



Above; Home on granite bedrock on south side of Camelback Mountain, Phoenix, Arizona, partially destroyed by rock slide after several weeks of above normal precipitation. (Photograph by T.L. Péwé March 2, 1978.) Right; Detail of above rock slide.

Geologic Hazards in the Phoenix Area

By Troy Péwé

Recent publicity has been given to flooding disasters, houses crushed under rockslides, and swimming pools broken by swelling clays — all examples of geologic hazards in the Phoenix area. In addition, earth cracks are lengthening in some areas and the potential for their formation in other areas is growing.

A geologic hazard is a perfectly normal geologic event or a process and becomes a geologic hazard only when it affects people's lives, property, or pocketbooks. About 100 years ago a majority of our citizens regarded these hazards (landslides, earthquakes, and floods) as "acts of God" (or the devil). The average citizen felt that it would be presumptuous to question these acts. But today people are recognizing that geological hazards are not hazards as such. They are hazards only because man places himself in the wrong place at the wrong time.

Environmental geology, or geology for land-use planning which includes the study of the hazards, has

been my concern and the concern of my students for several years in various parts of the world and since 1972 in the Phoenix area, where geological investigations have mainly centered around the eastern part of the valley. The City of Scottsdale has been the most receptive towards geological investigations for planning and development. They have partially funded three projects and are in part funding publication of the environmental geological folio of the McDowell Mountain area. The Bureau of Geology and Mineral Technology has long been interested in the contribution that geological work could make to planning and development in Arizona and is currently publishing the ten colored maps of the McDowell Mountain study.

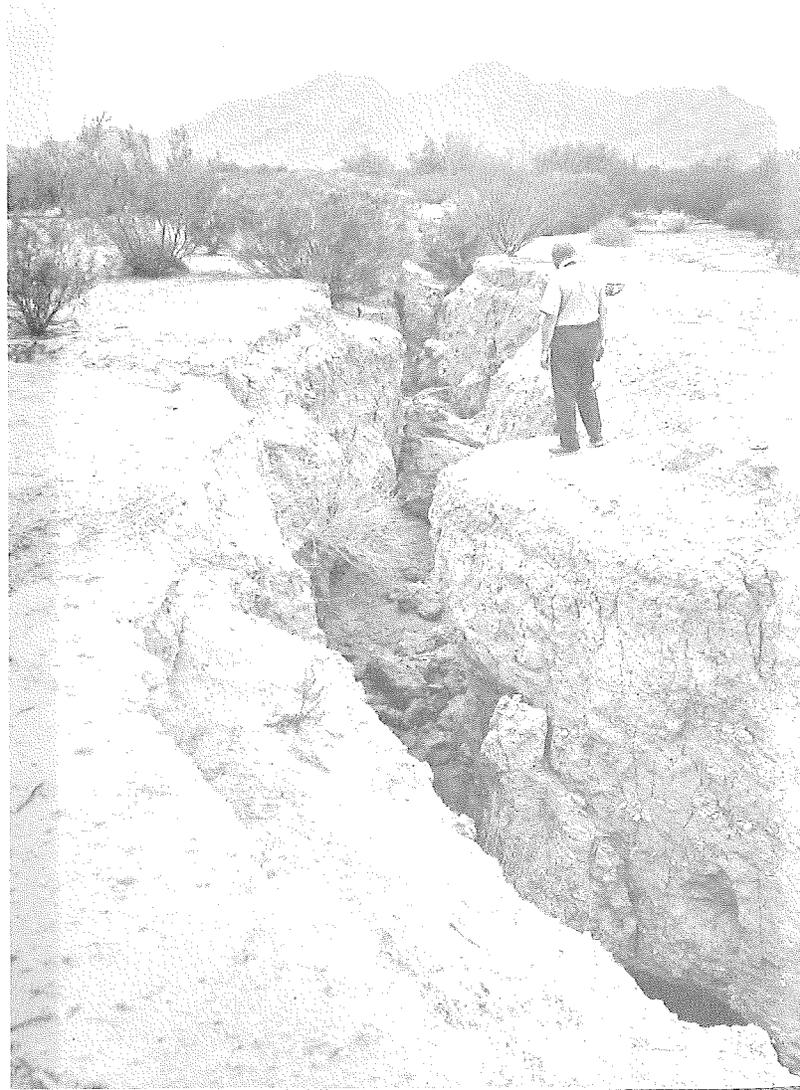
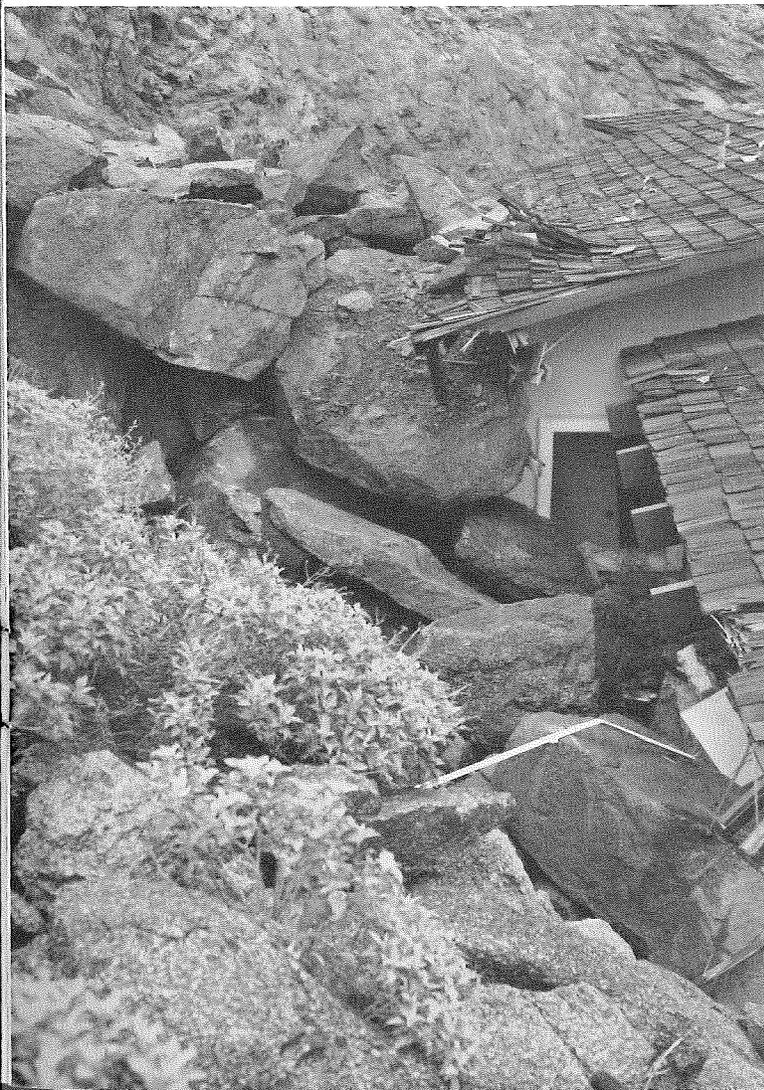
The work is prepared in nontechnical language so that the material can be readily used and understood by the developers, city council members, architects, engineers, and others dealing with the land. Maps are drafted that

