existence of natural spread may well prove an embarrassment in experimental work, and will certainly increase the difficulties of control.

DISCUSSION

RØNDE KRISTENSEN: showed some deformed apples of the Danish variety Guldborg and asked whether these deformations are similar to those of green crinkle. They have been transmitted by grafting in Denmark.

Answer: The symptoms are quite similar to those of green crinkle on other varieties and so they may be caused by this virus.

POSNETTE: Does there exist, after the opinion of Dr ATKINSON, a possibility of seed transmission of the apple mosaic virus? It sometimes occurs that apple seedlings develop mosaic symptoms and seed transmission seems more likely than spread of the disease in the nursery.

Answer: There is not previously known any case of seed transmission of the apple mosaic. But in New Zealand the Jonathan variety contains for 100% a mild form of apple mosaic. Furthermore the English 'variegation' in the seedlings is quite similar to apple mosaic. So seed transmission might be a possibility.

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FLAT LIMB (FUREDE GRENE) OF APPLE TREES

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DISTRIBUTION IN VARIOUS COUNTRIES

Flat limb was mentioned in an Australian report (Jas. Lang) as early as 1905 but was then considered a purely genetical phenomenon. In 1907 the disease was reported from Connecticut (G. P. Clinton) in U.S.A. and then supposed to be frost damage. Later on – in 1911-12 – another hypothesis was brought forward by Australian workers (D. Mc. Alpin), namely that flat limb was due to incompatibility between the rootstock and the scions of certain apple varieties. In 1938 workers in British Columbia (J. W. Eastham) believed that flat limb most probably is a virus disease, as no fungus or bacterium had been found in connection with the disease. From Italy flat limb is reported in 1941 (A. Biraghi) as a graft transmissible disease, which has been known in Italy for many years. A Californian report from 1942 (H. E. Thomas) describes the disease as a virosis, which is graft transmissible to Pyracantha sp. From Nova Scotia in 1943 (J. F. Hockey) flat limb was described as very annoying in the apple variety Gravenstein. In one fruit farm the disease could have existed for at least 40 years. Investigations carried out in Nova Scotia show, that flat limb is transmitted with scions from infected trees, and the results indicate that symptom expressions are strongest on trees growing on rather weak rootstocks (E.M. IX). In the Nova Scotia report it is concluded, that if flat limb
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Fig. 1. Green crinkle on Sturmer apple; wart symptoms

Fig. 2. Granny Smith apples showing severe symptoms of green crinkle

Fig. 3. Granny Smith apple with both concentric ring and russet symptoms of ring spot

Fig. 4. Russet patches with brown margins beginning to form on a Granny Smith apple infected with ring spot