insignificant. The woods are composed either of deciduous trees, especially *Castanea sativa* and *Fagus silvatica*, occasionally also *Quercus Ilex*, or of a large number of conifers of the genera Picea, Pinus, Abies, Juniperus, Cedrus and Cypressus. The distribution and nature of these woods and their components are described in considerable detail.

Finally, there are described the formations which have possessed themselves of the areas denuded of forest. Of these the most important is the garigue, the capacity of which for establishing itself on such lands exceeds that of any other formation. Not only does it occupy wide tracts of the former woodland girdle, but also it often reaches far above the upper limit of the Mediterranean forest- and tree-line.

G. M. ROSEVEARE.

A SURVEY OF PLANT DISEASE

Report on Fungus, Bacterial and other Diseases of Crops in England and Wales for the Years 1933–1942

(Ministry of Agriculture and Fisheries, Bulletin No. 126.) Pp. iv+100+8 plates. (London: H.M. Stationery Office, 1943.) 2*s*. net.

IT is sometimes a little difficult to attain true perspective in a science like plant pathology, where facts are accumulated in a manner necessarily fragmentary and sporadic. Diseases never occur in standard measure, either of space or time, and Pasteur's dictum that chance favours only the mind that is prepared applies with special emphasis to the study of plant pathology. It is very appropriate that a periodical review be made of the occurrence of all diseases, and Mr. Moore, who is mycologist to the Ministry of Agriculture and Fisheries, has gathered together such information for England and Wales. He has had numerous collaborators, and the review follows an earlier bulletin (No. 79) which covered the five years, 1928–32.

One of the outstanding indications of the bulletin is the increasing number of plant maladies which are now recognized. This is, in all probability, due to the fact that cultivators are now more aware of diseases than formerly. We are separated by little more than half a century from the time when blights upon crops were regarded as 'acts of God', as little amenable to control as the whirlwind. The increasing tempo of plant cultivation since the outbreak of war has brought the plant pathologist much extra work, but has also given him a further harvest of scientific facts. Moreover, such glances as are vouchsafed into what might be called the archæology of plant pathology show that diseases were often present on fragments of plant material preserved from bygone times. Greater awareness of disease is also shown by the increasing number of deficiency troubles which are included in the bulletin under review. The work of the pathologist here merges with the activities of the physiologist with ultimate advantage to both.

The bulletin arranges the diseases of each host according to the nature of their causal agents, and in the order fungi, bacteria, viruses and non-parasitic. Pathology of ornamental plants, of hop, mushroom and flax, and of fruit and vegetables is recorded, in addition to the maladies of all farm crops. An indication of the thoroughness of compilation is given by the mention of Pythium root rot and a mosaic virus on watercress, the notice of *Ovularia Nymphæarum* on water-lily, and a description of soft shell of the walnut; and diseases of the more usual crops receive no less encyclopædic treatment. Symptoms of the more recently discovered troubles are given in sufficient detail for field diagnosis, and some are illustrated in the eighteen excellent half-tone figures. Common names are in accordance with those recommended in the "List of Common Plant Diseases" of the British Mycological Society. The review certainly achieves the purpose of keeping the plant pathologist up to date.

Some effort has been made to correlate the incidence of disease with climate. Synopses of the weather in each of the ten years are given, and in some cases broad conclusions are possible. The general effect of weather on potato blight has been recognized for some time. Hot, dry summers in 1921, 1929, 1933–35 and 1940 rendered blight of little economic significance as a foliage disease. Wet and sunless periods between June and September in 1926, 1931, 1936 and 1942 brought very severe attacks of blight. A wet May seems to portend a bad year for apple scab, and abnormal rainfall in July and August renders the downy mildew of hops very destructive. Chocolate spot of broad beans can assume epidemic proportions in periods of dull, showery weather between April and July. Mr. Moore very rightly points out the need for more extensive and intimate studies of the 'micro-climate' within an infected crop. Closely connected with climatic survey is the question of estimation of disease intensity, and here the excellent pioneer work of the British Mycological Society is incorporated in the bulletin.

The incidence of wart disease is interesting. Its spread during the last twenty years has been greatly reduced by the operation of the Wart Disease of Potatoes Orders. Outbreaks since 1933 have averaged about 87 per year, and this figure has not been exceeded by the average for the war years. Onion smut, another disease subject to legislation, appears to be increasing, though it is probable that most of the new cases represent long-standing infection; they were discovered during an intensive survey by the Ministry's inspectors. The problem is complicated by the length of time the fungus can remain infective in the soil—at least seventeen years. A slight decrease in the amounts of severe mosaic and leaf roll is recorded in potato crops raised from new Scotch or Irish seed during the war years. There is also less virus infection in crops raised from once-grown seed. The bacterial disease mentioned most frequently is crown gall (*Bacterium tumefaciens*). It occurs upon such widely varying hosts as dahlia, raspberry, apple, vegetable marrow, tomato, mangold, chrysanthemum and many others. Of deficiency diseases, that of potassium appears to be most frequent, and most cases are reported in the war years. Magnesium, boron, manganese and calcium may also cause their respective deficiency symptoms. One type of injury likely to be recognized more widely in the future is that due to acid soil. Plants growing at the lower limit of their *p*H range frequently exhibit characteristic symptoms, and their tabulation is one of the future tasks for the joint efforts of plant pathologists and physiologists.

The bulletin is far more than a list of plant diseases. It is an informative conspectus of the intelligence section of phytopathology. Mr. Moore frequently uses a somewhat conversational blend of history and etiology, so that his descriptions are not merely arid records, and his pages often indicate the direction which future investigation should take.

JOHN GRAINGER.