PLANT VIRUS DISEASES

FOUR recent papers from the Rothamsted Experimental Station contribute to our knowledge of virus in the pure state and in the infected cell, and also to etiology. E. M. Crook and F. M. L. Sheffield (*Brit. J. Exp. Path.*, **27**, 328; 1946) have examined purified tobacco mosaic virus under the electron microscope. Particles from the slowly sedimenting fraction are almost spherical; but as the sedimentation-rate increases, particle-length increases. Treatment with phosphate and varying conditions of storage further affect the state of aggregation. Potato virus X also has particles of variable length.

N. W. Pirie (Cold Spring Harbor Symposia on Quantitative Biology, **11**, 184) discusses the state of viruses in the infected cell. In a fully documented account, he examines the possibilities that (*a*) the virus particle may form a complex with components of normal tissue, and (*b*) properties of the virus might be altered by the process of isolation. There must also be virus in a 'free' state, and it may be the properties of this phase which have hitherto been assessed. The influence of light intensity on the susceptibility of plants to certain virus diseases has been investigated by F. C. Bawden and F. M. Roberts (*Ann. App. Biol.*, **34**, No. 2, 286; May 1947). Reduction of summer light-intensity to one third increased their susceptibility to infection with tobacco necrosis, tomato bushy stunt, tobacco mosaic and tobacco aucuba mosaic. Shading increased the number of local lesions and the amount of virus in extracted sap and also of systemically infected leaves. Virus from leaves grown in reduced light is also superior for purification studies. The virus of tobacco necrosis has been found by F. C. Bawden and B. Kassanis (*Ann. App. Biol.*, **34**, No. 1, 127; Feb. 1947) to enter plants of *Primula obconica* and to multiply locally; most of the tissues are free from virus. This is in contrast to the systemic infection by most viruses.

I. W. Selman, reporting work at the Cheshunt Experiment Station, has also found (*J. Pom. and Hort. Sci.*, **22**, Nos. 3 and 4, 226; Dec. 1946) that tobacco and yellow mosaic viruses may, under certain conditions, become localized in developing fruits of the tomato for an indefinite period, without the virus infection being completely systemic. The same author has studied the effect of seven different base fertilizer treatments and two levels of watering on resistance of fruiting tomato plants to infection with yellow mosaic (*J. Pom. and Hort. Sci.*, **23**, Nos. 1 and 2, 71; Sept. 1947). Varying the manures had no effect, but over-watering decreased the resistance of plants to systemic invasion by the virus. On the dry border, however, the best result was obtained in one experiment in which only five plants developed systemic infection out of sixteen inoculated. Little critical work has been done on the general question of the growth of a plant in relation to virus infection, but a useful survey of the literature, still by the same author (*ibid.*, *J. Pom. and Hort. Sci.*, **23**, Nos. 1 and 2, 50; Sept. 1947), indicates that studies on these lines may lead to useful control of viruses in practice.

Bulletin 196, Council for Scientific and Industrial Research of Australia (Melbourne, 1946), by J. G. Bald, D. O. Norris and G. A. H. Helson, deals with aphid populations, resistance and tolerance of potato varieties to leaf roll. The aphids *Myzus persicæ* and *Macrosiphum gei* were studied as vectors. There were indications that the stage of development of the potato plant influenced the preferences of both species of aphid. Indeed, the latter species had no preference for diseased Up-to-Date potato plants if leaf-roll had caused severe stunting. Several varieties of potato have been evaluated for their tolerance or susceptibility to leaf roll, but the degree of tolerance is not always reflected in yield.

EDUCATION IN GUATEMALA

IN 1943 the U.S. Office of Education undertook the preparation of a series of basic studies on education in a number of Central and South American countries under the sponsorship of the Interdepartmental Committee on Scientific and Cultural Co-operation. The studies were begun to promote understanding of educational conditions in the American countries and to encourage co-operation in the field of inter-American education. "Education in Guatemala" is based on data gathered by Cameron D. Ebaugh in 1944 and 1945 and supplemented since by documentary study. Published in 1947, exactly a hundred years after Guatemala became a republic, this well-documented account of the state of education in the second largest and most populous of the Central American republics shows how the original method of education by religious indoctrination to limited numbers is now slowly giving way to a system of liberal education for all (Washington, D.C.: Gov. Printing Office).

Instruction by religious orders on organised lines was begun many centuries ago, and a *colegio* to offer education at the secondary school level was founded by a religious order so long ago as 1573. Schools of this type were generally open to the sons of peninsular and, later, of American-born Spaniards, the native Indians seldom being granted admission. In 1676 a university was authorized by royal mandate for the teaching of theology, law and medicine and the conferring of the degrees of bachelor, master, licentiate and doctor. The new institution was given the same scholastic standing as the University of Mexico and in 1875 became the National University of Guatemala; in 1945 it was made autonomous and its name was changed to the Universidad de San Carlos de Guatemala. To-day it is regarded as the most advanced and popular institution of higher learning in Central America.

Education in Guatemala continued largely in the hands of the church until the revolution of 1871. In that year, education was declared the right of all citizens, regardless of caste, creed, age or sex. Many elementary schools and a number of secondary schools were founded by the Government, many of them in former convents. Lay teachers were appointed and curricula devised on lines closely similar to those of Western European Countries. In 1875 the Organic Law of Public Education made public elementary education universal and uniform in organisation, administration and supervision. From that time Guatemala has provided compulsory, free and non-secular instruction at the elementary school level. Because of the lack of school buildings and teachers, however, compulsory education has not been widely enforced. To-day, of the population of 3,407,444, about 70 per cent are still illiterate. As in other Latin American republics, education in Guatemala is highly centralized and administration, organisation and supervision are controlled through the Ministry of Public Education in Guatemala City; the University of San Carlos is alone autonomous.