

stairway. An examination of the building itself shows that this provides sufficient illumination with diffuse daylight, and even on very dull days it is enough for all except, perhaps, the main corridor extending between the two lecture theaters on the ground floor, and then resort may be had to electric lighting.

The two stairways are lighted from the roof, and are so placed as to permit the student reaching any floor directly from the basement, where the reading and writing rooms are situated. The locker rooms and lavatories, on the other hand, are in the subbasement and can only be reached from the basement corridor.

The wings are, including the basement and subbasement, five stories in height. The main portion is only three stories, if we leave out of account the boiler room. This arrangement is due to the fact that the rear part of the building is placed in a shallow ravine. White brick, with stone facings here and there, is the material; the roof is flat and bordered all round with a brick parapet.

The building is heated by air forced over heated coils by large fans driven by steam and the ventilation is thus, in part, provided for, and also by the exhaust currents in the ventilation turrets which rise over the entrances.

A feature of special interest is presented by the small research rooms. The half units are intended to be used for various purposes, but chiefly for small groups of students pursuing advanced work or for special lines of research, but each of the fifteen small rooms, shown in the plans as adjacent to the lecture theaters, is reserved for individual workers carrying on selected investigations. These, with the other arrangements described, have been designed with the view of making the buildings a home for research. A. B. MACALLUM.

SCIENTIFIC BOOKS.

A Laboratory Text-Book of Embryology. By CHARLES SEDGWICK MINOT. Philadelphia, P. Blakiston's Son & Co. 1903. Pp. 380. With 218 illustrations, chiefly original.

The past year has witnessed the publication of several manuals of embryology, among which may be mentioned: (1) The comprehensive and exhaustive 'Handbuch der vergleichenden und experimentellen Entwicklungslehre der Wirbeltiere,' edited by Dr. Oscar Hertwig, of which eleven Lieferungen have appeared to date; (2) Korschelt and Heider's 'Lehrbuch der vergleichenden Entwicklungsgeschichte der wirbellosen Thieren, allgemeiner Theil' in two parts; and (3) McMurrich's admirable 'Development of the Human Body.' The first furnishes the student with the only complete summary of the embryology of vertebrates published since Balfour's 'Comparative Embryology' appeared in 1881; in it the enormous mass of literature since that date is fully digested, and the results are presented in connected form, so that it may serve as a new starting point for the student of vertebrate embryology. In the general part of their text-book Korschelt and Heider furnish the long-promised completion of the special parts by a full treatment of the structure, origin, maturation and fertilization of the germ-cells, and the experimental embryology of invertebrates. McMurrich's book is an excellent brief treatise for the medical student of the main facts of human embryology. Minot's new book is a laboratory guide, mainly in the embryology of mammals. Thus the teacher of embryology is furnished with a fairly complete 'up-to-date' equipment of the literature in his subject for the use of his students.

Minot's laboratory text-book is written from the standpoint of the anatomist rather than of the biologist. In this point of view lie both its limitations and its excellencies. It is the outgrowth of the actual experience of one of the best known of the teachers of embryology, and hence is strongly individualized. Too much praise can not be given to the large number of new and beautifully executed

illustrations; a number of fine figures are transferred from the original sources to a text-book for the first time, and only the best of the stock illustrations of other text-books are retained. The book is, indeed, built up around the illustrations, and the text often suffers by comparison. The figures of reconstructions of the pig embryo of twelve millimeters neck-length are especially fine, as are also the figures of sections of this embryo and of other sizes. In all of these figures there is the most painstaking reproduction of details, and the accuracy of the work is equaled only by its beauty. The illustrations of the two stages of the chick embryo studied are also noteworthy for accuracy and finish.

The contents are arranged as follows: The first chapter deals with general conceptions, the second with the early development of mammals, and the third with the most general development of the human embryo. These chapters are introductory in their scope, without practical directions. The following chapters are practical; the fourth deals with pig embryos: beginning with the embryo of 12 mm., there follow in order, embryos of 9 mm., 6 mm., 17 mm. and 20 mm. The fifth chapter is a study of two stages of the embryo chick, with twenty-four somites, and with seven somites. In chapter six we have a study of the blastodermic vesicle of mammalia and of the segmentation of the ovum. Chapter seven deals with the uterus and the fetal appendages of man, and chapter eight with methods.

Thus it will be observed that the student is led from a 12-mm. pig to a 9-mm. and 6-mm. stage, then by jumps to 20-mm.; from here a broad leap takes him to the youngest embryo yet studied, the chick of twenty-four somites, and he continues to descend by way of earlier stages of the rabbit, to the unsegmented ovum. This may fairly be termed *inverted embryology*. Professor Minot will not claim that this inverted order is logical, but only that it is practical. It is a question of the pedagogy of embryology. Now it is safe to admit, that, for an anatomist who knows nothing of biology, the inverted method of studying embryology is likely to be the more comprehensible; and as most of our medical

students are (crude) anatomists of this sort, it may be that their journey to embryological knowledge would subject them to fewer intellectual jolts if made by this road. It certainly is the historical highway by which the fathers of this science traveled; if recapitulation be the law in embryonic development, why not in embryological pedagogics?

