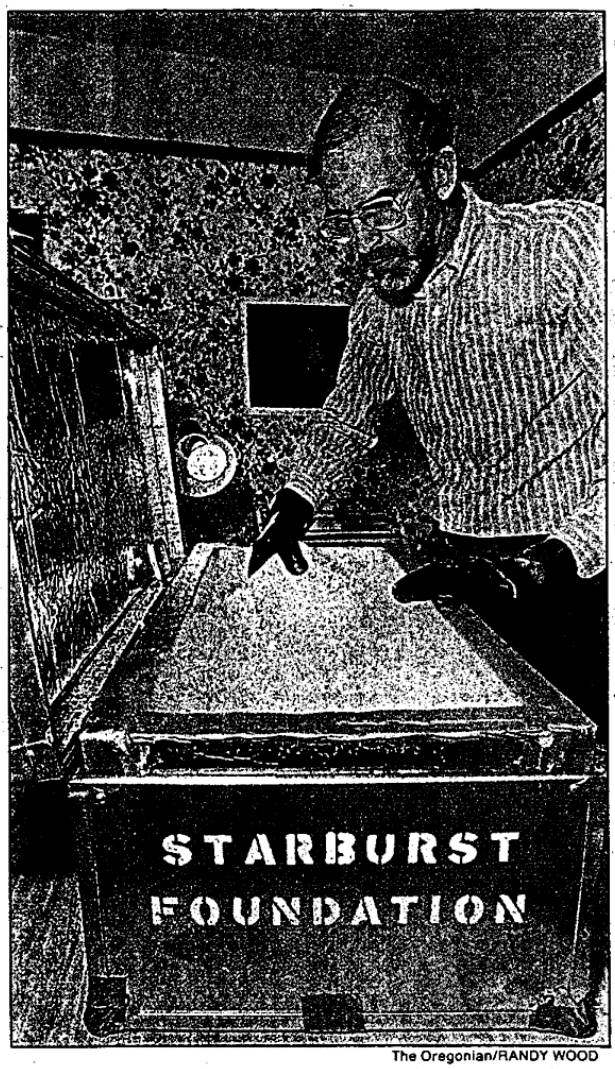

The Oregonian/RANDY WOOD

Paul LaViolette, who is picking up Antarctic ice-core samples in The Netherlands this week, carefully prepares a container in which he planned to transport the samples to Denver.

Scientist to test galaxy theory with Soviet ice

By RICHARD HILL
of The Oregonian staff

A Portland researcher outside the "mainstream" U.S. science community is scoring a coup this week in The Netherlands.

Paul A. LaViolette is in Rotterdam picking up 16 ice-core samples from Vostok, the Soviet Union's year-round base in Antarctica. He is the first American to receive Vostok ice samples directly from the Soviets.

The 40-year-old scientist hopes the samples will help in researching his theory about what he terms "superwaves" from the center of the galaxy and the impact he thinks they could have on Earth.

The Soviets, using a new thermal technique, obtained the core by drilling more than 7,200 feet — the deepest ever drilled into the Antarctic ice. Ice-core samples are especially valuable to scientists because air bubbles and particulates become trapped in the ice, allowing researchers to look at what atmospheric conditions existed in the past — in this case, more than 160,000 years ago through the last Ice Age that ended about 12,000 years ago.

LaViolette received a telegram May 20 requesting that he pick up the samples this week in Rotterdam from the Akademik Fedowov, a Soviet research vessel.

"I was very surprised when I found out that they were going to let me have the samples," said LaViolette, who managed to obtain approval for the ice transfer after writing the scientific attaché with the Soviet Embassy in Washington, D.C. Three previous letters to the Soviet institute in charge of the Antarctic base had gone unanswered, he said.

"It's absolutely amazing that he got these samples, a real coup," said Todd K. Hinkley, a geologist with the U.S. Geological Survey in Denver who plans to analyze the samples in his high-tech government laboratory.

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SCIENCE

Galaxy: LaViolette requests fellowship to study ice samples

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LaViolette is scheduled to turn the ice over Saturday to Hinkley, who will store the samples until final arrangements for the analysis can be worked out.

To study the ice-core samples, Hinkley hopes that LaViolette will be able to obtain a national research fellowship from the National Research Council through the USGS. "But it's highly competitive, and it's going to be tough. If he doesn't get the fellowship, then he's going to have to jump through some hoops to get this study financed."

