

Exploration With Radiation

By using an ingenious X-ray technique, archaeologists hope to discover whether or not any unfound burial chambers exist in Pharaohs' pyramids

➤ A RECENT agreement may either disprove or support through use of the most advanced scientific techniques, one of the most persistent beliefs of archaeology—that the real burial chambers of the Pharaohs have remained hidden in the Pyramids for 4,500 years.

The agreement, entered into by the governments of the United States and the United Arab Republic, sets in motion a study by an international team of scientists headed by Dr. F. El Bedewi, nuclear physicist of Ein Shams University, Cairo, and a member of the UAR Atomic Energy Commission; Dr. A. Fakhry, archaeologist and well-known authority on the pyramids, UAR Department of Antiquities; and Dr. Luis Alvarez, leader of a group of University of California research physicists at AEC's Lawrence Radiation Laboratory, Berkeley.

The overall responsibility for the

project will be vested in a committee of UAR scientists, scholars, and administrators.

In a few months the scientists will use an ingenious technique to "X-ray" the Second Pyramid of Chephren, at Giza, to determine whether undiscovered burial chambers exist in the huge mass of stone.

The method has been adapted from techniques used in cosmic ray and particle accelerator research and uses an array of cosmic ray detectors to obtain an accounting of the numbers of such particles that pass through the pyramid.

AEC and Smithsonian Institution interest in the project is primarily one of proving out the technique rather than in the archaeological search for chambers which centuries of investigation have failed to uncover. If the method is successful, it may then be possible

to examine other pyramids, such as the Great Pyramid of Cheops, also at Giza, in the same way.

This approach to archaeology, using the techniques of cosmic ray physics, was proposed by Dr. Alvarez, and the detailed experimental plan was elaborated jointly by UAR and U.S. scientists.

In the experiment, the scientists will use cosmic ray muons, nuclear particles of the meson family, as their "X-rays." As the muons pass through matter they lose energy, and are ultimately absorbed.

Modern detectors, called spark chambers, used to photograph the tracks of fast-moving nuclear particles will be placed in the known subterranean chamber beneath Chephren's Pyramid. The spark chambers will record cosmic ray mesons reaching the detectors from all directions.

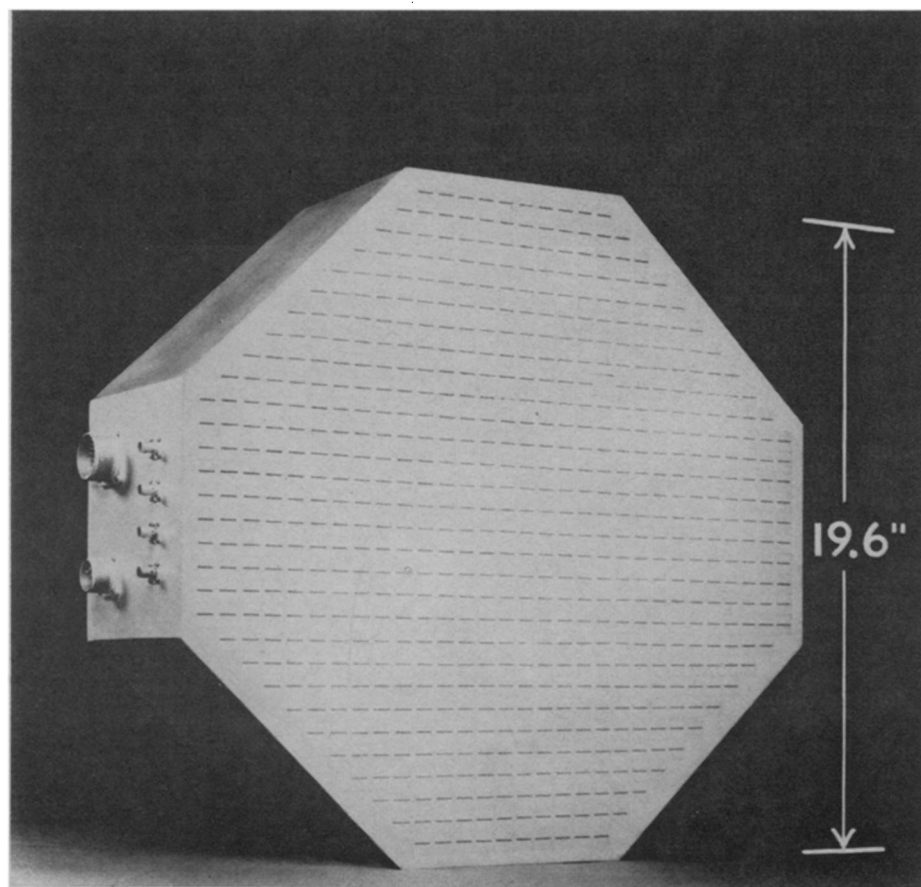
Muons which have passed through a void in the limestone—such as a hidden chamber—would be relatively more frequent and more energetic than those passing through solid rock. Thus, more of them would reach the spark chambers to be recorded, and the hidden void would show up in the detectors as a comparatively higher rate of incoming particles.

With two spark chambers about a foot apart from each other the scientists believe it will be possible to detect any hidden chamber and to pinpoint its location to within a few yards. Tunnelers could then bore directly to the chamber to explore further.

The basis for the experiment is the deception theory which holds that the Egyptian monarchs, wary of grave robbers and anxious to preserve their bodies for immortality, ingeniously planned their pyramids in such a way as to mislead future generations into believing that the tombs had already been sacked.

If this theory is correct—and it has had adherents among many generations of Egyptologists—then the passageways and chambers so far discovered in the major pyramids may be relatively less important than those yet to be discovered. Or perhaps the method will end the persistent hope that there remain to be discovered tombs rich with artifacts of ancient Egypt and still bearing the king's mummy.

• *Science News*, 90:7 July 2, 1966



RADAR WITHOUT MOTION—Moving parts have been replaced by electronic scanning in this new microelectric radar system being developed by Texas Instruments, Dallas, for the U.S. Air Force. Each of the hundreds of squares on its face will be a separate transmitter-receiver module.

ASTRONOMY

Next Sunspot Peak Forecast as Mid-1968

➤ THE CURRENT sunspot cycle will hit its peak no earlier than mid-1968, a Greek scientist predicted.

Dr. John Xanthakis of the Research and Computing Center, Academy of Athens, made this forecast on the basis of trends he found in previous sunspot cycles, projecting these trends forward to reach the 1968 figure.

Details of his calculations are reported in *Nature*, 210:1242, 1966.

• *Science News*, 90:7 July 2, 1966