SCIENCE

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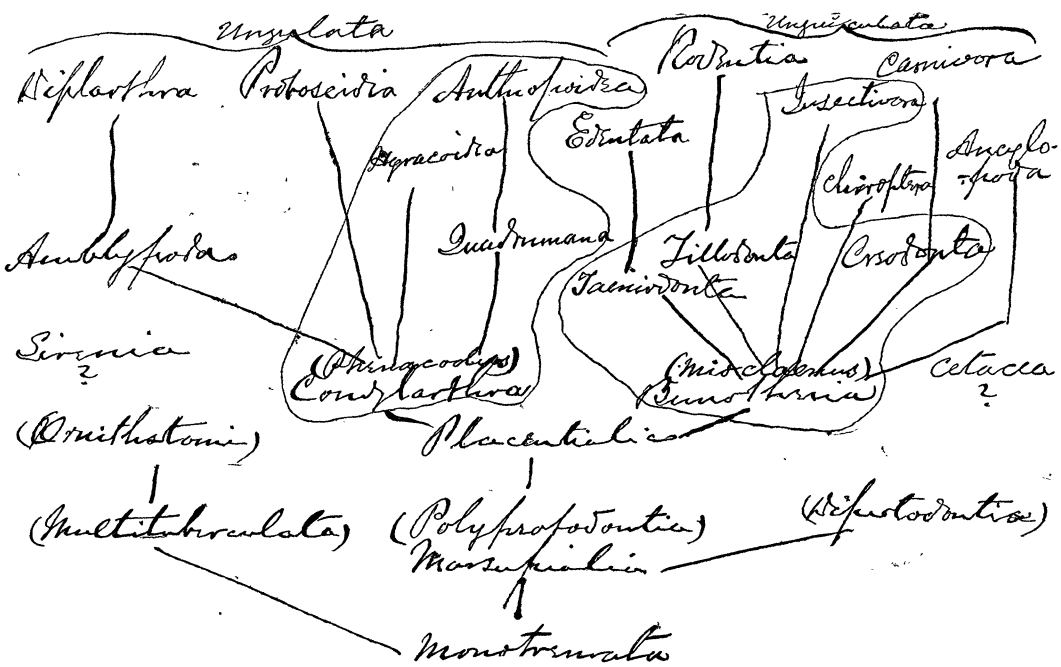
CONTENTS:

MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Professor J. McKeen Cattell, Garrison-on-Hudson, N. Y.

A MEMENTO OF PROFESSOR EDWARD D. COPE.

DURING the winter of 1894 Professor Cope visited my laboratory, and we had a somewhat prolonged discussion of evolutionary problems. During this conversation I asked him concerning his views as to the actual phylogeny of the mammalia. This led to his writing down on a large sheet of paper the interesting table of descent which is herewith reproduced in facsimile (p. 114).

It was written out under the guidance of question and answer, but I think it will be clear in spite of some apparent confusion. The groups Sirenia and Cetacea he would express no opinion about, and they were jotted down where there happened to be space on the paper, but with no indication of their affinities. In response to a question concerning the Proboscidea he declared that they had no close affinity with the Anthropoid group, which he marked off with an irregular line which collates in one group the Anthropoidea and Condylarthra. A similar question in regard to the Cheiroptera led to a line being added to separate the Cheiroptera from a group which comprises the Insectivora, Creodonta, Fillodonta and Tæniodonta. Professor Cope considered the mammalia as of single and not multiple descent. Of course, he did not regard the living Marsupials and Mono-



tremes as true surviving ancestral types, as the table might seem to suggest.

It is merely justice to him to add that he regarded the whole subject as a problem for further investigation, and that he by no means looked upon his own conceptions at that time as final. Charles S. Minot.

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*RECENT EXPERIMENTS ON CERTAIN OF THE CHEMICAL ELEMENTS IN RELATION TO HEAT.**

The discovery that different substances have different capacities for heat is usually attributed to Irvine, but there can be no doubt that Black, Crawford and others contributed to the establishment of the idea. The fact that equal weights of different substances, in cooling down through the same number of degrees, give out different amounts of heat, may be illustrated by the well-known experiment in which a cake of wax is penetrated with different degrees of rapidity by balls of different metals heated to the same temperature. But, for the quantitative estimation of the amounts of heat thus taken up and given out again—that is, the *specific heats*—the physicist must resort to other forms of experiment, each of which presents difficulties of its own. Broadly speaking, three principal methods have been used in the past for this purpose. The first is based upon the observation of the exact change of temperature produced in a known mass of water, by mixing with it a known weight of the substance previously at a definite temperature above or below that of the water. The second consists in determining the quantity of ice melted, when the heated body is brought into contact with it in such a way that no heat from any other source can reach the ice. And the third method consists in observing the rate at which the temperature of the heated body falls through a definite range of degrees, when suspended in a vacuous

*A Lecture delivered before the Royal Institution of Great Britain on May 13, 1898, by Professor W. A. Tilden, D.Sc., F.R.S.