spontaneous action, to grow, through habit, into sentiment, and to mature, through unconscious or conscious thought, in definite motive. It is heterodox, perhaps in more senses than one, to affirm that motive—the noblest character of humanity—buds in spontaneous action, blossoms in subconscious habit, and attains fruition in the highest intellectual activity, whether unconscious or conscious, of which the individual or group is capable; certainly the affirmation represents complete inversion of a notion prevalent in savagery, dominant in barbarism, and gradually weakening through civilization; yet it is sustained by all that is known of the processes of acquiring knowledge, by the history of the growth of knowledge in general, and, indeed, by nearly all applied statecraft and most applied priestcraft throughout human history. The recognition of the genesis and antecedents of motive must afford a vantage point for a clearer survey of the vast field of human emotion, affection, passion, aspiration, disposition; and, at the same time, it cannot fail to give a key-note for improved education—for the still more complete control of mind.

These are but a few of the many ways* in which the great science based on human activities tends to bring order out of that vast chaos of action and thought which has so long resisted analysis and synthesis—that last citadel of the unknown.

IX.

Hitherto Humanity has been the theme of poesy and romance rather than of sober science. All men have perceived that their kind possess attributes distinguishing them from the rocks and plants and beasts of lower nature, yet for the most part these attributes were either ignored or transfigured into a dazzling halo which defied analysis none the less by reason of its subjective character; even to-day and in the most enlightened circles of the most enlightened nations there are few willing to consider, and content to consider dispassionately, the purely human attributes; but to these few the chaos of industries and ideals, of emotions and passions, of conduct and motive, and of all other things human, falls into a simple order nearly as definite as the order recognized in each of the older sciences—the order of human activities and activital products.

Exact knowledge began with the remote and progressed toward the near; with every stage of progress it has been a power for the conquest of natural forces and conditions, has exalted intellectual mankind above all brainless or small-brained creatures, and has made continually for human welfare and happiness; and now, that the methods and purposes of science are extending to the human body and brain, it cannot be doubted that these, like all other material things, will be controlled and reconstructed for the good and the glory of intelligent Man. This is the end of the Science of Humanity.

W J McGEE.

* One of these is the control of society itself for the common good, as shown by Ward in his masterly memoir on 'Dynamic Sociology,' which it must suffice to mention merely.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

SECTION F.—ZOOLOGY.

The officers of the Section were as follows:

L. O. Howard, Washington, Vice-President; C. C. Nutting, Iowa City, Ia., Secretary; F. M. Webster, Councillor.

Sectional Committee: L. O. Howard, Vice-President, 1897; C. C. Nutting, Secretary, 1897; Theodore Gill, Vice-President, 1896; D. S. Kellicott, Secretary, 1896; Charles Sedgwick Minot, Henry F. Osborn, Wm. H. Ashmead.

Member of Nominating Committee: Wm. H. Ashmead.

Committee to Nominate Officers of Section: The Vice-President and Secretary and Charles Sedgwick Minot, Theodore Gill, F. M. Webster.

The scientific papers presented were as follows:

The Spread of Land Species by the Agency of Man with special Reference to Insects. Address of Vice-President Dr. L. O. Howard. Printed in Science, Sept. 10th.

(1) *On the Relationships of the Nematognaths.* By Theodore Gill, M.D., LL.D., Professor of Zoology, Columbian University, Washington, D. C.

The Nematognaths have been considered by most ichthyologists to be most nearly related to the Ganoids or even associated with them in the same order. Their entire structure, however, indicates that they are most nearly related to the Plectospondyls, and they may even associate in the same superorder for which the name Ostariophysi of Sagenmehl may be adopted.

(1) *On a Collection of Cephalopoda from the Albatross Expedition.* By Wm. E. Hoyle, Owens College, Manchester, England.

(6) *On the Sarcostyles of the Plumularidæ.* By Professor C. C. Nutting, A.M., Iowa City, Iowa.

