

centre of a hollow metallic sphere, which was connected with the Sprengel pump and surrounded with cold water, and were allowed to cool. The temperature of the cooling globe was read off at equal intervals of time by means of a thermo-electric junction; and from these readings the absolute loss of heat per unit of cooling surface, per unit difference of temperatures of surface and surroundings, per unit of time, is calculated.

The details of the apparatus and method of experimenting are given in the paper. It is enough to say here that the globes were used with their surfaces in two different conditions:—(1) Thinly coated with lamp-black, and (2) silvered and brightly polished; and in both conditions the absolute loss of heat, both in air and in vacuum, more or less complete, was determined. The tables and curves attached to the paper give the details of the results.

To quote one or two examples:—With the sooted surface a total loss of heat by convection and radiation of 3.42×10^{-4} c.g.s. units per square centimetre, per second, per 1° C. of difference of temperatures of globe and surroundings, was observed with a difference of temperatures of 100° C., and with the surroundings at about 14° C. Under similar circumstances the radiation in vacuum of $\frac{1}{2}M$ (half-a-millionth of atmospheric pressure of non-collapsible gas) was about 1.40×10^{-4} .

Taking a silvered and brightly-polished surface under the same circumstances, the loss in full air was 2.30×10^{-4} c.g.s.; and with the highest vacuum and brightest polish obtained, it was reduced 1.80×10^{-6} with in this case a difference of temperatures of 180° C. The loss with 100° C. difference would be considerably less, but is not known experimentally at present.

The author returns thanks to Mr. James H. Gray, M.A., B.Sc., for excellent assistance given; and expresses himself most deeply indebted, both for assistance in experimenting and calculating of the results, and for most valuable and ingenious aid of various kinds during the course of this work, to his friend Mr. A. Tanakadate, now Professor in Tokio, Japan.

XVI. "The Cerebrum of *Ornithorhynchus paradoxus*." By
ALEX. HILL, M.D. Received June 16, 1892.

(Abstract.)

The brain of *Ornithorhynchus paradoxus* is by no means Avian in type. All its characters are Mammalian, but it presents certain peculiar features which have been overlooked or misunderstood by the anatomists who have hitherto examined it with the naked eye. The most obvious and noteworthy departures from the form of brain

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found in all other Mammals concern the rhinencephalon, the hippocampus, and the cerebral commissures.

The olfactory bulb is quite free from the frontal portion of the hemisphere. Its stalk is exceedingly thin, and connected with the under surface of the hemisphere near the median line. The portion of the mantle which receives it is separated from the general surface by a deep incision (ectorhinal fissure), which extends in depth almost to the mesial surface. The pyriform lobe thus formed merges with the general surface far back on the mesial aspect of the hemisphere, at the spot at which the hippocampal fold commences.

The hippocampus is very extensive; it lies entirely dorsal to the velum interpositum, and is continued forwards to the extreme anterior end of the brain. With the rhinencephalon it forms therefore a loop, open in front.

No commissural fibres cross the *incisura pallii longitudinalis* dorsally to the hippocampus. For reasons stated in his paper, the writer considers that fibres which cross from one hemisphere to the other on the peduncular (portal) side of the fascia dentata cannot be homologous with the corpus callosum, and he therefore concludes that this structure is completely absent from the brain of *Ornithorhynchus*. A strong commissure or decussation lies within the concavity of the rhinencephalic loop, but its fibres are restricted in their distribution to the hippocampal fold, as shown in sections stained after Weigert's method. The convex portions of the mantle are entirely dependent upon the anterior commissure for mutual connexion.

Exception being made to the *incisura rhinalis* and *dentary fossa* as not belonging to the category of fissures, the cortex is completely destitute of convolution.

Each hemisphere of the brain was cut into a series of sections, the anatomical features of which were described in detail.

XVII. "Contribution to the History of the Interchange of Pulmonary Gases in the Respiration of Man." By WILLIAM MARCET, M.D., F.R.S. Received June 9, 1892.

[Publication deferred.]

XVIII. "Magnetic Properties of Pure Iron." By FRANCIS LYDALL and ALFRED W. S. POCKLINGTON. Communicated by J. HOPKINSON, F.R.S. Received May 4, 1892.

[Publication deferred.]

XIX. "On the Alimentary Canal of *Pontia brassicæ*." By A. B. GRIFFITHS. Communicated by Professor HUXLEY, F.R.S. Received April 1, 1892.

XX. "On a new Method for the Bacteriological Examination of Water, and on a new Bacillus discovered in Rain-water." By A. B. GRIFFITHS. Communicated by Dr. KLEIN, F.R.S. Received May 18, 1892.

The Society adjourned over the Long Vacation to Thursday, November 17.

Presents, June 16, 1892.

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