facial nerve, was especially important. Dr. Mendel experimented by destroying the muscles supplied by these nerve-branches (mainly the muscle raising the upper eyelid) in young animals, and then observed the atrophy of nerve fibre and cell in the central nervous system. He found that the origin of this nerve-branch was not, as is currently supposed, in the general nucleus of the facial nerve, but in the posterior part of the nucleus of the oculo-motor nerve. This is another evidence to the fact that the nerve-centres are arranged for co-ordination of function (not for topographical convenience), those nerves arising from a common centre as must frequently act together in exciting a useful movement.

Dr. Spitzka of New York showed the cerebellum of a child of five years, who had never learned to speak or walk. The cerebellum was enormously asymmetric, and the entire brain and much of the body presented striking abnormalities.

Dr. Homen of Finland described a distinction between the motor and sensory areas of the spinal nerves as brought about by atrophy resulting from amputations. Dr. Otto of Munich advocated the use of magenta as a staining for sections of the nervous system.

Quite a number of papers of much too general a character were presented. Such papers, however valuable in themselves, are too much the record of individual opinions to be profitably presented at an international meeting. Such questions as the 'definition of insanity,' 'the classification of insanity,' and the like, are sure to be profitless; at least, until we know much more of the pathological nature of mental aberration than we do now. A very opposite criticism is to be passed upon the discussion on the relation of syphilis to insanity, which aroused much interest, and was practically and profitably conducted. The leader in the discussion was Dr. G. H. Savage of Bethlem, England.

MENTAL SCIENCE.

The Chronological Progress of Infants.

THE scientific observation of the early stages of development of the human infant, though no longer a novelty, can be said to have yielded only the first suggestions of the valuable generalizations which this study is destined in part to discover and in part to corroborate. Amongst these generalizations the most important is that psychological law which finds its analogue in the embryological law that the early life-stages of a species high in the animal scale repeat in part the mature stages of an animal lower in the scale, and announces that the mental development of the child repeats in part the development of the race. The many and suggestive analogies between the emotional traits and thought-habits of children and of savages have been frequently recorded, and their importance is more and more widely appreciated. Nor has the practical aspect of infant psychology been neglected. Once educators have recognized that this study promises a surer basis for early school-room work than any amount of simplification of exercises originally arranged for more mature minds, it makes the teacher learn from as well as teach the pupil. One educational body has asked for systematic records of child-growth, bodily and mental, and a few normal schools are substituting for the dry and often narrow course in 'Methods of Teaching,' a practical and original essay recording observations of various traits of child-life. One main purpose in all such records has been to get an average of the date and order of appearance of the several acts, instincts, emotions, ideas, and so on, in the child. In the process of obtaining such an average, much information will at the same time be gained as to the range of variation in time of appearance of the several traits, of the influence of sex, of heredity, of nationality, and of environment upon them. When such a record will be at our command, the rate of progress of any particular child, whether precocious or backward, will be easily ascertainable, and much energy be saved in propping up what needs support, in checking over-development of certain traits, and thus promoting that harmonious all-sided growth which modern education regards as its ideal. The caution in the process should be in the direction of remembering the individual variation as well as the average, — that by nature men are far from being alike, and civilization requires them to be so only in a very restricted though important field of activity.

Dr. Stanford E. Chaillé of the Tulane University has recently put together, in a form very convenient for others to supplement and perfect, the various stages of infant progress. He gives in a series of brief paragraphs the chief acquisitions which the average infant may be expected to exhibit for each month of the first year of life, and at intervals of several months from then to the third year. The acts whose appearance he notices include the physical signs as well as the actions on which mental growth is founded. As the article of Dr. Chaillé is itself a *résumé*, it will hardly be profitable to further epitomize the facts there given. Referring to the original paper for the facts (*New Orleans Medical and Surgical Journal*, June, 1887), it will be sufficient to state that they record the various reflexes (sucking, crying, sneezing, etc.) existing from birth, the order of the development of the senses (taste first) and the gradual change in their relative educational importance, the accommodation to the environment, the interpretation of the objective world (as the inference of distance by sight), the emotional evolution (fear being the first emotion), the expressions of pleasure and pain, the co-ordination of the muscle-movement into acts, the gradual voluntary control of hands and feet, the first sounds and attempts at language, the appreciation of colors, sounds, odors, and so on. The general conviction which this study has left upon Dr. Chaillé's mind is not in harmony with the popular belief that children are to a larger extent than adults virtuous and guileless, but agrees with the evolutionary notion that the virtues which civilization has taught us to admire are of recent growth, and not innate in the infant, whom it is more truthful to regard as a 'darling little savage,' than as a 'dear little angel.'

