walls were parallel as indicated by uniform stippling.

The pestle of the homogenizer was constructed of a 1-in Lucite rod 4 in. long, threaded at one end to receive a ¼-in. stainless-steel shaft. The shaft was of sufficient length to clear the reservoir by 2 in. with the pestle in position. The Lucite rod was turned down on the lathe to a diameter 0.001 in. less than that of the barrel. Eight turns of a four-to-the-inch left-hand thread were cut into the pestle, and four grooves 1/16 in. deep were cut longitudinally from the middle of the pestle to within ½ in. of the lower end. The threads and grooves were cut with a round-ended tool so that there would be no sharp angles into which the homogenate could pack. The top ¾ in. of the pestle was tapered outward from the stainless-steel shaft. Finally, the pestle was ground in with 220-mesh Alundum to give a loose fit (0.002 to 0.003 in. clearance).

In use, the barrel was held rigidly in a vertical position, and the shaft of the pestle was connected by a length of rubber pressure tubing to a suitable stirring motor. The tissue to be homogenized was minced and suspended in two volumes of the homogenizing medium. For intestinal mucosa, 5 sec in the Waring Blendor gave a suitable suspension. The suspension was then passed through the homogenizer at a rate of 600 ml in 30 min. In order to obtain adequate homogenization, two more passages through the homogenizer were required, after which microscopic examination indicated 70 to 90 percent disruption.

The homogenizer is obviously susceptible to considerable modification in size and detail, and could readily be jacketed for cooling. In addition to the work with mucosa, it has also been useful in preparing large volumes of liver homogenates (*2*).

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New Stereotaxic Instrument for Use with the Rat

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Since the original development of a stereotaxic instrument by Horsley and Clarke, a number of different devices for placing lesions within the brain have been described for use with monkeys, cats, and rats (*1–5*). Nevertheless, many fundamental difficulties remain in their use, particularly with the rat. The present development provides an instrument for use with the rat (*6*) that would offer maximal stability, accuracy, and ease of operation.

The following are the major advantages of the instrument described here (Fig. 1). First, the 10- by 30-cm platform *A* to hold the animal is mounted on two racks to permit movement of the animal forward and back or left and right under the active electrode. This procedure eliminates the need for racks or slides above the head of the animal, and thus simplifies the construction of the electrode carrier; more important, it gives clear and unobstructed access to the operative field. By moving the platform, the animal can be placed anywhere under the active electrode over a range of 5.0 cm in the anterior-posterior direction and 4.0 cm in the left-right direction.

The second, and perhaps most noteworthy, advantage, is the construction of the electrode-carrier assembly. The entire carrier is mounted on a movable post *B* attached to the base of the apparatus 18 cm in front of the ear bars. This post can be swung aside so that the head of the animal is fully exposed to the operator. When coordinates are to be determined or the electrode is to be placed, the post can be swung back and locked into position, leaving the electrode zeroed over the head of the animal. The electrode itself can be adjusted in four ways: (i) the electrode carrier *C* can be moved vertically by a rack-and-gear arrangement over a range of 5.5 cm; (ii) it can also be adjusted over a 90° arc *D* in the anterior-posterior plane, giving any angular approach from 45° posterior to 45° anterior; (iii) this anterior-posterior arc, holding the electrode carrier, is in turn attached to a circular rack *E* that permits angular adjustments in the left-right plane, 50° each way; (iv) the post supporting the entire carrier assembly can be moved up and down on a screw *F* over a range of 3.5 cm, and thus allows a second vertical adjustment of the active electrode.

With these four adjustments, the active electrode can be brought directly to any target structure within the brain from any angle. The principle involved is simply to make the target the center of the hemisphere described by the anterior-posterior and left-right arcs. Then, whenever the electrode-carrier is returned to zero, the tip of the active electrode will always be on the computed target, regardless of whether the approach is from a simple or a compound angle or is perpendicular to the brain.

The procedure is simple. When the active electrode is at the correct anterior-posterior and left-right coordinates above the target, the post is elevated far enough on its screw to allow the electrode to be set at zero and still clear the animal. The post is then lowered on its screw until the tip of the electrode just makes electrical contact with the dry dura mater. To prepare for the penetration of the brain for a given distance in order to reach a particular target, the electrode is raised above zero in excess of that distance, and the post is lowered on its screw by exactly that distance. Then, no matter at what angle the electrode is placed, its tip will always reach exactly the same target within the brain when its carrier is returned to zero since the target is always zero, and zero is always the center of the sphere that can be described by all angular adjustments.