Soviets stingy

Only one other American has ever received the Vostok core material, "and that was obtained through a third-country collaborator," Hinkley said, referring to Clare Patterson, a geochemist at the California Institute of Technology who received Vostok samples about three years ago through a French science agency.

"I can't emphasize enough the significance of what Paul has done," Hinkley added. "The Soviets have been very tight-fisted with their samples, and here they're turning them over to a rather unrecognized individual who is not connected with an established institution."

Hinkley speculated that LaViolette's superwave theory may have captured the attention of international researchers, including Soviet scientists, although the theory has not been given much credence by the U.S. scientific community.

From Earth to Milky Way

That theory, which LaViolette has been working on for nearly a decade, doesn't begin deep within the ice but about 22,000 light-years away in the center of the Milky Way, the galaxy in which Earth resides. (A light-year is the distance that light travels in one year, about 5.9 trillion miles.)

The main points of his "galactic superwave" theory include these:

- Eruptions that periodically take place in the galaxy's center throw out cosmic rays accompanied by electromagnetic radiation — such as gamma rays, X-rays, radio waves and light waves.
- The explosive outbursts last from several hundred to several thousand years and recur about every 5,000 to 15,000 years.
- Upon entering the solar system, the "superwaves" vaporize comets and push the resulting cosmic dust into the Earth's atmosphere, causing climatic changes. LaViolette proposes that the last Ice Age came abruptly to an end because the dust particles caused a "greenhouse effect," trapping the sun's heat close to the Earth's surface.
- Because the superwaves are traveling at the speed of light, they not only could alter the Earth's climate in the future, but they could create electromagnetic interference similar to the electromagnetic pulse generated by the aerial detonation of a nuclear weapon. The superwave signal possibly could be mistaken for a nuclear explosion, LaViolette says, and could lead to a nation launching missiles in the belief it was under attack.

Tracking superwaves

What LaViolette is looking for in the ice-core samples is evidence of past superwave episodes. That can be determined by analyzing the levels of beryllium 10, an isotope produced in the atmosphere by cosmic ray bombardment, he said.

LaViolette previously studied ice-core samples from Camp Century in northwest Greenland and filtrates from ice core samples taken from the Byrd Station in Antarctica while working on his dissertation about the theory at Portland State University.

In analyzing those samples, he found that greater concentrations of the metallic elements iridium and nickel corresponded with climatic changes during the last Ice Age. He contends that the particles most likely came from the vaporizing of comets rather than from terrestrial sources, such as volcanic eruptions.

He also rules out the possibility that the elements came from an asteroid or comet striking the Earth.

"The problem is that such events would not be expected to occur frequently enough to account for the observed" high levels of iridium, he stated in a paper published in the journal Meteoritics.

LaViolette received his doctorate in systems science from PSU in 1983 after working four years on his superwave theory. His résumé lists a bachelor's degree in physics from John Hopkins University and a master's degree in organizational administration from the University of Chicago.

In addition to the ice study, LaViolette is using the 27-antenna Very Large Array radio telescope in Socorro, N.M., to examine CTB 80, a radio-emitting supernova remnant in the Cygnus constellation. He hopes the data he obtains will provide additional evidence to support his theory that cosmic ray volleys travel through space from the Milky Way's center.

"At this point my goal is to present a little more evidence to convince the scientific community that indeed there are high levels of cosmic dust in the ice," the soft-spoken LaViolette said before leaving Portland last week.

"I'd like to see two or three other scientists take a look at my theory and do their own investigations."

Support slow-developing

Getting support for his theory has been difficult, however.

"The problem is that I'm a newcomer to this field, and it's very difficult to become established, especially when you're submitting an entirely new idea," LaViolette said.

In 1984, in an effort to raise money to support his research, LaViolette launched his Starburst Foundation. The foundation's aim, he said, is to serve as a vehicle "through which donors may support research on novel ideas that normally would have a difficult time being funded through most foundation or government channels."

SCIENCE

The Oregonian, Thursday, November 3, 1988 D

Theory waiting 'on ice'

Scientist in search of research funds

By RICHARD L. HILL
of The Oregonian staff

A Portland scientist's theory is on ice in Denver.

