-The Oregonian -

METRO NEWS, D3,6 COMICS, D4,5 **OBITUARY, D6**

SCIENCE

NOTEBOOK

Hot spots ring Venus

enus may be venting interior heat through giant hot spots called coronae, a form of volcanism.

Ellen Stofan, a geologist with the Magellan spacecraft project, which is mapping the planet with radar, said the coronae may be where hot material is rising from the planet's interior.

Coronae are circular or oval features as much as a mile or more high surrounded by a ring of ridges and troughs. They range in size from about 100 miles to more than 600 miles in diameter.

Stofan said coronae are among several types of circular features associated with volcanism on Venus, including large volcanoes and spider-web shaped features called arachnoids. Arachnoids are surrounded by complex fractures and may form by volcanism in an area where the surface is pulling apart or extending.

"Coronae, arachnoids and volcanoes are ways in which Venus transfers heat from its interior out to the surface," Stofan said. "On Earth, this loss or transfer of heat is dominated by plate tectonics," she said.

Diaper dilemma

Yet another study resulting from the cloth vs. disposable baby-diaper controversy chalks one up for the disposable advocates.

A study published in this week's Journal of the American Medical Association shows that putting infants and toddlers at day-care centers in paper diapers and clothes limits fecal contamination.

Rooms in which children wore clothes over their diapers had significantly fewer contaminated objects, such as toys, than rooms in which overclothing was not worn, according to Dr. Rory Van and his colleagues at the University of Texas Health Science Center in Houston

Scientists ponder big quake

□ Seismic information gathered in Olympic National Park points to the possibility of a catastrophic shake-up

By RICHARD L. HILL of The Oregonian staff

cientists have come up with another piece of evidence that supports the theory that a catastrophic earthquake could rock the entire Northwest.

A study conducted at Olympic National Park shows that the northwest Washington coastline is being

forced upward and the Olympic found the distance between some Mountains are being squeezed together. Researchers say the deformation apparently is caused by the underlying tectonic plates locking together offshore and squeezing the Earth's crust as they try to slide past each other.

James Savage and Michael Lisowski, geophysicists with the U.S. Geological Survey in Menlo Park, Calif., took extremely precise measurements with a geodolite -alaser distance-measuring instrument — between a network of markers atop eight park mountaintops between 1982 and 1990. The survey covered an area about $12\frac{1}{2}$ by $18\frac{1}{2}$ miles.

Over the eight-year period, they

markers had shortened about $2\frac{1}{2}$ centimeters — about 1 inch.

"We believe that's a significant amount of movement," Lisowski said. "It's just one more piece of the puzzle involving the possibility of a subduction-zone earthquake."

The researchers reported their findings in the April 5 issue of the journal Science.

Savage and Lisowski believe the cause of the deformation involves the Cascadia Subduction Zone, an area off the Northwest coast where the North American Plate is grinding over the Juan de Fuca Plate.

The pattern of compression between the markers was in a northeast-southwest direction - the direction of strain that would be duction-zone earthquakes. expected if the northeastward-moving Juan de Fuca Plate is locking up as it plunges beneath the North American Plate.

The lighter, hotter Juan de Fuca Plate originates in the Pacific and subducts beneath the North American Plate offshore in a 750-mile line from southern British Columbia to Northern California. Scientists say if the two plates are locking up as they jerk past each other, tremendous pressure would be created that could only be released through a massive earthquake measuring





Oregon State University projects on three creeks show promise of enhancing damaged streams By JOSH KAHAN

ome of the world's most beautiful rivers and streams are in Oregon. Unfortunately, many of the waterways are in a degraded condition. Rivers in the Willamette Valley

have been straightened and diverted and typically lack adequate shade for fish. Rivers in Western Oregon forests commonly lack instream large woody debris, which slows the erosive force of water and provides habitat for fish and wildlife. Streams in Eastern Ore-







In addition to the Olympic Park work, Savage and Lisowski examined data collected between 1940 and 1975 from four tide gauges from Astoria to Seattle and found that the coastline is rising a few millimeters a year. They found that Astoria is rising about 3.8 millimeters a year about .15 inch.

