

# NAS notes

Gathered at the 105th annual meeting of the National Academy of Sciences in Washington, D.C.

## METEOROLOGY

### Atmospheric layers influence cloud seeding

A statistical analysis by an international team of scientists of the 23 known controlled experiments on cloud seeding performed all over the world shows that the results of tossing silver iodide into the air from ground-based generators are contrary to those previously suggested.

Updrafts, expected to increase the effectiveness of silver iodide as a rain producer, actually produce uncertain effects. On the other hand, cloud seeding on days with strong stability layers increased the normal precipitation by factors ranging from 1.7 to 3.0.

Dr. Jerzy Neyman of the University of California, Berkeley, makes these points in a summary of three related papers on weather modification by two meteorological teams, one in Switzerland and one at the University of California, Los Angeles, with Berkeley's team of statisticians.

## NEUROLOGY

### Fibrous protein may serve as track

A substance loosely identified as fibrous protein has been found in a wide variety of tissues, often in the form of filaments or tiny tubes. Dr. Francis O. Schmitt of the Massachusetts Institute of Technology suggests that these microtubules, when found in nerve fibers, may serve as a chemical transport system.

The nerve cell is unusual in that its sites of specialized action, the synapses, are far removed down nerve fibers from the cell's nucleus. The nucleus, however, is responsible for synthesizing the chemicals which produce nerve action at the synapses. The question of how these chemicals are transported unidirectionally down the fiber has been a vexing one.

Dr. Schmitt theorizes that the chemicals are packed in packages called vesicles. The molecules on the outside of these vesicles fit together with the fibrous protein molecules of the microtubules in a kind of ratchet arrangement, permitting only one way motion. Impetus for the motion is produced by an arrangement of molecular attractions that results in a net force down the fiber.

## ECOLOGY

### Fungi vital to rain-forest trees

Ecologists have long sought to explain how lush rain forests grow on some of the poorest soils in the world. Drs. Frits W. Went and Nellie Stark of the Desert Research Institute of the University of Nevada say the answer lies in a closed nutrient cycle between trees, fungi and dead organic matter.

Studies were made in the Amazon rain forest. It is generally accepted that the inorganic nutrients of the Amazon region cannot be replenished significantly from the completely leached soils. Dr. Went says there is a revolving capital of nutrients that go from decaying matter back to the living vegetation without being released into the soil.

Soil fungi, Dr. Went says, provide the bridge by which the nutrients are returned to the trees. These fungi are thickest about the roots of the trees; they absorb the nutrients, then pass them on to the roots directly. It appears that the trees are more parasites of the fungi than vice versa, as once was thought.

Dr. Went says this ability of fungi to support a forest with very little in the way of soil nutrients points the way toward the possibility of establishing forests on desert dunes similar to the forests of Georgia and Florida, which grow on very poor sandy soils and which also may be fungi-supported.

## HEREDITY

### Armadillo quadruplets challenge gene role

A study of supposedly identical armadillo quadruplets has revealed wide variations between littermates. The findings, by Drs. Eleanor Storrs and Roger J. Williams of the University of Texas, suggest genes may not directly control many of the important variations, such as running speed and intelligence, that are observed in a single species.

Sixteen sets of armadillo young were studied. Some littermates are found to be quite similar when judged according to such factors as body weight, individual organ weight, and the amount of norepinephrine in various organs. But by and large the variation according to these parameters is very large, even though each animal of a set bears genes identical with the others.

It is postulated that when the original egg divides four ways, there will usually be an unequal distribution of the egg's cytoplasm and cytoplasmic organelles. Dr. Storrs suggests there is a cytoplasmic factor, responsible for turning arrays of genes on and off, which thus would be unevenly distributed. The main effect of such a factor would be control of the extent of proliferation of the various differentiated tissues.

This extent of proliferation, not the gene pool, may be the dominant factor in determining inheritance of factors which vary quantitatively in a species.

## ETIOLOGY

### A cause of gastric ulcers

Gastric ulcers may be caused by food stagnating in the stomach, Dr. Lester R. Dragstedt, of the University of Florida, reports. It is generally accepted that gastric and duodenal ulcers are both caused by an excess of stomach acids. But while duodenal ulcers can be traced to nervous hypersecretion of acid, gastric ulcers can not.

Dr. Dragstedt says his experiments involve narrowing the exit of the stomach and other alterations in lab animals in order to cause food to remain too long in the stomach. The over-long presence of the food stimulates prolonged secretion of the hormone gastrin by the stomach. This excess hormone stimulates excessive secretion of gastric acids, leading to ulcers.

Dr. Dragstedt says he and his associate, Dr. R. E. Doyle, are able to produce gastric ulcers in their animals at will.

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