our experimental plots because the virus of peach mosaic is not transmitted through the seed of the peach.[2] Seeds were planted in November, 1940, at Whitewater, Mesa County, Colorado. On May 15, 1941, the seedlings were approximately from 4 to 6 inches in height. On this date Elberta peach nursery trees in this area were well leaved. Twenty feet to the west of the seedling plot, which totaled approximately 400 trees, was a row of 30 three-year-old Elberta trees affected with the severe strain of the peach mosaic virus. Fifteen of the seedling trees on August 25, 1941, showed symptoms of the severe strain of the peach mosaic virus. These symptoms were evident in the new growth. Under these conditions of natural spread the incubation period was approximately 100 days or less and the spread of the disease occurred in the spring. This natural spread of the disease has never been observed in one-year-old Elberta peach trees in commercial orchards. It has been recorded in only a very few instances in the past in two- and three-year-old Elberta trees.[3]

Approximately the same length of time for the incubation of the virus has been demonstrated when bud and graft inoculations have been made in the spring.[2] In these latter cases symptoms of mosaic were shown by inoculated trees during the same growing season. On the other hand, trees inoculated in mid-summer or later did not show symptoms of mosaic until the following spring.

These studies re-emphasize the need for the immediate removal of all diseased trees as soon as leaf symptoms are evident.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE MECHANICAL SHAKER

A NUMBER of mechanical shaking devices are reported in the literature.[1-10] Some of these are of excellent design but involve considerable expense as well as the services of a trained mechanic in their construction. This places them beyond the means of many small projects.

Schwarz and Shapiro[9] have pointed out the advantages of the reciprocating type of shaker as compared to the rotating type, since the rapid changes in momentum of the liquid produce greater agitation. The reciprocating type, however, is subjected to considerably more strain in operation, and unless very good alignment is obtained the machine soon breaks down.

An almost ideal combination of advantages in construction, design and type of action is furnished by an ordinary sewing machine head. From it a mechanical shaker can easily be built which is compact, convenient and quite inexpensive. Following is a description of the shaker designed for use in this laboratory:

The sewing needle is detached and a thin strip of iron eight inches long by five-eighths inch wide is welded into its place. To this strip is fastened a wooden rack twelve inches long by seven inches wide. This rack is designed to hold flasks during shaking and is equipped with appropriate fittings. The wheel of the sewing machine is replaced by a pulley of desired size and the shaker is then powered by a belt drive from a 1/16 h.p. motor. The accompanying diagram (Fig. 1) illustrates its construction.

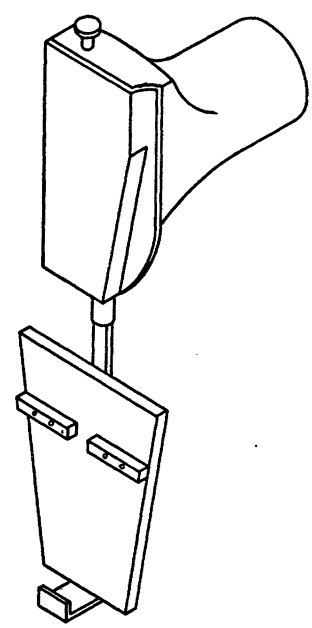

FIG. 1.

In order to reduce excessive noise and vibration at high speeds (200 strokes per minute), the shaker is made to operate against a slightly stretched screen door spring which is fastened to a stationary object (in this case the floor). A rubber eraser fastened to the shaker stand is placed so as to make a sliding contact with the flat surface of the moving flask carriage. The eraser thus acts as a guide for the carriage and effectively eliminates horizontal vibration. Care should be taken not to

[2] Lee M. Hutchins, E. W. Bodine and H. H. Thornberry. U. S. Department of Agriculture Circular No. 427. 1937.
[1] Anon., *Chem. Ztg.*, 36: 679, 1912.
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[8] Theodore Neustadter and Raymond Holz, *Jour. Lab. Clin. Med.*, 23: 313, 1937.
[9] E. R. Schwarz and Leonard Shapiro, *Ind. Eng. Chem., Anal. Ed.*, 10: 281, 1938.
[10] W. Steinkopf and H. Winternitz, *Chem. Ztg.*, 37: 40, 1913.

