He gives first a series of anthropometrical measurements of the skull and of the brain, and then describes what he calls the pathological anatomy of the criminal. In other words, those anomalies which would come under the head of pathology, rather than some variation in simple normal measurements.

Professor Lombroso admits that there is very little to be learned from anthropometry in connection with the present study. It is only by comparison of a very large number of very carefully taken measurements that differences between normal and abnormal women can be discovered. It is in the line of the pathological anomalies that he finds the most to attract his attention. Generally speaking, he finds that the anomalies in the female offender are less than in the males of the corresponding class. So far as the skulls are concerned, he states that the skull of criminal woman approximates somewhat to the male skull, especially in the heaviness of the lower jaw-bone, in the exaggeration of the supra-ciliary ridges, and in peculiarities of the occipital region. As regards the brain of female offenders, the anomalies in structure and size are few. There are, however, very often pathological conditions which are of a striking character. Thus in one-third of thirty-three female criminals, there were found gross lesions of the central nervous system.

In making a summary of the chapters on anthropometry of female criminals, Lombroso confesses that the cumulative figures do not amount to much, and he affirms again that the stability of type is much greater in woman than in man. Still he asserts that in female criminals, the height, the stretch of arms and limbs, are less than normal, while in proportion to the height the average weight of certain classes of criminal women is greater than in moral women. Lombroso asserts that grayness is rarer in the normal women than in criminal women, while baldness is less common in this latter class.

The author's chapter on facial and head anomalies of female criminals seems to us to be full of industriously collected figures, which have, at present, a very slight value. He asserts, however, as a conclusion from a study of them, that these anomalies of the face and body are much more frequent in the female criminal than in the moral classes. The asymmetrical face, strabismus, virile and Mongolian types of physiognomy, out-standing ears, crooked nose, hairiness, prehensile feet, large jaws and cheek bones and anomalous teeth, are among the stigmata that are mentioned. He endeavors to show that certain kinds of criminals have more of these stigmata than others, but no generalization is attempted.

A number of chapters follow upon the physiognomy of female criminals, on tattooing of the offender and on the acuteness of their various special senses, and the book concludes with studies upon the psychology of the born criminal, the occasional criminal and discussions upon hysterical criminals and crimes of passion.

The book as a whole leaves the impression that the author has not made very much headway in establishing a criminal type which can be determined by physical characteristics alone. Still, he has accumulated a large number of facts, and when this is still more increased, particularly by observations on normal women and upon women of different races, some deductions may perhaps be drawn.

The general chapters which bear upon the subject of the production of criminals are interesting and form a valuable contribution to penology.

CHARLES L. DANA.

NEW YORK.

Bildungselemente und erziehlicher Wert des Unterrichts in der Chemie. VON PROF. DR. RUDOLF ARENDT. Voss, Hamburg and

Leipzig. 1895. 8vo. Pp. 103. Price, 2 marks.

Under the above title Professor Arendt has reprinted the introductory chapters of his book, called 'Technik der Experimental Chemie,' and in these he points out the great advantages that are to be gained by a study of the natural sciences in the secondary schools. In order that the pupils of these schools may gain the greatest possible benefit from such study he recommends that they be taught physics and chemistry, and that the instruction in the purely descriptive sciences, such as botany and physiology, be omitted. In the lower classes he insists that the treatment of these sciences must be purely empirical. Facts must be collected and arranged systematically. All speculative discussion in regard to things that lie beyond what can be observed, and all hypotheses of a metaphysical kind, must be avoided. The minds of the pupils must first be furnished with a sufficiently broad knowledge of the facts of observation before the attempt is made to make a more profound study of physical and chemical phenomena. It is only in the higher classes that subjects of a theoretical nature are to be considered, and then great care must be taken by the teacher to present these subjects in their true light, so that the students may clearly apprehend what is fact and what is hypothesis.

The author considers first how conceptions and ideas are formed in studying changes in material things, then how the results of observation and experiment are to be arranged and classified and how generalizations are to be reached. The inductive method of working is explained in great detail, and the author calls attention to the unusually good opportunity which the study of chemistry offers for making students thoroughly familiar with this method of investigating nature.

