

developed. To many minds shock has come to be associated in a restrictive manner with surgical shock alone. This is no doubt due largely to the labours of Crile in directing attention to the nature and prevention of surgical shock.

Working along the lines suggested by Golz's experiments on frogs that the vascular phenomenon is the primary cause of shock, Crile has attempted by careful and extensive experimentation to solve the problem of surgical shock. His experiments have been carried out principally on dogs. Blood pressure was, in each experiment, carefully noted with mercury, and sometimes, both mercury and water manometers. Various procedures for reducing the animal to shock were resorted to, as, laparotomy, crushing and tearing of various organs and members, extensive dissection of skin and tissues, pulling and tearing of viscera and peritoneum, removal of portions of the brain, burns, and gun-shot wounds. In most of these procedures there was noted a preliminary rise in blood pressure, but continued manipulation was followed by gradual decline of blood pressure and, in proportion to the rapidity and amount of fall of blood pressure, the different stages of shock appeared. Usually in advanced shock stimulation of an afferent nerve, such as the sciatic, resulted in no vaso-motor response. Procedures such as section of the spermatic cord, crushing or mechanical violence to the testicles and ovaries, resulted in a fall of blood pressure from the beginning.

Crile's conclusions are essentially as follows: Mixed nerves contain pressor and depressor fibres; stimulation normally calls into effect pressor action and blood pressure is raised. Continued and especially severe stimulation exhausts the pressor effects and the depressor action is called into effect with a consequent fall of blood pressure. The depth of shock is in proportion to the failure of the pressor action. This places the failure of blood pressure as the principal cause of shock, and this failure of blood pressure has as its cause vaso-motor exhaustion. Cardiac and respiratory failure are factors in the causation of shock, but are only of secondary consequence.

As a support to his contention of vaso-motor exhaustion, Crile has shown that if the afferent nerve paths from the field of operation are blocked by cocaine, and severe afferent impulses thus prevented from passing centripetally, the vaso-motor centre continues to function well and blood pressure is maintained. Adrenalin will provide a temporary pressor mechanism by contracting the muscle in the walls of the blood vessels. Also transfusion of blood and peripheral pressure, maintained by means of a pneumatic suit encasing the patient, will raise blood pressure by hydraulic principles; such rise is only temporary, where shock