12 (1972)

The supposed relation of the adrenals to reflex volume changes in the denervated limb.

By G. N. STEWART and J. M. ROGOFF

[*From the H. K. Cushing Laboratory of Experimental Medicine, Western Reserve University, Cleveland, Ohio*]

Bayliss[1] showed that when the central end of a peripheral nerve (sciatic) is stimulated the volume of a hind limb (denervated by section of the anterior crural and sciatic nerves) increases coincidently with the rise of blood pressure and then diminishes to less than the initial volume. He explained the dilatation of the limb as a passive dilatation due to the increase of blood pressure and the subsequent constriction as a local reaction, "the muscular coat of the arteries reacting, like smooth muscle in other situations, to a stretching force by contraction."

Von Anrep[2] stated that constriction of the limb never occurred in the absence of the adrenals. He drew the conclusion that it is due to a reflex increase in the epinephrin output, and that the explanation of Bayliss was not satisfactory.

We have reinvestigated the question in a series of about 50 animals, chiefly dogs.

We find that a typical reaction can be elicited in acute experiments after the adrenals have been clipped or tied or the glands excised, in the great majority of dogs in which before interference with the adrenals the reaction was present. In a certain number of animals, the reaction has not been obtained by us either before or after interference with the adrenals. Bayliss[3] seems also to have encountered animals in which similar reactions were not obtainable.

A considerable number of experiments were made on dogs which had recovered from adrenal operations entailing marked interference with, or suppression of the epinephrin output (removal of one adrenal and the greater part of the other, with curetting away of the remaining medulla and denervation of the

[1] Bayliss, *Journ. of Physiol.*, 1902, xxviii, 220.

[2] Anrep, *Journ. of Physiol.*, 1912-1913, xlv, 307, 318.

[3] Bayliss, *Journ. of Physiol.*, 1902, xxviii, 288.

fragment). Even after removal of the adrenal remnant typical reactions were obtained.

We must accordingly conclude that Anrep's experiments do not constitute a proof that the epinephrin output is reflexly increased by stimulation of the central end of the sciatic.

Stimulation of the splanchnic, with either the corresponding or both adrenals eliminated, frequently gave good reactions. We do not doubt, however, that since splanchnic stimulation is known to increase the epinephrin output, such increase with direct stimulation of the peripheral secretory nerves, when the adrenals are intact, can be a factor in the reaction as obtained in this way.

13 (1973)

Lasting individual differences in the resistance of normal bloods to shaking.

By OSWALD H. ROBERTSON and PEYTON ROUS

[*From the Rockefeller Institute, New York City*]

In previous papers observations have been recorded which indicate that the normal destruction of red cells is accomplished, in part at least, by a fragmentation of the elements while circulating[1]. It has seemed possible that the behavior of cells shaken in *vitro* may yield some indication of their resistance to the fragmenting process.

Marked differences in the red cells from different species have already been disclosed by the shaking method[2]. Further observations have now been made. Shaking which suffices to liberate 10-25 per cent. of the hemoglobin contained in a suspension of washed cells of the rat brings out only 4 per cent. of the pigment from an average specimen of rabbit cells, 1 per cent. from monkey blood, and a mere trace from human blood. Dog corpuscles are among the most labile, as many investigators can attest who have striven to obtain plasma untinted by hemolysis.

The variation in the resistance of individual bloods of a single species, the rabbit for example, are by no means inconsiderable.

[1] Rous, Peyton, and Robertson, O. H., *Jour. Exper. Med.*, 1917, xxv, 651.

[2] Rous, Peyton, and Turner, J. R., *Jour. Exper. Med.*, 1916, xxiii, 219 and 239.