to the rate at which man can accommodate himself to faster travel. On foot, man has improved on the mile running record by 12 seconds, in the same time as he has taken to change from 10 miles per hour to 600 miles per hour flight. The effect of such rapid change is bound to be tiring and inconducive to sustained first-class work. He mentioned that the accelerated process of burning frequently becomes an uncontrollable conflagration, and left his listeners to draw their own conclusions. Isolated wars and isolated diseases may now, with the impact of speed, get quickly into the general circulation with disastrous results. Speed has explosive tendencies and man should inquire into and attempt to control such tendency.

Dr. L. B. Cacciapuoti, deputy-director of the Social Science Department of the United Nations Educational, Scientific and Cultural Organization, winding up, struck a hopeful note, suggesting that the impact of speed will make for the quicker and wider dissemination of scientific knowledge in a manner similar to that following on the development of the art of printing. The impact of speed means that associations of scientific workers may now congregate from the corners of the earth, and with radio communication and air transport, no man of science need find the latest developments or the greatest men inaccessible to him. Such easy access to discuss calmly, with the aim of seeking truth about natural phenomena, promotes fraternal feeling transcending artificial political and racial barriers. Dr. Cacciapuoti's fear is that over-specialization may defeat this end by losing sight of the wholeness of science; but here again he hoped the impact of speed would overcome the difficulty, by spreading scientific knowledge, below technical specialization, but at a high level. He professed great faith in the potential for international association of men of science which the impact of speed on world communications makes possible, and in which he trusted lies the germ of world peace and understanding.

JOHN MACPHERSON

HISTORY OF CULTIVATED PLANTS

A SERIES of papers on cultivated plants, with special reference to their origins and histories, was given in Section K (Botany) of the British Association at the recent Edinburgh meeting.

Sir John Milne Home opened with a discussion of the introduction of exotic conifers into Great Britain and their influence on forestry. Several of these have been long established in Britain; thus, the Norway spruce (*Picea abies*), which is suited to the rainfall, was introduced about four hundred years ago. Other species long known in cultivation in the British Isles include the sitka spruce, Japanese larch, Douglas fir, giant silver fir, western hemlock and the western arborvitæ. More recently many species have been, and are being, given trials; but their value as forest trees in Britain remains more or less uncertain. Included in this category are the Monterey cypress, the Serbian and oriental spruces, two firs (*Abies amabilis* and *A. nobilis*), and the giant redwood. Many of the new introductions thrive well under certain conditions, but have limits to their sylvicultural value. Exotic conifers have had a great influence on British forestry, and this may be increased in the future.

Mr. J. M. S. Potter dealt with the history of the apple. It is not possible to say exactly where the cultivated apple originated; but it spread through Europe from east to west. *Pyrus malus* (*Malus communis*) was certainly one of the most important of its ancestors; but botanists are not entirely in agreement regarding the classification of the subdivisions of this aggregate species. The Romans may have introduced the cultivated apple to Britain. It was widely grown in monastery gardens, and since the monks were in contact with monasteries on the Continent new sorts of apples were frequently introduced. South-east England, from its nearness to the Continent and by the immigration of refugees, became a centre of fruit-growing in Tudor times. Many names of cultivated apple varieties are of French or Flemish origin. The distribution of apple cultivation on a commercial scale in Britain largely depends on ecological factors; dessert apples are mainly grown in drier areas, since fungal diseases can be more easily controlled than where the rainfall is heavy. Turning to more recent times, T. A. Knight may be regarded as the father of fruit breeding. In 1894, Pickering, at Woburn, started the first modern studies on fruit research in Britain, and in the succeeding years three institutions dealing with research in fruit were founded: the Long Ashton Research Station in 1903, the John Innes Horticultural Institution in 1910, and the East Malling Research Station in 1912. Apple cultivation has been revolutionized by studies on rootstocks, fertilizer treatment, pruning methods, general orchard practice, diseases and pests, fertility and sterility, and the breeding of new varieties. It remains to be seen if scientific research will result in the production of varieties better than those left to us by our forefathers.

The subject of olives was considered by Dr. W. B. Turrill, who said that both the wild and cultivated plants are characteristic of the countries bordering the Mediterranean Sea. The cultivated olive is of very great importance to the countries of southern Europe, northern Africa and western Asia for its fruits and the oil produced from these. Before the Second World War the area covered by olive plantations was estimated at 22,580 square miles, yielding 160,000 tons of oil and 20,000 tons of fruit for table use. Spain, Italy, French North Africa and Greece were the largest producers in the order named. *Olea europœa*, the common olive, is an evergreen tree up to fifteen metres in height or a shrub. Its opposite leaves are narrowly elliptic to linear-lanceolate of a subdued green on the adaxial and whitish grey on the abaxial surface. Its small white flowers are produced in May, and the best oil comes from the pulp of the drupes. The tree requires warm, well-drained soil, and responds quickly to proper treatment, especially to pruning. A large number of varieties, based on fruit shape, have been named and described. These are mainly propagated by vegetative means, and the varieties, as with so many other cultispecies, therefore occur as clones. The wild olives of the macchie, usually referred to as var. *oleaster*, are a heterogeneous assemblage, a mixture of microvarieties that need detailed cytogenetical investigation. The two or three published records of chromosome counts give $2n = 46$; but all are based on cultivated material.

