University, who has been studying the site with NMU botanist W. James Merry. It has been thought that the last glacial advance in the region occurred some 11,850 years ago, an episode called the Valders stadial. Now, says Hughes, it appears that "as recently as 10,000 years ago, glacial ice filled almost all if not the entire Superior basin." The Valders stadial could have lasted longer than previously believed, but there may have been a whole additional retreat-advance episode. Growth-ring studies of one 130-year-old tree suggest that the climate was slowly cooling for the first hundred years, followed by more rapid cooling over the last 30, Hughes says. A possible inference is the onset of a new glacial stage.

The forest was actually discovered more than a year ago and kept secret while the NMU scientists studied it with the aid of a $16,000 grant from the mining company, whose cooperation throughout the project is highly praised by both researchers. The secrecy, says Hughes, served both the company, by preventing what could have been long-lasting protectionist delays, and the scientists, by preserving the site. As soon as the age of the forest was made public, in fact, says Hughes, "one of the stumps disappeared overnight."

Hughes/NMU

Ancient spruce: Drowned by a glacier?

The wood in the Gribben Basin trees was "remarkably well preserved," says Merry, with only the bark and a fraction of an inch of the outer layer showing carbonization. The only comparable finds, according to Hughes, have been a glacial forest unearthed about 50 years ago at Two Creeks, Wis., showing the 11,850-year age, and a 6,000-year-old one discovered in Cochrane, Ontario, about 300 miles northeast of the Gribben site. □

An attractive way to deliver drugs

Often drugs kill or injure healthy, innocent cells in addition to their diseased targets and this limits their use. In the past, efforts have been directed at devising drugs tailor-made for the diseased cells, but this is not always possible and is usually expensive and time consuming. Two medical school students had a different idea. Why not guide the drug to what it is to destroy instead of giving it free reign in the body where it can play havoc? Why not manufacture minuscule, magnetic drug packets so that a magnet outside the body could direct the drug to its desired destination? That way the dose and subsequent unwanted toxicity of the drug could be reduced.

Andrew E. Senyei and Kenneth J. Widder took a year off from medical school and, working with Steven D. Reich, David F. Ranney and Dante G. Scarpelli of Northwestern University Medical School, did just that.

Senyei, presenting the group's findings at the annual meeting of the Federation of American Societies for Experimental Biology in Atlantic City this week, reported that by using magnetic microspheres, they have been able to concentrate in sections of rats' tails toxic amounts of adriamycin —a potent anti-cancer drug—using levels of the drug 100 times lower than those required when the drug is administered by conventional means. The packaged drug was able to exert its toxic effects on the skin of rats' tails, while drug concentrations in other major organs of the body were 20 to 60 times lower than when the drug was given in free form, Senyei said.

The technique is potentially useful for a variety of localized diseases, such as surgically inaccessible cancers or bacterial abscesses and for a variety of water-soluble drugs.

The microspheres that have been used in medicine for the last five or six years were too big for what the researchers wanted. They needed tiny microspheres that could travel through the capillaries without blocking them. A drug has its best shot at the deranged cell when it is in a capillary. The microspheres they fashioned using ultrasonic techniques are one micron in diameter, or about one-fifth the size of a red blood cell. Small amounts of the drug and magnetite, a nonirritating particle capable of responding to a magnet, are embedded in a matrix of albumin —a protein normally found in the body— that composes the bulk of the microsphere. The spheres can be engineered so that they contain as much drug as desired.

A magnet is held over the diseased site and the medicine-laden microspheres are injected into an artery upstream. (Microspheres are injected at a site close to the target so that they won't pass by the spleen or liver, which gobbles up and destroys foreign particles.) The circulating microspheres are attracted to the magnet and stop at the target site. Once there, the spheres adhere to the sides of the capillaries or migrate into the spaces between cells of the capillary walls, break down and release the drug locally, Widder said at a press conference.

Once the microspheres are localized, the magnet is no longer needed, Senyei told SCIENCE NEWS. In the rat tail experiments, the magnetic field required was very low and could be removed after 30 minutes. Twenty-four hours later, the microspheres were still in the same place releasing the drug. The amount of iron in the microspheres is lower than the levels normally ingested each day.

Senyei and Widder began their work with a very unsophisticated "dime-store" magnet. They said with more sophisticated magnets currently available drugs could be localized with this method quite specifically at less superficial sites in the body. □

Habits, fluoride aid heart?

Death rate in the United States has declined dramatically in the last five years. The drop is due almost entirely to a reduction in heart disease, says Peter Bourne, a special assistant to President Carter. Bourne credits focus on diet, exercise and early detection of hypertension.

Fluoridation of water supplies may be another factor, Donald R. Taves suggests in the March 23 NATURE. Taves, of the University of Rochester, compares heart disease rates between 1950 and 1970 in 20 fluoridated and 15 nonfluoridated cities. He finds a 2.5 percent greater decrease in all heart disease in fluoridated cities. Fluoride might inhibit calcification within blood vessels, and thus reduce heart disease caused by artery blockage. Taves says the fluoride-heart disease link is at this point only an intriguing possibility, but he proposes that it would be worthwhile to obtain additional epidemiological and laboratory data. □

Chinese accelerator physics

Particle physics has mostly been done in Western countries. East of Russia, Japan is the only country that has gone in for the building of accelerators in a significant way. Now the world's most populous nation has decided to join the group. The People's Republic of China has announced plans to build a proton accelerator with an energy between 30 billion and 50 billion electron-volts. China has established a cooperative relation with the West European laboratory, CERN, at Geneva. Last week a delegation from the Academia Sinica's Institute of High Energy Physics, including Ho Lung, Fang Shou-Hsien, Tsao Tsan and Han Tsien arrived at CERN to study problems of large accelerator construction. □