labelled carbon dioxide in the dark for 1 min.–2 hr., radioactivity was incorporated into the acids of the Krebs tricarboxylic acid cycle and amino-acids such as glutamic acid, aspartic acid and alanine. The authors considered that the amino-acids arose from the α-keto acids of the cycle by transamination reactions. The extremely low activity of transaminase observed by us at night may be indicative of predominance of organic acid production during dark fixation of carbon dioxide in cactus, with minimal transformation of α-keto acids to amino-acids. Conversely, the high activity of the enzyme commencing at noon and reaching an abrupt peak at 4 p.m. may be associated with increased amino-acid synthesis in the day-time. Our work on non-protein nitrogen of cactus tissue has been of a preliminary nature, but estimations of total protein reveal a rhythmic increase in the day-time.

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Shortening the Juvenile Phase of Apple Seedlings

Apple seedlings usually take 7–14 yr. to come into bearing. Many attempts have been made by plant breeders and others to reduce this juvenile phase, in order to obtain an earlier assessment of new seedlings.

Variations in pruning, nutrition and cultural practices have failed to shorten this juvenile period. By working seedlings on the dwarfing rootstock *MIX*, Tydeman[1] was able to shorten the juvenile phase by approximately one year. This practice has the disadvantage that many clones of this rootstock carry virus diseases and will consequently infect the new seedlings. It is therefore necessary to maintain the unworked seedling as well as its progeny worked on the rootstock, a system which doubles the land required by the plant breeder.

It has been found that apple seedlings worked on apomictic seedling rootstocks from *Malus sikkimensis* have a shorter juvenile phase than when worked on *MIX*; and since the apomictic seedlings are virus-free it should not be necessary to maintain the original seedling.

In an experiment begun in 1956, three crosses were made from which twenty-five seedlings were raised. These were multiplied vegetatively during their first year by budding on to one-year-old seedlings of *M. sikkimensis*; the young trees were later transplanted into the orchard.

It can be seen (Table 1) that 15 per cent of the trees were flowering 3 yr. after budding and 53 per cent after 4 yr. Since about one-third of the trees were fruiting by the end of their fourth year, and were carrying an average of seven fruits, it was possible to obtain an early assessment of the value of these new seedlings. None of the original twenty-five seedlings planted alongside for comparison has fruited during the same period, although both sets of trees have been treated similarly and no pruning has been carried out.

The possibility that other apomictic species may have a similar effect on the juvenile phase of apple seedlings worked on them is being investigated.

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Table 1. Apple Seedlings worked on *Malus sikkimensis*

Family	No. of trees	Third year				Fourth year			
		Per cent flowering	Per cent fruiting	Av. No. per tree		Per cent flowering	Per cent fruiting	Av. No. per tree	
				Flower clusters	Fruits			Flower clusters	Fruits
Newton Wonder × Emneth Early	88	23	6	4	7	57	25	17	18
Newton Wonder × Woolbrook Pippin	86	5	2	6	1	45	37	32	7
Newton Wonder × Mr. Prothero	34	20	19	4	2	38	29	41	

Cactus Virus in the United States

Since the first report by Molisch[1] of the presence of proteinaceous spindles in the cells of certain cacti, a series of researches has been made demonstrating the association of virus with the spindles and with amorphous inclusions[2].

The immediate source material for these investigations has been exclusively from European greenhouses and botanical gardens. We can now report the presence of virus in cacti cultivated in the United States.

Characteristic cigar-shaped spindles, usually one, but occasionally two to the cell, have been observed, mainly in the hypodermal cells of free-hand sections of pads of *Opuntia monacantha f. variegata* and of four other kinds of flat-padded opuntias cultivated in Montana and California. We examined one field sample of *O. lindheimeri* shortly after it was collected in Texas. No inclusions associated with virus were