

imperator. It can not, in the writer's opinion, be successfully controverted that the La Brea fauna existed during the first interglacial stage.

Scenes like that represented by the mural doubtless occurred, but they must have been infrequent. Osborn's census (his page 528) shows 5,237 animals caught. If the time required was two thousand years the risks run by elephants, camels, sloths and horses were not great. An elephant and a horse were entrapped in a century; a sloth and a camel every thirty-three years; a bison a little more frequently. The saber-tooths and wolves depended little for their living on the catches of those traps. Twenty-one carnivores perished for each herbivore. Evidently there is some as yet unthought-of explanation for the destruction of the wolves and saber-tooths. Professor Osborn's theory of illusory waters in a thirsty land is inadequate. Horses, bison and elephants require water even more than do wolves and tigers.

Probably there are those who believe that the history of the tar pits was a short one and that the sanguinary performances enacted there were more nearly continuous; others, as the writer, that the history was much longer than two thousand years.

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AGE OF PRESBYOPIC VISION AS AN INDEX OF THE LONGEVITY OF PRIMITIVE MAN

IN normal individuals the onset of presbyopia during the fifth decade of life is a very striking and constant phenomenon. The loss to the individual of the ability to adjust his crystalline lens for near vision can not be regarded as otherwise than a handicap to that individual. Even in the life of primitive races such loss must of necessity have placed its victims in an unfavorable condition as compared with younger members who possessed clear vision from a foot to a hundred feet. In the case of modern civilized man such loss is very obvious and would work serious hardships were it not an easy matter to correct it by means of appropriate lenses of glass. The point I wish to bring out is that if primitive man had lived in any numbers beyond the fifth decade, it is not improbable that there would have developed through the survivorship of the more fit a race which would have retained elasticity of the crystalline lens for more decades than five. It is well appreciated that the above idea may be a case of "the cart before the horse" and that presbyopia may have been a small one of several factors causing the members of primitive races to die at relatively earlier ages as compared with the average age of death of modern civilized man. That a small percentage of persons possess an elastic lens for more

than five decades shows the possibility of postponing presbyopia had there been any occasion for applying the law of natural selection. The presbyopic age falls in so closely with the average age of longevity in the past as expressed by Dr. T. Wingate Todd in "Age: the Piper," *SCIENCE*, September 3, 1926, that the matter seems to be more than a coincidence.

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THE INDICATION OF QUOTATIONS

WHEN the reader of a scientific paper encounters quotation marks he usually apprises his audience of the fact in one of various ways; he may say "quotation" where it begins and "end of quotation" at the end, or he may say "quotes" and "quotes closed." Where quotations are frequent the reader may fail to indicate them accurately because of the time and awkwardness involved, and misunderstanding may result. This difficulty has arisen, also, in the reading of proof by one person to another.

Perhaps there is a reader of *SCIENCE* who knows of something that has been done toward simplifying the indication? It is suggested that matters might be improved by using more easily vocalized expressions and by taking advantage of the inflection of the voice. The expression "coo," for example, might be conventionalized as the indicator of the beginning of a quotation and "cō" as the indicator of the end. These combinations are quickly and easily vocalized and the falling inflection in "cō," which occurs naturally, suggests the end of the quotation. Indicators of this character would scarcely be confused with the content of the paper being read.

Where conditions permit, perhaps tapping would afford a more effective mode of signalling. Two taps of a pencil on the table, for example, might be made the pre-quotational and one tap the post-quotational signal. Such indication would obviously stand out from the context.

One lecturer has been known to signal quotation by an arm gesture symbolic of brackets. A disadvantage of inaudible gesture, though, is that it is not noticed by those members of the audience who do not happen to be spectators at the right moment.

