in the document to be drawn up by Ruffini.

RESEARCH SERVICE TO THE INDUSTRIES OF MICHIGAN

UNIVERSITY extension service to the manufacturing and technical interests of the state is being introduced to the Michigan manufacturer through the issuing and distribution of a booklet explaining the purpose and facilities of this special department.

Professor A. E. White, director of this de-

partment, has been investigating the problems of the state's industries and his purpose is to put the facilities of the various university laboratories at the service of Michigan manufacturers. Through this service trained specialists in practically all phases of research work will be available to the manufacturer. The large and complete technical library of the university will also be at the disposal of any one having special problems.

It is believed that there is a definite need for a research service of this kind, and that many Michigan industries will avail themselves of the service as in many cases the type of research which is necessary may be conducted only with expensive equipment such as is contained in many of the university's laboratories.

The types of service of this department are of three kinds. The library service, in addition to making available the scientific library, is prepared to make photostat prints, write translations and do other work of a like nature. The second division of the service is for the study of problems requiring an ultimate though not immediate answer. The third is for the investigation of problems which require the full time service of one or more persons for a period of six months or longer. This includes the chemical and physical tests.

The problems which may be studied through the department with the present facilities are grouped under the following specific types of service: aeronautics, automotive equipment, ceramics, design of special machinery, electric transmission and distribution, fuels, heating, ventilating and illumination, hydraulics, machine shop practice, power plants and their equipment, radio and telephony and tests of building and engineering materials.

PUBLIC LECTURES OF THE CHICAGO SECTION OF THE AMERICAN CHEMICAL SOCIETY

THE Chicago Section has launched an aggressive campaign to popularize chemistry by choosing speakers, and by advising various civic, social and cultural organizations in the city that these men and women are willing to talk to them about chemistry. Two letters have been sent out; the first to speakers, advising them as to the best methods of making popular addresses, and the second to organizations which the section believes will entertain the idea of learning some of the modern facts about chemistry. Below is the list of speakers chosen for this work:

G. L. Wendt, Ph.D., chief research chemist, Standard Oil Company of Indiana; former professor of chemistry, University of Chicago.

W. Lee Travis, Ph.D., head of the chemistry department of Northwestern University; developer of war gas known as "Lewisite."

David Klein, Ph.D., technical director at the laboratories of Wilson and Co.; formerly assistant professor at the University of Wisconsin; state chemist of Illinois; specialist in the use of internal glandular extracts in medicine.

Otto Eisenschiml, head of the Scientific Oil Compounding Company: "Chemistry as a career."

Julius Stieglitz, Ph.D., head of department of chemistry of the University of Chicago: "Chemistry in everyday life."

Mrs. L. F. Supple, assistant professor of textile chemistry at Lewis Institute: "The chemistry of cloth."

P. N. Leech, Ph.D., laboratories of the American Medical Association: "Home remedies—their use and abuse."

G. A. Menge, Ph.D., consulting chemist: "Milk—its various available forms and their relative merits."

H. E. Barnard, Ph.D., director American Bakers Institute; formerly state food commissioner of Indiana: "The bread of life—its rôle in nutrition."

I. K. Russell, editor of *Baking Technology;* formerly on editorial staff of the New York *Evening Mail:* "Pasteur, the chemist."

F. L. Dunlap, Sc.D., consulting chemist; formerly associate chief, United States Bureau of Chemistry: "What do we know about flour?"

C. S. Miner, consulting chemist; head of the Miner Laboratories: "The chemist in the courts."

W. D. Harkins, Ph.D., professor of chemistry, University of Chicago: (1) "Radioactivity"; (2) "The building of atoms."

J. A. Hynes, chief chemist of the United States Customs Service at Chicago: "Reminiscences of a customs house chemist."

G. W. Hoover, M.D., chief, Chicago Station, United States Bureau of Chemistry: "Food and drug frauds."

E. H. Volwiler, Ph.D., chief chemist, Abbott Laboratories: "Coal tar in medical science."

W. D. Richardson, chief chemist, Swift and Company: "Vitamines in everyday diet."

L. M. Tolman, chief chemist, Wilson and Company: "Shortening fats and household economy."