"There are other possible explanations for the deformation in the region," Lisowski said, "but we feel that the best explanation is to have a subduction zone locked somewhere offshore that will eventually rupture

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Large logs were reintroduced to **Quartz Creek in** the Willamette **National Forest in** a study designed to benefit aquatic plants and animals and to stabilize riverbanks.

Hau Significantly rewer contain inated objects, such as toys, than rooms in which overclothing was not worn, according to Dr. Rory Van and his colleagues at the University of **Texas Health Science Center in** Houston.

In addition, use of paper diapers with increased absorbency 'resulted in significantly less fecal contamination in the environment in rooms where overclothes were not worn," they write.

Taking the cure

Don't automatically reach for an over-the-counter pain reliever when combating the aches and sniffles of a cold, says a cold expert at the University of Washington.

Dr. Hjordis Foy, UW professor of epidemiology, said that a study published recently in the Journal of Infectious Diseases supports earlier doubts about non-prescription pain medications when it found that aspirin and acetaminophen (Tylenol's ingredient) caused more problems than they cured for cold sufferers.

The main conclusion is that a cold sufferer can infect others with the cold virus a little longer by taking the pain medications, Foy said. But subjects taking the drugs also suffered slightly more nasal obstruction than those who weren't. The study also showed that aspirin and acetaminopohen mildly suppress the body's ability to fight off invading cold viruses.

Foy said the best course of action when faced with a cold is to drink plenty of warm fluids to dissolve phlegm and suppress a cough, while taking it easy to let your body concentrate on killing off the virus.

Early jump counts

Forest firefighters may be getting some fast fire information in the future, as field tests have begun in Southern California on an airborne system to map wildland fires.

Called Firefly, the system charts fires using an infrared sensor flown on an airplane and transmits highly detailed digital maps to firefighter camps on the ground within minutes. The system is sensitive enough to spot a hibachisized fire from an altitude of 10,000 feet, and is able to distinguish fire hot spots and other zones of changing fire intensity.

The Firefly system is being created by NASA's Jet Propulsion Laboratory for the U.S. Forest Service.

- From staff and wire reports

ed and typically lack adequate shade for fish. Rivers in Western Oregon forests commonly lack instream large woody debris, which slows the erosive force of water and provides habitat for fish and wildlife. Streams in Eastern Oregon rangelands are shallower and warmer than they used to be, and stream banks are often denuded of vegetation.

However, several research projects by Oregon State University are designed to examine ways of restoring rivers and streams in Oregon. These projects are taking place on Oak Creek in the Willamette Valley, Quartz Creek in the Cascades and Bear Creek in Eastern Oregon's rangeland. Although the projects only recently have been initiated, they already are demonstrating the potential to greatly enhance degraded streams and riparian zones, defined by biologists as the area of land bordering creeks, rivers and lakes.

OAK CREEK

Before settlers came to the Willamette Valley, Oak Creek near Corvallis flowed through a forest of white alder, ash and oak. Today, much of Oak Creek is surrounded by agricultural fields and pastures. Excess amounts of soil and nitrogen flow into the creek because of the presence of livestock and the application of fertilizer. This form of pollution is difficult to regulate.

In the spring of 1989, almost 1,400 cottonwood cuttings were planted along Oak Creek to see if the trees could take up some of the excess nitrogen. A year later, alder seedlings were placed adjacent to the creek near the cottonwood cuttings. This project was initiated by Bill Emmingham and Dave Hibbs of OSU's Forest Science Department, Jim Sedell of the U.S. Forest Service Research Sta-

Josh Kahan is district manager for the Cowlitz County Conservation District in Kelso, Wash.