Paul A. LaViolette, who last summer became the first American to directly receive ice-core samples from the Soviet Union's Vostok station in Antarctica, now is seeking to analyze that ice in hopes that it will provide evidence to support his theory which involves "galactic superwaves" and climatic changes.

To thaw, however, requires cold cash.

Most U.S. scientists are familiar with the fund-raising process, perhaps the least glamorous aspect of scientific research. It can take several forms: Tedious grant-writing to compete for public funds, seeking ties with corporations interested in specific research, or searching for noble benefactors who enjoy scientific pursuit for itself rather than a big dividend.

For LaViolette, the funding quest is an especially difficult venture in that he is a self-described "maverick," out of the scientific mainstream where funding usually depends on peer review or belonging to an established research facility.

Five years ago, LaViolette began his non-profit "Starburst Foundation," which he says serves as a way for donors to contribute to research on "novel ideas" that would have a tough time being funded through most foundation or government channels.

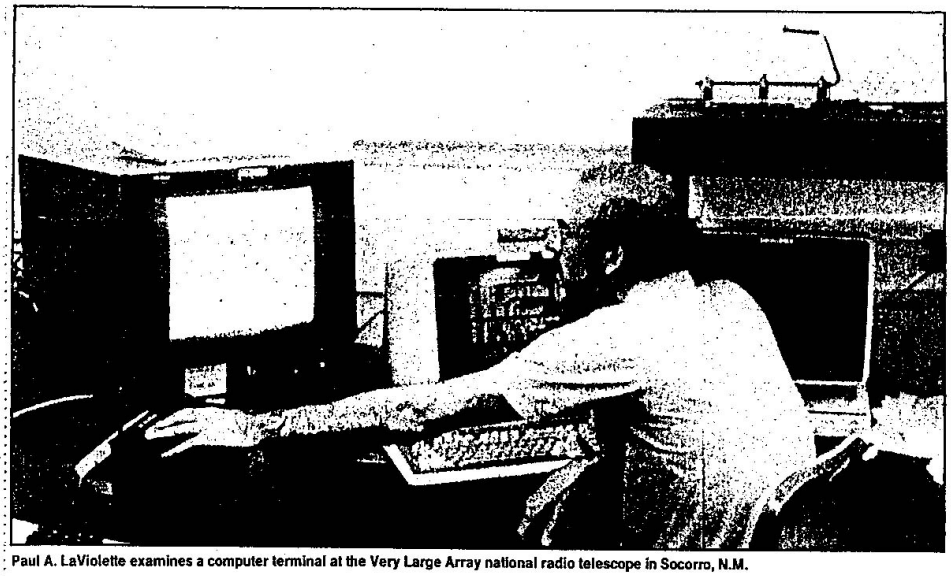
LaViolette says the traditional methods of funding work "against the maverick. One of the reasons Starburst was set up was to avoid the peer-review process which can sort of be an old-boy's club."

"If reviewers happen to know you and you're part of their group then you stand a much better chance of getting your proposal funded. We're trying to get around those restrictions."

Gathering evidence to support his "superwave" theory is a complex proposition, requiring examining the far reaches of space as well as the deep confines of polar ice. This summer he traveled to Amsterdam to get the Soviet ice and to Socorro, N.M., to use the Very Large Array national radio telescope in examining a distant supernova remnant.

The 40-year-old researcher has met with some success in raising funds. His ice-retrieval trip to Amsterdam was funded by a donation from the Ruth and Vernon Taylor Foundation in Denver and his radio telescope research was aided by a grant from the Sunflower Foundation in New York City.

His theory involves what he calls "galactic superwaves," intense volleys of cosmic rays that are periodically emitted from the center of the Milky Way — which is believed to be a black hole — and travel outward at close to the speed of light. Such eruptions last from several hundred to several thousand years and recur about every 5,000 to 15,000 years, according to his theory.



Paul A. LaViolette examines a computer terminal at the Very Large Array national radio telescope in Socorro, N.M.

Theory: Greenhouse effect ends Ice Age

■Continued from Page D1

LaViolette theorizes that upon entering the solar system, the superwaves vaporize comets and push the resulting cosmic dust into the Earth's atmosphere, causing climatic changes. He proposes that the last Ice Age abruptly ended because the dust particles created a "greenhouse effect," trapping the sun's heat close to the Earth's surface.

