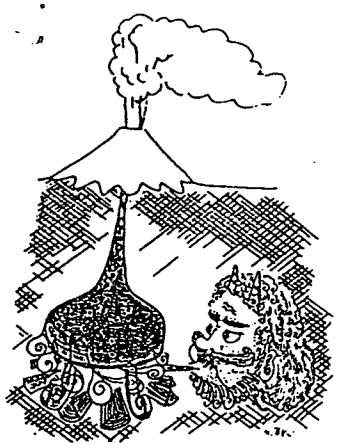


ASH FALL

Newsletter of the Volcanology Division
Geological Association of Canada

ASH FALL #27 JANUARY 1991

LEOPOLD GELINAS AWARD 1991

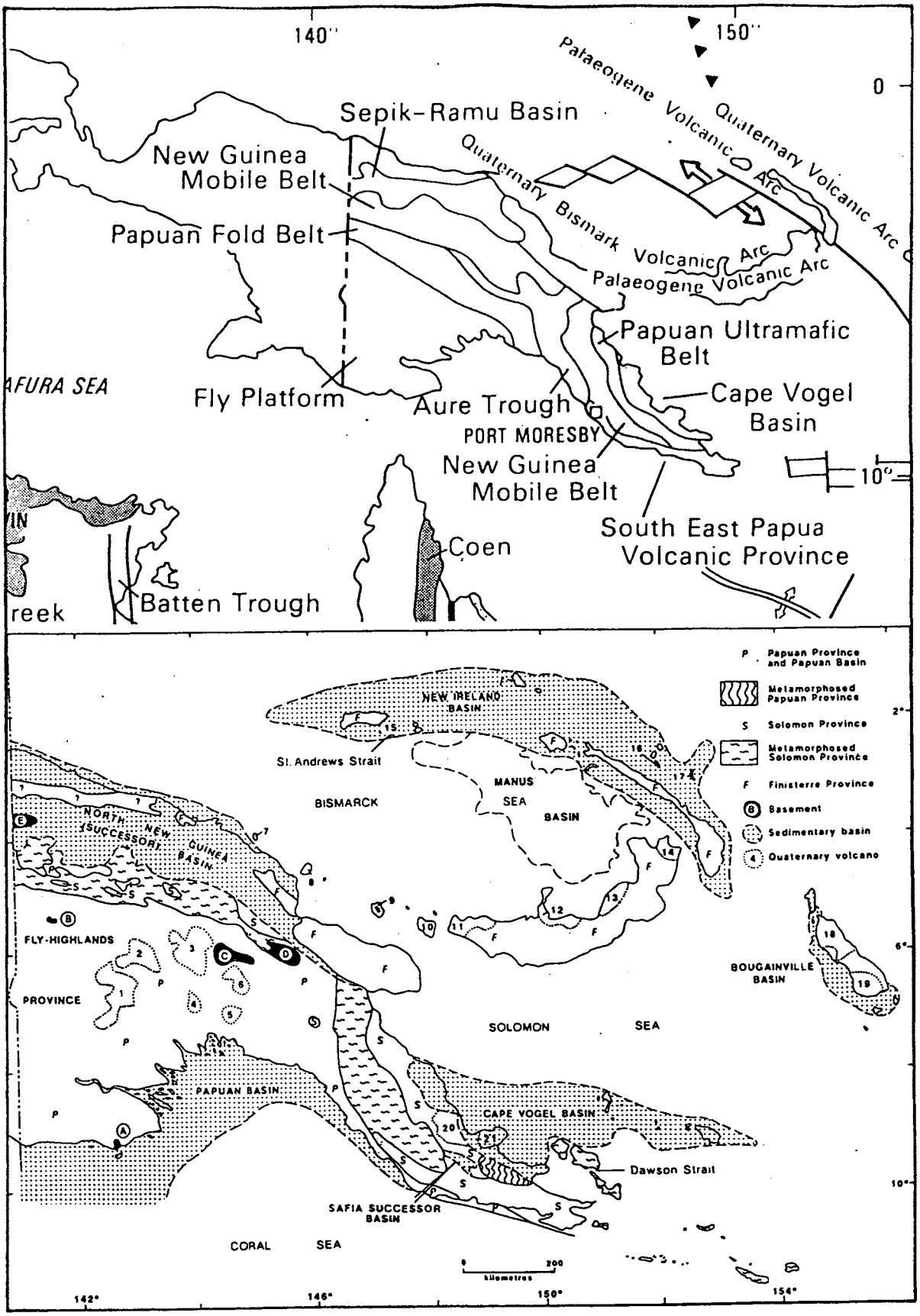
"The Leopold Gelinas Award for 1991 will be for the most outstanding M.Sc. thesis, written by a Canadian or submitted to a Canadian University, that was defended during 1989 or 1990 and which has a content that is at least 50% volcanology or volcanology-related. The winner of the award will receive $250. Nominations will be evaluated on the basis of originality, validity of concepts, organization and presentation of the data, understanding of volcanology and depth of research". One copy of any thesis nominated should be sent before February 28, 1991 to:

