of these, *Studies of Mineral-Forming Solutions*, by N. P. Yermakov, forms part I and fills nearly half the book. Parts II and III are translations of the journal *Research on Mineral-Forming Solutions*, volume 1, part 2, and volume 2, part 2, both edited by Yermakov.

After a discussion of mechanisms causing formation of inclusions, a classification scheme is presented to aid in the critical but often subjective discrimination between primary inclusions and those formed after the host mineral. Examples are given of inclusions, ranging in size from microns to 6 centimeters or more, in over 50 minerals. In most cases, inclusions contain two or more phases.

Fluid inclusions are useful only if they remain hermetically sealed throughout geologic time. The controversy found in our literature on this topic should be settled by the extensive evidence here presented, from both natural and synthetic inclusions, demonstrating that at least the predominant components of inclusion-fluids are retained nearly permanently. The interpretation of an inclusion is limited, however, because "only the temperature, but certainly not the composition of the captured droplet could have been the same as that of the mother liquor" (p. 49). In accord with this precept, compositions are largely neglected in favor of methods of evaluating the temperature of crystallization of the host mineral. Decrepitation is discredited, but the method of homogenization of phases (for transparent minerals) appears to give only slightly low temperatures, although corrections must be considered.

Descriptions of apparatus used in heating minerals while observing inclusions are slanted toward Soviet components and are of little value, particularly since commercial units are now available.

An interesting variant to these studies has been the measurement of volumetric phase ratios versus temperature. This technique offers easily acquired data directly related to "gross compositions"; such data are interpretable provided that sufficient volumetric data on pertinent solids and fluids become available. There is no discussion in the book of the utility of freezing-point determinations as used in this country.

The valuable information afforded fills only about half the volume; it is diluted by verbose and imprecise prose (apparently not the fault of the translation), by overly repetitive examples, by extraneous philosophizing, and in part I by frequent doses of propaganda. For example, errors are usually attributed to Americans, progress to Soviet geologists: "American geologists, whose concepts . . . tend towards simplification and emasculation . . ." (p. 293), ". . . creative daring of the young Soviet geologists . . ." (p. 297), and ". . . liberation from concepts alien to the Soviet school . . ." (p. 297).

The basic scientific method of the authors may be criticized on several counts. Few numerical data are given, and the derivation of values is often at least obscure. Quantitative evaluation of uncertainties is very rare indeed. The figures occasionally lack units for coordinates or on contours; graphs in parts II and III often present experimental curves without data points. My confidence was also shaken by such statements as "heating serves to reduce the volume of the vacuole wherein the inclusion is confined . . ." (p. 73).

Although the scientific quality of this book is only mediocre and the price seems excessive, purchase is warranted in the absence of another text on mineral inclusions.

H. L. BARNES
Geochemisches Institut, Universität Göttingen, Göttingen, Germany

Mammoth in situ

No natural history museum worthy of the name lacks its display case of mammoth or mastodon teeth or its diorama of the "Great Ice Age" mammals. But to see the bones of such creatures exposed in the beds where they occur naturally, let alone to share the excitement of the "dig," one must be or travel with a paleontologist or amateur collector. To my knowledge there is no permanent public display of mammoth bones with artifacts of Early Man in a natural outcrop anywhere in the United States.

Domebo, named for its owner in southwestern Oklahoma, would not have been an easy fossil site to stabilize for such a purpose. The excavation team had its hands full mapping, jacketing, and removing mammoth bones before the spring thaws slumped over the site. **Domebo, a Paleo-Indian Mammoth Kill in the Prairie-Plains** (Contribution No. 1 of the Museum of the Great Plains, Great Plains Historical Association, Lawton, Oklahoma, 1966. 63 pp., illus. Paper, $2.50), edited by F. C. Leonhardy, treats the geology (Retallick and Albritton), paleontology (Slaughter and Mehl), archeology (Leonhardy and Anderson), malacology (Cheatum and Allen), and palynology (Wilson) of beds containing bones of a single subadult, probably female, Imperial Mammoth (*Mammuthus imperator*). Found with the bones were three projectile points, one of Clovis fluted type and one approaching the Plainview type. Carbon-14 dates on the organic fraction of the mammoth bone give its age as 11,200 years. Twelve species of small vertebrates and 30 species of molluscs were removed from associated beds. Part of the fauna cannot be regarded as contemporaneous, as it came from beds 1000 years younger than the mammoth itself. But the pollen diagram by Wilson indicates no major vegetation changes throughout this interval, and the environment 11,000 to 10,000 years ago may have been quite similar to the present one.

Although the information they contain bears directly on a leading controversy in paleoecology—the cause (or causes) of late Pleistocene megafaunal extinction—few single large mammal sites have received the careful attention devoted to the Domebo mammoth. Paleoecologists need many more case histories of this sort. And the public and the scientist both may hope that among future discoveries one showing bones, artifacts, stratigraphy, and ancillary evidence will prove suitable for a permanent exhibit *in situ*.

PAUL S. MARTIN
Geochronology Laboratories, University of Arizona, Tucson

Motion of Fluids

Basic Developments in Fluid Dynamics, volume 1 (Maurice Holt, Ed. Academic Press, New York, 1965. 459 pp., illus. $17.50), consists of five articles on topics of current interest. "The numerical solution of problems in gas dynamics," by O. M. Belotserkovskii and P. I. Chushkin of the Computing Center of the Academy of Sciences of the U.S.S.R., describes three numerical methods of solving nonlinear partial differential equations used mostly in gas dynamics, namely the method of finite