It seems to me, however, to be an unwise concession to the present imperfect preparation of our medical students, and, in all seriousness, I believe an unnecessary concession; for my experience is that, after the first shock of exposure to biological conception and ideas, the medical student readily follows the *cœnogenetic* and logical method of proceeding upwards from the ovum. Moreover, the time is not far distant when every medical student will be required to have mastered the rudiments of biology before he shall be admitted to the study of that branch of applied biology known as medicine. With such a preparation the logical method is much better.

It is not, however, incumbent on the user to follow the order of the book, for the description of each stage is complete in itself. Those who use it, therefore, will probably follow their own ideas of order; and the practical parts can be unhesitatingly recommended as excellent in themselves.

The chapter on methods is rather brief, but good as far as it goes; a larger number of formulæ of killing fluids and stains and the methods of using them would undoubtedly be an improvement.

The three general introductory chapters are best, as is to be anticipated, in the parts allied to the author's own province of work; thus the 'law of genetic restriction' is well expressed and discussed; and the third chapter on the human embryo is by far the best brief outline of human development known to me. On the other hand, the unfortunate student who might have to derive his ideas on karyokinesis and on the maturation of the ovum from the vague accounts of this book, would probably conclude, for his own peace of mind, that these subjects are not of much importance after all. As regards the germ-layers in mammals we read on p. 59 that 'it is probable that

the subzonal layer is the ectoderm and that the inner mass is the entoderm,' whereas it is well established that the subzonal layer forms the ectoderm of the chorion (possibly also its mesoderm in some forms) only, and that the inner mass forms all of the tissues of the embryo proper as well as the yolk-sac. The mesoderm is described as arising by a process of delamination in birds, reptiles, elasmobranchs and mammals: 'It is safe to say that the mesoderm probably arises by this process, which we call delamination in all vertebrates' (p. 74). It would be difficult to make a more misleading statement concerning the origin of the mesoderm in vertebrates. The necessity for condensation affords no excuse, as the admirably clear, accurate and brief statement on the same subject in McMurrich's new manual demonstrates.

Such sweeping statements as the two following are at least regrettable: 'It is fortunate for our comprehension of embryological processes that we are already able to say that Roux's hypothesis is erroneous,' referring to the mosaic theory of the segmented ovum; we know, as a matter of *fact*, that certain ova (*e. g.*, of *Ctenophores*) are true mosaics; and the general bearing of recent embryological results is that all ova are more or less mosaic, in an unstable fashion. On page 41 we are told that Weismann's hypotheses are 'complicated' and 'useless'; not to mention the stimulus they have given to research, this sounds strange on the eve of a general rehabilitation of such hypotheses in connection with Mendel's laws of inheritance.

The book contains too many bad misprints and similar errors; *e. g.*, page 19: 'In mammals there are always four pairs (of gill pouches) on each side'; page 29, 'latter' for 'former' in the second line of the last paragraph; page 63, first line, Fig. 23 does not show the structure referred to; page 63, another erroneous figure reference in the second sentence of the last paragraph; page 91 'ectoderm' for 'entoderm' middle of page; page 105, 'unguiculate' for 'ungulate,' last sentence of third paragraph; page 113, 'three months' for 'three weeks,' second line from bottom of first para-

graph. These are only a few instances of many.

Finally a protest should be entered against the use of the German word 'Anlage' to denote 'rudiment,' and especially against such a hybrid monstrosity as 'deck-plate' for 'roof-plate,' the first component being German and the second English. FRANK R. LILLIE.

Handbook of Climatology. Part I., *General Climatology.* By Dr. JULIUS HANN, Professor of Cosmical Physics in the University of Vienna. Translated by ROBERT DECOURCY WARD, Assistant Professor of Climatology in Harvard University. New York and London, The Macmillan Co.

English readers interested in the climate of the earth will welcome the translation of the most important portion of the 'Handbuch der Klimatologie' by Dr. Hann, who now by general consent is accepted as the leading authority on this matter in the world. But the new English edition is more than a translation, and it would have been clearer had the title read translated and revised. Professor Ward has taken great pains to bring all the matter down to date. Besides his own large reading on the subject he has consulted such experts as Professor F. W. Very, Professor W. M. Davis and Professor R. W. Wilson, and then referred all criticism and suggested changes or additions to Dr. Hann, who has passed upon them or revised them, and thus given the weight of his authority to the matter, so that the book becomes essentially a revised edition including more American examples than the original. The preface says that, "Most of the examples given, however, necessarily still relate to Europe, because the climatology of that continent has been studied more critically than that of any other region. A few cuts have been made where the discussion concerned matters of special interest to European students only. Most of the paragraph headings are new, and the arrangement of parts, sections and chapters is somewhat different from that in the original. These changes have been made with a view to adapting the book better for use in the class-room. Every change that has been made has the full