horn of the lateral ventricle, and the peculiar disposition of cerebrai substance constituting the hippocampus minor, but the conditions in which they have been found at so many distinct points of the series, appear to lead almost irresistibly to the following conclusions:—

1. That these parts, so far from being (as has been stated by some anatomists) peculiar to the human brain, are common to man and the whole of the Quadrumana, including even the lowest forms.

2. That they attain their maximum of development in species which do not belong to either extremity of the series.

3. That in the lower forms their diminution takes place chiefly in the antero-posterior direction, corresponding with the reduced length of the posterior cerebral lobes, the greater part of which is occupied by them.

4. That in the higher forms they are narrower in proportion to their length, and bear a smaller ratio to the surrounding mass of cerebral substance.

5. That the extreme of the last condition is met with in man, where these parts are also characterized by their variability in size and form, want of symmetry on the two sides, and frequent rudimentary condition, or even entire absence.

XIX. "On Liquid Transpiration in relation to Chemical Composition." By Thomas Graham, Esq., V.P.R.S., Master of the Mint. Received June 20, 1861.

(Abstract.)

In accordance with the analogy of the transpiration of gases, the passage of liquids under pressure through a capillary tube is spoken of as liquid transpiration. The subject owes the development which it has already attained chiefly to the investigations of M. Poiseuille. The precision of the mode of experimenting pursued by that physicist has been remarked on by every one who has engaged in the inquiry. The same method was accordingly adopted with little variation in the present investigation.

The isolated observation made by M. Poiseuille, that alcohol diluted to different degrees is most retarded in passing through a capillary tube at that degree of dilution where the greatest condensation of the mixed liquids occurs, was understood by the author as indicating that the definite hydrate of alcohol containing six equiva-

lents of water (or three equivalents of water with the formula of alcohol taken as $C_2\ H_3\ O_2$), was the most retarded in transpiration. The rate of transpiration appeared here to depend upon chemical composition, and to afford an indication of it. A new physical property may thus become available, like the boiling-point and others, for fixing the chemical constitution of substances. The same feature was recognized in methylic alcohol, although the six-hydrate here is not remarkable for condensation of volume; and the inquiry was then extended to the hydrated acids, and to other substances. The results appear to establish the existence of a relation between transpirability and composition.

The time of passage of equal volumes of different liquids under the same pressure and at the same temperature, may be termed their transpiration times, and be referred to the time of water as unity. The transpiration of nitric acid, NHO_6, with and without water, at 20° C. was as follows:—

Water added to 100 Nitric acid (NHO_6).	Transpiration time (water = 1).
0	0·9899
25·47	1·9885
28·56 (2 equivalents)	2·0258
30	2·0459
40	2·0833
42·85 (3 equivalents)	2·1034 (the maximum).
45	2·0977
50	2·0919
55	2·0632
57·12 (4 equivalents)	2·0459
60	2·0387
70	1·9626
80	1·8994
90	1·8261
100	1·7040
200	1·3563

The transpiration time rises with successive additions of water, till the proportion corresponding to three equivalents is reached, when the time is 2·1034, and has attained its maximum. Diluted beyond this point the nitric acid begins to pass more freely, and the transpiration time approaches again to that of water. The hydrate named, $NHO_6 + 3HO$, having sp. gr. 1·4, possesses the highest boiling-point, and the character of definite composition. It is what

I have elsewhere spoken of as the "constitutional" hydrate of nitric acid.

In acetic acid, the constitutional hydrate, $C_4 H_4 O_4 + 2HO$, is indicated by transpiration with equal precision. The transpiration time rises from 1·2801, the time of the basic hydrate, $C_4 H_4 O_4$, to 2·7040, the time of the hydrate first referred to; falling again afterwards as the water is increased. Butyric and valerianic acids present the same character, although slightly modified. Formic acid, on the other hand, departs entirely from the acetic type in transpirability, as it does in the density of its combinations with water, and in its indisposition to form basic salts. It is curious that liquid formic acid, although an acetic acid by derivation, should more resemble hydrochloric acid in physical characters.

The transpiration time of sulphuric acid is 21·6514, a high number, as might be expected from the viscosity of the liquid. But the time rose still further with the addition of water, till 17·5 parts of water were added to 100 of oil of vitriol, when the number was 23·7706. The proportion of water stated approaches closely to 18·36 parts, which represent 1 equivalent. Here again a well-known constitutional hydrate is indicated, $SHO_4 + HO$.

In hydrochloric acid the only sensible retardation observed was with the hydrate represented by $HCl + 12HO$. This is the hydrate which possesses least volatility at the low temperature of the experiment (20° C.).

It was supposed that glycerine, as a triatomic alcohol, might affect combination with water in the proportion $C_6 H_8 O_6 + 18HO$. But no such compound was indicated by transpiration of the aqueous solutions of glycerine.

The transpiration of pure acetone is remarkably rapid, and is greatly retarded by the addition of water. The time rises from 0·401, that of anhydrous acetone, to 1·604, the time of the twelve-hydrate, taking the equivalent of acetone as $C_6 H_6 O_2$, or of the six-hydrate with the equivalent $C_3 H_3 O$.

The transpiration times and boiling-points of three alcohols are as follows:—

	Transpiration time.	Boiling-point.
Methylic alcohol	0·630	66° C.
Vinic alcohol	1·195	78·5
Amylic alcohol	3·649	132

Of four others :—

	Transpiration time.		Boiling-point.
Formic ether	0·511	......	55°·5
Acetic ether	0·553	......	74·0
Butyric ether............	0·750	......	
Valerianic ether..........	0·827	......	133·5

Judging from these last observations, the order of succession of individual substances in any natural series will be indicated by the individual transpirability of these substances, as clearly as it is by their comparative volatility. Transpiration and boiling-point observations may come thus to claim an equal interest. In carrying out the inquiry, it will probably be found advantageous to transpire the liquids at a fixed temperature which is somewhat elevated. A large number of substances are liquid at 100° C., of which the transpiration times could easily be obtained. Slow transpiration and low volatility appear to go together, and both to be connected in a general way with a heavy molecule. So also the annexation of constitutional water to the hydrated acids and alcohols appears to impede the transpiration of these substances.

XX. "Electro-Physiological Researches.—Eleventh Series. On the Secondary Electromotor Power of Nerves, and its Application to the Explanation of certain Electro-Physiological Phenomena." By Professor C. Matteucci. Communicated by General Sabine, Treas. and V.P.R.S. Received June 2, 1861.

(Abstract.)

The object of this paper is to show by experiment that when a nerve is traversed by an electric current, it acquires in all its points a secondary electromotor power, and consequently becomes capable of producing in a conducting homogeneous circuit, whose extremities touch any two points of that nerve, an electric current in an opposite direction to that of the original current. This result is independent of the vital properties of the nerves, but is affected in greater or less degree by their physical condition. A similar effect indeed is produced by the passage of an electric current in all porous substances