

A CIBA FOUNDATION SYMPOSIUM

VISCERAL CIRCULATION

Editor for the Ciba Foundation

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VISCERAL CIRCULATION

Ciba Foundation Symposia

General Volumes:

Toxæmias of Pregnancy

Liver Disease

Isotopes in Biochemistry

The Spinal Cord

In preparation

Colloquia on Endocrinology

Vol. I. Steroid Hormones and Tumour Growth
and Steroid Hormones and Enzymes

Vol. II. Steroid Metabolism and Estimation

Vol. III. Hormones, Psychology and Behaviour
and Steroid Hormone Administration

Vol. IV. Anterior Pituitary Secretion
and Hormonal Influences in Water
Metabolism

PREFACE

THE Ciba Foundation is an international centre where workers active in medical and chemical research are encouraged to meet informally to exchange ideas and information. In three years since its opening in June 1949, in addition to many part-day discussions, there have been 18 international symposia, each lasting 2-4 days, attended on invitation by outstanding workers from many countries.

The informality and intimacy of these meetings have promoted discussion of current and incomplete research and stimulated lively arguments and speculation. They have also been the occasion for reference to much published and unpublished work throughout the world. The proceedings are now being issued in full, with only a minimum of editing, in order to pass on to a wider audience the benefits of these meetings. Assembled in book form they present very readably much information not readily available elsewhere.

Twelve of the 18 symposia so far held have been concerned mainly with steroid hormones, and are being published in a series of volumes under the heading "Colloquia on Endocrinology". The first four of these volumes have been produced and contain the proceedings of eight conferences. General symposia, on the varied subjects of "Toxæmias of Pregnancy", "Liver Disease", and "Isotopes in Biochemistry" have been published, and others in preparation include "The Spinal Cord", and "Mammalian Germ Cells".

This present volume on "Visceral Circulation" is the fourth general book to appear, and contains all the papers and the informal general discussions of a symposium attended by representatives from 8 countries. The variety in approach to this fascinating and important subject is evident from the presence of contributions from anatomists, physiologists,

biologists, biophysicists, biochemists, pharmacologists, and clinicians in medicine, surgery and anæsthetics.

The ground covered includes visceral vascular architecture, the laws of physics and flow in blood vessels, general and regional blood flow regulation, and the interaction of the general and visceral circulations.

It is hoped that these many-sided and authoritative discussions of the subject will not only be of great interest to other workers in all the disciplines mentioned above, but will also encourage and enable them to contribute to the solution of the many problems considered at this symposium.

List of those participating in or attending the Symposium on
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CHAIRMAN'S OPENING REMARKS

J. McMICHAEL

LET me extend a welcome to all who have come to co-operate in this conference. We are a group, rather artificially limited in number in order to keep the meeting manageable, as I hope it will be, with a common thread of interest in relation to different aspects of the circulation.

Twenty-five years ago when I was a student, circulatory physiology appeared to be completely incomprehensible. The reflexes were few in number and they all worked in a very reasonable way to achieve the optimum good of the organism, at rest or under stress. Unfortunately the situation now has become complicated; adrenaline, that link between physiology and pharmacology, has lost its pristine purity, and new reflexogenic zones, which will be discussed by Professor Whitteridge and Dr. Dawes, are added to the sino-aortic group of reflexes which used to dominate our physiological thinking; and even the carotid sinus reflexes nowadays seem to fail to work as we expect under some circumstances. The humoral factors involved in circulatory regulation, renin in particular, are rather under a cloud just now with the demonstration of Shorr's vaso-excitatory material and Grollman's production of hypertension in the nephrectomized parabiotic rat. Barcroft no doubt will tell us about vessels which have been deprived of their sympathetic nerve supply, and which seem to recover their reactivity completely in a matter of months.

Even the anatomy of the circulation is now complicated by the demonstration in various organs of arterio-venous communications, a conception which alters completely many of the older interpretations of physiological experiments. Pre-capillary sphincters are now talked about, and the Rouget

cell, which was so important 20 years ago, is now hardly ever mentioned. In addition to all this, ideas have grown and developed on the humoral transmission of impulses in the autonomic nervous system, and sympathin has been identified with noradrenaline. To all these things we must add new methods and techniques of approach to the problems of the circulation in the various organs and tissues.

Now, different parts of the circulation demand different methods of study, and each member of this company has had particular experience in the approach to the circulation through various organs and tissues. We hope to hear much of this from our experts in different fields, ranging from the lungs, the vessels of which have been claimed by some to be almost passive in their reactions, to the vessels of the uterus, where the flow undergoes the most enormous changes under physiological load. You will notice that the brain does not count as a viscus. It has been omitted—I don't know why, but I suppose we are just like the ancient Egyptians who regarded it as a sort of pith.

We take our programme in a logical order. First of all we discuss some patterns of vascular structure. Secondly, we go to physical problems of blood flow, then come neuro-humoral considerations, various reflexes and new thoughts on innervation. Thirdly, we go on to flow in various organs and tissues, and lastly we deal with some points in the interrelations of the general circulation with the visceral circulation which are seen particularly commonly in clinical medicine.

GENERAL SURVEY OF VISCERAL VASCULAR STRUCTURES

J. D. BOYD

THE subject of this conference is the visceral circulation and a reasonable question at this early stage is "What is a viscus?" C. J. Herrick (1922) in a discussion of this question wrote: "Words in commonest use are often most difficult to define," and it would seem that in this symposium the already difficult definition of a viscus has been both extended and restricted. As the programme shows, while much of the discussion is on splanchnic blood vessels, some of it is to be devoted to the blood supply of tissues (e.g. the skin and the voluntary muscles) not usually considered visceral in nature or origin. On the other hand, the blood supply of the brain, which, in view of its "soft and messy" nature, many would consider a viscus, is not included. This apparent illogicality is inevitable from a pragmatic point of view and, indeed, in my estimation, is correct from a biological point of view. For, of the few generalizations to which an anatomist dare commit himself in present company the first and most significant one is that the circulatory system normally functions as a unit. Any alteration or change in a single part of it has inevitable, though often slight, repercussions on the whole of the rest of it, splanchnic or somatic. This statement implies that the living blood vessels are not the more or less rigid hollow tubes that students of anatomy dissect with varying degrees of assiduity. In the living body the vessels are, all of them, reactive systems nicely integrated in their reactivity and normally able to ensure two rather separate functions—the circulation of the blood, as a whole, and the provision, from time to time, of special circulatory conditions in an organ of intermittent, or varying, function.