Dr. L.C. Coleman, Chairman
Volcanology Division of GAC
c/o Department of Geological Sciences
University of Saskatchewan
Saskatoon, Saskatchewan
S7N 0W0

Greece Tour 1992

The Volcanology Division of GAC has had to cancel its proposed fieldtrip to the Greek Islands for 1991, because of problems with getting notices published in Geolog, and the trip will now be affiliated with GAC Wolfville '92.

The proposed dates for the fieldtrip are May 9-24, 1992. Its leaders will be Dr. Karen Stamatelopoulou-Seymour and Dr. E.W. Grove. The itinerary includes classic volcanic localities and some recently described back-arc sections on the islands of Aegina, Milos, Thera (Santorini), Kos, Nisyros and Lesbos. Estimated cost, on the basis of 1990 prices, is $3,500. The fieldtrip is open to 36 geologists and accompanying members, with preference being given to members of the Volcanology Division. Deadline for initial subscription (deposit ca. $300-$400) will be Dec. 15, 1991.



VOLCANIC BELTS – PAPUA NEW GUINEA

Present approximate position of Papuan, Solomon and Finisterre stratotectonic provinces. The Papuan Basin is the largest part of the Papuan Province, which extends offshore. Other sedimentary basins are also shown. Basement blocks: A=Agaramuba inlier; B=Strickland granite; C=Kubor slab; D=Goroka slab; E=Emanab block. Pliocene-Quaternary volcanoes: 1. Bosavi; 2. Sisa, Doma Peaks, Kerewa; 3. Giluwe, Ialibu, Hagen; 4. Murray; 5. Duau; 6. Karimui, Crater; 7. Manam; 8. Karkar; 9. Long Island; 10. Umboi; 11. Langila, Andewa, Schrader; 12. Talasea, Dakataua, Pago; 13. Ulawun, Bamus, Hargy; 14. Rabaul; 15. Tuluman-St Andrew Strait; 16. Tabar; 17. Lihir; 18. Balbi, Bagana; 19. Loloru; 20. Lamington-Managalese Plateau; 21. Victory, Trafalgar.

Underwater volcanoes clue to abrupt climate change?

By Charles Seabrook
Cox News Service

A 16-KILOMETRE line of newly erupted volcanoes has been found deep in the Pacific Ocean off the Oregon coast — and may provide clues to mysterious warmings of the ocean and abrupt changes in climate.

Scientists said the submerged volcanoes are 2.4 kilometres deep on the Pacific floor, about 300 nautical miles off the coast. All of the eruptions have cones of fresh lava, and some are more than 30 metres high and almost a kilometre wide.

The volcanoes were discovered in August during deep-diving research in a small valley of a submerged mountain chain known as the mid-ocean ridge, where scientists have long suspected that the sea floor is spreading and forming new ocean floor. There were no signs of the volcanoes when scientists made similar dives in 1981.

Scientists believe the eruptions are directly related to "megaplumes" — mysterious, gigantic underwater geysers of hot, black mineral-rich water discovered in the area in 1986.

"If we can understand the volcanoes, then we can understand the megaplumes," said Dr. Robert Embley, one of the scientists who discovered the volcanoes. "And if we can understand megaplumes, then maybe we can understand how the tremendous heat they release affects ocean temperature."

Scientists suspect that even slight changes in average ocean temperatures can trigger major climate changes. In recent years, temperature changes in the South Pacific Ocean have been blamed for searing droughts in the American Midwest and Southeast and torrential rains on the West Coast.

Embley said it is unlikely that heat from the megaplumes and volcanoes discovered off the Oregon coast is related to the recent U.S. droughts. But similar processes elsewhere in the ocean may be related to the climate changes.

Snap, crackle, whoosh

Two researchers with RJR Nabisco Inc. have been awarded a U.S. patent for a volcano cookie: when it is placed in a microwave, chocolate "lava" erupts. Food that entertains is "a sort of pot of gold, a Holy Grail" for the industry, according to Martin Friedman, editor of Gorman's New Product News, an influential trade journal that tracks culinary innovation. Other mass-market companies including General Foods Corp. and Campbell Soup Co. are looking for products with play value. "It's food as a performing art," said Pat Custis, the group marketing research manager at Campbell's Microwave Institute.

