notions of time-units. Houzeau took his dogs out walking every alternate day, and after ten walks did not notice a spontaneous desire of the dogs to go out, although they enjoyed the walk. The dogs did not estimate the interval, but took hints from trifling indications. They notice the return of a complex series of circumstances. On the other hand, Houzeau ascribes an instinctive time-sense to the crocodile that comes back to its eggs after a definite interval, varying from ten to fifteen days in different species. The mules on the horse-cars in New Orleans make five trips a day, and are always very restless on completing their fifth trip. Such facts need more exact experimentation before they can be ascribed to real counting on the part of the animals.

THE INFLUENCE OF SENSATIONS ON ONE ANOTHER. — Under this head Dr. Urbanschitsch of Vienna reports some curious experiments, the value of which must be left to future research to decide. His general conclusion is, that the excitation of one sense-organ increases the acuteness of the others. If a disk be regarded at such a distance that its color is indistinct, the hearing of a sound will bring out the color. The beating of a watch is heard more clearly with the eyes open than with the eyes closed. Red and green increase auditory perceptions; blue and yellow weaken them. The fact that we listen to music with our eyes closed is due to other reasons, and also to the fact that the *ensemble* appears best when the tones are not at their clearest. Smell, taste, and touch are open to the same influence. Red and green increase the sensitiveness of each of these senses; yellow and blue weaken their sensitiveness. Touch and temperature have a reciprocal influence. If one tickles the skin and plunges it into warm water, the tickling ceases; if into cold water, the tickling brings out the feeling of cold. These observations are regarded as showing the same re-enforcing action between sensations as has been shown to exist between motions, and as offering a mode of explanation of those curious associations between colors and sounds so insistent in some minds.

BOOK-REVIEWS.

Greek Life and Thought, from the Age of Alexander to the Roman Conquest. By J. P. MAHAFFY. New York, Macmillan. 12°. $3.50.

THIS work is in the main a continuation of the author's previous volume, 'Social Life in Greece from Homer to Menander,' though somewhat wider in its scope. It lacks the absorbing interest that belongs to the history of the great days of Greece, but it has a new interest of its own in the spread of Hellenic civilization in Egypt and western Asia. The work is not confined to the moral and social life of the times, though this is the most prominent feature, but contains a great amount of information and discussion on almost every phase of Hellenic life. The political interest of the age immediately succeeding the death of Alexander centres partly in the division of his empire into various kingdoms, and partly in the struggles of the cities in European Hellas to recover their independence. Of the various kingdoms of the Hellenistic world, Egypt was, in Mr. Mahaffy's opinion, the most important and the most prosperous, — a fact which he attributes in great part to the statesmanlike genius of its founder, the first Ptolemy. In dealing with the cities of Greece, the author shows a lack of sympathy with the spirit of freedom and local patriotism which is not quite creditable in a citizen of a free country and a historian of Hellenism. It is true, the struggles of the cities to regain their autonomy proved unavailing, and perhaps they were not sufficiently cosmopolitan in their views; yet freedom is better than empire, and, while we acknowledge the defects and the failure of the patriots, we cannot but sympathize with their misfortunes.

Of the moral life of the period, we get glimpses from many points of view, and yet, as a whole, it is somewhat difficult to judge. The sins of the royal courts, especially the frequent murders, the use of torture, and the perpetual wars, are sufficiently prominent; yet Mr. Mahaffy thinks that the morality of private life was purer and more refined than it was in earlier times. In one respect there was certainly a real moral advance: it was during this period that the great schools of ethical philosophy were founded, and men came to regulate their lives by reason instead of by tradition and custom. The author gives an interesting account of the philosophical schools at Athens, which were established by law as religious corporations with regular endowments; and he shows clearly that during most of the period under review they were highly respected and influential.

The intellectual life of the Hellenic world is treated by the author with considerable fulness. The history of physical and mathematical science is omitted, on the ground that the author lacks the special knowledge requisite for treating it. In art the Rhodian and Pergamene schools are of course the most conspicuous; and Mr. Mahaffy shows, that, though this was an age of decadence, the number of excellent artists was by no means small. In literature, after the decline of the New Comedy at Athens, the chief interest centres in Alexandria. The establishment of the Museum and the great library in that city, and the liberal patronage of both by the Ptolemies, made the place the chief seat of literature, as it afterwards became of philosophy. Of the quality of this literature, Mr. Mahaffy expresses the opinion usually held of it by modern scholars. It was distinguished by erudition and imitation of earlier models rather than by original genius or power of style. It is worthy of note, however, that it was at Alexandria that the practice arose of writing poems, and afterwards prose fictions, on the theme of romantic love, — a theme which has since become the most prolific in literature.

The concluding chapter of the book gives an account of the introduction of Hellenic civilization into Rome consequent on the conquest of Greece by the Roman arms; but the subject is only just introduced, as the author intends writing another work on the spiritual life of Hellenism in the Roman Empire. Those who have read his other works will look with interest for the promised volume.

Mount Taylor and the Zuñi Plateau. By Capt. C. E. DUTTON. Washington, Government. 4°.

STUDENTS of American geology who have learned to expect in Captain Dutton's contributions important results ably elaborated, and presented in a style which is simply fascinating, — clear and graphic, and worthy of the geological wonderland in which it has been his fortune to work, — will experience no disappointment in this paper. The district to which it relates (longitude 107° to 109°, and latitude 35° to 36°) lies in the western part of New Mexico, and in the south-eastern corner of the great plateau country, and embraces two distinct geological problems of the first order, — the volcanic region of which Mount Taylor is the culmination, and the Zuñi Plateau. Captain Dutton's previous studies, as well as those of Gilbert, Powell, and others, were confined mainly to the western side of the plateau province, and especially to the portion traversed by the Grand Cañon of the Colorado. But although no geologist possessing any breadth of comprehension could enter the plateau country, and, after gaining an extended knowledge of its physical features, fail to perceive that it is a great unit, and sharply delimited from every thing which surrounds it, it was still extremely desirable to study the south-eastern extensions of these vast masses of strata and the features carved out of them, in the hope that problems which could be only half solved on one side of the plateau could be completely solved on the other. It was felt that the history and evolution of this unique region could be ascertained satisfactorily only by knowing the whole. The survey, therefore, embraced the first opportunity of attacking it from the eastern side; and the admirable monograph before us sufficiently attests the wisdom of this policy.

With the view of putting this new field at once into its natural relations with the whole of which it forms a part, Captain Dutton begins with a summary account of the plateau country in its entirety. The area of the plateau country, south of the Uinta Mountains, is about one hundred and thirty thousand square miles. A shaded map shows its form and its position with reference to the other portions of the western United States. The topographic features and extraordinary scenery of this region have been described many times, and it is deemed needless to descant upon them; but several pages are devoted to the general geologic features underlying these wonderful reliefs. The strata are normally approximately horizontal; and such slight inclinations as occur are very persistent, car-