The morphology of the Sarcostyles has been investigated by various writers from the middle of the century to the present. They are composed of ectoderm, endoderm and, according to most writers, a solid axial rod.

A body cavity was described by one of the earliest writers and redescribed by the present writer. The Sarcostyles are undoubtedly degraded 'persons' of the hydroid colony.

The function of these structures is not well understood. It appears to be partly defensive, partly prehensile and partly offensive. The function of scavengers and digestive organs has also been ascribed to them.

(8) *Notes on the Development of Drasteria erechtea.* By Professor F. M. Webster, Wooster, Ohio.

The paper gives the results obtained from rearing larvæ from the eggs to adults, and shows the individual variation of each, both in habit and appearance, the latter being the object of the studies.

(9) *Brood XVI. of Cicada septendecim in Ohio.* By Professor F. M. Webster, Wooster, Ohio.

The paper deals with the occurrence of Brood XVI. of *Cicada septendecim* in Ohio, in 1897. The area over which it has been observed is indicated; the influence of natural enemies is discussed and the probabilities of its becoming extinguished are explained.

(10) *Notes on the Embryology of the Pig.* By Dr. Charles Sedgwick Minot, Readville, Mass.

(1) *The Hypophysis.* There is a true infundibular gland, which is homologous with the saccus vasculosus of Teleosts, and is identical in form and connections with the embryonic saccus. The duct of the gland becomes a solid stalk.

There is also a true hypophysis, which develops a vestibule and gland-tubes homologous with the same parts throughout the vertebrate series.

(2) *The Cardinal Vein.* It is a striking peculiarity of transverse sections of pig-embryos that in the region of the Wolffian body no distinct vein appears, corresponding to the cardinal vein, usually found on the dorsal side of the Wolffian body. This is due to the fact that in the pig the cardinal vein, after entering the cephalic end of Wolffian body, breaks into a multiplied sinus, in which are lodged the Wolffian tubules. Another peculiarity of the cardinal vein is that it does join the jugular to

form the transverse Ductus buvieri, but joins instead the great hepatic vein (Ductus arantii) not far from the heart.

(3) *Allantoic Villi.* The stalk of the Allantois begins to form on its cephalad side within the abdomen a series of lobulated outgrowths, which gradually increase until they occupy a relatively considerable space in the abdomen. These villi consist of a cuboidal mesothelium covering a mass of matricial or ground substance, in which are scattered a few cells of mesenchymal character. The villi are beginning their development in embryos of 14.0–17.0 mm., and are already reduced in embryo of 24.0 mm. The author has no surmise to offer as to their function. Nothing similar to them is known in other mammals.

(11) *Harvard Embryological Collection.* By DR. CHARLES SEDGWICK MINOT, Readville, Mass.

The collection consists mainly of series of sections of vertebrate embryos. It is expected ultimately to have representatives of several divisions of the Mammalia, and of the principle types of non-Mammalian vertebrates.

The work of forming the collection is going forward with the following forms:

Man	Necturus
Dog	Amia
Pig	Amiurus
Rabbit	Batrachus
Chick	Acanthias
Lacerta	Torpedo
Frog	Petromyzon
Amblystoma	Amphyoxus

The plan is to select for each form a carefully graduated series of stages, and to make of each stage three complete series of sections in three planes, the transverse, the sagittal and the frontal, or if the embryo is curved or twisted the three planes are chosen at right angles to one another. A drawing of each stage is made. A double catalogue is kept; the first, in book form, is the entry-catalogue, and records all details of preservation, cutting, staining and mounting. The series of sections are numbered according to their order of entry. The second catalogue is on cards, which are arranged first according to species, second under each species according to stage. Every series of sections has a separate entry number and a separate card. Every section is counted and the sections of every series numbered. At the present time there are about one hundred series completed.

The collection is intended primarily for investigators, and is open to all competent investigators working in the Embryological Laboratory. It is hoped that it will increase during years to come, in size and still more in usefulness. So far as known to the writer, it is the first collection of the kind to be started.