PAUL E. BRAGDON Promotes biomedical research



Water troughs placed in a meadow adjacent to Bear Creek on the McCormack Ranch in Crook County help keep cattle away from the creek.

economic disadvantage of taking

agricultural land out of commis-

sion, the researchers say. Also, the

trees can provide income if and

Although this project is in its

infancy, it may be duplicated in

other parts of Oregon. State offi-

cials have already expressed

interest in establishing similar

projects near Coos Bay and Tilla-

mook. The Soil Conservation Serv-

ice is cooperating by finding

"There hasn't been much

interest in restoring agricultural

rivers and streams in the past,"

Hibbs said. "We hope the results

of this experiment will spur other

riparian rehabilitation projects

Although streams in forest

zones are regulated under the Ore-

gon Forest Practices Act, there is

no comparable law regulating

agricultural stream use in the

when they are harvested.

appropriate project sites.

throughout Oregon.'

tion, and Stan Gregory of OSU's of such projects may exceed Fish and Wildlife Department.

"Both the alder and cottonwood grow quickly and can extract a lot of nitrogen from the ground water. thus preventing it from reaching the streams," Hibbs said. "The cottonwood can grow as fast as 10 feet per year and can reach commercial size in seven years."

Besides taking excess nitrogen from the ground and being commercially valuable, these trees can eventually provide shade and large woody debris to the stream. "Shade keeps the stream cool, which is important for fish habitat," Hibbs said. "Also, the woody debris can reduce the velocity of the stream, creating ripples and pools for fish.

Streamside trees can also stabilize the banks and slow overland flow of water into the stream. "The trees provide cover and habitat for wildlife and may prevent cattle from going into the streams," Hibbs added.

The fact that trees can take away some crop and pasture land may make some farmers skeptical. However, the ecologic advantage



Educator to lead research foundation

Please turn to

RIVERS, Page D2

□ The former longtime president of Reed College will begin his new job immediately

By OZ HOPKINS KOGLIN

of The Oregonian staff

aul E. Bragdon, former president of D Reed College and more recently assistant for education under Gov. Neil Goldschmidt, has been appointed president of the Medical Research Foundation of Oregon. The foundation's board of directors confirmed Bragdon's appointment on Wednesday.

The prominent educator and policy consultant will begin his new job immediately. The post was vacated last June by the death of Forest W. Amsden, who was executive vice president for eight years. The Medical Research Foundation, a non-

profit, private organization, was founded in 1942 to advance medical research in the state. Today it provides seed money grants for research to all Oregon institutions doing medical research. The foundation also owns and operates the Oregon Regional Primate Research Center, one of seven such centers in the United States.

In accepting the new post, Bragdon said medical research is a key to confronting social and medical problems.

"In the tough independent world economy. few things rank higher on the competitive scale than improving the general health of the population while containing the cost of medical care," Bragdon said.

'Stronger support for biomedical research and for scientists - particularly young professionals entering the field — is essential to the solution of these societal problems. Even in

> Please turn to **BRAGDON**, Page D2

SCIENCE

Eastern Oregon rumblings form into seismic pattern

By ELLEN MORRIS BISHOP

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large magnitude earthquake, we now know, is likely to strike Western Oregon in the future. Locked subduction zones, rising coasts, sunken marshes and sea-bed sand all give the same view in our geologic crystal hall

Eastern Oregon seems more serene. But it's not. The dangerous seismicity east of the Cascades has become apparent as a pattern, part of the Earth's vital and unstoppable workings: Milton-Freewater, 1936, magnitude 6.2, three houses damaged or destroyed; Umatilla, 1952, magnitude 5.9.; Richland, 1913, magnitude 5.2.

In the Warner Valley, north of Adel, near Plush, 122 earthquakes struck between May 24 and June 24 in 1968. Four of these quakes, magnitudes 5.1, 5.0, 4.7 and 4.1, occurred on one day, June 3.

Eastern Oregon's earthquakes are driven by different stresses than the subduction-zone-related compression of the west. Here, under expansive skies, it is the stretching Earth that quivers.

One major fault zone is responsi-

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TIME TRAVEL

ble for much of Eastern Oregon's seismicity. Known as the "Olympic-Wallowa Lineament," this zone of faults extends from the northwestern boundary of the Snake River Plain, near Cambridge, Idaho, across northeastern Oregon from Richland and Halfway, through the Grande Ronde Valley, to Milton-Freewater. It is defined by some spectacular escarpments, including the eastern side of the Grande Ronde valley where Mount Harris and Mount Fanny rise 3,000 feet above wheat and grass fields. From the faults at their base, hot water seeps into the Cove swimming pool.