A point on which this paper is especially complete is the increase of weight, height, and chest-girth with each month of the first year of life, and at longer intervals from then to maturity. During the first three days of life there is a loss of weight, which should be regained by the seventh day. The greatest gain of weight occurs during the first five months, the maximum amount of growth falling probably in the second month, when the increase is from four to seven ounces weekly. From then on, the regular increase of growth which the table records takes place, leaving more room for individual variation with increase of age.

THE EFFECT OF OPIUM ON THE HIGHER ANIMALS. — It has recently been observed that opium affects apes just as it does men, producing all of the physical symptoms, and strongly suggesting the presence of some, at least, of the typical psychical accompaniments. A certain ape would always follow any opium-smoker, would look for the remnants which the smoker left unused, would cry when not admitted to the room where smoking was going on, and so on. The habit takes the same possession of them that it does of men. Apes who are in the habit of getting a little opium are inactive, dull, and useless if they miss their usual dose; and a Chinese merchant is recorded as having a large ape who howls piteously when his usual ration of the drug is denied him. Similar effects have been observed in dogs, and strikingly illustrate the functional similarity of the central nervous system of the higher mammalia.

A CHALLENGE TO THE EVIDENCE FOR THOUGHT PHANTASMS. — An article published in the *Nineteenth Century* for August, by A. Taylor Innes, and entitled 'Where are the Letters?' is in substance an attack on the nature of the evidence for death-bed and other coincidences, which Messrs. Myers, Gurney, and Podmore have collected in their 'Phantasms of the Living.' Most of these stories are those in which a friend or relative of the person concerned is suddenly presented with a vivid impression that the person in question, who is far distant, is threatened with danger; the case is then made out that the time of death of the individual coincided with the moment of the apparition to his friend. In a large number of cases documentary evidence of the simultaneity of the two occurrences — as when two letters, each recording one of the events, cross each other — is naturally obtainable; and the writer of the above article claims that in such cases the authors have been satisfied with the mere statement that such evidence existed without actually seeing the letters, and yet regarding such evidence as of first-class value. An actual examination shows how worthless such statements often are. In nine cases in which they did see the original manuscript the evidence is declared unsatis-

factory. On the basis of such omissions, a general distrust is thrown about the whole work, which only a very careful and accurate refutation by the authors of the work can remove.

BOOK-REVIEWS.

The Origin of Mountain Ranges, considered Experimentally, Structurally, Dynamically, and in Relation to their Geological History. By T. MELLARD READE. London, Taylor & Francis. 8°.

MOUNTAIN ranges, that show the effects of lateral compression in their folded structure, are explained by most geologists by means of Elie de Beaumont's 'contractional hypothesis:' the interior of the earth is thought to be contracting as it cools, and the outer part, or 'crust,' wrinkles as it settles down to accommodate itself to the diminished interior. But in recent years several geologists have urged that this hypothesis was quantitatively insufficient to account for the known mountain ranges, and while these criticisms do not seem to me to be by any means fatal to the effective working of the contractional process to a considerable extent, they have served a good purpose in emphasizing the need of further search for methods of mountain-making. The want of any sufficient means of accounting for plateaus of massive elevation, also points to the importance of further study of the physics of the earth.

The illustrious Playfair, writing early in this century, thought nothing so capable of causing a slow-acting, irresistible elevatory force as the expansive power of heat; but he suggested no means of applying the heat in proper time, place, and quantity. Mr. Mellard Reade, following out an idea advanced by Capt. Thos. Hutton of New Zealand, and others, attempts to supply this deficiency as follows: mountain regions were once regions of heavy sedimentation; the slow accumulation of sediments caused a depression, and a consequent warming of the mass beneath them; the warming mass tends to expand in all directions, but can expand only vertically; and, in this conversion of cubic into linear expansion, Mr. Reade finds a sufficient cause for the extravasation of lavas, the elevation of plateaus, and the crushing deformation of mountain ranges. The last-named process seems to me only remotely connected with this cause, but the other two may find some or much explanation in it. It is necessary, in order that the process shall work efficiently, that the depression caused by sedimentation, shall for a time go on faster than the consequent ascent of the deep isogeotherms; if we admit this to be possible, the hypothesis gives a qualitatively correct explanation of those paradoxical changes of level seen in the elevation of areas heavily loaded with sediments, and the depression of lands deeply denuded; it also suggests a reasonable correlation between the slow, light sedimentation of such regions as Wisconsin, and their long exemption from serious disturbance. The process therefore deserves to be discussed rather than dismissed: working with other processes, it will, I believe, come to be accepted as a useful aid to a common end.

