otherwise brilliant announcement. Dr. Aurbach noted the sequence of PTH's 84 amino-acid building blocks, and the synthesis of the first 34, had been achieved by Dr. John Potts and his colleagues at the MGH in Boston. He then took credit for affirming the activity of the synthetic molecule.

What he neglected to mention was that two weeks earlier, at a meeting at the University of Wisconsin, another NIH scientist had already announced determination of the sequence of parathyroid hormone. At a small and highly specialized Symposium on Sequence Determination of Amino Acids in Proteins and Peptides, Dr. Brian Brewer detailed the structure of PTH, amino acid by amino acid. At that same gathering, Dr. Hugh Niall, an associate of Dr. Potts, presented his group's evidence of the sequence of the first 45 amino acids only.

Scientists, like other men, want credit for their accomplishments. Perhaps even more than other men, they generally follow a rigid protocol for acknowledging their colleagues. Thus, it was disturbing that the Aurbach-Potts group failed to cite Dr. Brewer's sequence work. For this, they have been accused of a lack, at the very least, of common courtesy.

Commenting on the issue from the stance of an objective observer, one NIH official finds the whole situation regrettable.

It could, he says, eclipse the real significance of what are in fact two clearly important contributions to knowledge: Dr. Brewer's sequence determination of parathyroid hormone and the Potts-Aurbach synthesis of a large chunk of it. □

FROG OTOLITH

Adjusting to space

The experience of 26 American astronauts in zero gravity seems to indicate that man can adapt to weightlessness, at least for two weeks. Biologists, however, want to know how this adaptation occurs—what happens to the internal mechanism of response.

One such mechanism is found in the inner ear sensors that control balance and orientation in earth gravity. Preliminary results of a space biology experiment with two bullfrogs (SN: 8/8, p. 118), announced this week, may provide a key answer.

"We were very surprised that the balance sensors adapted to zero g," says Dr. Torquato Gualtierotti of the University of Milan, Italy, who designed the experiment with National Aeronautics and Space Administration scientists.

The frogs, whose inner ear is similar to man's, were launched into space

NASA

Instrumented frogs: Back to normal.

last week with microelectrodes surgically implanted in the vestibular (inner ear) nerves leading from the sensor cells in the frogs' otoliths. Scientists wanted to see what happened to this sensor when the basic condition or reference point (gravity) was removed. Several possibilities existed. One was that the central nervous system would simply ignore the signals of imbalance being sent from the inner ear. Another was that the inner ear itself would finally adjust to zero gravity and stop sending the signals. On the other hand, says Dr. Gualtierotti, were the otolith to continue sending the signals of disorientation, the signals could have overcome the activity of the brain.

The test results show that the otolith of the inner ear adjusted to the weightless state and assumed a normal pulse rate. The microelectrodes that transmitted the nerve pulse rates were attached to a nerve cell at the bottom of the macula. The macula is the sensor organ of the utriculus—the part of the ear that responds to gravity. The otoliths themselves are calcium carbonate crystals suspended in a jelly substance above the macula. As the otoliths move parallel to the macula, they move the macula hairs. This stimulates the sensors and issues an electrical impulse. It is this impulse that the electrodes transmitted.

Every response of the frogs to the motion of the spacecraft during launch was recorded. The preliminary results indicate that after an initial period of gradually increasing pulse rate, lasting about 51 hours, the rate returned to normal prelaunch parameters for the remaining three days in space. One explanation for the increase in pulse rate, or sensitivity, says Dr. Gualtierotti, may be that the sensors were attempting to find out what had happened to their normal reference point.

But the return of the pulse rate to near normal indicates that both the inner ear and the part of the central nervous system concerned with orientation adjusted to weightlessness.

"Since there was no gravity," says Dr. Gualtierotti, "we don't know what the sensors aligned themselves to. But so far, indications are that as far as the otolith is concerned, we don't need artificial gravity in space."

The secondary significance of the experiment is the biotechnology itself. Since the equipment is designed to transmit pulses, it could be used, says Dr. Gualtierotti, to monitor electrical pulses that come from muscle tissue, nerves or even the cardiovascular system.

The bullfrog flight is part of an overall study being conducted by NASA's Offices of Space Science and Application and Advanced Research and Technology to determine the biological effects of weightlessness and to study the need to equip space stations of the future with artificial gravity chambers. □

RUSSIAN CRAFT

Robot on moon

In a little more than 60 days, the Soviet Union has launched 22 space missions, including Luna 16, which returned moon dust to earth (SN: 9/26, p. 269). This week they scored another technological coup. Luna 17, launched last week, made a soft landing in the lunar Sea of Rains, and deployed onto the moon a remote-controlled, eight-wheeled robot machine shaped like a silver teakettle and adorned with Russian flags and a bust of Lenin.

According to Tass, "Lunokhod 1" (Moonwalker 1) took a 20-yard journey around the landing site, carrying a television and a radio to scan the moon's surface and send telemetry back to earth, an X-ray spectrometer to analyze the soil and an array of French-made mirrors to reflect laser beams sent from the earth. The craft was equipped with a soil-scooping device similar to the one on Luna 16. It was not designed to return to earth.

In addition to discussing future Lunokhod explorations of the moon, the Soviets also described similar automated stations and robots for Venus, Mars and Mercury. These they call "planetokhods" or "marsokhods."

The Soviet achievement is certain to re-intensify debate in the United States over the relative merits of manned versus unmanned explorations of the moon and planets. American scientists and officials hailed the accomplishment as a clear demonstration of the Soviet commitment to scientific studies of the solar system with automated devices. □