(12) *Organic Selection.* By PROFESSOR H. F. OSBORN, Columbia University, and PROFESSOR E. B. POULTON, Oxford University. Duplicate title (see No. 25).

(14) *Characters for Distinguishing the North American Species of Ceresa.* By WM. H. ASHMEAD, United States National Museum, Washington, D. C.

An explanation of the application of recently discovered morphological characters to the classification of the Homopterous genus *Ceresa*. The author points out the fact that many of the genera in the Membracidæ are merely dimorphic forms of other genera.

(23) *Reconstruction of Phenacodus primœvus, the most Primitive Ungulate.* By PROFESSOR HENRY F. OSBORN, Columbia University, New York.

This paper is accompanied by the remounted skeleton of Phenacodus and a wax model executed by Charles Knight. As originally mounted in Professor Cope's laboratory, the famous skeleton of *Phenacodus pri-*

mœvus conveyed a very imperfect impression of its actual form and proportions. Several serious errors were committed by the restorer, the most important of which was the implanting of two of the cervical vertebræ in the tail. The author, therefore, considered it advisable to completely remount the animal, and this has been done by Mr. Adam Herman and Mr. Martin, of the American Museum, at an expenditure of five months' time.

The animal is placed as nearly as possible in a natural position. It shows that the feet were not plantigrade, or soled upon the ground, but digitigrade, as in the Tapir. The body is characterized by the great convexity of the back, characteristic of the carnivore and of all early ungulates. A further carnivorous feature is the great development of the hind quarters and of the tail. The disproportion between the hind and the forequarters is heightened by the extremely small size of the head, containing a brain which was about the size of that of the opossum, which has been fully described by Cope.

(24) *Homologies and Nomenclature of the Elements of the Molar Teeth.* By Professor Henry F. Osborn, Columbia University, New York.

After a brief review of the tritubercular theory of Cope, the writer spoke of his hypothesis advanced at the American Association meeting in 1891, that the multitubercular teeth of the Multituberculata and Monotremata were also of tritubercular origin. This hypothesis seems now to be confirmed by the teeth of Gomphodontia, especially of the genus *Diadermodon*, by Professor Seeley in the Narvo Beds of South Africa, of Permian age.

The various Gomphodonts in these beds present molar teeth of more or less regular tritubercular pattern. Related to them in skull structure is Tritylodon—a typical multituberculate. This indicates that from the trituberculate Gomphodonts Tritylodon and other multituberculates may have taken their origin. The paper was discussed by Professor Minot and Dr. Gill.

(25) *Modification and Variation and the Limits of Organic Selection.* By Professor Henry F. Osborn, Columbia University, New York, and Professor Edward B. Poulton, Oxford University, England.

[An account of these papers will be published in a subsequent issue of Science.]

(26) *Geographical Distribution of the Golden Warblers.* By Harry G. Oberholser, Biological Survey, United States Department of Agriculture, Washington, D. C.

The so-called Golden Warblers form a group of some twenty-five species and subspecies in the genus Dendroica, and are distributed over almost all the Nearctic region, together with the Antillian, Colombian and Central American subregions of the Neotropical. The greatest differentiation of forms occurs in the West Indies, where the distribution of many of the species is somewhat anomalous.

(27) *Modern and Older Theories of Mimicry Illustrated by Butterflies of the Genus Hypolininas.* By Professor Edward B. Poulton, Oxford University, England. [To be published in Science in abstract.]

Wm. H. Ashmead,
Press Secretary.

FIELD WORK OF THE UNITED STATES COAST AND GEODETIC SURVEY.

Most of the reports from the field parties of the United States Coast and Geodetic Survey are now in, and it is possible to summarize the work for the fiscal year ending June 30, 1897.

The operations have been, as usual, widely distributed, and cover localities on the Atlantic, Gulf and Pacific coasts, including Alaska. Much work has also been