but this specimen was not among the materials received from that source. From the above chronological record, it is quite evident that the *Delphinus* skull was loaned to Professor Agassiz for use in his studies of the Cetacea and that it was in his custody when the actual transfer of National Institute specimens took place.

Recently the chronologic events in the history of this specimen were laid before Dr. Thomas Barbour, director of the Museum of Comparative Zoology in Cambridge, by Dr. Alexander Wetmore, assistant secretary of the Smithsonian Institution; the former acted promptly in having the specimen returned to the national collections. The type is in excellent condition and shows every evidence of careful handling throughout its unusual history.

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WAS THE AMERICAN MANO AND METATE AN INVENTION MADE DURING PLEISTOCENE TIME?

SEVERAL times since the writer discovered the deeply buried Gibson Site in January, 1930, he has found mano stones in the loose gravel below, and close to the bottom of the vertical bank containing the superimposed midden strata, at 24½, 27 and 30 feet below the present soil surface.[1] At this site in 1930 he found a mano stone immediately below a large hearth full of burnt stones, charcoal and a few man-made flint flakes. It lay in loose gravel as though it had just fallen out of the bank above. In 1936 another mano stone was found below the same bank. This mano has the same type of mineral incrustation which is found on the paleolithic type Abilene Points (Ray) found by the writer embedded in the 24½ feet deep stratum in the same site.[1,2]

Recently another visit was made to this site, where about two inches of what seemed to be a mano stone was seen exposed in the red clay, at a depth below the present soil surface of thirty feet. On excavating the stone, he found it to be a typical mano firmly embedded in the hard, red clay and charcoal stratum.

This is the same Gibson Site where in 1938 an elephas leg bone was shown to Dr. Kirk Bryan where it was embedded in gravel in the bank at a place a short distance farther up the creek.[3,4] This leg bone lay in a gravel stratum at approximately the same depth level and possibly in a later deposit than the silt in which the mano stone was embedded. Where the mano was excavated the gravel stratum lay six feet above it or at a depth of 24 feet below the surface. Where the proboscidian leg bone lay, at a place estimated to be about 1,500 feet up the course of Elm Creek, the gravel stratum which contained the leg bone lay at about the same depth as the mano, (30 feet).

In 1939 the writer dug out a mano and portions of a broken metate buried 19½ feet deep in a charcoal stratum at the Hodges Site. The writer dug back into the hard silt eighteen inches to find the whole mano and the metate fragments. At that site the grinding implements were in a stratum containing quantities of charcoal, burnt rocks, mussel shells and some flint flakes.

The Gibson Site is where the original discovery was made of the paleolithic type Abilene Points buried in a stratum of charcoal, burnt rocks and flint flakes at a depth of 24½ feet below the present soil surface.[1,2] Gibson Site is on Elm Creek, which is a branch of the Brazos River, near Abilene, Texas. Just above the top or 24½ feet deep midden level lies a hard compact stratum of gravel of an average thickness of about eight inches.

The three midden strata are imbedded in hard, compact red clay or silt below the gravel stratum. In 1934 the writer gave permission to E. B. Sayles to excavate in the Gibson Site for Gila Pueblo, and in their reports it is referred to as Stations 5 and 6. During that season several geologists inspected the site for Gila Pueblo, and among them were M. M. Leighton, of the Illinois Geological Survey. In Leighton's report, dated August, 1936, he divided the silts at this site into Elm and Durst silts. The lower or Durst silts he listed as Pleistocene in age in that report. A diagram of these is shown on page 9, Fig. 3, No. 1, of that report.[5] It was in the lowest or Durst level that the proboscidian leg bone was found in 1938, in the portion of the Gibson Site which Leighton terms Station 6. This year the mano stone was found in gravel in the same lower or Durst level in what he terms Station 5 of the Gibson Site.[6]

However, no one had found Pleistocene animal bones in the Gibson Site creek bank deposits prior to this writer's finding of a proboscidian's leg bone in July, 1938. The ancient Abilene Points (Ray) found here are in no wise similar to those listed under that name by others. The writer believes that the Abilene Points (Ray) are very much older.

In 1937 Gladwin stated that grinding tools were found in the Cochise culture, and placed their age at 10,000 B.C. The finding of a mano embedded in the

[1] Cyrus N. Ray, *Bulletin of Texas Archeological and Paleontological Society*, 2: 48–52, plates 11–14 and 15, 1930.
[2] *Ibid.*, 6: 107 to 111, plate 18, 1934.
[3] *Ibid.*, 10: 1, 269–273, plate 37, 1938.
[4] Kirk Bryan, *Bulletin of the Texas Archeological and Paleontological Society*, 10: 1, 273–274, plate 37, 1938.
[5] M. M. Leighton, "Geological Aspects of the Findings of Primitive Man near Abiline, Texas, Gila Pueblo, Globe, Arizona," pp. 16–20, Plate III-a, and Fig. 3, No. 1, 1936. (Stations 5 and 6 of Leighton's Report are his and Sayles's designations of the Gibson Site.)
[6] E. B. Sayles, *Medallion Papers*, No. xvii, Gila Pueblo, Globe, Arizona, 1935.