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translate the geological conditions of an area to illustrate the geological hazards as well as construction conditions, ground water resources, and waste disposal conditions. Also included is the distribution and development of caliche or hard pan in the soil so difficult to work with here in southern Arizona. Caliche is a calcium carbonate deposit similar to concrete. It is nature's cement in arid regions. Many builders have run into added costs when excavating for swimming pools, septic tanks and roads without previous knowledge of the distribution and thickness of caliche. *Continued on next page*

Right; Crack in deck of swimming pool due to clay swelling in foundation soils. Vertical displacement 1 cm. at this time. Similar cracks occur elsewhere in deck; four cracks are below water line. Pool, located at the McCormick Ranch in Scottsdale, Arizona, was constructed three to four months earlier. (Photograph by T.L. Pewe, January 6, 1978.)

Below, rt; Earthquake located on the south side of Chandler Heights on Hunt Road, 1¼ miles east of Powers Road on the boundary between Maricopa and Pinal counties. Earthcracks are caused by land subsidence, the result of ground-water withdrawal. The San Tan Mountains are in the background. The crack is open to at least a depth of 50 feet. (Photograph by T.L. Péwé, July 25, 1972.)





An environmental geology study of the Paradise Valley Quadrangle involving 14 colored maps has just been completed. These material may be viewed at Arizona State University. Mapping of the Tempe Quadrangle is now underway. Tempe and Phoenix have cooperated in these essential studies as has the Arizona Department of Transportation.

The public reaction to these studies has been rewarding, as they are learning of the potential contributions geologists can make to developing and planning as well as redeveloping and construction.

Dr. Péwé is Professor of Geology, and former department head, at Arizona State University in Tempe.

Below; Home of the south side of Camelback Mountain, Phoenix, Arizona, partially destroyed by mud slides during intense rainstorm. (Photography by T.L. Péwé, September 9, 1976.)

Left; Detail of mud slide below. (Photograph by T.L. Péwé, September 9, 1978.)