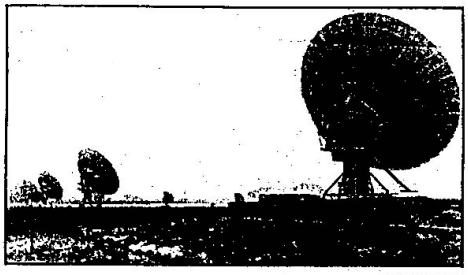
In addition to climatic changes, LaViolette proposes that the waves could cause electromagnetic interference with communication systems. He said the superwave signal could, in a worst-case scenario, be mistaken for a nuclear explosion and possibly lead to a nation launching missiles in the belief it was being attacked.

In the ice-core samples, he hopes to determine how peaks in cosmic dust concentration correlate with cosmic ray intensity, which would be indicated by amount of beryllium 10, an isotope produced in the atmosphere by cosmic ray bombardment.

"It would be quite a thorough study," LaViolette said. "We'd be looking at 30 different elements using two different techniques: nuclear activation analysis and isotope mass spectrometry."

Such analysis "definitely has value beyond my theory," he added. "If the interplanetary dust concentration has changed in the past, that's a major factor that has to be taken into account in our astronomy texts because it means the earth and solar system are somehow affected by some kind of astronomical event."

LaViolette, who received his doctorate in systems science from Portland State University in 1983, picked up the Vostok ice in Amsterdam from the Soviet research vessel Akademik Fedorov in June. He obtained approval for the ice transfer after writing the scientific attaché with the Soviet Embassy in Washington, D.C.



Los Angeles Times

These dishes, each 82 feet in diameter, are strung across an ancient New Mexico lakebed as part of the world's most powerful radio telescope. Twenty-seven dishes are linked together, forming a single antenna 21 miles in diameter. Portland scientist Paul A. LaViolette used the telescope to study the supernova remnant CTB 80.

The ice samples came in 17 cylindrical pieces, each about 12 centimeters wide and from 5 to 15 centimeters long, he said. The samples were placed in special containers and taken to Denver, where they were placed in a commercial freezer.

Todd K. Hinkley, a geologist with the U.S. Geological Survey in Denver, said he would like to analyze the samples in his high-tech laboratory if funding can be found.

"It would cost about $75,000 to $82,000 to do the research," and would take about a year, LaViolette said.

The Soviets obtained the ice-core samples by drilling about 7,200 feet below the surface — the deepest ever drilled into the Antarctic ice. Ice samples are valuable to scientists because air bubbles and particulates become trapped in the ice, allowing researchers to examine atmospheric conditions that existed thousands of years ago.

According to the journal Nature, the Soviets perfected a thermal technique at Vostok whereby the base of the cylindrical sampler is electrically heated, penetrating the ice as it melts without damaging the sample.

LaViolette previously studied ice-core samples from Greenland and filtrates from ice-core samples from the Byrd Station in Antarctica. In analyzing those samples, he found that greater concentrations of iridium and nickel corresponded with climatic changes during the last Ice Age.

He rules out that the elements may have come from comets or asteroids colliding with Earth. In a paper published in the journal Meteoritics, he stated that such events "would not be expected to occur frequently enough to account for the observed" high levels of iridium.

In late August, LaViolette spent five hours using the radio telescope in New Mexico to study the radio-emitting CTB 80, a supernova remnant. He hoped that studying the remnant would provide additional evidence to support the theory that cosmic ray volleys originating at the galactic center travel through the galaxy.

He didn't find a bow shock front, shaped like a bow around the radio source, that he was hoping to detect, but he did find that the radio source was "oriented perpendicular to the direction that superwaves would be propagating."

"I think that polarization would justify further investigation, but we don't have the money to do it."

The Portland scientist has received national attention by being mentioned in a recently published book, "Fire in the Crucible: The Alchemy of Creative Genius" by John Briggs. LaViolette is mentioned for developing a model to describe how the brain processes the complexity of emotional theme.

"I haven't given up hope (of finding a funding source)," said LaViolette, who has been slowly gathering evidence for his superwave theory the past 10 years. "I think the ice analysis will provide valuable information about what happened on our planet thousands of years ago."