

prehensive outline of human knowledge, showing the relations existing among its several branches, and giving the student a correct sense of the proportion between what he knows and what there is to know. Employing the scientific method, it teaches how to observe. College training in it is continued directly in subsequent experience with the world. The material is ever at hand. Dealing with the vital problems of all epochs, it inculcates breadth of mind and develops the reason. It induces consideration and awakens appreciation of other men and other races. It supplies an available touchstone of truth and error. Wherefore it is that a new and deeper meaning now abides in the words:

"Know, then, thyself; presume not God to scan;
The proper study of mankind is man."

FRANK RUSSELL.

AMERICAN MORPHOLOGICAL SOCIETY.

II.

Notes on Cyanea Arctica: CHAS. W. HARGITT.

The early cleavage phases are passed while the eggs are still within the gonads or in the complicated folds of the manubrium. A gastrula is formed, following total cleavage, by invagination, and an early closure of the blastopore ensues. The embryo becomes ciliated before its escape from the egg membrane, within which it may be seen slowly rotating. On emergence it is almost spherical but soon assumes the ovoid shape characteristic of the Cœlenterate planula. While details as to the formation of the entoderm are not yet complete they seem in the main to confirm the observations of Hyde, Smith and the recent work of Hein.

The encystment noted by Hyde and McMurrich has been common in the specimens under consideration, though I have been able to show that the process is rather in-

cidental than essential as claimed by McMurrich. It seems wholly conditioned upon the environment; where favorable and natural the process is rare or absent.

The scyphistoma stage of development was attained in variable periods depending again upon conditions. Under favorable conditions it may occur in from eight to ten days, while under other conditions it may not take place within as many weeks. Thus also with the changes involved in strobilization and the release of the ephyra. Under favorable circumstances they have taken place in the aquarium within a period of eighteen days from the escape of the planula to that of the ephyra.

Stolonization occurs as in *Aurelia*, but much less freely, as does also the origin of buds from the stolons. Budding from the side of the polyp was not observed in *Cyanea*, its small size probably rendering such process difficult.

The entire life history from the egg to the free ephyra was followed in detail with unusually good results in aquaria of varying size from a mere watch glass or petrie dish to jars holding a gallon or more.

Notes on the Cœlenterate Fauna of Woods Holl: CHARLES W. HARGITT.

Inheritance of Color Among Pointers: FRANK E. LUTZ and ELIZABETH B. MEEK.

Dr. Francis Galton ('89) proposed 'briefly and with hesitation' a statistical law of heredity applicable to bisexual descent. Briefly stated, it was that one half the offspring's characteristics are derived from the parents (an equal amount from each), one fourth from the grandparents, one eighth from the great-grandparents, one sixteenth from the great-great-grandparents, and so on. Galton himself ('97) tested this hypothesis by the consideration of a single color characteristic—the conditions of being tricolor or non-tricolor—in

Basset hounds; but with this exception the important law advanced more than a dozen years ago has not, up to this time, received a careful analysis of a large number of pedigrees, of three or more generations.

Our work was carried on with data obtained from the American Kennel Club Stud Books and includes 390 dogs, of the pointer breed, of which 660 parents, 1,367 grandparents, 1,361 great-grandparents and 978 great-great-grandparents are known. Four sets of color characteristics, namely, liver or no liver, black or no black, white or no white, and 'ticked' or not 'ticked,' were considered. By the method used no substitutions were needed to fill the gaps left by unrecorded ancestors of the first four degrees. The results showed an almost perfect harmony, in each instance, between the facts and Galton's law, the greatest real deviation being only 1.1 per cent., while the least was .4 per cent.

Astrosphere and Centrosome in the Fertilization of the Egg of Phascolosoma (P. vulgare and P. Gouldii): J. H. GERROULD.

The Larval Development of Phascolosoma: J. H. GERROULD.

On the Ova of Ophidia: E. L. MARK and C. A. CROWELL.

A System of Abbreviations for the Lettering of Anatomical Figures: E. L. MARK.

The Circulatory System of Lamellibranchs: G. A. DREW.

By careful injections, preparations and dissections, the vascular system of the large northern scallop, *Pecten tenuicostatus*, has been found to be extensive and definite. In the mantle, for example, the blood vessels branch repeatedly and form a very fine network that in appearance is much like a capillary plexus. From this plexus the blood is collected directly by vessels that join to form the vein that, in common

with the efferent vessels from the gills of the corresponding side, returns the blood to the heart. Inasmuch as some of the coloring matter of the injecting fluid finds its way out of the vessels and into the surrounding tissue, it seems quite possible that the blood may function directly as lymph. Large lacunæ, such as are generally supposed to be present in Lamellibranchs, have not been found. The vessel that supplies the foot is capable of great distention, and offers the same for the protusion of the foot, but the vessel is very definite in shape and is not comparable to a lacuna. The course taken by the blood in its circulation is essentially the same as has been described for other forms, but the vessels seem to be much more finely branched, and the circulatory system much more nearly 'closed' than has generally been supposed to be the case with Lamellibranchs.

On the Anatomy of a Double Monster: H. L. OSBORN. (Read by title only.)

A calf born near Minneapolis, Minn., in 1901, and which lived only a few minutes, came to my notice and proved interesting as a nearly complete twin formation. There is a single umbilical opening and cord, there are two functional hind legs and a single anus, but there are two tails and a third hind leg carried in the mid-dorsal line, and projecting backward. Anteriorly there are two complete animals, two heads, thoraces and two anterior abdominal regions completely developed. There is a single abdominal cavity posteriorly, but most of the viscera are double. There are two spinal columns, each sacrum articulates externally with a complete half pelvis, and these meet below, forming a symphysis, and on its opposite side each sacrum articulates with an ilium which meets a very imperfect ischium, so that here the division of the embryonic