Franklin's 'Autobiography' after 51, and Irving's 'Alhambra' at 49. Hawthorne began his series of great romances with 'The Scarlet Letter' at 46. Mrs. Stowe wrote 'Uncle Tom' at 41. Mark Twain produced 'Innocents Abroad' before 40, but 'Tom Sawyer' and 'Huckleberry Finn' considerably later. Lincoln delivered the 'Gettysburg Address' at 54, Webster his 'Reply to Hayne' at 48. Prescott wrote the 'Conquest of Mexico' at 47; Bancroft's 'History' occupied him from 34 until 75. Motley wrote the 'Dutch Republic' at 42; Parkman did not begin his series of volumes on 'France and England in North America' until he was 42. The first and the second series of Emerson's 'Essays' appeared at 38 and 41, respectively. Dr. Holmes wrote the 'Autocrat' at 49, Dr. Hale, 'The Man Without a Country' at 46. John Fiske did his best work, as Mr. Stedman has done his, after 40. Mr. Howells had scarcely made a beginning of his characteristic work before 40; Mr. James had made a good beginning, but the most and the best of his works have come later.

Indeed, if one were to generalize at all from this data concerning works notable in themselves and most characteristic of their authors, the conclusion for American literature would not be that no work of the first rank had been done by men above 40, but that the period of life conspicuous for superior production was between 40 and 50, and that, as Bulwer-Lytton suggested, real maturity seldom comes before the age of 35.

Clyde Furst.

Columbia University.

Production and the Modern Use of Carbonic Acid.

To the Editor of Science: Referring to Science for January 27, there appears on page 151, a brief extract of a paper by John C. Minor, Jr., presented to the New York Section of the American Chemical Society on December 9. The title of this paper, as given, is the 'Production and Modern Use of Carbonic Acid.' In the abstract, however, there is no reference to carbonic acid; the paper appears to deal entirely with carbon dioxide, and I suppose this is another case of the common misuse of this term. I would suggest that you make some effort to correct this prevalent error, because if we should want to talk about the real carbonic acid, there would be no way of conveying the meaning intended, unless the chemical symbol be used, because as it is, CO_2 has monopolized for itself two names.

A. Bement.

Mont Pélée?

Although nothing is commoner than instances of mistaken etymology, it rarely happens that a single name admits of so many interpretations as does 'Mont Pelée sive Mont Pelé.'

Having gone through in my own mind all the possibilities of the name, from that of the Hawaiian goddess, with which I started, to that of Pelée = bald, a good name for a bare summit, I have come at last to believe that it is simply the Gallicized form (Pélée) of the Greek Peleus, the son of Æacus and father of Achilles—*Mount Peleus* has a likely sound and needs no explanation of its gender. The form Pélée for Peleus is found in Littré.

Harris Hawthorne Wilder.

Smith College.

Special Articles.

Natural Mounds or 'Hog-Wallows.'

The paper of Mr. A. C. Veatch reported in Science, No. 530, p. 310, is of much interest to those acquainted with the natural mounds or hog-wallows of California and Oregon. Such mounds are especially abundant along the east side of the San Joaquin valley in California, where they cover hundreds of square miles, and extend from the valley floor, where they are most abundant, up the slopes of the foot-hills to an elevation of more than five hundred feet. The underlying rocks vary from Pleistocene gravels, sands and clays to granites, schists and folded paleozoic slates. I have never found them, however, in the sandy river bottoms. In height they range from one foot to four feet, and in diameter from ten to more than fifty feet. They are equally abundant in eastern Oregon and in

some parts of the drift-covered portions of the region south of Puget Sound.

The theories usually advanced in explanation of these mounds on the Pacific coast are: (1) Surface erosion, (2) glacial origin, (3) æolian origin, (4) human origin, (5) burrowing animals, including ants, (6) fish-nests exposed by elevation.

Bearing upon the theory of ant origin mentioned by Mr. Veatch, something will be found in the *Bulletin of the Geological Society of America,* Vol. VII., pp. 295–300, and also in the *Journal of Geology,* VIII., 151–153. It ought to be noted, however, that the ant-hills of the tropics with which I am acquainted, remarkable and abundant as they are, do not much resemble the hog-wallows or prairie mounds. Perhaps, however, no great stress can be placed upon this difference. The ant-hills of Brazil vary greatly in size and form, according to the species building them and according to the soil. If it be assumed that the ants built the mounds in this country and disappeared long ago, it is to be expected that time would have greatly modified and toned down their original relief. It is, perhaps, worthy of note, and may be of interest in connection with the ant-hill theory, that in western Washington and in parts of California they are partly on glacial soils, that is, on drift or on sediments spread over the San Joaquin valley during the glacial epoch. The glacial theory of their origin suggested by the letter of Wallace in *Nature,* XV., 274, is without support—the glaciers in California did not reach the region of the hog-wallows in the San Joaquin valley.

In addition to what Mr. Veatch says of the distribution of the mounds in the Mississippi valley it may be stated that they follow up the valley of the Arkansas and of the Neosho rivers across Indian Territory into southeastern Kansas. In Arkansas and Indian Territory they are common in forests as well as in prairies.