The last chapter deals with the practical details of instruction, what to teach and how to teach it. He recommends what he calls the synthetic method. The course begins with a consideration of the more important metals. The characteristic properties of these are discussed; then the changes that they undergo when they are heated in the air are examined experimentally. The causes of these changes are found to be due to the action of one constituent of the air. By further experiments the student is led to discover oxygen, to determine the composition of air and water. The action of oxygen upon combustibles is then taken up, and this leads to the determination of the nature of combustion. After the student has in this way learned something about the class of bodies called oxides he starts again with the metals and studies the effect of chlorine and sulphur upon them. Thus a knowledge of chlorides and sulphides is obtained. A comparative study is then made of the oxides, sulphides and chlorides, and the methods of transforming the members of one class into those of the other classes are considered. The course of instruction is continued in this way until the student has learned something about all of the more important elements and compounds. Throughout the entire course the inductive method is used, the student being constantly called upon to draw his own conclusions from the experiments and then to test these conclusions by means of new experiments.

Admirable as this plan seems to be for the instruction of young students, where the course can be extended through a series of years, it can hardly be regarded as a satisfactory one for more advanced students. It is only the simpler laws that can be worked out inductively by the students. The greater number have to be imparted to them directly, and the explanation given of how these laws were discovered and upon what basis they rest. The most that the

students can do is to verifiy some of them by means of one or two examples which illustrate them. Nevertheless, the plan of replacing the purely descriptive work in science by something which makes the students think, and makes them test the accuracy of their conclusions by means of new experiments, is greatly to be recommended.

E. H. K.

SCIENTIFIC JOURNALS.

BOTANICAL GAZETTE, JULY.*

Undescribed Plants from Guatemala and other Central American Republics, XV.: JOHN DONNELL SMITH.

For some years Captain Smith has been exploring the regions named and studying collections made there by others, with the result of finding many new plants which are being described (and some handsomely figured) in this series of papers. Many of the descriptions are contributed by European specialists.

Contributions to the embryology of the Ranunculaceæ: DAVID M. MOTTIER.

This paper, which is richly illustrated by 59 figures, brings to our knowledge considerable variation in the development of the embryo sac in different genera of the family. One of the most striking points is in the announcement of the frequent occurrence in this family also of more than one embryo sac in the ovule and the presence of as many as five or more initial cells of embryo sacs in *Caltha*.

Observations on the development of Colletotrichum lindemuthianum in artificial cultures: GEO. F. ATKINSON.

This fungus is the one producing the common spot disease (anthracnose) of beans. Having made many failures in germinating the spores in artificial media, Professor Atkinson finally succeeded and gives a detailed account of his successful methods in this paper. Photomicrographs reproduced in half-tone show his results.

On the validity of some fossil species of Liriodendron: THEO. HOLM.

Mr. Holm criticises paleobotanists for naming scrappy remains of leaves, and takes to task especially Professor Hollick's determinations of some cretaceous plants from Long Island.

The nomenclature question: (1) *Botanical nomenclature and non-systematists:* W. F. GANONG; (2) *Dr. Robinson and homonyms:* FREDERICK V. COVILLE.

The nomenclature question is attracting a great deal of attention at present among botanists. In the first named contribution to the discussion Professor Ganong opposes the proposed reform, because it violates the psychological principles of the use of language, and because it is not likely to obtain a sufficient following to make its nomenclature intelligible. Mr. Coville points out the advantageous working of the law of the rejection of homonyms in a real case, as opposed to its disadvantageous working in the case supposed in a previous note by Dr. Robinson.

In *Briefer Articles* Mr. M. L. Fernald describes a new dandelion with red fruits (*Taraxacum erythrospermum* Andrz.) which has made its appearance in New England; an account is given of the Gilbreth botanical collection recently presented to Radcliffe College; Professor W. A. Kellerman reports an apparently authentic case of poisoning of children by eating shepherd's purse; Mr. C. L. Pollard describes a new variety of the arrow-leaved violet (*Viola sagittata Hicksii*) from the District of Columbia; and Dr. L. M. Underwood figures a curiously deformed Equisetum, presumably *E. hiemale*.

Under *Current Literature* are reviewed Oliver's 'Natural History of Plants,' a translation of Kerner's 'Pflanzenleben';

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