

It is a matter of record that the dates were not determined at the University of Chicago laboratory, as Hibben, in correspondence, has recognized. No other laboratory is known to have determined radiocarbon dates until the Lamont laboratory began operations in 1951. Bryan died on 22 August 1950.

None of Bryan's intimate associates, including reputable archeologists and geologists, some of whom were deeply concerned with the development of radiocarbon dating, can recall having heard Bryan mention the samples or the dates to which Hibben refers. Furthermore, Bryan's records have been searched and no reference to the alleged Sandia samples has been found. The dates must be struck from the record before they cause further confusion.

Other confusing evidence indicates that the dates lack a proper source and record. Hugo Gross quotes "Dr. Frank C. Hibben, oral communication," as the authority for the statement that "... this method (radiocarbon dating) recently indicated an age of 11,000 and 19,000 years, respectively, for the Folsom and Sandia layers in Sandia Cave" (2). These dates, published in 1951, differ significantly from those published by Hibben in 1955—that is, 17,000-plus and 20,000-plus years ago. The latter dates were alleged to have been determined on charcoal said to have come from two fire hearths of only the Sandia level. The discrepancies in figures and the attribution to levels throw great doubt upon the statements in Hibben's article in *Science*.

The repudiation of the dates quoted by Hibben as originating with Bryan has no bearing on the dates from Sandia Cave determined by H. R. Crane (3). Such dates indicate the radiocarbon content of the samples delivered to the Michigan laboratory. Whether or not these samples are contemporaneous with the Sandia level is a completely different, unrelated question.

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References

1. F. C. Hibben, *Science* 122, 688 (1955).
2. H. Gross, *Bull. Texas Archeol. and Paleontol. Soc.* 22, 114 (1951).
3. H. R. Crane, *Science* 122, 689 (1955).

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In regard to the two samples of charcoal from Sandia Cave collected by the late Kirk Bryan, there has been a dearth of evidence as to where and how Bryan dated these samples. I am in agreement with Johnson that these dates should be removed from the record. This removal, of course, in no way invalidates either the very fine geologic work of Bryan or the dating of the Sandia deposits themselves.

The dates referred to by Hugo Gross were extracted from a series of lectures one of which was given by me at the University of Erlangen, Germany. These dates were derived from Bryan's geologic work and were extremely tentative. Dating by geologic means and carbon-14 were undoubtedly confused. Gross is in error in his dates of 11,000 and 19,000 years, respectively, for the Folsom and Sandia layers of Sandia Cave. The original dates given in the Erlangen lecture were 11,000 B.C. for a Yuma site, 9000 B.C. for Folsom layers in Sandia Cave, and 17,000 B.C. for Sandia level in Sandia Cave. All these dates were derived by stratigraphy and not by the radiocarbon method. As yet no carbon-14 date has been derived from the Folsom level of Sandia Cave.

Removal from the record of the radiocarbon dates attributed to Bryan does not invalidate the dates determined by H. C. Crane from mammoth ivory from Sandia Cave. These are substantiated by other evidence.

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Theory of Ice Ages

The theory of glacial and interglacial periods during the Pleistocene offered by Ewing and Donn in a recent issue of *Science* (1) is very provoking. It is certainly true that the melting of an Arctic Ocean ice sheet such as exists at present would, by making the Arctic Ocean ice-free, provide an increased source of moisture for the polar atmosphere, and it is true that this could have been accomplished through a greater interchange of water between the Atlantic and Arctic oceans. Whether this greater interchange would be associated with a cooling of the Atlantic, as the authors maintain, and also whether the open Arctic Ocean with its new moisture supply would favor the growth of glaciers over the areas to the south, is, however, a matter for further consideration.

While all the evidence as far back as the 1930's points to a warming of the Arctic Ocean, the more recent evidence shows a simultaneous though less marked warming of the Atlantic as well (2). Equally, the extensive deglaciation that has occurred within the past 50 years or so, particularly in the 1930's, coincided with a sharp decrease in the thickness of the Arctic ice pack from a value of approximately 3.6 m, which was measured by the Fram expedition, to a value of only 2 m, which was obtained by the North Pole expedition in 1937 and also coincides with a shrinkage of its area

by more than 10 percent from the earlier to the more recent period. Consequently, if the process were to continue, an open Arctic Ocean would be associated with increasing deglaciation and eventually with no ice whatsoever.

It is acknowledged that a very substantial lowering of sea level would, by restricting the interchange of water between the Arctic and Atlantic oceans, make it possible for the Arctic Ocean to freeze over. However, a frozen Arctic Ocean would, according to the authors' view, only stop the glaciation from growing through the cutting off of the new moisture supply. For a waning of the glaciation itself, to make the cycle complete, the authors assume a starvation of the ice. This might be true of the inland ice in a very limited measure, but not of the glaciers whose waning is accompanied by a recession.

Rather, I think that the same agency that is responsible for the simultaneous warming of the Arctic and Atlantic oceans and for the shrinkage of the arctic ice pack is also responsible for the deglaciation, and that this is due primarily to a rise in temperature. In accepting the authors' claim that an open Arctic Ocean provides a new supply of moisture for the polar atmosphere and for an increase in precipitation, I suggest that this precipitation is in the form of rain, not only over the adjacent lands to the south, but also over the Arctic Ocean.

The fact that within the recent period the temperature of the South Atlantic Ocean has also increased suggests that the agency responsible operated on a broad scale and from outside the earth.

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Presence of Serotonin in Lung and Its Implication in the Anaphylactic Reaction

Serotonin (5-hydroxytryptamine) is known to be widely distributed in the animal and plant kingdoms. In animals it has been reported to be present in gastrointestinal tract, blood platelets, spleen, and brain (1, 2), and possible functions for serotonin in each of these tissues have been suggested. There has been speculation for some time whether serotonin may