The angular adjustments afford two other advantages: (i) In different operations, different superstructures may be traversed on the way to the same target, thereby providing a control against incidental destruction of any particular structure in the brain above the target. (ii) They make it very convenient to reach targets on the mid-line without having the approach obstructed by the longitudinal sinus.

The active electrode is a wire of platinum and 10 percent iridium coated with glass, except for 0.5 mm of exposed tip. The glass insulation is achieved by heating the platinum wire to burn off the hydrogen for good fusion and then inserting it into a fine glass tube until a little more than 0.5 mm protrudes. The platinum and glass are then fused carefully in a tiny flame and a long, fine copper wire is soldered to the free end of the platinum. The electrode is then threaded through 1-mm glass tubing until 2 cm protrude, and it is secured to the glass holder by cement. Finally, the fused end of the electrode is ground by hand on a fine emery belt until it is sharpened like a pencil and only 0.5 mm of wire is exposed.

The chuck *G* holding the electrode is taken from an Eversharp automatic pencil, and it is mounted in the electrode carrier on a ball-joint. Once the electrode is in place, the chuck can be positioned on the ball joint until the tip has been zeroed precisely. Then the ball joint is clamped firmly. In this process of zeroing, the distance that the electrode protrudes from its chuck is also adjusted until its tip just makes contact with the true zero of the apparatus, located on the platform exactly in the mid-line between the posts holding the ear bars. An auxiliary zeroing point, well off to the side of the animal's head, permits adjustment of new electrodes while the animal is in the apparatus.

The current used to make lesions is supplied by a 45-v battery. An electronic current regulator permits the application of any current up to 5 ma for any duration without fluctuations due to accompanying changes in the resistance of the animal. The positive lead of the current source is jacked into the top of the carrier *H* to make contact with the fine copper wire soldered to the electrode. Thus the active electrode is an anode. The indifferent cathode is a brass rod, 3 mm in diameter, inserted rectally to complete the circuit.

The head of the animal is held in place primarily by means of ear bars *I* that slide in posts on the platform. The end of each bar has a small nipple *J* mounted on the wide taper of the head of the bar. To insert the nipples into the ears accurately, the ears are slit and the meatus exposed. By sliding the ear bars until their calibration marks show that they protrude equally from the posts, the animal can be centered under the electrode and secured in position when the bars are anchored by thumbscrews *K*. Then the nose of the animal is clamped between a bar *L* under the upper incisors and a clamp *M* over the nose. This nose-clamp assembly can be raised or lowered and moved anteriorly and posteriorly to adjust the animal evenly in the apparatus.

The final adjustment of the animal in the headholder is made by locating the bregma with the tip of the electrode. The bregma is the intersection of the

