iology. It is not correct to say with our author that the cerebellum is ontogenetically developed from a simple cell plate. There is abundant evidence that the cerebellum is essentially a paired organ, and this, too, is in harmony with its function. The curious method of supplying its surface where the bulk is increased, as in mammals, by lateral diverticles deserves passing mention.

The English translation is neatly printed, though there are a few mistakes which greater care would have avoided. Figure 3, for example, is wrong side up, and thus the description is belied.

The translation is far from faultless, though for the most part intelligible. We are prepared to find that a translator should be so influenced by the idiom of the original as to produce a somewhat halting English style, and it often happens that the translator's own style leaves something to be desired, but there is no excuse for translating Gehörgrube as oral pit, as Dr. Hall has done. Fasersystem appears as 'tract' in a connection where it is important to distinguish between these terms. 'Dicht anlegen' is translated 'lie close beside.'

On page 16 the author is made to say 'all vertebrates,' where the original says 'all lower vertebrates,' and proceeds to make an important distinction between lower and higher vertebrates.

We do not wish to enter upon the field of vexed neuronomy, but regret that the translator was not satisfied with 'neurite' or 'axis cylinder,' as used by the author, and substitutes the less satisfactory 'neuraxon,' which Dr. Edinger did not use at all. 'Fundament' for 'Anlage' is to us an unpleasant word, to say nothing of its ambiguous sound. 'Proton' is sufficiently well known. It seems strange that in an English work we should need to puzzle over the terms of direction 'up and down,' 'back and forward,' etc. Minor inaccuracies like 'mantel' for 'mantle' in one place are probably slips in proof-reading.

On the whole, then, while we congratulate ourselves on this addition to the resources of the teacher of neurology, we hope that a later edition may remove these causes for irritation to the instructed reader. C. L. Herrick.

The Characters of Crystals, an Introduction to Physical Crystallography. By Alfred J. Moses, E.M., Ph.D., Professor of Mineralogy, Columbia University, New York City. New York, D. Van Nostrand Company. 1899. Pp. 211.

This little volume contains the principles of modern crystallography and descriptions of the instruments and methods used in the determination of the various physical characters of crystals. The advanced student in mineralogy and crystallography will find it of much assistance, because it presents in a concise form, omitting unnecessary detail, the subjects treated of in the larger foreign text-books on physical crystallography.

The contents are divided into three parts, the first dealing with the geometrical characters of crystals. In the classification of the thirty-two types of crystals the author has followed Professor Groth, and has wisely retained the same descriptive names for the classes and forms. The common methods of measuring crystals are well described, but a more complete description of the use of the two-circle goniometer would have been better, since this instrument will undoubtedly be used in the future by the advanced worker more than the ordinary goniometer; also in the chapter on crystal projection no mention is made of the gnomonic projection, the value of which Professor Goldschmidt has so well demonstrated. This projection possesses so many advantages over Miller's that it, in connection with the use of the two-circle goniometer, should be understood by every mineralogist.

An excellent course in optical crystallography is given in the second part of the book. The causes of the various optical phenomena and the latest methods for the determination of the optical characters of crystals are explained briefly, yet clearly enough for the student to readily understand this difficult subject.

The third part treats of the general physical characters, such as the effects of heat, magnetism, electricity, etc., on crystals. The author appends a synopsis of an advanced course of crystallography as given at Columbia University. The book is well illustrated by crystal-drawings and by cuts of instruments, and fre-

quent references to original articles are cited in the foot-margins.

This is the first American text-book on purely physical crystallography, and, containing, as it does, the sum of what is at present known on the subject, it must commend itself to every student of the science.

A. S. EAKLE.

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Algebra for Schools. By GEORGE W. EVANS, Instructor in Mathematics in the English High School, Boston, Mass. New York, Henry Holt & Co. 1899.

This book is a fresh treatment of the topics commonly found in algebras for schools. It is by no means a mere compilation or reprint with slight alteration of texts now before the public. While, of course, it is not, nor pretends to be a contribution to knowledge, it is distinctly what the author has sought to make it, a real contribution to the art of presenting knowledge to the beginner. Ordinary algebra is, in its elements at least, nothing but an extension and refinement of common sense applied to number. Consistently with this idea, the author's arrangement of topics, as well as his method of attack —in both of which respects there is a noticeable departure from tradition—are well adapted 'to preserve the pupil from the besetting sin of conceiving algebraic operations as a species of legerdemain.' An appeal is invariably made, in the first instance, to the reader's practical sense. Theory is not slighted; being approached through concrete examples, it is, however, rather produced than presented, and its correctness is not so much demonstrated as its *reasonableness* is shown. As instances of this procedure may be cited the treatment of signs, imaginaries and exponents. In case of the latter two themes the spirit is particularly commendable. Among other specially praiseworthy features are the chapter on the abbreviation of rules by means of symbols; the prominence given to identities, together with the clear distinction between the latter and equations of condition; the geometric interpretation of the simplest equations; the extended and accentuated treatment of factoring and of the quadratic equation; the discussion of the notions of constant, variable and limit, and the abundance and variety of exercises not copied from other works. An easily detectable slip in logic occurs on p. 105 in justifying steps (4) and (6) by reference to axiom *A*. The proper justification is that such equations are satisfied if either factor be equated to zero.

An adequate characterization of the book is impossible in so short an account. That it is immensely superior to the average of its rivals is obvious on comparison. It should be added that the book is written in excellent English, and is well printed and well bound.

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The Emotion of Joy. By GEORGE VAN NESS DEARBORN, A.M., M.D. New York, The Macmillan Company.

This monograph opens with a rather extended vindication of parallelism, but the writer cannot keep to this point of view, *e. g.* pages 8, 13, 14, 16. But at any rate parallelism at present is metaphysical, exact coincidence of external expression and internal emotion is yet to be shown experimentally, and, as assumption, it is obscurrantist in breaking up the universal causal nexus, which is the basis of science, and putting a bare dualism for rational coordination. Of course the difficulty of experiment seems insurmountable, since the agent can only indicate to us the moment of his emotion by an expression. After outlining the general parallelistic doctrine of emotion, Mr. Dearborn presents some experiments which are so hypothetical as to be only of the slightest value in revealing the opinions of fourteen persons as to how they would feel and act if given sums of money from ten to ten thousand dollars. Much the most interesting and valuable part of this paper is that which reports researches on the effects which pleasantness and unpleasantness have upon the involuntary muscular movements. It is particularly interesting to notice that "the left hand appears much more sensitive to involuntary reaction than the right, and this was to be expected, perhaps, most of the subjects being right-handed and, therefore, with their right hand 'civilized,' so to say, away from the original biological habits of emotional con-