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more instance of the rarely observed migrations of butterflies, and is printed in the hope of drawing forth accounts of similar observations. It is of course impossible to identify the butterfly seen by Mr. Edwards, but the swarming habits and lofty, sailing flight of *Danaida Plexippus* very naturally suggest this common insect. There are only two other common dark-colored butterflies which would be suspected of moving in such migratory swarms, *Vanessa cardui* and *Eugonia j-album*, and their flight would be different from that described by Mr. Edwards. Instances of the pseudo-migration of *Vanessa cardui* have been recorded in Europe,¹ and of a species of *Eugonia* (*E. Californica*) closely allied to *E. j-album*, in America (by Dr. Behr; Proc. Calif. Acad. Sciences, iii. 124). It has been suggested that these occasional movements among butterflies, which have been observed, especially in the tropics, in several genera of the larger forms, might be explained by a scarcity of the food-plant of the caterpillar, upon which the female lays its eggs; but this would scarcely be applicable to *Vanessa cardui*, since thistles and mallows — the food-plant of the larva — are abundant and wide-spread weeds. It would be well in observing such moving swarms to collect as large a number of butterflies as possible and determine the sex of each individual and the comparative maturity of the eggs.

It may be added, that when these observations of Mr. Edwards were read before a meeting of the Natural History Society of Boston, Mr. B. P. Mann stated that he once observed in Brazil a similar flight of a species of *Coea* or an allied genus. — SAMUEL H. SCUDDER.

ANTHROPOLOGY.

ANTHROPOLOGICAL NEWS. — The most thorough and successful archæological work done on American soil in the last two years is that of Mr. Paul Schumacher in the Kjökkenmöddings and graves of the extinct races of the Santa Barbara Islands and the mainland. The islands examined were San Miguel, Santa Cruz, San Nicolas, Santa Barbara, and Santa Catalina. The mainland examined was the coast region of Santa Barbara and San Luis Obispo counties, most especially that portion in the vicinity of Point Sal. The Kjökkenmöddings are found wherever sandy ground exists. The deposits in these heaps are so much exposed to the driving winds that many of the objects of interest have been laid bare and carried off by casual visitors. The same winds which denude the shell heaps also expose the large whale's bones which were used by the former inhabitants to separate the bodies in the well-filled graves, and in this way serve as veritable tombstones to mark their sites. Mr. Schumacher opened several of these ancient sepulchres and took therefrom over a thousand skeletons, and with them many articles of ornament or use. The bodies were buried from three to six feet under ground, and sometimes from three to five deep; but it is evident from

¹ See American Naturalist, x. 610.

the disturbed condition of many skeletons that the burials were not all made at the same time. Most of these cemeteries are in the Kjøkkenmøddings themselves, because the soil of these heaps is the only place which is not too hard for the aboriginal wooden spade, and is yet sufficiently firm to allow the digging of a pit. In connection with these digging sticks, Mr. Schumacher makes a very ingenious observation concerning the great quantities of stone rings, or "doughnuts," which are found here. From the testimony of an old vaquero he was led to believe them to have been designed to give weight to the spading stick. Among the many interesting objects of industry found, the mortars and pestles hold the first place. The fishing tackle comes next. Mr. Schumacher was so fortunate as to secure a full set of shell fish-hooks, and tools for making them, so as to illustrate the whole process. The shell ornaments and other burial deposits form a collection which must be seen in order to be appreciated.

Mr. Moses Strong, Assistant State Geologist of Wisconsin, has made a very extensive survey of the prehistoric mounds of Grant County in that State. These mounds are similar in all respects to those reported by Mr. I. A. Lapham in the seventh volume of the Smithsonian Contributions.

