chanics of differentiation. Of the four commonly recognized features of differential cleavage—viz.: (1) inequality, (2) non-alternation of directions, (3) qualitative differentiation and (4) lack of rhythm—the first three may be correlated with these movements. Unequal cleavages are due to movements which, beginning with the early anaphase, carry the nucleus out of the center of the cell. Non-alternation is due to the absence of currents, alternation to the regular reversal of currents during each successive division. Certain qualitative differences of the two daughter cells of every cleavage are also due to these movements. The remains of the centrosphere (idiosome of Meves, mother periplast of Vejdovski) in each blastomere is carried by definite rotations of the protoplasm into one only of the two daughter cells into which the blastomere divides; there is thus produced by protoplastic movement a visible qualitative difference in the two daughter cells formed at every division.

*The Characteristics of Mitosis and Amitosis.* S. WATASÉ.

*On Hæmatococcus.* F. H. HERRICK.

OBSERVATIONS on Hæmatococcus began with Girod-Chantrans in 1797 and have been continued during the present century by Agardh, Cohn, Braun, Rostafinski, Bütschli and others. The chief points of contention lie in the supposed sexual character of this organism and in the structure and functions of the zoospores.

The following summary of results was presented: (1) Resting cells after long submergence in water lose the power of development. In one case, after being submerged for two years, the cells have greatly thickened walls, but no zoospores are formed. If these cells are now dried, even for a short time, and then returned to water development rapidly follows. Hæmatococcus has thus become adapted to the alternation of drought and moisture, so that desiccation or something equivalent to this has become necessary to bring about a normal response. (2) Great variation not only occurs in the form and size of the sporangium (developing mother cell wall) and in the number of the zoospores, but in the size of the zoospores produced in the same sporangium. In respect to size at least the terms 'macrozoospore' and 'microzoospore' have no significance. (3) The zoospores imbibe water after liberation and undergo marked changes in appearance. Before maintaining that all zoospores have a similar structure, it may be necessary to repeat and extend certain experiments, but we are convinced that no sexuality can be attributed to this form, and that no true copulation has ever been observed. (4) Monstrosities frequently occur in the motile stage, such as twins and cells with four or more 'heads' (pairs of flagella) in all cases due not to *fusion*, but to incomplete division of the mother cell. (5) Reproduction by internal cell division has been observed in the motile stage in a few cases, in one of which the zoospore-colony consisted of four small cells freely moving in the sac of the mother zoospore, which was itself distinctly propelled by its own cilia. The mother capsule soon burst setting the young free. (6) When a motile cell comes to rest its protoplasmic sac contracts and a spherical resting cell is formed which secretes its proper wall while still enclosed in the evanescent wall of the zoospore. The flagella break at the 'beak,' leaving two slender rods united with the wall of the metamorphosed zoospore. These are probably elastic cellulose tubes which serve to sustain the flagella at the points where they pierce the sac. (7) In the course of zoospore-formation in large cells endosmosis is very great and the surface tension of the wall unequal. The transparent sphere is blown out in a form often resembling that of an incandescent light bulb, with abundant room for the

active cells. The wall at the small end of the bulb is still very thick, and at the moment of bursting suddenly contracts and scatters the zoospores with a rush. (8) Under various conditions direct development of resting cell from resting cell seems to occur. This looks like a process of arrested development of zoospores, in which cell division is complete, but the characteristics of the motile cell do not appear.

Bashford Dean,
*Secretary.*
Columbia University.

(*To be concluded.*)

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*ASSOCIATION OF AMERICAN ANATOMISTS.*

The eleventh annual session was held in New York City, December 28th–30th, in conjunction with the 'Naturalists' and other affiliated societies. Most of the meetings were held at the Medical Department of Columbia University. Forty-one members attended and 20 new members joined, making a total of 141, of whom 10 are honorary. The localities and names of the new members are as follows: From Ann Arbor, Professor J. P. McMurrich, University of Michigan; from Baltimore, Professors F. P. Mall and L. F. Barker and associate R. G. Harrison, of the Johns Hopkins University; from Buffalo, Dr. N. S. Russell, assistant in anatomy, University of Buffalo; from Ithaca, Dr. L. Coville, lecturer and demonstrator in anatomy, Cornell University Medical College; from Montreal, Dr. J. G. MacCarthy, senior demonstrator of anatomy, McGill University; from New York City, Professor J. D. Erdmann, of Bellevue Medical College; Dr. Evelyn Garrigues, assistant demonstrator of anatomy, Woman's Medical College; Dr. Ales Hrdlicka, associate in anthropology, Pathological Institute of New York Hospitals; and the following assistant demonstrators of anatomy in Columbia University: Doctors G. E. Brewer, C. Carmalt, H. D. Collins, G. W. Crary, W. Martin, W. H. Rockwell and A. S. Vosburgh; from Philadelphia, Professor J. C. Heisler, of the Medico-Chirurgical College; from Savannah, Dr. E. R. Corson; from Washington, D. C., Dr. C. I. West, demonstrator and lecturer in topographical anatomy, Howard University.

The address of the President, Dr. Burt G. Wilder, discussed, 'Misapprehensions as to the Simplified Nomenclature;' the speaker urged especially a fuller recognition of what had been done by the English anatomists, Barclay, Owen, Pye-Smith and T. Jeffery Parker, and hoped the nomenclature of the future would be called the 'Anglo-American.'

The Association voted that abstracts of papers be required in advance, and that brief abstracts be included in the program; that the time for reading papers be limited to thirty minutes; that the Secretary-Treasurer be allowed his railroad fare and ten dollars toward his hotel expenses at each meeting. The Association also accepted the propositions of the editors of the (English) *Journal of Anatomy and Physiology* as to making that journal the official organ of the Association, and nominated Professor George S. Huntington as the American editor. The details of the arrangement will be given in a circular to be issued by the Secretary of the Association. Dr. E. W. Holmes, of Philadelphia, was elected member of the Executive Committee, and the President was authorized to fill the vacancy in the Committee on Anatomical Nomenclature caused by the resignation of Dr. Dwight.*

The subject assigned for discussion, 'The Teaching of Anatomy in Our Medical Schools,' was opened by Dr. Holmes; 'The Defects of our Present Methods,' and further considered under ten divisions, viz: (1) Preparatory education. (2) The value and place

* Dr. E. C. Spitzka, of New York City, has since been selected.