tions. Landsteiner himself early pointed out the possibility that iso-agglutination might prove of importance in the identification of blood for medicolegal purposes and also in blood transfusion. The practical use of blood grouping, now universal, to exclude incompatible donors in therapeutic transfusion was initiated and developed especially in this country. When it became established that the factors on which blood grouping depends are transmitted according to the laws of heredity, determination of the blood groups was applied to the study of interracial relationships and of problems of parentage. When Landsteiner described the blood groups, he was an assistant under Weichselbaum in the pathologic-anatomic institute of the University of Vienna. No doubt he little thought then that that work was to bring him such rich reward thirty years later, but he did the work and carried out the observations as carefully and accurately as he could without any consideration or motive other than to find out all in his power about something new and obscure. Thus his work became the starting point in a series of advances in knowledge and achieved its international and well-merited recognition.—*The Journal of the American Medical Association.*

SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN ELECTROMAGNETIC TOUCH-STIMULUS REACTION KEY

FOR laboratory investigation of tactual reaction time, the author has constructed and employed with success at the Florida State College for Women an electromagnetic touch-stimulus reaction key which can be controlled at a position remote from the recording chronoscope. The apparatus described below is an improved form of the author's original key. The extended rocker of the original key was provided with an elongated terminal perforation through which a metal rod was activated vertically by means of the armature of a modified electromagnetic sounder. By substituting linear solenoid motion for the leverage armature motion which characterized the earlier model, any angular displacement of the plunger rod is completely eliminated.

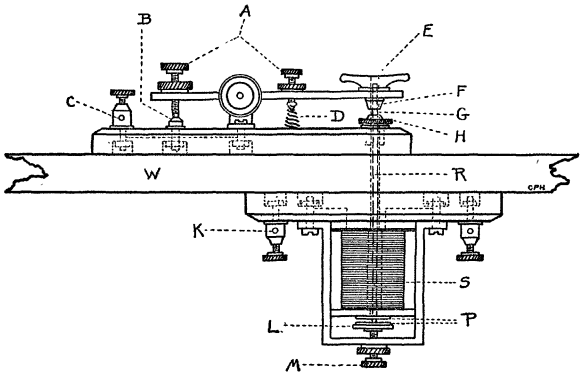

FIG. 1. Electromagnetic reaction key. A, Adjusting screws. B, Platinum contact. C, Binding post. D, Brass resistance spring. E, Rubber finger knob with circular hole in center through which plunger rod passes. F, Heavy platinum contact. G, Hard rubber plunger rod. H, Adjusting screw which serves as binding post. K, Binding post connecting electromagnet. P, Thin felt cushions. S, Magnetic coil wound with 22 B.S. gauge double cotton covered wire. R, Plunger rod passing without contact through table top. L, Soft iron plate to which plunger rod is affixed. M, Adjusting screw to vary the distance between plunger plate and magnet core.

The reaction key (Fig. 1) is simple in design and is substantially constructed of hard brass to withstand considerable laboratory use and punishment at the hands of the beginner. The reaction key is employed in conjunction with the Heinlein duo-circuit stimulus key. The latter key, consisting of two conjoined but mutually insulated parallel rockers balanced on a single fulcrum, acts as a nicely adjusted double-pole single-throw circuit breaker. Both reaction and stimulus keys are inserted in the conventional Dunlap chronoscope circuit. The complete electrical hookup is indicated in Fig. 2.

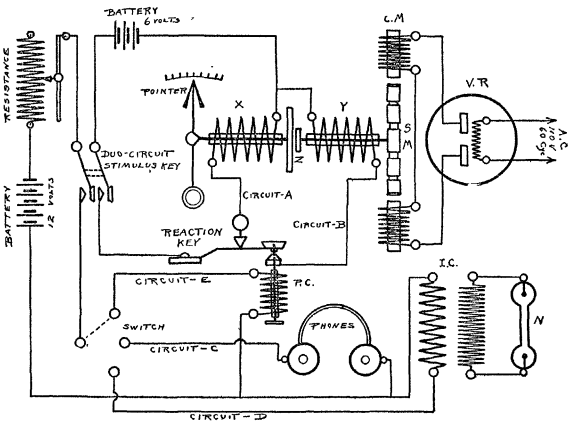

FIG. 2. Chronoscope hookup. X, External clutch coil. Y, Internal clutch coil. Z, Clutch plates. SM, Armature of synchronous motor. CM, Motor field pole. VR, Valve rectifier. PC, Plunger coil of touch reaction key. IC, Induction coil. N, Neon tube.

