

*The Intracranial Vascular System of Sphenodon.*

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(Abstract.)

This memoir contains a detailed description, with illustrations, of the intracranial blood-vessels of the Tuatara, of which no account has hitherto been published. The description is believed to be more complete than any hitherto given for any reptile, and a considerable number of vessels are described which have not hitherto been noted in Lacertilia. This comparative completeness of detail is largely due to the employment of a special method of investigation. By this method the entire contents of the cranial cavity are fixed and hardened *in situ*, and are then in excellent condition either for dissection or for histological purposes. The brain does not occupy nearly the whole of the cranial cavity, there being a very large subdural space (especially above the brain), across which many of the blood-vessels run, together with delicate strands of connective tissue which connect the dura mater with the pia. The eyeballs are removed and an incision is made on each side in the cartilaginous wall which separates the cranial cavity from the orbit. Acetic bichromate of potash (made up according to the formula given by Bolles Lee) is injected into the cranial cavity through these incisions, and the entire animal, after opening the body cavity, is suspended in a large volume of the same fluid for about five days, and then graded up to 70 per cent. alcohol. When the cranial cavity is now opened up the cerebral vessels are seen with extraordinary distinctness, although they have not been artificially injected.

Further details were made out by means of serial sections, both transverse and longitudinal, and both of the adult and of advanced embryos (Stage S). In most respects the arrangement of the intracranial blood-vessels agrees with that found in the Lacertilia, so far as these have been investigated, but there is an important difference in the fact that the posterior cephalic vein leaves the cranial cavity through the foramen jugulare and not through the foramen magnum, while a slightly more primitive condition is shown in the less complete union of the right and left halves of the basilar artery. *Sphenodon* makes some approach to the condition of the *Chelonia* in this latter respect, but differs conspicuously from this group in the fact that the circle of Willis is not completed anteriorly, as well as in the fact that no branch of the posterior cephalic

vein leaves the cranial cavity through the foramen magnum. A very characteristic feature of *Sphenodon* is the development of large transverse sinuses resembling those of the crocodile, but these communicate with the extracranial vascular system in quite a different manner from that described by Rathke in the latter animal.

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*The Variations in the Pressure and Composition of the Blood in Cholera; and their Bearing on the Success of Hypertonic Saline Transfusion in its Treatment.*

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During the quarter of a century which has elapsed since the discovery by Prof. Koch of the comma bacillus of cholera, research work has been almost confined to the bacteriology of the subject. Unfortunately, with the exception of M. Haffkine's prophylactic inoculations, which are now very little used even in India, this line of work has done little or nothing to help the practitioner who is confronted with the treatment of this terrible disease. No powerful antitoxic serum of practical value has been produced, and even if such should still be obtained, many patients come under treatment in such a state of collapse that no medicine can be absorbed, even if retained.

The old controversy between the evacuant and conservative methods of treatment has long since ended in the practically universal adoption of the latter, although as late as 1866 Dr. George Johnson advocated castor oil, denying that there was any relationship between the amount of fluid lost from the body and the mortality, while he strenuously opposed the use of intravenous saline injections to replace it. There is still much difference of opinion about the latter treatment, for although all who have used transfusions testify to the remarkable immediate improvement in the pulse and general condition, yet this is commonly of such brief duration that many think it only serves to needlessly prolong the agony of the patient, so that of recent years it has been only exceptionally resorted to in India.

For a long time I have been investigating the blood changes in cholera (1), in the hope of finding some indication for a more rational and successful line of