About eighty-five species have been described within the genus *Olea*; but recent research shows that many of these are not valid species. The genus is mainly tropical, apart from *C. europæa*, and ranges through tropical and south Africa, the Mascarenes, western China, the Indian subcontinent, Malaya and Australasia. It does not occur in the New World. *Olea chrysophylla*, to which several species have been reduced, has the widest range throughout the greater part of Africa south of the Sahara and in Asia from Afghanistan to western China. In the Sudan and the southern Sahara there are plants intermediate between *O. chrysophylla* and *O. europæa*, and others occur also in Madeira. In particular, specimens named *Olea laperrini* from the Hoggar Mountains and from Jebel Marra are of great interest.

The place, time and immediate ancestry of the cultivated olive are unknown. It is frequently referred to in the Old Testament and in ancient Greek literature. The legends of Greek mythology point to its origin outside Greece and its introduction as a plant already in full cultivation. In ancient Egypt, the olive was certainly known, even in predynastic times, and recent archæological evidence suggests that it was of greater importance than was formerly thought. Unfortunately, there is no known reliable evidence of *Olea* as fossils, and the few cytological studies published throw no light on the origin of the cultivated olive. After a careful consideration of various possibilities, it is concluded that *Olea europæa* may have arisen from *O. chrysophylla* in northern tropical Africa and that it was introduced into the countries of the Mediterranean Basin via Egypt and then Crete or Palestine, Syria and Asia Minor.

In outlining the history of the more important cereals, Dr. G. D. H. Bell pointed out that the chief centres of origin of these are the Mediterranean basin, Persia, Abyssinia, far-eastern Asia, south-eastern Asia, central Asia, and South America. These centres for the most part coincide with areas of ancient civilization. The genera mainly considered by Dr. Bell were *Triticum, Secale, Hordeum* and *Avena*. The oats are taxonomically quite distinct from the first three of these genera, for which a prototype with $2n = 14$ chromosomes has to be postulated. In the genus *Triticum*, mutations gave rise to various species and were followed by polyploidy. Wheat, however, did not evolve within the one genus. A cross between a diploid *Triticum* and a diploid *Agropyron* followed by allopolyploidy gave the chromosome number of $2n = 28$. A second intergeneric cross between a *Triticum* with $2n = 28$ and an *Aegilops* with $2n = 14$, again followed by chromosome doubling, gave the important wheats with $2n = 42$. Cytogenetical researches on barley and rye have thrown much light on the constitution and origin of these cereals; but the history of cultivated oats is less well understood in spite of the fact that they are of more recent origin than the other plants here considered. The infinite range of morphological and ecological types of the cultivated cereals was emphasized.

Dr. J. G. Hawkes reminded the meeting that the potato was introduced into Europe at the end of the sixteenth century and was regarded as one species until the early part of this century. Now about fifteen species are recognized in place of *Solanum tuberosum*. The basic chromosome number of these is $x = 12$. South Peru and north Bolivia, centres of ancient Andean civilizations, are included in the range of the *Tuberosa* series. Chromosome numbers ranging from diploid to pentaploid occur in the cultivated potatoes and to hexaploid in wild species. Probably wild tetraploids were taken into cultivation. In nearly all areas of western South America there occur wild potatoes with long stolons. These grow in places where competition with natural vegetation is not great and where the soil is rich in nitrogen. Hence they take full advantage of areas disturbed by man. They survive from one season to the next by pieces of the long stolons being left behind in the soil by the early users of the tubers. The original ancestor of the cultivated potato, however, probably no longer exists—it was all taken into cultivation. No doubt the modern potatoes show little resemblance to the first cultivated plants.

ANIMALS AND FORESTRY

SECTIONS D (Zoology) and K* (Forestry) of the British Association held a combined symposium at the recent meeting in Edinburgh in order to discuss the relation of animals to forestry. Dr. F. Fraser Darling, a member of the Scottish Committee of Nature Conservancy and formerly director of the West Highland Survey, opening the symposium with a contribution on mammals, said that the relation of mammals to forest growth is a critical one, for its survival or extinction, and it is one of the most dramatic complexes in Nature. The advent of pastoral, agricultural and civilized man has complicated the situation ecologically. Forests are either climaxes or stages well on the way to the climax, a feature of which is the increasing variety of organic forms and degree of stability. This stability may be interpreted as self-regulation, and the biological system becomes a continuum. Climaxes are constantly being broken by natural catastrophes such as hurricane and fire, but in limited areas, so that the set-back in ecological succession creates edge effects and allows the continued existence of forms which could not endure in the absolute climax. The over-all biological picture is enriched by periodic natural catastrophe.

The profound benign or depressive influence of mammals in the natural chequerboard of climax forest, secondary growth and primary colonization is clearer if the animals are classified according to what they do—predators, browsers and grazers, rodents and insectivores. The predators as a group, of which several species have been lost by extinction, form the insurance company, ensuring the forest as a continuum by controlling the populations of rodents and grazers and browsers. The insectivores share with birds and predatory insects the control of invertebrate populations which tend to depress forest growth. Control is never absolute and no one species is critical; control rests with the complex. The depletion of the predators in the interests of particular forms of land use has endangered the maintenance of old forests and is a grave handicap to the establishment of new ones. Dr. Darling suggested that human ingenuity is not yet equal to controlling small rodents in an extensive habitat, for example, wood mice (*Apodemus*) and squirrels. Their vast numbers and fecundity, their smallness and capacity for evasion are too much for us. A good and varied stock of small carnivores is not only our best insurance but also the cheapest.

The grazers and browsers are comparatively few in numbers, but represent a considerable bio-mass. Although depressive to forest, a low density (the