scientific knowledge to the improvement of crops, for example, by seeking for improved strains suitable for local conditions, by research on fertilizers and in many other directions. The fact that surplus wheat for export has decreased suggests that the present production is required for home consumption in India. When the permanent schemes of irrigation now in hand bring much more land under full cultivation, India may again wish to take her place in the export market. To do this in the face of international competition, well-planned agricultural research will be essential.

While the character of India's exports has seen many changes in the last hundred years, to-day exports of cotton, jute and tea amount to about 60 per cent. of the total exports of India. Next in importance come oil and seeds, 6 per cent., hides, 5 per cent., and lac 1 per cent. There is no doubt that more scientific knowledge would increase the production of all these things. There is of course the need to make sure that there is a market for such surplus. Of India's staple exports, cotton represents about 20 per cent. of the total value. It is characteristic of Indian cotton that the staple is short and, until the cultivation of better varieties is more general, no competition will be possible with cottons of the American type, and trade must mainly be confined to the Indian market and the far eastern countries. Here there appears to be a wide field for applied research. Good work has been done by the Indian Cotton Committee, which has taken steps to improve the staple and prevent adulteration and intermixture of various varieties. The problem can be approached, however, not only in the seeking of better varieties but in finding uses and methods of treatment for the short staple variety. The importance of research on the cotton itself is well brought home by the results achieved in the United Kingdom. The Cotton Research Association there has found that many of the defects which appear in the finished article can be traced back to defects in the raw material.

Finally, a word might be said concerning the need for research on radio-communication, so important a matter to a large country like India. I do not refer to technical research in transmitting and receiving apparatus but rather to the type of fundamental investigation pursued under the Radio Research Board in Great Britain. These investigations, begun in the early days after the war, have shown that the propagation of radio-waves over large distances is very dependent on the electrical state of the upper atmosphere. It is now established that a number of electrified layers exist in the higher atmosphere which under certain conditions are able to reflect electric waves. The details of this electrical distribution vary considerably with the hour of the day and with the season of the year, as well as with geographical location. Such information, which is of practical importance in the selection of the most suitable wave-lengths for radio-communication, must obviously be secured by research conducted in the country itself. Moreover, it does not seem impossible that such a survey may prove of value in long-range weather forecasting.

There is here then much scope for research in a wide field, which I hope will be pursued vigorously in India. It is pleasant to note that a more promising stage in tackling fundamental radio problems of this character has already been made here by Professor M. N. Saha and S. K. Mitra and their students. The importance of survey work of this kind has already been recognized in other parts of the Empire, where it has received official support and encouragement. I refer in particular to the admirable work in this field by the Radio Research Board of Australia.

SCIENTIFIC EVENTS

THE NEW YORK BOTANICAL GARDEN

THE Board of Managers of the New York Botanical Garden on January 10 received the report of Dr. H. A. Gleason, head curator, officially closing his term as acting director. Since the appointment of Dr. William J. Robbins as director, Dr. Gleason has been serving as assistant director. He stated that the herbarium is exceeded in the number of flowering plant specimens only by the National Herbarium in Washington. In its collections of fungi for study it is exceeded only by the Department of Agriculture and the Farlow Herbarium at Harvard, while in mosses it is probably the largest in the world.

Thirty-one botanists from other cities and countries have engaged in research in the herbarium during 1937. Its contents have been made available to others by the loan of more than 16,000 specimens.

Studies of heredity received special attention during the year. As useful by-products of this research, beautiful new forms of day lilies and many hardy seedless grapes have been developed. Work on the grapes, which have been especially created for culture in New York and other northern and eastern states, has been undertaken in conjunction with the New York State Agricultural Experiment Station at Geneva. About 175 new kinds have been developed, a number of which are deemed suitable for commercial culture.

Other work included studies of diseases of ornamental plants and the preparation of monographs on

certain fungi and flowering plants, including the American nutmegs, verbenas of the world, rotenone-yielding plants of South America and some native aquatic plants and the preparation of hand-books on the ferns of various regions.

