

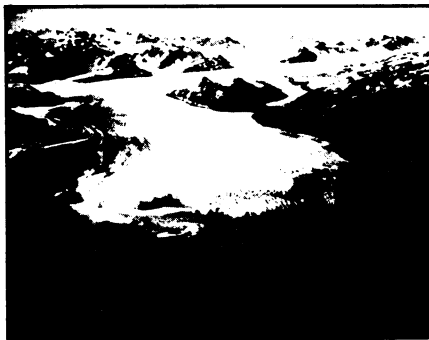
## Glacial trouble forecast for tankers

To the list of natural phenomena that may be predictable, the U.S. Geological Survey has now added glaciers. Survey scientist Mark F. Meier and others predict in a recent report that the Columbia Glacier near Valdez, Alaska, is about to begin a drastic retreat. Not only a major step for glaciology, the prediction may also be significant economically: As the 425-square-mile glacier retreats from Prince William Sound, it will begin flinging off more and larger icebergs than usual. And that is a potentially dangerous prospect for the oil tankers that daily visit Valdez, the southern terminal of the Trans-Alaska Pipeline. In fact, the Survey considers the future iceberg threat so serious that it has issued a formal hazard watch to state and federal officials, such as the Department of Energy, the Coast Guard and the state of Alaska.

The prediction and hazard watch are firsts of their kind, according to Meier, chief of the usgs glaciology project in Tacoma, Wash., and they are particularly important because "this is the first time we have been able to catch a calving [iceberg producing] glacier going into a drastic retreat mode that can cause navigational hazards." Similar situations have occurred in recent years, he says, but "scientists weren't around to measure them."

The Columbia Glacier has long been a target of Survey attention. Several years ago, according to Meier, usgs scientist Austin Post realized that not all glaciers behave the same. Glaciers with firm footing on land, such as those that scoured North America during the Ice Age, advance and retreat with changes in climate. But glaciers like the Columbia, which bleed into water, are largely controlled by their configuration in water. The tip of the Columbia, for example, rests on shoals in shallow water, explains Meier, but most of the glacier fills a deep channel. Usually the rate of flow of ice toward the tip of the glacier equals the rate of iceberg production, and the glacier stays grounded on the shoals. But if the rate of ice flow declines, the tip is chipped away berg by berg until it retreats to deeper water. At that point, says Meier, the rate of berg production, and consequently the retreat, accelerates rapidly.

Based on data from 12 other calving glaciers and from aerial observations of the Columbia glacier begun in 1974, Meier and co-workers developed a computer model that predicts the future discharge of icebergs from a calving glacier. Including such factors as the rate of ice flow and the effects of changing channel geometry on berg production, the scientists found that the tip of the Columbia will retreat to deeper water in two to three years. The rate of calving will then peak at 20 to 27



*Aerial view of Columbia Glacier (top). View across the crevassed tip of the glacier (bottom) with bergs in background.*

million tons per day during the period covering 1982 to 1985, according to the report, "Predicted Timing of the Disintegration of the Lower Reach of Columbia Glacier, Alaska." Currently, iceberg production is about 4 million tons per day, says Meier. The glacier will retreat by about five miles by 1985 or 1986, according to the model, and as it continues to withdraw at a speed of a mile or more per year, as much as 50 cubic miles of icebergs could be released into Prince William Sound in the next 30 to 50 years.

The effect on tanker traffic is less easy to predict. The rate of iceberg break-off is never continuous, Meier says, and days may pass when no bergs are released. "Then again, it could be that all of the Valdez Arm [of Prince William Sound] will not be navigable — though I don't think that will happen." John Ratterman, manager of public affairs for the Trans-Alaska Pipeline, agrees. "It doesn't mean that the tankers will stop, just that they will have to be careful navigating. The only thing that would stop them is a massive amount of ice all at once." Moreover, he said, the area is used by an average of only one and a half tankers per day carrying a total of about 1 million barrels of oil, and the prevailing winds blow some bergs away from tanker lanes while others are trapped behind small islands. If all else fails, he says, the Coast Guard is entertaining thoughts of corralling errant bergs behind a giant nylon net. □

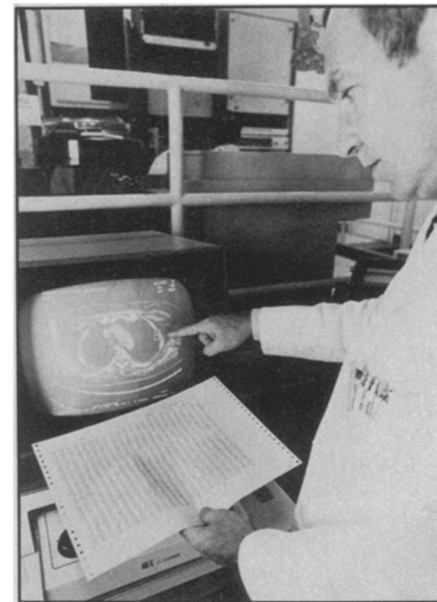
## CT scan used in tumor diagnosis

Benign lung growths spotted in chest X-rays can only be differentiated from malignant tumors by two criteria: absence of growth or the presence of calcium deposits. But calcification can often be too diffuse to show up clearly, and monitoring for growth may mean allowing an easily spreadable tumor a chance to develop and spread.

Doctors at the Johns Hopkins Medical Institutions announced this week a way out of the dilemma, through the use of computed tomography (CT). "We know that approximately half of the growths in the lung will prove to be benign after biopsy or surgical removal," says Stanley Siegelman, one of the developers of the new diagnostic method. "With this technique to analyze tissue, we can rule out cancer, without further tests, in two-thirds of the benign lesions."

The method makes use of the basic mathematics behind CT scanning. The CT image is actually a computer formulation using numbers generated by measurements of relative tissue density. Siegelman and his colleagues looked directly at the numbers and found that higher numbers mean the spot is benign, while lower numbers mean the spot is malignant.

The technique benefits both the patient's health and pocketbook, says Siegelman. In the current issue of the *AMERICAN JOURNAL OF RADIOLOGY*, he reports that the CT technique allows for earlier diagnosis and treatment of malignant tumors. And as a definitive test, it can replace the need for direct tissue sampling by needle biopsy or removal of part of the lung, an operation that costs thousands of dollars. □



*Siegelman: Low density indicates cancer.*

Johns Hopkins