cal, or other unscientific prejudices" can be escaped only by accepting consciousness as a function of the brain in the sense of a vital mode (Chapter XVI) like muscle contraction, nerve conduction or reflex physiological habit, and, therefore, as a causative factor in bodily activity. Allied with this vital function are systems of "vital reserves" (Chapter XVII) ranging from the simple reflexes to the more general reserves of the cerebellum and the specific mnemonic reserves of the cerebral cortex, the last of which is the source particularly of spontaneity, initiative and inventiveness. "Forward Reference" (Chapter XVIII) through symbolism "comes to fruition as conscious purpose," which is not a mystical force but the natural result of cortical processes which are natural results of previous bodily activities—the expression of vital reserves in cortical action.

The last chapter (XIX), which can not be briefly summarized but must be read in the light of what goes before in order to be fully appreciated, urges the consideration that man's behavior is not that of rats and monkeys simply enlarged and complicated, but contains new patterns not elsewhere known, in which habitude "gives way to insight in terms of generalization of experience, foresight of possible future consequences of action, the fabrication of consciously directed purposes, deliberative choice in view of these purposes, and finally the development of ideals of character and the shaping of daily conduct with a view to molding the personality in conformity with these ideals." Since "mind as cause" is in this unique pattern a "new vital mode" it is purely biologic. At the same time it pragmatically satisfies all requirements "esthetically, socially, morally."

In the preface Professor Herrick explains that this book is the outgrowth of a resurvey of the cerebral cortex, particularly in the light of "Lashley's fundamental experiments in the learning processes of rats," in search for a "common ground upon which objective psychology and introspective psychology may cooperate harmoniously without sacrifice of sound scientific method or of those distinct technical procedures which each of these sciences has hitherto so fruitfully employed." In line with this purpose the work appeals to the writer as an exceedingly valuable contribution, in which masterful, detailed knowledge of the nervous system blends with a comprehensive view of the field of psychology. Since the details of conduction paths are not introduced, profitable reading requires only a good knowledge of the general divisions of the brain and of cortical structure.

The personal touch given by the author's reference to his brother, the late Professor Clarence Luther Herrick, as his inspiration to scientific endeavor in the particular line of this work will meet an affectionate response on the part of all who knew that "unsurpassed teacher" as companion and friend.

G. E. COGHILL
THE WISTAR INSTITUTE OF ANATOMY AND BIOLOGY,
PHILADELPHIA, PA.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLE METHOD FOR THE DEVOCALIZATION OF DOGS

IN a laboratory situated within a residential district, it is frequently somewhat of a problem to keep a number of experimental dogs because of their persistent barking during their cage confinement. Training the animals to remain quiet requires a great deal of time and much more patience and is usually unsuccessful. If new dogs are being continually introduced into the laboratory it is impossible to prevent this annoyance except by depriving the dogs of their vocal function. The following method of devocalization is recommended for its simplicity and effectiveness. In the past year. successful devocalization has been accomplished on over one hundred dogs at the School of Hygiene and at the Biological Laboratory at Cold Spring Harbor, L. I., N. Y.

A head-holding device, as is illustrated in Fig. 1, is very inexpensive and is adaptable to almost any type of operating table. It is necessary to employ some such mechanism as this, as it is exceedingly difficult to procure a mouth-gag that is suitable for all sizes and types of dog mouths.

This apparatus was devised and built in the laboratory. The support (A) is of strap iron 1¼″ x ⅜″ bent as illustrated to conform to the dimensions of the table and the general proportions indicated in the figure. The horizontal portion is drilled (¼″ holes) about two inches from each end (D and D′) to accommodate two ring-bolts. If rope-holding clamps are available, they may be fastened to the support in place of the ring-bolts. The vertical portions of the support are drilled (¼″ holes) at several three-inch intervals from the free ends, so that the height of the rack may be adjusted to the requirements of the animal. Small stove-bolts through a pair of these holes at corresponding levels hold the rack at the desired height. The ends of the support penetrate pieces of strap iron 3½″ x 1¼″ x ⅛″, which are provided with slots to receive the ends of the support. Two holes are drilled in each of these plates to take the wood-screws or bolts which fasten them to the top of the table flush with the surface. The rack is further secured by two pieces of strap iron 3½″ x 1¼″ x ⅛″, sufficiently offset to embrace each end of the support. These are fastened to the table by bolts, as

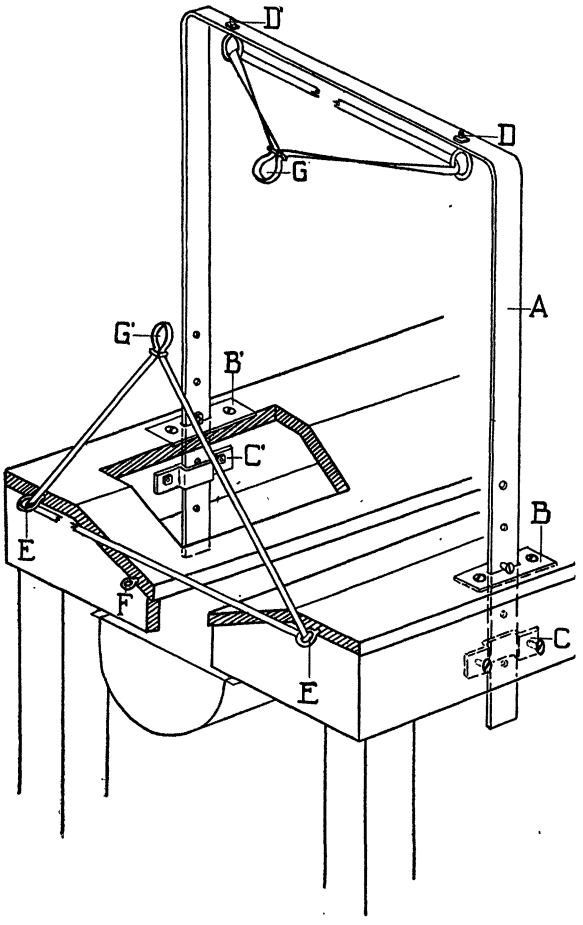

FIG. 1. Diagrammatic representation of front end of operating table with head-holding rack in position. Section on left side cut out to show details of fastening support at C'.

shown in the illustration.

The rack may be removed when not in use. It should be protected against rust either by galvanization before assembling or by painting with aluminum paint.

The front end of the table is provided with two large screw-eyes (E and E') and one smaller one (F).

For holding the jaws, lamp wicking three fourth inch wide has been very satisfactory. A narrow brass buckle slipped close to the dog's muzzle holds the wicking tightly around his jaw. The wicking has the advantages of being soft and flat enough to protect the dog's lips, and yet of gripping the jaws of any size dog very securely.

The dog is prepared for the operation by the injection of about 1/150 grain of atropin sulphate (in order to control salivation) with or without morphia. The animal is much easier to handle if from one half to one and a half grains of morphine sulphate, according to the weight of the animal, are injected a half hour before operating. The dog is tied securely on to the table in the ventral recumbent position. Enough ether is administered to render the animal entirely unconscious. If desired, the use of ether may be avoided by spraying a 1 per cent. solution of novocaine into the mouth over the tongue and down into the larynx, but as a rule ether anesthetization is more satisfactory. The loops of wicking (G and G') are quickly slipped into the dog's mouth, the buckles pushed against the muzzle, and the wicking is then pulled tight so that the jaws are opened as far as possible. It is fastened by tying in a knot between D and D' and between E and E', unless clamps have been used to hold it. The dog's tongue is seized with tongue-grasping forceps and is pulled forward. A cord from the screw-eye at F is tied into the handle of the forceps with a slip-knot in order to secure the tongue. The epiglottis is seized with a long pair of tissue-grasping forceps and is drawn forward. The field of operation, the interior of the larynx, is thus exposed and is best illuminated by a headlight. The true or inferior vocal cords appear as whitish membranous folds on the lateral walls, diverging as they extend dorsally. They are separated by a triangular space. Holding the epiglottis forward, the movable blade of a No. 1 or "small" round Hartman tonsil punch (may be obtained either with scissor handle or pistol grip) is inserted lateral to the fold, and as large a section of the vocal cord as possible is removed. The operation is repeated until the entire vocal cord is cut away from the larynx, then the other cord is similarly removed. The removal should be quickly accomplished and in such a manner that no ragged edges or tags of tissue are left. Unless the walls of the larynx are mutilated, bleeding is very slight and is controlled by a cotton swab dipped in a 1 per cent. Dakin's solution. The entire operation must be completed before anesthesia has worn off and the laryngeal walls have become tactually irritable, otherwise a coughing reflex will occur each time the lining of the larynx is touched. The clamp on the epiglottis is removed, the tongue is released and the animal is allowed to recover from the anesthesia. No further treatment is necessary.

There has never been, in any of my cases, interference with deglutition because of laryngeal relaxation after cutting the vocal cords. The animals eat normally from the day after the operation. Their attempts to bark are in no way interfered with, but the only sound they are capable of producing is a muffled hissing sound, scarcely audible in the next room.

JUSTIN M. ANDREWS

JOHNS HOPKINS SCHOOL OF HYGIENE AND PUBLIC HEALTH