Durst silt extends this age back into the mists of Pleistocene time if Leighton's estimates of the age of the bottom layer of Elm Creek silts is correct.[7]

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AUTHORS' ABSTRACTS

SINCE it is now about twenty years since the *Astrophysical Journal* and the *Physical Review* began providing authors' abstracts at the beginning of articles, a brief report on the extent to which the practice has been adopted by other scientific journals may be of interest.

Authors' abstracts have been found of value both to readers and to abstract journals. As reported in SCIENCE,[1] answers to a questionnaire sent to the readers of the above journals in 1922 showed that 93 per cent. had found the abstracts useful and wished them to be continued. Two years later, at a meeting in Brussels, an international sub-committee of bibliography appointed by the League of Nations and including H. A. Lorentz (*chairman*), Madame Curie, Paul Langevin (editor of *Journal de Physique*) and Mr. Cooper (editor of *Science Abstracts*), recommended "that all articles published by scientific journals should be preceded by abstracts, prepared as far as possible by the authors themselves." That was fifteen years ago.

In the case of journals of physics, I am glad to be able to report that more than half now provide authors' abstracts. These include most American and British journals and also some Argentine, French, Italian, Spanish, Japanese and Russian journals. Unfortunately, the German journals have not yet adopted the practice and continue to provide only summaries, though these are not as convenient for readers, since they are placed at the end rather than at the beginning of articles, and are not as useful since they are not independent of the articles, as a rule, and are not suitable for reprinting in abstract journals.

The abstracts in the *Physical Review* from 1920 to 1925 were analytic abstracts, including subtitles intended to form precise and complete indexes of the new material contained.[2] While such abstracts are more efficient than ordinary abstracts, they have been found impractical since they require considerable editorial revision by a specialist. My zeal for perfection led me, as special abstract editor, to spend several thousand hours rewriting authors' abstracts, inserting sub-titles and making sure that they were accurate and complete. I am now convinced that such editorial work is not necessary.

Authors can prepare suitable abstracts for publication with their articles without much if any editorial revision. As evidence for this conclusion is the fact that the programs of the meetings of the American Physical Society have for many years contained abstracts which, although prepared by the authors and published without revision, are as a rule excellent. Obviously, authors can prepare equally good abstracts for publication with their articles if they will regard the abstract *not as an introduction or summary associated with the article but as a separate entity like the abstract in an abstract journal.* This view-point is difficult for an author to accept, since he naturally prefers to have his article read in full and dislikes furnishing an abstract which gives all the information which many readers desire about the article. Nevertheless, cooperation of authors can be obtained by all journals since it has been obtained by many. I am glad to report that the abstracts now being provided for articles in physics are adequate for the most part, as is proved by the fact that most of them are reprinted without change in *Science Abstracts.* In the volume for 1938 more than half of the abstracts of articles written in English are credited to the authors. Incidentally, this fact shows how important is the service authors' abstracts may render to abstract journals. If all the more than 100,000 scientific articles now published each year included adequate authors' abstracts, re-abstracting of the articles for the various abstract journals published in English, German, etc., would be unnecessary, and many trained scientists would be released from work which now must require some 500,000 hours of abstracting each year.

I must now admit that the rules I formulated for preparing analytic abstracts[2] are useful only to an expert. I am confident that editors can secure adequate authors' abstracts if they merely require authors "to prepare abstracts suitable for reprinting without change in an abstract journal." Authors are thoroughly familiar with such abstracts, and since they are naturally anxious that suitable summaries of their results appear in the abstract journals, they will prepare adequate abstracts, as a rule.

Authors' abstracts fill a gap between titles, which average ten words or less, and articles, which average several thousand words. They supply the needs of the many readers who wish to know more of what the articles are about than the titles tell, and of those who wish to know the main results without reading the articles. They also supply abstracts to the abstract journals, promptly and at minimum cost in the time of scientists. Thus they constitute an essential feature of an efficient system of scientific documentation. It is hoped that the time will soon come when all scientific journals will consider it their duty to provide authors' abstracts for all their articles.

GORDON S. FULCHER

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[7] "Excavations at Snaketown," Vol. 2, p. 79. Gila Pueblo, Globe, Arizona, December, 1937.

[1] SCIENCE, 56: 678, 1922.

[2] SCIENCE, 54: 291, 1921.