

SOME PHASES
OF THE
INTRACRANIAL CONTENTS

by

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PART I.

ON THE POSSIBILITY OF EARLY DEMONSTRATION OF VARIATIONS IN THE DILATION OF THE VENTRICLES OF THE BRAIN.

While endeavoring with Dr. O. S. Knapp and Professor A. H. K. Kosterhouse to produce artificial internal hydrocephalus by plunging the neck of a bottle with a cotton plug, after the manner of Bandy, the water was struck by the great difference

subject some sixty years previously. demonstrated the presence of the fluid in the living Cohn is almost universally given credit for having with the discovery of the fluid about 1842, although Walter S. Bandy (2), of Baltimore, credits Magendie It is also interesting to observe that

he discovered the foramen that bears his name for its "inlet" into the cerebral ventricle that independently in 1826, and it was while searching Magendie (1) re-discovered the fluid apparently It is interesting to note in passing that

fluid finally was discovered by Cohn in 1774. water into the spinal regions. The cerebrospinal report capable of coagulation, which gravitated as showed that the cerebral ventricle contained a matter precipitation. Haller (1768-77) he- fluid existed during life, or was simply a post- however, considerable doubt as to whether the tricular contents consisted of fluid. There was, disease (1641-1716) also observed that the ven- tion of the breast gland, the seat of the scurvy. Willis (1621-25) regarded the fluid as a distill- was to pump water into the ventricle of the brain. believed that the function of the choroid plexus its presence, as also did Vesalius (1517). Vesalius was a tubercle. Vesalius (1514-64) considered that it 201 A.D.) held that this fluid contained the animal known to the earliest anatomists. Galen (131- The cerebrospinal fluid was undoubtedly

prospinal fluid. Variations in the distribution of the ven- tricles of the brain are directly dependent upon variations in either the total quantity or in the relative distribution of their contents, the cere-

that it some method could be devised which would show
 action of these ventricles. It would seem, therefore,
 a long time is required to produce demonstrable ill-
 in his paper, one cannot avoid the impression that
 produce the cases of hydrocephalus presented by Bandy
 it is observed that from 1 - 3 months are required to
 easily hydrocephalus may be questioned. Then further
 excess quantities are unnecessary, the diagnosis of
 dilation of the ventricles. As the demonstration of
 duration, an interval too short to give a demonstrable
 1877, states that the symptoms were only of a week's
 extent, and the same notes reported by Hagenbein in
 reports of a case of hydrocephalus of the form known
 Bandy (4) (Am. Surg. Aug. 1919, page 135)

following experimental procedures.
 water will be to detect abnormal dimensions
 as these variations in the normal are slight, the
 sufficiency of the ventricles, and in proportion
 of the normal limits of variation in the size of
 hydrocephalus, one must have a fairly accurate idea
 work on the production of artificial internal
 it is obvious that before one can do any

in Bandy's illustration.
 This is very different from the condition depicted
 since the roof and floor are mostly in contact.
 exactly the cavity of the ventricle is not spherical
 able series of animals. Bandy (3) states "con-
 has been verified by the examination of a consider-
 able is more or less potential. This condition
 are almost in apposition. The space between the
 likely to be still larger, the ventricular walls
 a matter of fact, where the ventricles would be
 almost the same level, a little further back, as
 2 it will be observed that here, in a section at
 rather wide. When this is contrasted with Fig.
 longitudinal sections also, it will be observed, is
 hardening. The ventricles gave quite a steady. The
 body covering and then sectioned, presumably after
 observed that the brain has been taken out of its
 is reproduced here in Fig. 1, a & b. It will be
 work. Dr. Bandy's conception of a normal ventricle
 of these ventricles as found in the course of the
 depicted by Dr. Bandy in his paper, and the size
 in size of the normal lateral ventricles as

fairly accurately changes in the size or in the state of distention of the cerebral ventricles in a shorter time, this would be of considerable value in permitting of more rapid work in experiments of this nature.

It is the purpose of this paper to point out that a certain well known method of anatomical investigation lends itself admirably to this purpose, and further, that by the use of this method, definite dilations of the ventricles can be shown to occur, not only in less than a week's time, but may actually be shown to occur in animals killed half an hour after completion of experiment.

It is proposed to study the relative sizes of ventricles in animals that have been frozen at temperature of from 0° to -30° F and have then been subjected to transverse sectioning at various constant levels.

Methods of procedure

Various operative procedures were employed in attempting to vary the amounts of fluid in the ventricles. These will be detailed later. After these various operative procedures were completed, the animals in all cases were set out to freeze. Two methods of freezing were employed - 1. Natural. 2. Artificial.

The natural method was perhaps the more satisfactory, as without Manitoba winter conditions it permitted of more rapid freezing than the artificial method.

Temperatures 0° F to 30° F were obtained, and the animals hardened quite rapidly - within 24 hours. Freezing was materially hastened by soaking the animals fur with water, or better still, splitting the scalp and stripping the temporal muscles away from the cranium. The animals mouth was kept widely open with a gag. A breezy place was found a useful factor in hastening the process.

In the artificial method the animals were "dressed" in the manner above described, except that they were covered with a jute sack and placed in a commercial cold storage plant and then subjected to temperatures of about 0° to -5° F for several days. The animals when taken out were very well frozen indeed.