Quite a lively discussion has sprung up in the *Academy* for September 23d, et seq., around the assertion of Professor Mahaffy that cats were domestic animals among the Greeks, basing his belief upon the occurrence of the word $\gamma\alpha\lambda\eta$ in Aristophanes and other Greek writers. The question of the existence of domestic cats in Greece is discussed by Sir G. Cornwall Lewis (Notes and Queries, 1859, page 261). The subject is also treated by Professor Rolleston in a paper entitled, On the Domestic Cats, *Felis domesticus* and *Mustela Foina*, of Ancient and Modern Times, in the *Journal of Anatomy and Physiology*, November, 1867. The $\gamma\alpha\lambda\epsilon\eta$, or $\gamma\alpha\lambda\eta$, then, was one of the *Mustelidæ*, or martens, and the domestic cat was not known outside of Egypt before the Christian era. Mr. Mahaffy gracefully acknowledges the correction.

In the *Geographical Magazine* for October, Mr. E. G. Ravenstein publishes a series of maps of the part of Eastern Europe occupied by the Turks, showing (1) Political Divisions; (2) Density of the Population; (3) Mohammedans; (4) Nationalities. The author also reviews the history of that part of Europe overrun by the Turks.

Mr. A. H. Sayce reviews very favorably, with some slight criticisms, in *Academy* for October 14th, four very important works on Oriental Archæology: An Archaic Dictionary, W. R. Cooper (London: Baysted and Sons, 1876); Cory's Ancient Fragments. New and enlarged edition, E. R. Hodges (London: Reeves and Turner, 1876); Dates and Data relating to Religious Anthropology and Biblical Archæology (London: Trübner & Co., 1876); and Histoire ancienne des Peuples de l'Orient, 2nde Edition. Par G. Maspero (Paris: Hachette et Cie., 1876). The

first of these works is an attempt to do for Egypt and Assyria what Lemprière has done for Greece and Rome. The second work mentioned is an improved reprint of Cory's magnificent design of bringing together all the scraps of classical literature that bear upon the history and antiquity of the ancient East.

In the third work, the anonymous author "arranges in consecutive order, under specific dates, some of the results of recent researches on prehistorical and Biblical archæology and comparative mythology, with the view of attempting to furnish trustworthy materials for the study of religious anthropology." Of the last-mentioned work Mr. Sayce says, "The work is simply indispensable for all who wish to have some acquaintance with the subject."

In the *Contemporary Review* of April, Mr. Sayce discusses the jelly-fish theory of language. The principal feature in this theory is the belief that the sentence is the fundamental unit, and that words, especially "abstract and general terms, are only short-hand notes, in which we sum up the results of our analytical processes." — O. T. MASON.

GEOLOGY AND PALÆONTOLOGY.

THE TRENTON LIMESTONE AT MINNEAPOLIS. — The Trenton limestone in the vicinity of Minneapolis presents many features of interest both to the student of science and the simply commercial observer. The value which it possesses as the support of our magnificent water-power is sufficiently well known and appreciated. But to the student it is of interest on account of its accessibility and the varied forms of life which are preserved in it. Below are given a few notes upon some of the many fossils which have been broken from the massive escarpments that overlook the Mississippi below the fall. Two important divisions may be seen in the rock which are nearly equal in thickness. The upper being crystalline, the lower more firm, and better adapted for building purposes. Both are surmounted by a thin layer of shale of varying thickness. The total height of these in a vertical section is forty feet in round numbers, but it lies an equal distance above the river-bed, being supported by the St. Peter sandstone.

It is interesting to notice that the lower or building rock is not as devoid of fossils as has been somewhat generally supposed. There seems to be good reason to believe that life was at least as abundant at the period when these rocks were deposited as in the succeeding one. The reason the fossils in the lower rock have been overlooked is obvious on a careful study of the rocks. The upper is quite crystalline and the fossils preserved are almost entirely in the form of casts; these are loose and easily broken from the rock; they are also generally colored by iron, which is seldom the case in the lower layers.

Though it is true that they have been to a great extent destroyed, yet by a careful manipulation of the building rock many curious forms are