

Earliest Animal Domestication Dated?

The title of Protsch and Berger's (1) article is incomplete: it should read, "Earliest radiocarbon dates we have assayed on what we take to be domesticated animals." To those of us with some experience of the archeological contexts, comparative sequences, and zoo-archeology of southwestern Asia, the article is an unfortunate blend of incompleteness and error. Milošević of Heidelberg University (the excavator of Argissa-Magula) is of the same opinion regarding the use of the European evidence (2). Because the authors use the "calibrated" rather than the conventional style of citations for age determinations (3) and round off their calibrated ages, the article is both awkward and confusing to use comparatively.

Ignoring both earlier work on the method and recent concern that collagen-based age determinations may produce questionable results (4), the authors set aside, for a variety of supposed contextual reasons, age determinations based on charcoal samples. To us, the reasons offered for rejecting the charcoal-based determinations make very little archeological sense. Naturally there may be problems of contamination associated with charcoal samples, but contamination problems may also exist with samples of bone collagen and, in our experience, "long, vertically positioned bones" (1, p. 236) in archeological context are very rare indeed. Next, they claim, "All bone selected [for assay] was positively identified on morphological grounds as being from fully domesticated animals . . ." (1, p. 237). We can only speak for the bones we supplied the authors: these samples were from Palegawra, Asiab, Jarmo, and Sarab, and there is at least some wild fauna from each of these sites. The samples consisted of unidentified (and, in our opinion, unidentifiable) splinters, and the authors were so informed (5).

The authors took undue liberty in announcing, before we had fully analyzed our evidence, that the small series of

bones we recovered from Asiab included domesticates. Their figure 1 (1, p. 238) shows domesticated sheep at Asiab, although we identified none. Actually, the earliest dog on record, described by Lawrence (6), is from Idaho. The authors ignore Perkins' (7) report on domestic sheep at Zawi Chemi Shanidar, Iraq, 10,800 ± 300 years ago (W-681) and also Perkins' (8) note on the lack of evidence for domesticated sheep and goat at Çatal Hüyük. If, however, they would allow that the series of charcoal-based determinations from Çatal Hüyük has some validity, then that site's domesticated cattle would appear to be as early as those of Argissa-Magula. There is no presumption that there were domestic cattle at Jarmo and no evidence whatsoever (osteological or otherwise) for domesticated onager in prehistoric southwestern Asia.

What of the general cultural-historical picture that the Protsch-Berger scheme implies? It may be seen as part of a current fashion that attempts to establish a case for independent European beginnings of "civilization" (the word "civilization" in this instance is usually defined primarily as the appearance of some one or two spectacular traits, such as megalithic monuments). While some of us may wish for a more fully rounded definition of "civilization," this aspect of the Protsch-Berger article naturally gained notice in a Sunday issue of the *New York Times*. We readily grant that our present knowledge of the prehistoric and protohistoric time-space systematics of both southwestern Asia and Europe is far from complete and that our knowledge of the processes of change from one level of culture-history to another is even more incomplete. Enough is certainly understood, however, to make the Protsch-Berger scheme highly suspect.

In the end, of course, this article could have certain positive effects, to the extent that it increasingly stimulates more archeologists to have second thoughts about the immediate useful-

ness of radiocarbon age determinations simply because they come out of "scientific" laboratories. The more that confusion mounts in regard to which method, which laboratory, which half-life value, and which calibration is most reliable, the less we archeologists will feel slavishly bound to accept any "date" offered us without question (9).

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References and Notes

1. R. Protsch and R. Berger, *Science* **179**, 235 (1973).
2. V. Milošević, letter to R.J.B., 15 February 1973.
3. H. T. Waterbolk [*Proc. Prehist. Soc.* **27**, 15 (1971)] comments in detail on the necessity of retaining the conventional style of citation of *Radiocarbon*, the standard journal of announcements of carbon-14 age determinations. A succession of international congresses on radiocarbon have also urged adherence to this style.
4. Protsch and Berger (1, p. 235) appear to suggest their own laboratory's priority in having "published a method for the proper dating of bones—a method based on dating collagen . . ." but see K. P. Oakley, *Science* **140**, 488 (1963); R. W. G. Wyckoff, *Proc. Nat. Acad. Sci. U.S.A.* **50**, 215 (1963); F. M. Sinex and B. Faris, *Science* **129**, 969 (1959). At least three articles [H. Barker, *Nature* **213**, 415 (1967); J. C. Vogel, *S. Afr. Archaeol. Bull.* **24**, 83 (1969); M. A. Tamers, *Archaeometry* **14**, 21 (1972)] show concern that collagen-based age determinations are, or may be, too young.
5. Indeed, many of the points raised in this comment were communicated to Protsch and Berger by R.J.B. and C.A.R. in a letter of 18 January 1972, after the authors had forwarded a first draft of their article to R.J.B.
6. B. Lawrence, *Z. Säugetierk.* **32**, 44 (1967); *Tebwa* **11**, 43 (1968).
7. D. Perkins, Jr., *Science* **144**, 1565 (1964).
8. ———, *ibid.* **164**, 177 (1969).
9. Both Waterbolk's article (3) and a review by R. M. Adams [*J. Near East. Stud.* **32**, 253 (1973)] reflects archeologists' trend toward second thoughts. As to cultural-historical generalizations based primarily on selected radiocarbon age determinations, Milošević (2) remarks, "Was auf diesem Gebiet produziert wird, erweist sich von Tag zu Tag als immer grösser werdender Unsinn, wobei jeder Dummkopf glaubt, jetzt mitreden zu können" [What is being produced in this field becomes more nonsensical from day to day so that now every dunderhead believes he can also join in the discussion].

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