W. M. D.

The Teaching of Geography. By ARCHIBALD GEIKIE. London, Macmillan. 12°.

THE book under review is the first volume of Macmillan's geographical series, which is edited by Archibald Geikie. It is an introduction on the teaching of geography, in which the author sets forth his views on the scope and goal of geographical science and of the methods of teaching it. The book shows in an admirable way how geography can be made a useful and attractive study, how in teaching it the mental faculties of the child can be developed and its power of observation increased.

Of course, the author's method rests on the views he holds on the aims and method of geography. He says (p. 2), "It is the special function of geography to direct our attention to the [phenomena surrounding us], to increase our knowledge of the country we live in, and thence to trace analogies and contrasts among the aspects of nature in other regions of the globe. Geography compares the topography of one continent with that of another, dwelling upon the fundamental elements of each, and showing how they have affected the distribution and development of the human population. . . . In gathering the materials for this comprehensive picture of the earth as the dwelling-place of man, geography culls freely from almost every branch of natural science and from history."

From this standpoint the subject is admirably treated. Geikie shows how every single fact and every single observation can be made use of from a geographical standpoint, — the state of the weather, the furniture of the school-room, the silk kerchief of a child, or the coal used for fuel. He makes the study of the surroundings the starting-point for teaching phenomena of natural history, of meteorology, history, and of social science. But it seems to us that if the curriculum of a school should be planned out according to Geikie's suggestions, the geographical point of view would become too predominant. His recommendation that actual observations should always be the foundation of teaching is of eminent importance, but observations must not be exclusively treated from a geographical standpoint.

Two ends are to be kept in view in teaching: the development of the power of reasoning and of observation, and that of the heart and feelings. In the elementary stage both goals are attained by inducing the child to look at the things themselves, and to take a lively interest in them, and by training it to notice differences in things. By this method the child gains an active interest in the subject which it is taught, and a foundation is laid for future explanations and classifications. So far, Geikie's proposals cannot be excelled. But later on, the character of the natural sciences and physics makes it necessary that they deal to a great extent with generalizations and abstractions which only educate the powers of reasoning. Geography acts as an important counterbalance against this tendency, and we should wish that this fact had been more energetically emphasized by the author. He recognizes this fact, and mentions it in several passages of the book, e.g., "The objects of excursions are to train the pupils in habits of observation and reflection, to teach them the elements of topography, to enlarge their capacity for the comprehension of geography, and generally to stimulate their love of nature" (p. 73). But it is our opinion that this last point ought to be made the principal goal of geography-teaching in all grades. While the teacher of natural science chiefly develops the power of reasoning, the geographer must always try to keep alive the actual interest in the individual phenomenon as it presents itself to the eye, and in the mutual interdependence of its parts. Therefore geography must be placed in the curriculum of the school in one class with history and literature, and in advanced teaching it ought to be treated accordingly.

If Geikie's proposals for elementary teaching were accepted by teachers, — not of geography alone, — and if the historical standpoint were to be taught in the same enlightened way, a great step forward would be made.

We agree more fully with the author's views on the teaching of physical geography than with his treatment of political geography. Many subjects upon which he touches, which belong to linguistics and social science, seem to be too difficult to be grasped by a child, and others can be more adequately dealt with from an historical point of view than from a geographical one. The cultivation of land, its products, the situation of villages and roads, and similar subjects, may be treated with advantage, while money, telegraph, and post, etc., are more satisfactorily dealt with from an historical standpoint. Particular care ought to be taken in treating anthropogeographical subjects, for most of these phenomena are so complicated that the juvenile mind is unable to grasp them. Science itself has not treated these subjects in a satisfactory way, and most of its theories are vague and not well founded. We should hesitate, for instance, to lay any stress on such facts as the position of Britain in the very midst of the land hemisphere (p. 198), as upon thorough investigation it may be shown that in fact they are only of secondary importance. But the elementary problems of anthropogeography may be treated: the influence of climate upon the life of peoples and man, the means of communication, and their dependence upon the configuration of the ground, etc.

The present book, and several other publications, are proof of the stimulus the teaching of geography has received in England by the endeavors of the Royal Geographical Society. So far, little interest has been awakened on this side of the ocean, but publications of this kind cannot fail to excite the interest of American geographers.

F. BOAS.