In this method, bridges should be spaced about 3 inches apart around the trunk making sure that the bark in the middle between the bridges does not lose contact with the wood.

Following grafting, the unions at which the scions have been grafted to the tree should be bound tightly with tape and sealed with grafting wax or asphalt grafting compound. In the summer all shoots from the scions must be removed. The tape with the sealing compound should be removed in the late summer. It is advisable to protect the bridge grafts from frost during the winter by wrapping them with Tree Wrap paper bands.

In 1956 I performed the German method on 7-year-old 'Jonathan' trees on 'Minnesota Seedling' roots with 'M.9' scions and in 1972 the trees were still only approximately 12 feet tall (Fig. 4).

The German method is more complicated than the Sax method but the dwarfing effect is permanent.

Fruit Breeding Projects at the South Haven Experiment Station

ROBERT L. ANDERSEN AND JAMES E. MOULTON*

In March of 1969 Professor Stanley Johnston passed away, leaving a rich legacy of fruit germplasm for the authors to utilize in continuing fruit breeding efforts by the Michigan Agricultural Experiment Station. Some changes in projects have occurred. This article briefly summarizes present projects and their objectives.

Dr. Andersen, Superintendent of the South Haven Experiment Station, makes the station his residence during the growing season. The rest of the year he is officed in the Department on the East Lansing campus where laboratory and computer facilities are available. He is responsible for all tree fruit breeding.

Dr. Moulton is responsible for the small fruit breeding projects and has his office and home in East Lansing.

Fruit Breeding Projects

Apricots. This project started in 1939. One variety, 'Goldcot' (1967) was developed by breeding, and several other breeding selections are now receiving extensive orchard trials in Michigan. These have not been officially named or released. There is considerable interest in the possibility of growing apricots in carefully selected locations in Michigan both for fresh market and for processing.

Blueberries. The South Haven Experiment Station started investigations with the highbush blueberry in 1923. From this beginning a large industry has developed in Michigan. In the early stages, blueberry research at South Haven was largely involved with cultural problems. Blueberry breeding has followed two avenues, 1) crossing with the highbush species and 2) crossing the lowbush and highbush species. The main objective of the latter type of hybridization has been the development of suitable varieties for northern Michigan and for regions of simliar climate. There, the growing season is too short and temperatures too low for success with the highbush varieties. This has been a time-consuming and difficult project, but encouraging results have been obtained in recent years. The 'Northland' (1967) variety shows best suitability for this use. A wide range of interesting plant material has been obtained in this project, some of which

*Department of Horticulture, Michigan State University, East Lansing, Michigan 48823.

should be of value in present highbush production areas as well as in northern regions. The primary objective of present blueberry breeding is the development of a series of highbush varieties for the southern Michigan industry.

Nectarines. In 1963, after many years of testing nectarine varieties bred in other parts of the U.S.A., Professor Stanley Johnston initiated a nectarine breeding program for Michigan. The objective of this research, presently, is to develop a series of large, high quality nectarines to satisfy the growing consumer demand for this "fuzzless peach." Adaptability of our breeding lines to Michigan climate has been accomplished. Therefore, new nectarine varieties can be expected in the 1970's. New chemicals and hot water bath treatments for brown rot control increase the chances of Michigan growing this crop successfully.

Peaches. This project started in 1924 because at that time 85 percent of Michigan's peach production was of the 'Elberta' variety. This often caused market gluts, low prices, and harvesting and packing problems. Eight freestone varieties have been introduced: 'Halehaven' (1932), 'Kalhaven' (1936), 'Redhaven' (1940), 'Fairhaven' (1946), 'Sunhaven' and 'Richhaven' (1955), 'Cresthaven' and 'Glohaven' (1963). A clingstone variety, 'Suncling', was released in 1961.

The "Haven" varieties have been primarily useful to extend the fresh market season. 'Halehaven' is useful in commercial canning, and 'Kalhaven' for freezing. 'Redhaven' has gained world-wide acceptance as an early season fresh peach.

Present Peach breeding objectives are:

1. To find better fresh market varieties maturing three weeks before 'Redhaven'. These are expected to enhance direct fresh fruit sales by northern Michigan growers to Michigan's summer recreation customers.
2. To find a good fresh market variety ripening 2½ weeks after 'Redhaven' (between 'Glohaven' and 'Cresthaven' seasons). This is the time of the season when southern Michigan growers often receive the highest return for peaches.
3. To find a series of suitable clingstone varieties for processing.

At present, four fresh market freestones and 7 early clingstone processing selections are in advanced stages of testing on grower-cooperator farms. Release decisions on these eleven selections will be made in the mid 1970's.

Red tart cherries. This project started in 1970. Michigan is the leading producer of tart cherries. Spring frosts frequently cause crop losses. Fluctuations in supply due to such environmental stresses cause extreme price fluctuations and difficulties in holding markets. The advent of mechanical harvesting has revealed several other weaknesses of 'Montmorency', the only variety presently used by the Michigan industry. Variable fruit size and soft fruit cause mechanical pitting problems (pits being a major source of consumer complaints). The use of hardier, firmer pollen parents in crosses with 'Montmorency' is expected to produce new varieties with greater consumer acceptance and a more favorable grower profit situation.

Strawberries. This project started in 1950. Objectives have been to develop better varieties both for fresh market and processing. Attempts have been made to develop dual purpose varieties. No varieties have been named or released from this project but some promising selections are now in row tests and will soon receive extensive grower trial. Major emphasis is on sorts ripening before and after 'Midway', at present Michigan's leading variety.