[3] E. W. Bodine and L. W. Durrell, *Phytopath.*, 31: 322–333, 1941.

place too great a load on the shaker when it operates at high speeds, an audible "knock" warning the operator in such cases.

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AUTOLOGOUS PLASMA CLOT SUTURE OF NERVES

FIBRIN suture of peripheral nerves accomplished by the use of fortified cockerel plasma with chick embryo extract as the clotting agent has been described by Young and Medawar.[1] These authors reported encouraging results following application of the method to suture of the sciatic nerve in rabbits. In repeating these experiments, we have found considerable inflammatory reaction with fibrosis at the site of the nerve suture. Because such reaction may seriously interfere with proper regeneration of nerve fibers, we have been led to study the suitability of autologous plasma clotted with autologous muscle extract for suture of peripheral nerves. Among other advantages, the procedure has proved to be simpler than the method employing heterologous materials.

The technique consisted of exposing and cutting the sciatic nerves of rabbits, bringing the retracted stumps together with jeweler's forceps, depressing the ends so as to form a trough and adding first 5 drops of plasma and then 1 drop of tissue extract. The fluids were mixed *in situ* and about 3 drops were withdrawn into a pipette to reduce to a minimum the amount of clot remaining as suture material. Although clotting occurred in about 40 seconds, the nerve ends were held together with the forceps for 4 minutes after addition of the fluids to make certain that the clotting process was complete. When tension on the suture line was great or the clot was of poor tensile strength, separation of the nerve stumps followed withdrawal of the forceps. This occurred in about 30 per cent. of the operations.

In order to evaluate the suitability of different suture materials, comparative studies were carried out with cockerel, human and rabbit plasma. In most of the experiments, heparinized or unmodified mammalian plasma was used and fortification of the plasma by the addition of fibrinogen was omitted. When no anticoagulant was employed, the blood was drawn into a chilled syringe coated with mineral oil and immediately transferred to paraffin-lined test-tubes packed in ice. The tubes were centrifuged in 250 cc cups filled with ice. In a few instances, citrated plasma was used and clotting was induced by addition of calcium chloride and tissue extract.

[1] J. Z. Young and P. B. Medawar, *The Lancet*, 2: 126, 1940.

Concentrated saline extracts of mouse lung and rabbit gluteus muscle were employed as clotting agents. One cc samples of plasma were coagulated in test-tubes of 8 mm internal diameter and the clots tested for tensile strength. Although great variation was found, the results indicated a superiority of mammalian over cockerel plasma. The average tensile strength found in 74 tests of human plasma was 89 grams; in 34 tests of rabbit plasma, 34 grams; in 16 tests of cockerel plasma from 4 birds, 19 grams.

Suture of the sciatic nerves was done in 27 rabbits. Rabbit plasma was employed in 19 of the sutures, while human and cockerel plasma were utilized 13 and 9 times respectively. Silk sutures and other control procedures were carried out in 11 instances. The sutured nerves were removed 2 to 26 weeks after suturing. Microscopic studies showed evidence indicating that the nerve fibers readily grow beyond the suture line into the distal end of the nerve.

These experiments have progressed sufficiently to permit the following conclusions:

(1) Rabbit plasma with rabbit muscle extract is superior to cockerel plasma with chick embryo extract for nerve suture in rabbits. The former clots possess greater tensile strength and provoke less inflammatory and fibrotic reaction.

(2) Clots obtained from human plasma cause more tissue reaction in rabbits than clots obtained from rabbit plasma.

(3) Autologous plasma clot suture of nerves in rabbits compares favorably with silk suture in the amount of resultant tissue reaction. The former moreover obviates the disadvantages of strangulation and disorganization of nerve fibers which occurs with silk suture, especially in small nerves with delicate connective tissue sheaths. When the nerve stumps are under tension, plasma clot suture is, at present, not as desirable as silk suture, since it possesses less holding power.

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