of food to plants. Agronomists may be sure that they have not yet found out every method of increasing soil fertility by the use of fertilizers. As the needs for food become more pressing many additional discoveries will result from the researches of students of the soil.

Superior tillage methods, better rotations, and many other improvements in soil management may be expected to contribute to the increasing of the yield of the present cultivated area.

So much has been done during the last few generations to improve crops that we should hesitate before placing any limit on what may be accomplished in this respect in the future. The discovery of some of the fundamental principles of heredity has made progress much more rapid during the last few years than previously when everything was done by the hit-or-miss method.

If no additional land could be added to the cultivated area and if there were no way to increase the fertility of the soil, considerable relief in the food situation might in time be expected to come from crop improvement alone; but when this can be taken in connection with the others, it becomes an especially valuable tool. For example, there are almost unlimited possibilities in developing crops suited to resisting drouth, soil alkali, or other unfavorable conditions in which ordinary crops can not thrive. But here too there is a limit to possible improvements.

From the foregoing, it is evident that the agronomist will be able to render valuable service in insuring an adequate food supply for the increasing population of the world. The question now arises as to what his duty is in the matter. Should he sit idly by as a disinterested spectator and allow things to take their natural course, or should he assume initiative and take an active part in helping to forestall trouble? Will he be one who will give the ounce of prevention, or will he wait till the pound of cure is required? Probably both courses will be taken.

He who is progressive, he who takes his work seriously and is anxious to use his training for the welfare of his fellows, will doubtless take the more positive attitude and devote himself energetically to the solution of the many problems that crowd upon him. Only by profound research can these problems be solved; but he who devotes himself honestly to seeking these solutions will find joy unspeakable and will render a lasting service to mankind.

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## SCIENTIFIC AND INDUSTRIAL RESEARCH IN FRANCE, ITALY, BELGIUM AND JAPAN

The British Committee of the Privy Council for Industrial and Scientific Research in their annual report to Parliament give some account of similar work in other countries. In addition to the activities of the French Department of Scientific, Industrial and Agricultural Research and Inventions, attached to the Ministry of Public Instruction, important steps towards building a great optical industry in France have been taken by the French Ministry of Public Instruction and Commerce, under whose auspices there has been created in Paris an establishment known as L'Institut d'Optique Théorique et Appliquée, with General Bourgeois as president. The institution will include a school of advanced optics, a research and testing laboratory, and a professional school. Measures have been taken to secure a government subvention and an appeal for funds has also been addressed to scientific and industrial organizations. Progress has also been made in engineering research in France. The metallurgical and engineering firms in Grenoble are showing a commendable exhibition of independent initiative and, without waiting for a more or less problematical government grant, have collected funds to found a mechanical and metallurgical laboratory. The laboratory itself is secured and they have appointed a competent local man as its head. There only remains the acquisition of the needful machinery and equipment. This is to be obtained partly by purchase and partly by gifts.

The Italian government has decided to devote special attention to the establishment of industrial experimental stations and the encouragement of technical education. Besides studying new processes and making new applications of old methods, these stations will supply industries with a trained personnel. Five such stations have already been established—two at Milan, for paper and fats respectively; two at Naples, for leather and ceramics; and one at Reggio Calabria, for essential oils and perfumes. It is planned to establish three new stations: one at Rovigno, for the sugar industry; another at Milan, for the development of the refrigerator industry; and a third, probably at Rome, to study the distillation of gases and their by-products and, in general, all processes of combustion. Other stations are under consideration. Laboratory schools are being organized at Turin, Milan, Genoa, Florence, Rome, Naples and Palermo. Provision is also being made for ordinary schools of industry, of which 150 will be royal schools and 400 others subsidized.

The establishment of a national system for encouraging scientific and industrial research in Belgium has been provisionally approved by the minister, but details have not yet been published.

An Institute of Physical and Chemical Research was established in Japan in 1917 with government support of £200,000 over a period of ten years, while a gift of £100,000 has been received from the emperor. The balance of the £800,000, which is required is being collected from private sources. The institution is apparently intended to serve three purposes: (*a*) the prosecution of fundamental researches; (*b*) the conduct of industrial investigations on lines similar to those of the Mellon Institute; and (*c*) the training of research workers who will be elected from among university graduates to research scholarships. Until the laboratories of the institute can be built in Tokyo accommodation is being provided by the universities of Tokyo, Kyoto and Sendai. It is understood further that another Imperial Ordinance has been issued announcing the establishment of a new Bureau in the Department of Agriculture and Commerce for the purposes of industrial experiment. This bureau will control work in connection with experiments, analysis, appraisal and instruction. There will be two experimental stations; one in the Tokyo district and one in the Osaka district.

## SCIENTIFIC EVENTS

### AERONAUTIC SECTION OF THE AMEERICAN SOCIETY OF ENGINEERS

IN the field of aviation a good deal of cooperative engineering work has been done, standards have been established, details of construction perfected, interchangeability secured. Nevertheless there still exists the real opportunity for promoting in a large way the broad engineering development having to do with the future of aerial navigation regarded as an essentially international science, art and business. To this end the members of The American Society of Mechanical Engineers interested in aeronautics have organized themselves into a professional section of this subject.

Howard E. Coffin, Jesse G. Vincent, Orville Wright, C. F. Kettering, Elmer A. Sperry, James Hartness, John R. Cautley, Lionel S. Marks, Miller R. Hutchison, Charles E. Lucke and Joseph A. Steinmetz, all prominent in the aeronautic field in the war, are among those who have registered in the section.

As chairman of the advisory committee on aeronautics under the Council of National Defense, Mr. Coffin sent the first American delegation to the London Conference on Aircraft in the spring of 1918. In the full realization of the possibilities of future commercial as well as military and naval development, the Peace Conference created a commission for drafting an International Aircraft Convention. Benedict Crowell, assistant secretary of war, and as chairman of the American Aviation Mission visiting Europe in 1919, urged the adoption of a definite engineering basis to secure the future of air navigation and to guide bodies entrusted with the formulation of laws. Herbert Hoover, in his recent address before the American Institute