It is supposed that sections through these mounds would explain them. In California hundreds of mounds have been cut through by railways and by common roads, and many such sections have been examined. The cuttings, being made without any special care, exhibit only a compact clayey 'hard-pan' that shows no signs of burrows or anything that has been recognized thus far as different from the soil of the adjacent areas. In the San Joaquin valley the soil of the hog-wallows is not regarded as good. In some places it is so hard that it is very difficult to plow it. In the region between the San Joaquin River and the city of Fresno the soil of these hog-wallows is mostly of quartz, feldspar, mica and hornblende, with a little clay and some iron. These materials are derived from the granites and other crystalline rocks of the mountains to the east. One section examined in a pit eight feet deep and one thousand feet north of Herndon station is spoken of in my notes as a 'hard-pan of quartz sand, clay and feldspar resembling a horizontally bedded sandstone with some clay in it.'

Similar mounds occur in many places and covering large areas over the flat prairie lands along the eastern slopes of the Andes in the Argentine Republic. I used to think the Argentine mounds were of æolian origin, but while some mounds are evidently made in this way, the explanation is not satisfactory for the great bulk of them.

Of the theories spoken of above, the ant-hill theory seems to me the most plausible, but with our present knowledge it is far from satisfactory. One other theory has been in my own mind for several years, but it is almost entirely without observations to support it, and it is, perhaps, too vague to be clearly expressed. The idea is that in soils of certain kinds long exposed to weathering agencies chemical reactions possibly take place around centers that result in the transfer of minerals in solution to and the precipitation in nuclei that are now represented by the positions of the mounds, while the withdrawal of these minerals from the intervening areas causes the depressions around the mounds. In other words, it is a theory of concretionary action on a large scale due in part to chemical and in part to physical conditions. With this theory in view I have gathered samples from beneath the hog-wallows near Fresno and others will be gathered during the coming

vacation. It is hoped that chemical analyses of these samples will throw some light on the subject.

The following references to the literature may be useful to those who wish to read what has been written regarding these mounds on the Pacific coast: Le Conte, *Proceedings California Academy of Sciences,* V., 219 (1873); *Nature,* April 19, 1877, XV., 530; Wallace, *Nature,* XV., 274; Barnes, *American Naturalist,* September, 1879, XIII., 565; Turner, 17th annual report U. S. G. S., Part I., 681. To these may be added Walther's 'Denudation in der Wüste,' 377, 390. The paper by Mr. Turner contains a good picture of the mounds on the foot-hills near Snelling, California.

J. C. Branner.

Stanford University,
March 3, 1905.

NOTES ON THE HISTORY OF NATURAL SCIENCE.

OPPIAN ON FISHING.

An early work on angling, dating from the second century of our era, and possessing considerable scientific as well as literary merit, is the 'Halieutica,' in five books, by Oppian of Cilicia. Unlike most ancient writers on natural history, Oppian manifests a strict regard for truth, not only avoiding fabulous tales, but often refuting popular errors. To wide and accurate observation the author adds the charm of felicitous description, his treatment of the subject-matter being unusually graceful and animated. Concerning modes of fishing and diving, habits of marine animals and general natural history, there is much of interest to modern readers, and in former times the work was held in high esteem. Appended to the English translation, published in 1722, is a catalogue of the vernacular names of fishes mentioned by Oppian, with their common English equivalents—the latter, however, not being always accurately given. A revised *Nomenclator* of classical names of animals, with synonyms and etymology, would be gladly welcomed by modern systematists.

ROMAN ICHTHYOLOGY.

Amongst early works of interest to ichthyologists, noticed more or less fully by Cuvier in his 'History of Natural Sciences,' there are two or three Roman writings which contain numerous and valuable observations on aquatic animals. These appeal with equal force to naturalists and classicists of our own day, though the latter appear to be on more familiar terms with them.

One of these works well worthy of attention is the '*Halieutica*' of Ovid, or commonly attributed to him, a poem which has come down to us in only one third of its entirety. Names are given in this fragment of fifty-three species of fishes, most of which are tolerably well indicated by the descriptions. Cuvier remarks that but for this poem of Ovid, a number of passages in Pliny would be unintelligible to modern readers; and in the copy belonging to the Harvard Museum, formerly the property of Louis Agassiz, occurs a manuscript note by the latter, referring to Ovid's comment on fossil shells and description of man in his '*Metamorphoses.*'

Another work regarded by Cuvier as 'extremely precious for natural history' is that bearing the assumed name of the gourmand Apicius, the ninth and tenth books being especially fruitful in information. Various ichthyological notices are contained in the agricultural works ('*De re rustica*') of Columella, Varro and Cato. Apuleius is credited with having made refined anatomical dissections, and Athenæus gives descriptions of eighty-four species of fishes, arranged in alphabetical order. It may not be generally known that Cuvier himself assisted in the recension of the text of Ælian's 'History of Animals,' his collaborators being the well-known French translators of Pliny.

SUBTERRANEAN FISHES.

Lasaulx, in his 'Geology of the Greeks and Romans,' and Sir Charles Lyell, in the introductory chapter of his 'Principles of Geology,' are responsible for widespread misconception of Aristotelian views in regard to the nature and origin of fossils. Certain passages in the