The lineament is a complex fault zone that allows the northeastern corner of Oregon to remain relatively stable as the area from Vale to Pendleton moves toward the northwest. Technically, it is known as a "right lateral fault duplex." Nontechnically, it is rather like trying to split a log by beating on one side of its end with a sledgehammer.

Many of Eastern Oregon's most storied and scenic valleys owe their presence to the fault zone. Baker Valley has been torn asunder by extensional faulting that raises Elkhorn Ridge on one side and the Eagles, or southwest Wallowas, on the other. Pine Valley and the valley at Halfway are also "pull-apart ba-



Mount Emily, uplifted 3,000 feet along the Mount Emily fault, rises on the west side of the Grande Ronde Valley near La Grande.

sins," part of the same system of crustal extension.

Although a few historic earthquakes were recognized, until opposite end of the fault zone, recently we thought Eastern Oregon to be seismically safe. We are discovering that it is quite the opposite, at least along Oregon's northern and southern-most parts of the lineament

In the late 1970s, earthquakes of magnitude 3.0 to 4.2 shook the area around Milton-Freewater. On the quakes of 4.8, 3.8, 3.6 and 3.4 rattled western Idaho in the late 1970s and early 1980s and have occurred within 5 miles of Brownlee Dam on the Snake River

Research by Kevin Pogue of Whit-

man College has revealed major offsets along the Milton-Freewater segment of the fault zone that must have occurred since the end of the Pleistocene about 10,000 years ago. Ice-age silts are faulted against 15 million-year-old Columbia River basalt. Thus, the lineament along Oregon's northern border has seen major movement during the last 10.000 years. The 1936 earthquake was not a fluke or an oddity but the hallmark of an active fault.

Elsewhere in Oregon's eastern scenic quietude, it is not so quiet, either. In Maupin, for example, north of Madras, north of Warm Springs, a cluster of earthquakes shook the ground in 1976. Named the "Deschutes Valley swarm" by Oregon State University's Richard Couch for their epicenter near the Deschutes River, the largest temblor was magnitude 4.6. But the earth still trembles. In August 1987 another, less intense swarm of earthquakes occurred near the epicenter of the 1976 swarm, according to data from the University of Washington and Tom Yelin of the U.S. Geological Survey. The largest tremor measued only 2.6, but it was felt by people in the area.

This seismicity is related to compression, to the pushing and rotation of Oregon northward. Similar forces have wrinkled the crust of southern and central Washington, and the basalts of the Columbia Pla-



teau, for probably 15 million years They are not likely to stop now. Nor are earthquakes along the fault near Maupin.

Southward, near Adel and Plush, the Warner Valley earthquake swarm was the result of crustal extension, of the basin and range being pulled and rotated westward. This, too, has continued for 15 million years, and is apt to continue.

Silvio Pezzopane of the University of Oregon has noted fault scarps 14 feet high in Surprise Valley of northernmost California, and old scarps 4 to 6 feet in height along Summer Lake and Abert Rim. These features suggest major earthquakes in southeast Oregon within the last 10,000 years, and very likely more recently. His measurements of uplifted and tilted Pleistocene shorelines around the old Pleistocene lake show deformation occurring at the rate of about 1 inch every 25 years.

So Eastern Oregonians should not rest easily either. They should, instead, insist upon more stringent building codes, especially for new public and commercial buildings. They should look for faults in their planning before they build, and take potentially devasting earthquakes into consideration in their personal lives. The hazard is not so great that we should live under the doorframe forever. But we should know where the doorframe is and how to use it.

Bragdon: Educator long encouraged science work

Continued from Page D1 times of fiscal stringency, Oregon must not slip behind," he said.

Oregon must sustain and improve its strong foothold in biomedical research and in committed human resources if the state is to "shine even brighter in the 1990s and into the new century," he said. "Building on its impressive ac-

complishments, MRF now has the challenge and the opportunity of doing much more in the future; indeed, MRF can and must take a greater leadership role in helping to realize the medical and research goals that are of such great importance to our state and to our country," he said.

