

nongahela Rivers in Pittsburgh has been noted to vary markedly in nickel and strontium content. Water that travels through the same pipes and taps may differ from day to day.

So with the effects of various chemicals on health uncertain and the chemical content of drinking water hard to pin down, it is little wonder that national drinking standards are inadequate. "Drinking water standards," Robeck flatly admits, "have little scientific basis for existence." What is needed, he says, is better research into the chemical content and hazards of drinking water. The National Academy of Sciences and the National Academy of Engineering will soon publish suggestions on research needs in water supplies. Several bills before Congress would also provide research so that better standards can be set. □

Meteorite material is oldest yet found

Meteorites preceded moon rocks in the laboratories of earth. Now it appears that meteorites may well have preceded the moon in condensing from the early solar nebula. At least *some* material found in the Allende meteorite is older than anything yet dated on the moon. In fact it is older than anything ever dated so far, 4.61 billion years.

C. M. Gray of the California Institute of Technology announced the findings this week at the annual meeting of the American Geophysical Union in Washington. The Caltech group concluded that the results indicate that many planetary bodies such as the Allende meteorite, Angra dos Reis (another meteorite), other meteorites, and the moon condensed from the solar nebula over a distinct time interval of about 10 million years that ended 4.6 billion years ago.

The Caltech group dated calcium-aluminum rich inclusions in the meteorite. Scientists have accepted for several years now the hypothesis that highly refractory materials such as aluminum and calcium were among the first condensates of the solar nebula.

The relative age of these inclusions is based on what scientists believe to have been the ratio of rubidium to strontium in the early solar nebula. These values were derived by studying strontium 87/86 ratios in meteorites such as Angra dos Reis, which is a little younger (in cosmic terms) than Allende. Before Angra dos Reis, the most primitive strontium had been found in basaltic achondrites, and dated 4.6 billion years old.

Another significant finding is that the inclusions have been altered recent-

ly in space—since 3.6 billion years ago, maybe by collision with a comet.

The aluminum- and calcium-rich inclusions in the Allende meteorite have attracted more than usual interest because the moon's highlands are rich in these same elements. Some geophysicists have gone to great lengths to demonstrate how the moon could be made of the same material as the Allende inclusions. But at this year's conference, serious objections were raised to this model. The trace element differences between the lunar material and Allende are great. According to Lawrence Grossman of the University of Chicago, Allende is enriched in iridium and siderophile elements compared with the moon. Also the oxygen isotope content differs by two percent. "You have a serious problem making the moon out of Allende inclusions," he says. "The Allende inclusions are a fantastic geochemical anomaly. There are no rocks on earth like them."

How part of the moon was made of much the same material as inclusions found in the meteorite remains unanswered. But Allende is gaining new fame. "Allende is a Rosetta stone," says Grossman, "because it demonstrates spectacularly that chemical fractionation involving major elements took place as early as the condensation of the nebula." □

Salyut 2: Signs of difficulties

The Soviets were not talking this week about the Salyut 2 space station, launched April 3 (SN: 4/14/73, p. 237). Such silence usually means the mission is not going as planned.

There are ways of cracking the silence curtain, however. Last week spacecraft trackers noted that the station had been shifted to a higher orbit 161 miles above the earth. Experts had been expecting a Soyuz launch around April 7 to take cosmonauts up to dock with the station.

The orbital shift seemed to indicate the Soviets have parked the station because of either trouble on the ground with Soyuz or unresolved trouble with the station itself. (Placing the station in a higher orbit will allow it to survive. Otherwise the atmospheric drag would have slowly pulled the station's orbit down.)

Solar physicists speculated that the Soviets delayed Soyuz 12 because of unusually high solar activity which began about the time they would have launched the cosmonauts. There was an increase in sunspot activity around April 7 leading to more than 35 flares. Most bets this week, however, were on trouble with Soyuz. □

Developing vaccines for hepatitis A and B

Hepatitis attacks the human liver from two directions. Infectious hepatitis is transmitted by a virus (Type A) that lives in the intestines and sewage. Serum hepatitis (Type B) is transmitted through the blood via transfusions or from contact with nonsterile instruments such as hypodermic needles. Progress in developing vaccines against both forms of this disease was announced last week.

In 1967 an infectious hepatitis virus (CR326) was isolated in marmosets (a South American primate), but there was some doubt that this was the same virus that attacked humans. Now there is good evidence that it is and researchers have been using it in attempts to develop a vaccine. CR326, together with blood serum from humans with infectious hepatitis (and therefore antibodies to the disease) was given to uninfected marmosets. These animals developed fewer cases of hepatitis than did animals given the virus alone or the virus with blood from humans without the disease. This work indicates that the antibodies can destroy the virus, and is the first step in developing a vaccine. The work was done by researchers at the Merck Institute for Therapeutic Research in West Point, Pa., and scientists at the Louisiana State University International Training Center in San Jose, Costa Rica.

Progress toward the development of a vaccine for the prevention of Type B hepatitis is reported in the April 12 *NEW ENGLAND JOURNAL OF MEDICINE*. Two years ago Saul Krugman and Joan P. Giles announced the development of a prototype for such a vaccine (SN: 3/27/71, p. 211). Patients at the Willowbrook State School in Staten Island, N.Y., were exposed to serum hepatitis after being inoculated with inactivated (boiled) serum from infected patients. Immunity was produced but the results were not conclusive. Now Krugman and Giles report, after two years of follow up and retesting, that the immunizing process produces a decrease in the incidence of acute hepatitis as well as a decrease in the incidence of the hepatitis carrier state. This means it is possible to prepare a vaccine for the prevention of viral hepatitis. However, the researchers note, the rate of progress toward the development and ultimate licensure of an inactivated vaccine will depend upon the successful propagation of the virus in cell culture or a suitable animal (or both). Sensitive, reproducible tests will be needed to provide objective evidence of lack of infectivity. □