

THE TREATMENT OF FAILING CIRCULATION, WITH SPECIAL REFERENCE TO THE USE OF STRYCHNINE.

When a physician is confronted by a case in which there is either sudden, gradual, or threatened failure of the circulation, the pregnant question arises—What is he to do? Naturally, his first thought is of some drug which, either from his own experience or that of others, he knows has been successful in combating or postponing this formidable complication, and the remedy he most desires is one that will act promptly and, as nearly as possible, entirely upon the circulatory apparatus. His judgment in the selection will be guided, if he be not merely an empirical therapist, by the cause of the cardiac weakness, the disease and condition of the patient, and the physiological action of the drug. It may seem unnecessary to make this preliminary statement, or even to broach the subject at all, to those whose high positions as teachers of medicine give them unlimited opportunities for experience and observation, and may even seem truistic in view of the fact that most of the matter here discussed can be found in so many text-books. But when it is considered that the average practitioner is prompted to request a consultation when this symptom begins to show itself, and that, as a matter of fact, comparatively few are able to cope with it, the writer may be pardoned if he omits an apology. He submits this paper with some diffidence, to invite a discussion upon this important subject, and in the hope that it will suggest to the minds of those who are familiar with the treatment of so-called heart-failure the usefulness of a publication of their knowledge of it.

There are numerous instances of the heart ceasing its function when it cannot be said that life would have flown under proper treatment, and it is in these cases that there is shown either the lack of proper remedies or the absence of a sufficient amount of medical skill, if not negligence. As previously stated, the remedy should act upon the circulatory system, and in a way that will increase the strength of the cardiac contraction and promote the rapidity of the circulation; and upon other parts of the organism it should not have any, or, at least, only a minimum, antagonistic concomitant action, which would tend to annul or counterbalance the prime effect upon the heart.

A glance at the physiological action of the cardiac tonics will show that some of them have a very disagreeable behavior in this respect, and in none is it so well marked as in the case of digitalis, which is generally adopted as an efficient agent. Quoting the words of an eminent writer, digitalis "prolongs the diastole and increases the vigor of the systole," an effect most desirable,

because it gives the ventricles time to fill and to expel a maximum amount of blood into the lungs and arteries, but, unfortunately, it at the same time contracts the arterioles and raises the blood-pressure, thus lessening the rapidity of the blood-flow and preventing a proper washing out of waste products from the tissues. In addition to this, if large doses be given, it impairs the irritability of the sensory and motor nerves and muscular fibres, and interferes with reflex action, effects that cannot fail to retard nutrition. Clinically it has been found unsatisfactory in those low states of the system brought about by high temperature and degeneration of the muscular tissues—notably of the heart itself—such as are found in typhoid fever. Recently a scientific teacher of therapeutics was quoted as recommending that digitalis be employed in typhoid fever, and that he had had most excellent results from its use. It is difficult to understand this opinion, as the same writer states in his book that he has seen digitalis produce, even in therapeutic doses, a dicrotic pulse, and numbers of authorities have, both by their writings and lectures, condemned it. The late Dr. James H. Hutchinson was very pronounced in his opinion against the employment of the drug in fever, and once told the writer that he knew of several cases of sudden death occurring in the course of fever that were unquestionably due to the digitalis administered. In the failure which accompanies simple organic disease of the heart itself, and in that which follows the shock due to hæmorrhage and similar conditions, digitalis is the proper remedy; but in the class of cases mentioned above it does not fulfil the requirements. The slowness of its action precludes its use in acute heart-failure, for, though given hypodermically, it is from two to four hours before its peculiar effect is manifested. Clearly, then, digitalis should be employed in only a limited class of cases, and is not the drug for the majority of emergencies.

Ammonia has been spoken of as the most powerful cardiac stimulant known, but its action is transient and of short duration. In some cases it does not act well. Wood speaks of it as being most serviceable in purely functional cardiac failure, and as not a reliable agent in that accompanying the adynamic fevers. To obtain from it a satisfactory effect it must be administered at short intervals, from every half-hour to one hour, and an insuperable objection to it is the fact that it cannot be used hypodermically without producing an inflammation at the site of the injection; and, in a disease like typhoid fever, fatal sloughing might result. It can be administered by the veins, but this is always a dangerous procedure, and it is doubtful if it be effective, as strong alkalies injected into the circulation of animals destroy the red corpuscles. It possesses the