The precipitate from heated human plasma (presumably fibrinogen) was rendered innocuous simply by homogenizing it in an apparatus capable of breaking up tissue cells. Rapid intravenous injection of 40 cc of the homogenized suspension of the precipitate had no toxic effect on rabbits. This demonstrates conclusively that it is the particle size rather than the chemical constitution of this material which bears the toxic properties.

There is a distinct possibility that capillary emboli may play a role in the constitutional effects of severe burns. Many of the older investigators on pathogenesis of shock and toxemia in burns considered this possibility. Frankel[4] noted minute capillary thrombi in the liver, spleen and kidneys in burn cases, and Bardeen[5] reported that capillary thrombosis in the liver was not infrequent following burns. Billroth[6] and others supported the embolic theory of the etiology of Curling's ulcer. In experimental burns, Salvioli[7] found that previous defibrination of the blood rendered dogs more resistant to burns. He showed that warming of the mesentery to 55° C. caused adherence of platelets to the walls of small vessels and formation of minute thrombi. Vaccarezza[8] observed hypocoagulability of the blood following burns in dogs.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE METHOD FOR RAPID TUBE FEEDING OF RATS[1]

OUR attempts to forcibly feed rats have developed a method permitting one person to feed rats rapidly without recourse to expedients such as gags,[2, 3] holding the tongue,[4] wrapping the animal in towels[5] or clipping the teeth.[6] The method is described here in the hope that it will prove of value to others confronted with this problem.

The equipment required is: (1) a syringe of appropriate size; (2) a 7-inch piece of soft rubber catheter tubing (No. 8 Fr.), one end being cut square and the other beveled; (3) an adapter made by soldering a piece of brass tubing (1 cm long, 2 mm o.d.) to the hub of an old hypodermic needle and inserted into the square-cut end of the catheter tube; (4) a ring stand and burette clamp; (5) a piece of heavy string about 30 inches long having a large securely tied loop at each end.

The feeding is done as follows: The syringe is filled with the desired quantity of the liquid food mixture and is securely clamped to the ring stand in a horizontal position by means of the burette clamp. The rat is grasped in the left hand with the thumb and index fingers about the shoulders and the left foreleg held between the index and middle fingers. The right foreleg is supported by the thumb. With the rat in a vertical position facing the operator, one loop of the string is caught over the upper incisors, the string is passed over the back of the left hand and between the fourth and little fingers and is fastened by winding it several times about the latter. The tension on the string should be sufficient to hold the head of the animal securely against the palm of the hand. The other loop of the string is now caught over the lower incisors, passed down over the back of the thumb, and fastened by winding around the middle and fourth fingers of the left hand. Tension should be sufficient to hold open the animal's mouth, the extent of opening being controlled by pulling apart the thumb and index fingers which respectively increase the tension on the lower and upper jaws of the animal. The rat is thus effectively suspended by the two strings attached to its jaws. Undue pressure can not be exerted on the animal, for, in order to hold it securely, the thumb and index fingers must be held apart.

With the animal in a vertical position and resting its hind feet on the operator's chest, the wetted tube is inserted into the esophagus with a downward rotating motion. Using a soft rubber tube we have not once, in the course of several thousand feedings, inserted the tube into the trachea. When the tube is pushed down sufficiently (depending on the size of the rat), the adapter is firmly attached to the syringe and the contents of the latter are slowly forced through the tube. The tube is withdrawn and the string attached to the lower jaw is unwound from the fingers.

[1] Aided by a grant from the Rockefeller Foundation and administered by Dr. P. E. Smith.

[2] R. M. Reinecke, H. A. Ball and L. T. Samuels, *Proc. Soc. Exp. Biol. and Med.*, 41: 44, 1939.

[3] C. S. Mathews, E. L. Schwabe and F. E. Emery, *Jour. Lab. and Clin. Med.*, 27: 352, 1941.

[4] A. E. Pugh and A. W. Tandy, *Jour. Lab. and Clin. Med.*, 24: 80, 1938.

[5] D. J. Ingle, Personal communication.

[6] R. M. Reinecke and L. T. Samuels, *Endocrinology*, 30: 687, 1942.

[4] E. Frankel, *Deutsche med. Wchnschr.*, 15: 22, 1889.

[5] C. R. Bardeen, *Johns Hopkins Hosp. Rep.*, 7: 137, 1898.

[6] T. Billroth, *Wien med. Wchnschr.*, 17: 705, 1867.

[7] J. Salvioli, *Virchow's Arch. f. path. Anat.*, 125: 364, 1891.

[8] R. A. Vaccarezza, *Comp. rend. Soc. de Biol.*, 86: 1114, 1922.

The animal is placed on the table in an upright position and the loop holding the upper teeth flicked off in a single motion. The syringe and tube are rinsed with water and are ready for the next animal.

After short training a single operator can feed 30 to 40 animals per hour. Regurgitation or leakage up the esophagus is never encountered. By the use of this method we have supplied normal and hypophysectomized rats of all ages, beginning at 35 days, with their entire food supply for long periods with excellent results.

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THE USE OF CREOSOTE IN MOUNTING FLEAS AND OTHER ARTHROPODS ON SLIDES

To study the classification of fleas properly, it is necessary that unsclerotized structures and intestinal contents be cleared or dissolved away so as to expose the taxonomically important terminalia. In general, the procedures used to accomplish this end are long and tedious. It is usually considered necessary to treat the material with potassium hydroxide, dehydrate in several changes of alcohol and clear in xylol before mounting in balsam. The technique of C. Fox[1] makes eight treatments necessary before the flea is ready for study, while that published by the writer[2] in 1940 involves six steps, which is but a slight saving in time and trouble.

In an effort to discover a method of preparation which would dispense with potassium hydroxide, and the necessity for dehydrating and clearing in separate processes, experiments were made with cedar oil, clove oil, beechwood creosote and wood creosote. It was soon discovered that the best of these reagents for this purpose is wood creosote. Creosote not only clears the soft parts and intestinal contents to a satisfactory degree, but also prepares the specimen for mounting in balsam. No other reagent is necessary. The flea may be removed from any degree of alcohol or even from water and placed in creosote for 24 hours. Thereafter it is ready for mounting in balsam. Both the creosote U.S.P. from wood tar and the creosote U.S.P. from beechwood were satisfactory.

The chief advantage to this method of preparing fleas is the convenience of having to use but a single reagent. There are other advantages, however, to the use of creosote instead of KOH. It frequently happens in the use of KOH that important taxonomic characters are distorted, the setae are loosened and lost, and in general much destruction of parts inflicted. These things do not happen where creosote is used, and it is the writer's opinion that a much better mount is obtained, since sufficient clearing is accomplished without the violent action of a caustic. A disadvantage to the use of creosote is its slightly irritating effects to the human skin and the objectionable odor, but the writer does not regard these as annoying to a prohibitive degree.

This simple process has proved a boon not only as regards research in the taxonomy of fleas, but also in preparing material for use by large classes in entomology. Thrips, Collembola, mites, immature stages of Diptera, and insect organs, such as honeybee stings, mouthparts, etc., have been prepared quickly and easily by simply dropping the material in creosote and mounting in balsam after 24 hours. Where the integument is rather delicate, as in the case of some Collembola, it is preferable to "cut" the creosote with equal parts of absolute alcohol. The process should not be used, however, where the integument is very delicate or where it is desirable to retain the coloration.

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[1] Carroll Fox, "Insects and Disease of Man," p. 221. Philadelphia, Pa., 1925.

[2] Irving Fox, "Fleas of Eastern United States," p. 2. Ames, Iowa, 1940.

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