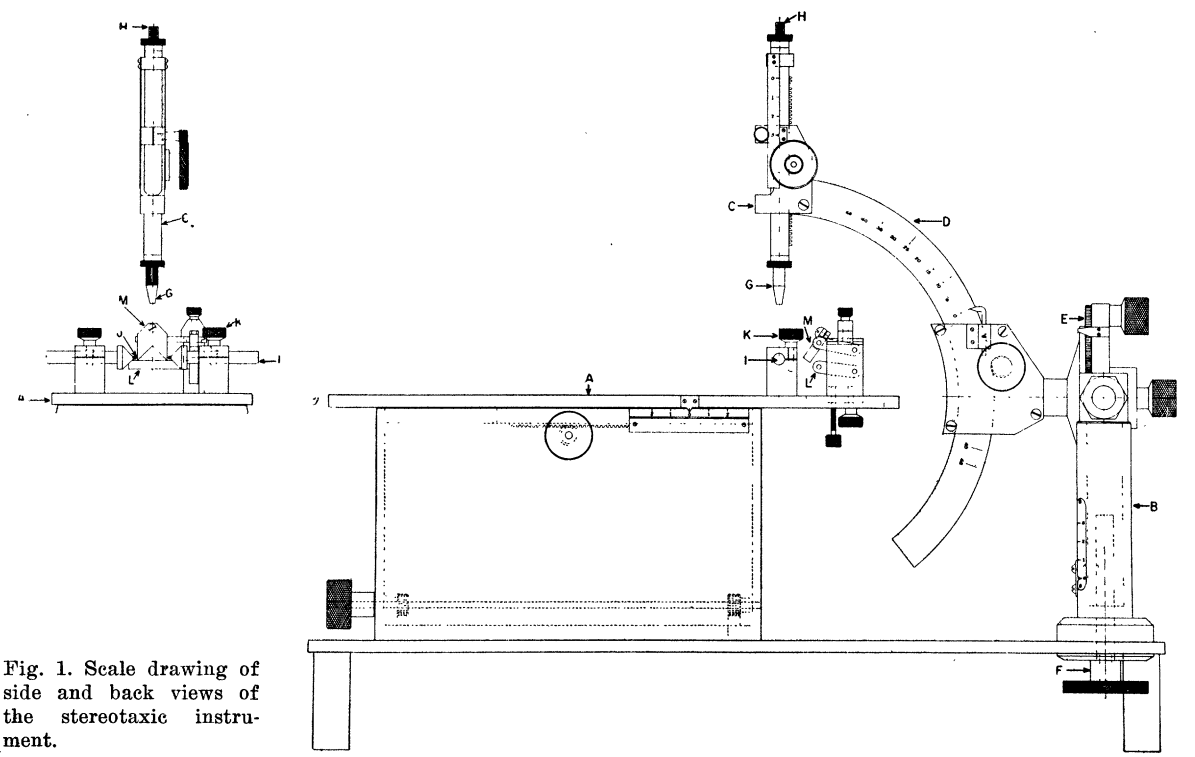

Fig. 1. Scale drawing of side and back views of the stereotaxic instrument.

frontal and sagittal sutures, and it is indicated on Krieg's atlas of millimetric sections of the rat's brain (*7*). Hence, it can be used as a reference point for the coordinates needed to reach any structure within the rat's brain.

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New Method of Presentation of Food Samples to the Hunter Color and Color Difference Meter

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In our attempts to establish the relationship between the color of processed fruit and vegetable products, as determined by the Hunter Color and Color Difference Meter (*1*) and the score given for color by the Agricultural Marketing Service inspectors, certain difficulties have arisen. The Hunter instrument only permits the use of products in discrete forms through multiple spot readings on the sample food product. These multiple readings are time consuming. To surmount this difficulty, some investigators (*2*) have presented a homogenized sample to the meter. This does eliminate the variation induced by the various angles and interstices of the product, but it also presents to the meter a product totally unlike that which is viewed by the Agricultural Marketing Service inspector or other observers.

We are reporting a new approach to the problem

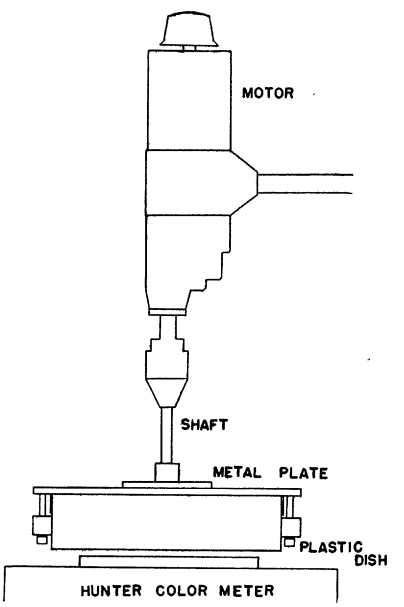

Fig. 1. Apparatus for the presentation of food samples to the Hunter Color and Color Difference Meter.

Table 1. A comparison of Hunter* "L," $+a_L$, and $+b_L$ readings taken by three methods of sample presentation.

	Sliced Marshall strawberries				Whole Canby raspberries			
	Homogenized sample	Rotated in dish	Five multiple spot readings	Average of spot readings	Homogenized sample	Rotated in dish	Five multiple spot readings	Average of spot readings
Hunter "L"	24.6	29.2	29.4 28.5 28.4 31.7 30.0	29.6	21.7	17.9	16.0 19.2 18.8 20.1 19.0	18.6
Hunter $+a_L$	27.0	31.6	32.7 **32.9** 28.7 32.3 30.3	31.4	30.2	27.3	26.9 26.0 28.8 28.1 28.4	27.6
Hunter $+b_L$	12.0	16.8	16.4 **15.7** 14.2 16.7 16.2	15.8	10.0	7.9	7.1 8.1 8.3 9.2 8.5	8.2

* L (visual lightness) and ordinates "a" and "b" are used to describe color by the Hunter system.