Bragdon served the longest tenure ever - 17 years from 1971 to 1988. as president of Reed, a private liberal-arts college in Southeast Portand He is credited with strengt



Researchers look over logs to be placed in Quartz Creek as part of a stream-rehabilitation study.

Rivers: Large logs placed in Quartz Creek

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QUARTZ CREEK

In the early 1970s, a stand of timber was clear-cut along both sides of Quartz Creek, a tributary of the McKenzie River. The clear-cut went down to the banks of the stream. After the harvesting operation, large in-stream logs were removed from the river, possibly for the purpose of improving fish habitat. Large floods may have also removed some of the

The loss of this large woody debris from the river system actually deteriorated the fish habitat. Instream logs slow the river current, allowing spawning pools to form. The logs also can trap sediment that clog spawning grounds. Logs also are important because they trap leaves that insects feed on. The insects in turn, provide food for the

It would, however, take more than 150 years for the stand of regenerated trees to deliver an adequate number of large logs to the streambed. In the meantime, fish populations in this section of the river would decline.

In 1988, large logs were brought in and re-introduced to the stream along a two-thirds mile stretch of the river. The logs, measuring 100 feet in length and 2 to 3 feet in diameter, were strategically placed in the river using a hydraulic excavator. The project was sponsored by OSU and the Forest Service.

"Trout populations were 20 percent greater during the first summer after the logs were placed, although it is too early to attribute that change to the addition of logs," said Stan Gregory of OSU's Department of Fish and Wildlife. "We carefully designed the log accumulations to behave naturally, and none has washed out during recent winter experimental analysis indicates the

floods."

Along with Gregory, project participants include Randy Wildman. OSU fisheries biologist; Fred Swanson and Gordon Grant from the Pacific Northwest Forest Research Station: and Bob Beschta from OSU's Forest Engineering Department.

Large in-stream logs can also improve the habitat for other aquatic species. "The logs slow the flow of winter flood water," Gregory said. "This provides refuge along the edges and in debris dams for aquatic species such as fish, insects and invertebrates that would otherwise be carried downstream during a flood."

Besides directly benefiting aquatic plants and animals, in-stream logs also stabilize riverbanks, reducing the potential of erosion. They also reduce the erosive force of the water, which can undercut the banks or downcut the channel.

The logs were placed in-stream according to a "natural blueprint" of an old-growth forest river system. "It's important to understand how a natural river system affects the channel morphology and the amount of in-stream woody debris present," Gregory said. "Previous land-management policy advocated keeping streams clear of woody debris. Looking at pristine conditions, we now realize that a river with plenty of downed woody debris is more stable biologically.'

According to Gregory, before riparian restoration projects are implemented, the original cause of degradation must be determined and alleviated. Also, a complete analysis of the stream ecosystem should take place to determine what restoration procedures would be most effective.

A long-term evaluation of the biologic, structural and hydrologic processes taking place in this portion of the McKenzie is under way. Early

biological response may be positive. According to Gregory, this

research will improve forest management along streams and rivers. "It's important to leave a lot of standing trees in riparian forests to provide shade and downed woody material to the stream into the future," Gregory said. "Recognition of the ecological importance of riparian areas has increased tremendously in the last decade, and land management practices have also improved."

BEAR CREEK

Because of the arid conditions in Eastern Oregon, riparian zones are highly desirable grazing sites for cattle. However, because of improperly managed rangelands, livestock overgrazing has severely affected many rangeland riparian ecosystems

Bear Creek in Crook County is no exception. Historically, vegetation adjacent to the creek has been denuded and banks have eroded, which has severely affected fish and wildlife habitat.

The McCormack ranch borders Bear Creek. Livestock on this ranch spend much less time drinking from the creek than they used to.

In a winter hay-feeding study, a water trough was built on a meadow adjacent to Bear Creek to encourage cattle to drink from a source away from the riparian area. The study was sponsored by OSU and the Governor's Enhancment Board.

John Buckhouse from OSU's Rangeland Resources Department and Jim Moore and Ron Miner from OSU's Agricultural Engineering Department helped design the water system. Rancher Bill McCormack supplied the cattle and land for the study.