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THE CALORIMETRIC METHOD OF DETERMINING BLOOD FLOW IN THE EXTREMITIES

DR. STEWART's communication, which appeared in *SCIENCE* for September 3, 1926, and which carries the title quoted above, is presumably a rejoinder to my special article which was printed in *SCIENCE* July 2, 1926, under the caption: "On the Elimination of Heat

from Normal and Pathologic Subjects as Determined from Calorimetric Studies of the Extremities." It is possible that Dr. Stewart did not appreciate the fact that my article in *SCIENCE* is, in large part, only an abbreviated report of my conclusions and does not contain the data which I believe support them. The complete paper, together with the separate contributions on this general topic by two of my colleagues, will appear shortly in the *Journal of Clinical Investigation*. It does not seem to me either necessary or desirable to make any further comment, inasmuch as I should be rehearsing selected and hence disconnected portions of the data and discussion given in the complete paper. I am prepared to rest my case upon the materials contained in the full text of my experiments and conclusions.

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SCIENTIFIC BOOKS

The Growth of Biology. Zoology from Aristotle to Cuvier, Botany from Theophrastus to Hofmeister, Physiology from Harvey to Claude Bernard. By the late WILLIAM A. LOCY. New York, Henry Holt and Company, 1925.

HAVING used Locy's "Biology and Its Makers" (Third Edition, 1915) as a text-book for a number of years, I have, in common with many others, a sense of deep obligation to its author. The historical method of treatment has many advantages, not the least being that the human story always arouses and holds the interest of students. Locy succeeded in writing a book which was at once sound, reasonably comprehensive and attractive. It was no small task, especially as the greater part necessarily dealt with the labors of Europeans, and many desirable works of reference were not easily obtained. It was only too possible to be misled by imperfect or erroneous information, or to fail to preserve a balance between the various subjects and men according to their importance. Yet the book has stood the test of use very well, and among current text-books easily ranks as one of the best. One obvious criticism related to the title, which led us to expect a history of biology, whereas botany was practically ignored. This was inconvenient, because it is common to treat the history of biology as a whole, and the teacher of such a course, using this text, had to prepare supplementary matter dealing with the botanical side. Even so, botany could not be adequately presented, and the course was to that extent lopsided. Evidently the author came to feel that this was true, so he set to work to write another book, which should actually

cover the whole biological field. Unfortunately, this was not finished at the time of his death in October, 1924, but there was enough to make a volume, about equal in bulk to the earlier text. This is now before us, and bears the title "The Growth of Biology." It fully maintains the author's previous standard, and while there are many passages borrowed from the other book, there is very much that is new and extremely interesting. Very appropriately, we begin with a discussion of those early biological studies represented by the wonderful work of paleolithic man. While the mammoth was still alive, there were zoological artists (as we should now call them) to picture the great beast with skill sufficient to indicate its disposition as well as its form. Although Locy does not say so, it is evident that the ancient cave man discovered the principle of the moving picture. The running herd of reindeer is shown with the horns of the hindmost animals greatly elongated, indicating speed. The infuriated mammoth appears to have several trunks, showing how he waved his trunk in the air when enraged. Between this period and that of Aristotle was a very long story of human culture, and, as Locy remarks, no wonder the Greek philosopher spoke of the "ancients." However, it is pointed out that before the time of the Greeks "science was an anonymous social product," growing by slow degrees as observations were added to current tradition. It is still in that stage among uncivilized tribes. But certain individual Greeks made it their business to collect and arrange scientific data, and thus we have the beginnings of organized zoology, botany and physiology. Full justice is done to the versatility and learning of Aristotle, passages of whose works sound extraordinarily modern even to-day. Theophrastus, as the father of botany, is dealt with at some length. Then we pass up through the centuries, and there is a good account of the early printed books on natural history, with copies of the often crude illustrations. Brunfels's figure of the plantain (p. 129) is upside down. The fabulous "Su," figured on p. 296, appears to have been based on some one's recollection of a woolly opossum (*Caluromys*). The early microscopes and the discovery of micro-organisms are discussed, with copies of the old figures. It has been suggested that Roesel's "kleine proteus" was not the amoeba, but *Pelomyxa*, the latter being more recognizable on account of its larger size. But Roesel's original figure, copied by Locy, is evidently that of the amoeba. We are also shown Leeuwenhoek's original illustrations of bacteria; how little could he realize the tremendous importance of the group of organisms he had discovered! There is a most interesting chapter, "The Period of Hofmeister; with a Digression on Text-books and Improvements in