binding, and activation could be "explained" just as readily by assuming slow equilibria between polydispersed phases and the surrounding aqueous medium. Further experimentation is needed to distinguish between these viewpoints (*6*).

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References and Notes

1. Omnishaker, Buchler Instruments, New York, N.Y.
2. This calculation assumes that the concentrations used are not much different from equilibrium concentrations, and that the methyl stearate in the lower phase is present largely in the particles. (The bulk of the ester present in true solution is readily extractable by heptane.)
3. F. Schonheyder and K. Volquartz, *Acta Physiol. Scand.* **10**, 62 (1945).
4. Calcium chloride was not effective in the absence of sodium stearate.
5. M. Bier, in *Methods in Enzymology*, S. P. Colowick and N. O. Kaplan, Eds. (Academic Press, New York, 1955), vol. 1, p. 629; R. A. Boissonas, *Helv. Chim. Acta* **31**, 1571 (1948).
6. This work was supported in part by a research grant from the National Multiple Sclerosis Society, and was performed with the technical assistance of Mrs. Eileen G. Whitlock. The constructive criticism of Dr. Warren M. Sperry and Dr. David Rittenberg is gratefully acknowledged.

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Arlington Springs Man

Abstract. Bones of a man were found at a depth of 37 feet in waterlaid sediments on Santa Rosa Island, California, and dated by radiocarbon at 10,000 years before the present (B.P.). Two later occupational levels are dated at 7350 and 2090 years B.P. No artifacts are associated with the oldest bones, which are believed to be an accidental burial on the edge of a cienaga.

Human bones (*Homo sapiens*) protruding from a cut bank at a depth of 37 feet below the surface in Arlington Canyon, Santa Rosa Island, California, were discovered in 1959 by the 13th Santa Rosa Island expedition of the Santa Barbara Museum of Natural History. The bones were left *in situ*, and a thorough geological study was made of the Santa Rosa Island formation (*1*), in which they occur.

In 1960 a field conference was held, attended by prominent scholars representing archeology, paleontology, geology, geography, and oceanography (*2*), who viewed the bones *in situ*. Limited excavation and the collection of soil and radiocarbon samples were performed by various members of the party.

Following the conclusion of the field conference, the human bones, which consisted of two femora, were removed in a block, and excavation was carried out designed to develop an understanding of the rather complicated stratigraphy.

This is a stratified site exposed in the side of Arlington Canyon. On the surface is an Indian shell midden and a cemetery [C^{14} date, 2090 ± 200 years B.P. (M-1147)], which is underlain by several feet of tan, sandy silts, followed by a heavy black humus zone at about 10 feet, containing red abalone shells (*Haliotis rufescens*). This is separated from another black humus zone by a 1-foot layer of white sand. From the top of this black humus zone, and the bottom of the white sand, a red abalone shell was collected by J. B. Griffin (*3*) and dated at 7350 ± 350 years B.P. (M-1133) by H. R. Crane, University of Michigan–Memorial Phoenix Project Radiocarbon Laboratory.

About 5 feet below this dark humus layer are horizontal banded silts, and a dark humus line which dips sharply to the south, marking the old land surface, and levels out at 37 feet below the present surface of the valley fill, where it evidently was the bottom of a small cienaga, or hillside marsh, since filled with fine buff-colored silts, and interlined with narrow humus bands.

The human bones were found in this humus zone, along with thousands of bones of the island field mouse (*Peromyscus sp.*) and iron-stained casts of reeds. The human bones were lying at an angle to each other, and parallel to the sloping stratigraphy, and both showed pre-burial weathering. It is apparent that the bones do not represent a formal burial, but rather an accidental deposition along an edge of a small cienaga filled with rushes or cattails. The great number of mouse bones may be accounted for by the animals' struggling through these reeds until they became exhausted and drowned, a condition which may be observed today in many cienagas. About 6 feet below the bone layer is an active spring which forms a modern cienaga, and a number of other cienagas occur in the immediate region.

When the human bones were first discovered, a small sample of organic earth containing flecks of charcoal was removed adjacent to the bones, and radiocarbon dated by W. S. Broecker of Lamont Geological Observatory (L-568-A) at 10,400 ± 2,000 years B.P. (*4*). The high plus-or-minus factor was due to insufficiency of the sample. In May 1961 a second sample (L-650) was collected by Broecker, William Farrand, and me, and the date of 10,000 ± 200 years B.P. (*5*) was secured as an average of several runs.

Well-formed small gypsum crystals in rose form are found immediately above the dated level. Dwarf mammoth bones are found within 150 feet on either side, and Indian artifacts are found in the upper 10± feet of the deposits. However, no artifacts or mammoths have been found *directly* associated with these human bones.

Elsewhere on the island, a repeating pattern of burned mammoth bones, fire areas, abalone shells at considerable depth in terrestrial deposits, and chipped stone tools are found, and have been dated variously from 12,500 back to 29,700 years B.P. (L-290-R). The evidence suggests the presence of man during the Wisconsin glacial stage (*6*, *7*).

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References and Notes

1. P. C. Orr, *Bull. Geol. Soc. Am.* **71**, 1113 (1960).
2. Those who attended were Fay-Cooper Cole, chairman, prehistory committee, Santa Barbara Museum of Natural History; V. L. VanderHoof, director, Santa Barbara Museum of Natural History; Luther S. Cressman, University of Oregon; Alex Kreiger, University of Washington; Jesse Jennings, University of Utah; Emil Haury, University of Arizona; James B. Griffin, University of Michigan; K. O. Emery, University of Southern California; Brigham Arnold, Sacramento State College; Norman Gabel and Roger Owen, University of California, Santa Barbara College; Wilbur A. Davis and myself, of the Museum of Natural History.
3. J. B. Griffin, personal communication.
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5. E. A. Olson and W. S. Broecker, *Lamont Natural Radiocarbon Measurements VII, Radiocarbon*, vol. 3, pp. 141–175 (1961).
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7. This report is Santa Barbara Museum of Natural History contribution No. 2 and Western Speleological Institute contribution No. 18. This work is the result of long-term activities, sponsored by the trustees of the Santa Barbara Museum of Natural History and the Western Speleological Institute, with the cooperation of Vail and Vickers Co., owners of Santa Rosa Island; the Adventurers' Club of Chicago, the Wenner-Gren Foundation for Anthropological Research; the Max C. Fleischmann Foundation of Nevada; and the Leighton Wilkie Foundation. Radiocarbon dating was done by Lamont Geological Observatory, Columbia University, and the University of Michigan–Memorial Phoenix Project Radiocarbon Laboratory.

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