least of the inhibitory fibres of the vagus go, there to come into intimate relation with the cardiac mechanism.

Effect of Stimulation of Ostial Parts of Great Veins in certain Abnormal Conditions.

At certain stages of the process of asphyxia, and in the dying heart, there is often seen a very remarkable alteration in the behaviour of the ostial parts of the great veins towards direct stimulation with interrupted currents. In such circumstances, an inhibition of the spontaneous rhythmic action of these parts may often be seen as a result of direct stimulation, whereas in the normal state such a stimulation is productive of immediate and striking acceleration.

VI. "On the Structure of the Electric Organ of *Raia circularis*."

By J. C. EWART, M.D., Regius Professor of Natural History, University of Edinburgh. Communicated by Professor J. BURDON SANDERSON, F.R.S. Received April 30, 1888.

(Abstract.)

This paper gives an account of the structure of the cup-shaped bodies, which, as mentioned in a previous paper read 26th April, 1888, make up the electric organs of certain members of the skate family. The structure of these electric cups has been already studied in three species of skate, viz.: *Raia fullonia*, *R. radiata*, and *R. circularis*. The present paper only deals with the electric organ of *R. circularis*. It shows that the cups in this species are large, well-defined bodies, each resembling somewhat the cup of the familiar "cup and ball." The cup proper, like the disks of *R. batis*, consists of three distinct layers, (1) the lining, which is almost identical with the electric plate of *R. batis*; (2) a thick median striated layer; and (3) an outer or cortical layer. The lining or electric plate is inseparably connected with the terminal branches of the numerous nerve-fibres, which, entering by the wide mouth in front, all but fill the entire cavity of the cup, and ramify over its inner surface, the intervening spaces being occupied by gelatinous tissue. This electric layer, which is richly nucleated, presents nearly as large a surface for the terminations of the electric nerves as the electric plate which covers the disk in *R. batis* and *R. clavata*. The striated layer, as in *R. batis*, consists of numerous lamellæ, which have an extremely contorted appearance, but it differs from the corresponding layer in *R. batis*, in retaining a few corpuscles. The cortical layer very decidedly differs in appearance from the alveolar layer in *R. batis*. It is of considerable thickness, contains large nuclei,

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and sometimes has short blunt processes projecting from its outer surface. These short processes apparently correspond to the long complex projections which in *R. batis* give rise to an irregular network, and they seem to indicate that the cortical layer of *R. circularis* essentially agrees with the alveolar layer of *R. batis*, differing chiefly in the amount of complexity. Surrounding the cortex there is a thin layer of gelatinous tissue in which capillaries ramify. This tissue evidently represents the thick gelatinous cushion which lies behind the disk in *R. batis*, and fills up the alveoli.

The stem of the cup is usually, if not always, longer than the diameter of the cup. It consists of a core of altered muscular substance, which is surrounded by a thick layer of nucleated protoplasm continuous with the cortical layer of the cup, and apparently also identical with it.

The cups are arranged in oblique rows to form a long, slightly-flattened spindle, which occupies the posterior two-thirds of the tail, being in a skate measuring 27 inches from tip to tip, slightly over 8 inches in length, and nearly a quarter of an inch in width at the widest central portion, but only about 2 lines in thickness.

The posterior three-fifths of the organ lies immediately beneath the skin, and has in contact with its outer surface the nerve of the lateral line. The anterior two-fifths is surrounded by fibres of the outer caudal muscles. It is pointed out that while the organ in *R. circularis* is larger than in *R. radiata*, it is relatively very much smaller than the organ of *R. batis*.

VII. "On Æolotropic Elastic Solids." By C. CHREE, M.A., Fellow of King's College, Cambridge. Communicated by Professor J. J. THOMSON, F.R.S. Received May 1, 1888.

(Abstract.)

This paper treats of elastic solids of various non-isotropic kinds. Its object is to obtain solutions of the internal equations in ascending integral powers of the variables, and apply them to problems of a practical kind, some of them already solved, but in an entirely different way, by Saint-Venant.

On the multi-constant theory of elasticity the equations connecting the strains and stresses contain 21 constants. As shown by Saint-Venant these reduce for one-plane symmetry to 13, for three-plane symmetry to 9, and for symmetry round an axis perpendicular to a plane of symmetry to 5.

Part I of this paper deals with one-plane symmetry. A solution is obtained of the internal equations of equilibrium complete so far as