the University of California and Ein Shams University in Cairo. They have been using cosmic rays in an attempt to find chambers within the bulk of the Second Pyramid. One of the group, Luis W. Alvarez of the University of California at Berkeley, reported at last week's meeting of the American Physical Society that the result is negative. "I am convinced there are no chambers in this pyramid," he says, "and I'm surprised."

The search and the surprise both arise from experience with the nearby Great Pyramid. Once upon a time, in the tenth century of our era, there was a caliph of Cairo, Mamoon by name, who needed cash. Knowing that the ancient tombs were often full of it, he commenced driving a tunnel through the bulk of the Great Pyramid starting in the middle of the north face. He intended to drive right through to the middle of the south face, thinking that an architect with a sense of proportion would have put the burial chambers in the middle of the bulk. Had Mamoon continued as planned, he would have missed the burial chambers of Cheops entirely. The ancient Egyptians, wily as always where grave robbers are concerned, had put the chambers 26 feet to the east of the center line of the pyramid. An accidentally dislodged stone caused Mamoon's sappers to alter their direction and discover the Cheops chambers.

Under the Chephren pyramid is a chamber that has been known for a long time. Archaeologists hope it is a decoy, an empty chamber set up to fool thieves into thinking the tomb had already been looted. In this known chamber equipment was placed to measure the cosmic rays that come through the pyramid. The idea was that if there were chambers in the bulk, more cosmic rays would get through in the directions where the chambers lay because there would be less material to absorb the rays.

Alvarez says he does not quite understand why there are no chambers in the Second Pyramid, but the archaeologists in the group have an explanation. As presented by one of them, the late Ahmed Fakry, it goes like this: The pyramid builders were engaged in experiment. In Cheops' pyramid they put chambers, but by the time they got to Chephren's, they had decided they didn't want chambers in the bulk of the pyramid.

The search for Chephren's grave is not over, however. Soon a team from the Stanford Research Institute will go to Egypt to use short-wave, short-range radar that can penetrate limestone to look for chambers under the known one. The radar will also look up because there is one outside chance of a chamber that escaped the cosmic-ray search, a room full of just enough gold to absorb just enough cosmic rays to look like solid limestone. If there is such a golden chamber it will give a banging big signal on the radar because gold is a good electrical conductor.

Meanwhile the swirling sands of the desert still conceal the secret the ancient priests intended them to keep. Will modern technology finally foil the intentions of these early morticians? We shall have to wait and see. □

Chemistry: Looking at the solution

Chemists go busily about their work producing, observing and trying to understand complicated chemical reactions. Many of these reactions, and some of the most important take place in solution. The basic processes of life, for instance, are the result of chemical reactions that take place in solution in cells. In many cases such reactions have been investigated as if nothing were involved except the reacting molecules. The solvent or solution in which the reaction takes place has been largely ignored.

Recent work suggests that the influence of solvents on reactions is much more important than has been previously realized. Some of the evidence for this conclusion comes from work done by John Brauman of Stanford University who used a technique developed by a colleague, John Baldeschwieler. The technique, called ion cyclotron resonance (ICR), works on the same principle as cyclotrons used in physics. It allows chemists to record which ions or charged particles are or are not taking part in a reaction.

The Stanford researchers used the ICR method to study the relative acidity of various molecules. "The results have astounded chemists," says a summary in the newly issued annual report of the National Science Foundation, which has supported the research.

Strong acids transfer a hydrogen ion to weaker acids. This transfer can be detected by ICR and a scale of the relative acidities of molecules can be built up. Surprisingly, the experiments showed that the methyl alcohol, toluene and propylene are all stronger acids than water. In solution, water appears to be 100 times stronger an acid than the alcohols. Toluene and propylene show almost no tendency to act as acids in solution.

If the ICR findings are correct about the true acidity of these molecules, then it is the solution that is responsible for the observed acidity or lack of it. Or as the NSF report puts it, "the only remaining explanation was that the interactions between reacting molecules and solvents were so important that they could completely control the chemistry observed."

In 1935 Michael Polanyi theorized that the energy of certain reactions should be that needed to remove solvent molecules from between reactants so that they could get together. The ICR work of Brauman and Baldeschwieler, for which they have received the American Chemical Society's Award in Pure Chemistry, seems to confirm this as does other recent work. "The studies," says NSF, "should help bring order out of many phenomena that have been difficult to understand, as well as turn up new surprises." □

Hormone switch: Clinical promise

A year and a half ago, Paul Brazeau and his colleagues at the Salk Institute in California reported that they had isolated, characterized and synthesized a substance from the hypothalamic region of the brain that switches off growth hormone. The factor was dubbed "somatostatin." They hoped that somatostatin might prove useful in treating patients with acromegaly, an abnormal enlargement of the face, hands and feet caused by an oversecretion of growth hormone. Tissue experiments with somatostatin indicated that it might (SN: 1/13/73, p. 26).

Now five acromegaly patients have been treated with somatostatin. It almost completely wiped out the production of growth hormone in their bodies. Samuel S. C. Yen and his colleagues at the University of California at San Diego School of Medicine report their findings in the April 25 NEW ENGLAND JOURNAL OF MEDICINE. Unfortunately, though, somatostatin's impact on growth hormone was brief. For this and other reasons endocrinologists are not sure that somatostatin is the answer to the treatment of acromegaly.

Still, Yen and his colleagues did find some unexpected effects of somatostatin on the patients. Aside from turning off growth hormone, which is secreted by the pituitary gland of the brain, it also turned off three other hormones: glucagon, insulin and prolactin. Prolactin is released by the pituitary, but glucagon and insulin are made by the pancreas. So somatostatin's "multitude of action at the level of the pituitary (possibly pancreas and peripheral tissue as well)