"The cattle spent 90 percent less time in the creek after the water

"We carefully designed the log accumulations to behave naturally, and none has washed out during recent winter floods."

- Stan Gregory, **OSU** Department of Fish and Wildlife

troughs were built." Buckhouse said. "The only time they would spend in-stream would be to cross

Buckhouse speculates that cattle prefer to drink from the troughs because it's physically less demanding than drinking from a creek. 'They also seem to drink more water from the troughs," Buckhouse said

The fact that cattle drink more water may have a positive physiologic effect on the livestock. "The ability of livestock to process forage seems to improve with greater water intake," Buckhouse said. "Cattle with access to the trough apparently didn't lose as much flesh during the winter feed period as cattle that depend on the stream for water.

Keeping cattle out of rivers and streams is beneficial to the environment, he said. Cattle can trample stream banks, defoliate vegetation and defecate in the water. "The more time a cow spends in a riparian zone, the greater the potential of bacterial concentration in the stream," Buckhouse said.

Buckhouse believes the study was important for two reasons. "Not only can the condition of riparian ecosystems improve with proper water management, but ranchers can benefit by better maintaining the weight gains of their cattle," he said

According to Buckhouse, more ranchers are becoming interested in improving riparian zones. "Previous studies have shown that as range riparian areas improve, so does fish and wildlife habitat," he said. "The seasonal availability of water also increases." These factors, coupled with the potential to better maintain livestock weight throughout the winter months, may make riparian restoration more appealing in the future.

According to these OSU researchers, the success of riparian restoration does not justify poor land-management practices. The prevention of river and stream degradation must be given higher priority.

The researchers also emphasize that merely restoring the immediate vicinity of the riparian zone will not result in long-term improvement. Upland areas occupy a vast majority of the watershed, and events that occur in the uplands such as overgrazing, improper timber-harvesting methods and poor road construction will subsequently affect low-lying rivers and streams.

The scientists say that long-term watershed management is the best way to ensure that riparian zones are enhanced and remain in a stable condition. They stress that this will require cooperation among foresters and farmers, city dwellers and rural communities as water issues become more pronounced in Oregon and the rest of the West.

tance to our state and to our country," he said.

Bragdon served the longest tenure ever — 17 years from 1971 to 1988. - as president of Reed, a private liberal-arts college in Southeast Portland. He is credited with strengthening the school's financial support and endowment, improving the quality of student life and working for faculty development. While at Reed, he was named by his peers as one of the 100 most effective college and university presidents in the United States.

He was Goldschmidt's assistant for education from 1988 to 1990.

At the national level, Bragdon has held leadership roles in such organizations as the American Council on Education, the Council for Financial Aid to Education and the National Association of Independent Colleges. He also was one of seven presidents of small liberal-arts colleges who created a coalition - known as the Oberlin Group — that made the case for the role of such colleges in producing graduates who go on to careers in science.

Before his assignment at Reed, Bragdon was a vice president at New York University, where he was involved in successful efforts to obtain direct public financial support for non-public institutions. While at Reed, he held a number of part-time, unpaid positions in public service, including membership on the Oregon Environmental Quality Commission, chairman of Gov. Tom McCall's Select Committee on Conflict of Interest Legislation, and chairman of the Governor's Council of Economic Advisors.

Bragdon, 63, was born in Portland, Maine. He is a graduate of Amherst College and Yale Law School.

Chemistry professor to address banquet

eraldine Richmond, associate professor of chemistry at the University of Oregon, will be the guest lecturer this week at the annual Women in Science, Math & Technology banquet.

The banquet, sponsored by Saturday Academy, will be held from 6-9 p.m. Friday in Merlo Hall of the World Forestry Center.

Richmond, who has been active in encouraging young women to pursue careers in science, is a recipient of the Presidential Young Investigator Award and a Alfred P. Sloan Research Fellowship.

The banquet will pay tribute to Dr. Antonia C. Novello, appointed last year as the nation's first woman surgeon general.

More than 280 girls from high schools in the Portland area and from the seven Saturday Academy centers around Oregon have been invited to the banquet.

More information may be obtained by calling Gail Whitney, Saturday Academy director, at 690-1190