

pital and physician are liable if a patient contracts hepatitis from virus-contaminated blood transfusions (SN: 10/24, p. 337) was, expectedly, viewed with alarm. The House resolved to seek state legislation protecting medical personnel from liability except in cases in which negligence could be proved.

■ **AMA membership.** Procedures for admitting interns and residents to AMA membership were approved.

■ **Federal Department of Health.** The House of Delegates adopted a resolution reaffirming its intent to push for such an independent department to be headed by a physician who would have Cabinet rank. □

CLOUD SEEDING

Snowfall, ecology and man

Within the next few weeks, the Bureau of Reclamation expects to begin seeding clouds over the San Juan Mountains of southwestern Colorado, marking the formal beginning of the four-year Colorado River Basin Pilot Project. The final instrumentation check took place on Dec. 9 and now the project need only await the appearance of a suitable cloud.

The purpose of the project is to determine the feasibility of increasing the water flow from the Rocky Mountains by seeding winter snow clouds to augment the snowpack.

However, partly because very little is known about ecological consequences of weather modification, the project has aroused considerable local concern (SN: 5/9, p. 461).

To help answer some of the questions that have been raised, the Department of the Interior has tacked a new phase onto the project—an intensive study of the ecological effects of induced increases in snowpack and precipitation.

The four-year, \$881,000 ecological study will be conducted by the University of Colorado, Colorado State University and Fort Lewis College. Thirteen interrelated studies are planned.

Scientists will examine the effect of increased snowfall on the animals—big and little—that inhabit the region, including elk, marmots, shrews, squirrels, chipmunks and rabbits. Studies of the elk will pay particular attention to changes in grazing habits. A trap and tag program will help researchers keep track of the smaller mammals.

But one animal, the lowly toad, will receive particular scrutiny. Of all the animal populations in the San Juan Mountain area, toads are the most sensitive to snow cover changes. Shifts in these amphibian populations could, therefore, provide early warning of other, slower changes elsewhere in the ecosystem.

Other studies will examine the effect of increased snowfall on the alpine plants that form the diet of some of the animals. Researchers will also make repeated inventories of varieties, numbers and densities of various species of forest vegetation to discover changes in plant population or character. A separate study will look at effects of added precipitation on the growth of principal species of forest trees.

In attempts to reconstruct the climatic history of the area, researchers will examine tree rings, weather records, mine camp journals and old newspapers. No formal weather record for the area exists, but records from one weather station on the front range of the Colorado Rockies indicate that the mean air temperature for the summer months of 1953 to 1969 has declined by 2.9 degrees F., with a corresponding increase in snowfall.

This poses a problem for the researchers. If the San Juan Mountains are already undergoing natural ecological changes, it may be difficult to differentiate the effects of the cloud seeding project from natural changes. The researchers hope that by reconstructing a climatic-ecological record for the area over the past several hundred years, they will find some way to make this distinction.

To study the effects of increased snowfall on the relation between climate and plant growth, scientists will tap selected trees with small devices that can record the pulse of life in the trees. The device, known as a dendrometer, responds to the pressure of sap as it rises and falls in the trunk of the tree, and is so sensitive that it can detect the instant that growth begins in the tree and the instant it stops.

The seeding agent to be used in the project, silver iodide, may itself become a factor in ecological change, as vegetation on which it is deposited from the snowfalls is consumed by animals. Accordingly, a separate study will be made of the accumulation and toxicity of silver.

Finally, scientists will conduct a general ecological overview of the region and study the impact of weather modification on alpine geomorphic processes.

The Bureau of Reclamation stresses that the project does not encompass all of the important issues that might be considered, but it believes the major questions about effects will be answerable.

Project coordinator Dr. H. L. Teller of Colorado State University points out that one of the study's purposes is to evolve a methodology for future studies of this nature.

"Right now we're groping," he says. "This is the first large-scale study of the ecological impact of weather modification." □

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