Records of the floral displays show that more than 30,000 plants, annuals, were grown in the borders; 1,500 new hybrid tea roses were planted in the rose garden; 8,000 plants of heather and heath were added to the Thompson Memorial Rock Garden, more than a hundred mountain laurels were placed in the woodland background to the rock garden; 1,125 rhododendrons and laurels have been planted in a new rhododendron glade; nearly a thousand new trees and shrubs have been set out to add to the permanent collections. An inventory of the rock garden indicates that more than 2,200 different kinds of plants are being cultivated there, while in the greenhouse there are more than 2,500 kinds of cacti and other succulents, many of which are very rare.

Since late spring the conservatory displays have been eliminated because of the reconstruction of the main range of greenhouses. The collection of begonias, which is housed in the greenhouses on the east side of the grounds, is said to rank as the finest in eastern America.

ELI LILLY AND COMPANY RESEARCH AWARD IN BACTERIOLOGY AND IMMUNOLOGY, 1937

AN annual research award of $1,000 and a bronze medal has been offered by Eli Lilly and Company to a young man or woman under thirty-one years of age who has made outstanding contributions to knowledge in the field of bacteriology or immunology while conducting investigative work in a college or university in the United States or Canada. This award is being made to stimulate research activities in young people and to reward meritorious achievement at a time in the life of an individual when recognition means the most.

The recipient of the award is chosen by a committee composed of members of the Society of American Bacteriologists, the American Association of Immunologists and the American Society for Experimental Pathology.

The committee has decided that the 1937 award should be given to Dr. Frank L. Horsfall, Jr., whose investigative work has largely been done in the Medical Schools of McGill University and Harvard University, and in the Hospital of the Rockefeller Institute for Medical Research. The choice of the recipient, however, was not an easy task, because the nominees constitute a group of exceptionally able investigators.

This second award is made in recognition of Dr. Horsfall's work dealing with the rôle of lipids in immunological reactions—work that has played a significant part in the establishment of a new thesis in the field of immunology. It was demonstrated that certain antibodies are lipo-protein complexes, the protein being responsible for the specific features of the antibody while the lipid is concerned with the non-specific secondary properties, that is, those causing precipitation and agglutination. Moreover, it was shown that certain species of animals form antibodies in which lecithin is the principal lipid constituent, while in other species the dominant lipid in the antibody is cephalin. This work was extended to demonstrate that lipids are readily and selectively adsorbed by antigen-antibody combinations, and, when so adsorbed, modify many properties of the antibody and qualify its *in vivo* effectiveness. Finally, through a thorough survey of the basic qualities of antibodies, Dr. Horsfall approached the problem of the treatment of human lobar pneumonia and has been instrumental in demonstrating the therapeutic value of anti-pneumococcal rabbit serum.

In his work Dr. Horsfall has exhibited imagination, originality, mental acuity and technical versatility and, because of this fact, the committee believes that this year's selection maintains the high standard set last year—a standard that will inevitably result in the advancement of knowledge in the fields of bacteriology and immunology and be a source of gratification to the donor.

THE FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY

THE Federation of American Societies for Experimental Biology will meet in Baltimore, Md., on March 30 and 31 and April 1 and 2. The Lord Baltimore Hotel will serve as headquarters.

All scientific sessions including motion picture and static demonstrations, except the Federation Joint Session, will be held in the Fifth Regiment Armory. The Federation Joint Session will be held in the Lord Baltimore Hotel.

The scientific sessions will begin on Thursday morning, March 31. Programs will be mailed to members. Wednesday is thus available for visits to points of interest and for other meetings, *i.e.*, of the councils and of the American Institute of Nutrition. No person will be admitted to any of the scientific sessions or demonstrations who can not show the official registration card.

On Thursday evening at nine o'clock the local committee will provide an informal smoker. The annual dinner will be held on Friday evening at seven o'clock.

The new plan for demonstrations and motion pictures will be in effect. According to this plan provision will be made in the Armory for: