30 (726)

Reversal of the cardiac mechanism. An additional note.

By HORATIO B. WILLIAMS and HENRY JAMES.

[*From the Physiological Laboratory of Columbia University, New York.*]

Since making our previous report on this subject, electrocardiograms have been obtained from the same patient in which occasionally the small downward deflection between R and T fails. The form of the ventricular electrogram in these instances is precisely similar to the others with the sole exception of the absence of the small downward deflection. This we regard as confirmatory evidence of the correctness of the view that the downward deflection is caused by the action of the auricles and that the usual curve is not simply an unusual ventricular complex. In the occasional instances cited conduction seems to have failed.

When this case first came under observation it seemed desirable to attempt to reproduce the condition experimentally. We have performed up to the present time seven experiments with one positive result. Rothberger and Winterberg have published curves showing transient reversal resulting from simultaneous depression of the sinus-region of the right auricle with cold and stimulation of the left ganglion stellatum. The apparent permanence of the condition in our patient leads us to think rather of an anatomical lesion than of nervous influences as the cause of the condition. Our experiments have consisted in depression (with anode) crushing, and excision of the region of the sinus node. In some instances nearly the entire anterior wall of the right auricle including a large part of the walls of the venæ cavæ where they fuse with the auricle, have been excised.

Slowing of the heart beat was the usual result and the auricles and ventricles generally beat nearly or quite simultaneously. In the single positive experiment auricular fibrillation resulted from the application of a clamp to the upper part of the sinus region where the greater bulk of the node is usually found. This persisted for twenty minutes and stopped immediately on application of a second clamp immediately below the first. The auricles

and ventricles then beat simultaneously. The application of a third clamp at the junction of the inferior vena cava and auricle was followed by reversal of the mechanism which persisted until the animal was killed.

The occurrence of reversal but once in a series of seven experiments has occasioned no surprise. We had surmised that after destruction of the usual pacemaker it would be quite fortuitous should the next most irritable focus lie below the auricles.

Before definite conclusions can be drawn regarding any relation which may be thought to exist between the clinical and experimental conditions it will be necessary to determine whether this is the only lesion which can give rise to a permanent reversal of the cardiac mechanism.

31 (727)

The intercalated discs of atrophied heart muscle.

By H. E. JORDAN.

[*From the Anatomical Laboratory, University of Virginia.*]

In two earlier papers[1] I presented evidence in support of my interpretation of intercalated discs as irreversible contraction bands. In a more recent paper the idea was tested by appearances in a natural experiment, namely, extremely hypertrophied heart muscle.[2] The conditions here obtaining were in perfect accord with, and confirmed the plausibility of, my previous interpretation. Since then I have had opportunity to study lesser degrees of hypertrophy, as well as an excellent specimen of atrophy[3] (weight of heart 180 grams). It is the purpose of this note to complete my report of observations on intercalated discs by a record of my findings in atrophied heart muscle, and to reëmphasize the point that all the evidence, including ontogenetic, com-

[1] Jordan, H. E., (1911) "The Structure of Heart Muscle of the Humming Bird, with Special Reference to the Intercalated Discs," *Anat. Rec.*, 5: 11; (1912; with Mr. K. B. Steele) "A Comparative Microscopic Study of the Intercalated Discs of Vertebrate Heart Muscle," *Am. Journ. Anat.*, 13: 2.

[2] Jordan, H. E. (1912), "The Intercalated Discs of Hypertrophied Heart Muscle," *Anat. Rec.*, 6: 9.

[3] For this material I am indebted to Dr. W. H. F. Addison, of the University of Pennsylvania.