

heaths has been studied by Miss E. Oyler and Dr. Bewley, who find that it is caused by the fungus *Phytophthora Cinnamomi*. New work on virus diseases by Dr. G. C. Ainsworth includes the description of 'bushy-stunt' of tomato, a disease of the 'fern-leaf' type upon the same host, fig mosaic, and a virus disease of water-cress. Mr. E. R. Speyer has turned the entomological investigations to a study of various injuries caused by thrips, particularly on carnations and roses. The uses of the new spray fluids, copper oxychloride, copper salicylanilide, and cuprous cyanide, are discussed by Mr. W. H. Read, whilst Dr. O. Owen has investigated the use of chlorate weed killers, and other problems. In the realm of physiology, Messrs. B. D. Bolas and I. W. Selman

have studied the movement of assimilate in seedling tomato plants, and Mr. D. W. Goodall considers some of the causes of variation in growth-rate of the tomato. Finally, a modest report from the Station's Extension Officer, Mr. O. B. Orchard, shows that the important work of translating research findings into practical technique receives the energetic attention it deserves.

The work of the Station is made possible by the Nursery and Market Garden Industries' Development Society, Ltd., and it is encouraging to note that an endowment fund has now been opened. The Society's late president, H. O. Larsen, has performed his last act of generosity to the Station by a bequest of £2,000.

British Thunderstorms

IT is a fortunate circumstance for British climatology that there has never been a lack of scientifically-minded laymen ready and willing to co-operate in large-scale observational work. The late G. J. Symons and his successor, Dr. H. R. Mill, found it possible to enrol more than five thousand voluntary observers of rainfall. Quite recently, as we learn from the annual report of the Director of the Meteorological Office, more than eight hundred observers responded to an invitation to co-operate in a special investigation of mist and fog.

Mr. S. Morris Bower began his work on summer thunderstorms in 1931, when he invited co-operation in a project to record storms occurring between the months of April and September. Prior to that date, he had been engaged on a census of winter thunderstorms, following earlier work on similar lines by Capt. C. J. P. Cave. Nearly a thousand observers assisted Mr. Morris Bower in 1931; in 1934 the number of observers had risen to 1,254*. That is a very large number of persons to take part in a purely private enterprise, and it affords remarkable evidence of the extent to which scientific zeal is disseminated among the general population. We may conclude that the enthusiastic private investigator is assured of public support in a piece of work that seems worth doing, notwithstanding the official meteorological service, to the maintenance of which the observers themselves have to contribute as taxpayers.

That leads us to reflect upon the relationship which should exist between the official service—represented by the Meteorological Office—and a private organization such as that maintained by Mr. Morris Bower. So far as climatology is concerned, the function of the Meteorological Office is to collect and preserve for public use an adequate number of weather records from all parts of the British Isles. In pursuance of that aim, it maintains about fifty official stations; the records from these are supplemented by about three hundred co-operating 'climatological' stations, most of which are maintained by local authorities. The principle of voluntary co-operation has, indeed, been a funda-

mental feature of British climatological work since the earliest days of the Meteorological Office. The 350 official and voluntary stations suffice for the general purposes of climatology; but they do not suffice for an intensive study of the geographical distribution of a particular element such as rainfall, fog or thunderstorms. Thus we have to recognize the need for a closer network of stations when problems of this character arise, and the need is best met by an *ad hoc* organization. The role of the special organization is to amplify and extend the work of the official climatological organization, just as the three hundred co-operating climatological stations amplify and extend the work of the fifty official stations. There is clear evidence that Mr. Morris Bower and his collaborators have fully appreciated this aspect of their work. It is of interest to note that all the observers who participated in the special investigation of fog referred to above, and a large proportion of Mr. Morris Bower's thunderstorm observers, are drawn from the ranks of the five thousand or so rainfall observers of the British Rainfall Organization, which thus forms as it were a 'reservist' body of meteorological workers who may confidently be relied upon to furnish volunteers for any special piece of work.

To return to the report under notice—it is a well-produced account of the summer thunderstorms of 1933 and 1934, illustrated with numerous charts (many in two colours), photographs and diagrams. In addition to the charts and statistics relating purely to the incidence of thunderstorms, there are sections on damage to house property, trees struck by lightning (by Mr. S. T. E. Dark) and on damage to wireless installations (by Mr. Ralph A. Price). The present writer feels that the report is rather lacking in details of individual storms. In "British Rainfall" one finds a good deal of information about the rainfall occurring in noteworthy thunderstorms, and one would like to be able to turn to Mr. Morris Bower's report in order to find the corresponding information about the incidence of thunder and lightning. Such information exists in the form of manuscript records, and it is to be hoped that it will find its way into the report as funds allow. Meanwhile, Mr. Morris Bower and his collaborators are, nevertheless, to be congratulated on the results of their ambitious undertaking. E. G. BILHAM.

* Survey of Thunderstorms in the British Islands. British Thunderstorms, continuing Summer Thunderstorms. Fourth Annual Report 1934. By S. Morris Bower and Others. Vol. 2, Part 1. Pp. 48 + vii + 4 plates. (Huddersfield: Thunderstorm Census Organisation, 1936.) 2s. 6d.