When the finger knob of the duo-circuit stimulus key is depressed, through completion of the primary and secondary circuits, both the internal electromagnetic coil of the chronoscope friction clutch and the electromagnetic coil of the touch-stimulus reaction key are simultaneously activated. If the internal resistance, magnetic affinity and working load of each electromagnetic coil are approximately the same, the

dynamic lag characteristic of the first coil should approximately equal the dynamic lag characteristic of the second coil. Any existing lag difference will not vitiate accurate timing provided that the extent of such lag difference is determined, since the existing difference itself is a constant when the parallel circuit E.M.F. is constant.

In actual experimentation, the director first presents to the subject a "get ready" signal by depressing a special circuit key which may either illuminate a small tungsten lamp or activate a high frequency buzzer. This preliminary signal is afforded for the purpose of informing the subject just when to place his finger on the concave cushion knob of the reaction key. After an appropriate interval, the time value of which may be controlled by a seconds pendulum and varied at the discretion of the director, the experimenter then depresses the duo-circuit stimulus key. Depression of the reaction key followed by depression of the stimulus key closes circuit B (Fig. 2), thereby forcing the plunger rod through the finger knob aperture of the reaction key simultaneously with the initial movement of the pointer on the time dial of the chronoscope. The subject has been previously instructed to release his finger from the reaction key the instant that he perceives the plunger rod touch his skin. Release of the reaction key by the subject provides a circuit transfer from B to A which magnetizes the external coil X of the chronoscope clutch and thus attracts the dial pointer outward to a state of rest. Since a valve rectifier (VR) is inserted between the synchronous motor of the chronoscope and the alternating circuit main, the conventional 60-cycle input is converted into a 30-cycle input (sixty impulses per second) which provides a dial measuring unit of one six-hundredth of a second. According to Dunlap, a measuring unit of two sigma is small enough for practical purposes. The investigator should never utilize alternating current that is not centrally synchronized.

If the experimenter wishes to investigate reaction time to auditory and visual stimuli in addition to reaction time to touch stimuli, the necessary apparatus adequate to provide such sensory stimulation may be inserted in the same chronoscope circuit without difficulty. A three-point switch shifts the stimulus control current from the plunger coil (circuit E) either to a pair of 2,000 ohm headphones (circuit C) or to an induction coil which is directly connected with a neon lamp (circuit D). The same reaction key may be used for each of the three types of presented stimuli.

CHRISTIAN PAUL HEINLEIN
PSYCHOLOGICAL LABORATORY,
FLORIDA STATE COLLEGE FOR WOMEN

A METHOD TO SOFTEN TISSUE ALREADY IMBEDDED IN PARAFFIN[1]

THE method is believed to be generally applicable. It was first tried by the writer on lily ovary tissue in Professor W. C. Coker's laboratory at the University of North Carolina. The most convincing results, however, have just this summer been obtained while doing histological work on the pineapple leaf.

The pineapple leaf in a fresh condition, though rigid, is not particularly tough. In paraffin it is definitely brittle, and without softening treatment the tissue crumbles on the knife instead of cutting.

The following method has been used very successfully in obtaining smooth, even and straight paraffin ribbons of sections of pineapple leaf.

1. Rectangular pieces of leaf not over 4 by 10 mm, preferably smaller, are fixed in FAA. The pineapple leaf varies in thickness from less than 1 mm to about 2 mm.

2. Dehydrate and clear in the usual way with ethyl alcohol and xylol.

3. Infiltrate and imbed in paraffin. Infiltration must be as nearly perfect as possible. Paraffin of melting-point 52°–54° C. has been used on account of lack of that of 56°–58° C., which it is believed would be better suited for our laboratory temperature range of 27°–29° C. during the daytime. At this temperature sections could not be cut continuously successfully at less than 12 μ.

4. Shape the imbedded tissue ready for cutting. Trim the two edges and one end so that the leaf tissue will be directly exposed. This is very necessary to facilitate the subsequent treatment. If the piece is long, both ends may be exposed. Drawing the edge of a sharp, thin razor blade across the surface of the paraffin block to which the leaf tissue is nearest will also help, but is not necessary unless large pieces are used.

5. Store in 95 per cent. alcohol (at a temperature of about 30° C.) containing enough carbol fuchsin to make it pink. If material turns red throughout when transferred to water containing a little carbol fuchsin, infiltration was not complete. Such material will not cut satisfactorily. Paraffin is very slightly soluble in 95 per cent. alcohol at 28°–30° C.

Two to 4 days is sufficient to make the younger leaf tissue cut satisfactorily. Two to 3 weeks improves it and is necessary for the older leaf tissue.

6. Transfer to water 2 to 24 hours before trying to cut.

7. If, after half a block has cut well, the ribbon

[1] Since this announcement went to press, more definite results have been obtained and will be published later. The work is being continued in the Botanical Laboratory of Johns Hopkins University.