Source: The Washington Post.

Record snow in Europe

LONDON — Winter weather blasted its way across Europe yesterday, leaving at least 18 people dead and transport in chaos. The cold front caused snow as far south as Madrid and southern Italy's volcanic Mount Vesuvius, blocked a tunnel under the Alps and flooded Venice. *Reuter*

Mountain of Hell erupts

REYKJAVIK — Iceland's Mount Hekla volcano, traditionally called the Mountain of Hell, erupted yesterday, hurling a huge column of fire into the sky, Icelandic Radio said. The eruption caused no immediate casualties or damage, but farmers near the volcano, 110 kilometres east of the capital, said a broad lava flow was coursing down the mountain. *Reuter*

THE FIELD

BY DOUGLAS McARTHUR
The Globe and Mail
Las Vegas, Nev.

IN a city where nothing succeeds like excess, two wretchedly excessive hotels are succeeding excessively well.

You have to book well in advance to spend a night in The Mirage — where a fake volcano erupts every 15 minutes after dark —

There is nothing real about the volcano, but it's a hades of a show nonetheless. On the quarter of each hour from dusk till 1 a.m., natural gas flames erupt from the top of the waterfall in front of the hotel. As cameras click and throngs of spectators gasp, the fire spreads, carried by the rushing water down the stair-like face of the falls. Suddenly, the lake below becomes a sea of flames. Then, as quickly as it all began, the computer control switches off and the show is over.

VENUSIAN CONTINENTS

If you want to see what Earth's surface looked like before huge continents came to dominate its features, planetary geologists Jim Head and Larry Crumpler suggest you look at Venus.

Working primarily with radar images from the Soviet satellites *Venera 15* and *Venera 16*, the two Brown University researchers have concluded that certain well-known Venusian landmasses are the planet's first continents in the making. These structures are basaltic plateaus that rise one to two miles above surrounding dry plains; collectively they cover 10 to 15 percent of the planet's surface. What Head and Crumpler have learned — from topography and local anomalies in the strength of gravity — is that some of these plateaus seem to be splitting apart, while others are crunching together. On Earth huge landmasses have been splitting and joining for billions of years. Venus, says Head, thus presents us with "a snapshot of early Earth history."

Head and Crumpler attribute the formation of plateaus on Venus to local thickening of the crust. The plateaus rise at hot spots around the planet's equator, where blobs of molten rock well up from the lower part of Venus's mantle and spread out beneath the surface. Similar plateaus have formed this way on Earth; one of them is Iceland.

These plateaus, like all crust, essentially float on the mantle, and they tend to drift away from the equator and toward the poles. As they drift and as the hot plumes underneath them become exhausted, some of the thickened masses of crust develop rifts and split into pieces.

"If you start producing these plateaus," says Head, "at some point — probably after hundreds of millions of years — you have enough of them so that they start colliding." One place where Head and Crumpler think a few pieces have collided and welded together is a spot in Venus's northern hemisphere called Fortuna Tessera, which appears to consist of three distinct plume plateaus. "You could call Fortuna Tessera a continent already," says Head, "although it's missing a lot of the features of Earth continents." Most significantly, it's missing the Earth-like erosion caused by the relentless action of water.

String of volcanoes grows off Oregon coast

By John Balzar
Los Angeles Times

IF IT'S NOT enough these days to have a Hawaiian volcano consuming communities, a Washington state volcano ominously shuddering and belching and a massive Alaskan volcano rumbling from the deep, scientists now have discovered a string of eight or so brand-new baby volcanoes off the coast of Oregon.

In the inky waters almost 300 nautical miles offshore and 2,400 metres underwater, a crack in the Earth's surface has brought forth fresh eruptions sometime within the last decade.

Where the ocean floor was more or less featureless in 1981, it now is dotted with volcanoes up to 45 metres tall and hundreds of metres across.

But only this autumn did anyone find out, and then only with a good bit of luck.

Three scientists at the Mark O. Hatfield Marine Science Centre in Newport, Ore., say their discovery is the first time anyone has come across the active volcanic creation of those famous slow-moving tectonic plates that cover the crust of the planet, forming continents, colliding and creating mountains, rubbing shoulders with each other and triggering earthquakes.

Offshore from Oregon is a zone where two of these plates meet — one the giant sea-floor Pacific Plate and a smaller Northwestern cousin, known as the Juan de Fuca Plate. They are moving in opposite directions, with the Pacific Plate drifting northwest while the Juan de Fuca Plate is creeping southeast at perhaps six centimetres per year.

As they pull apart they create what scientists term a "spreading centre," which can be visualized simply as a crack in the ocean floor. Volcanic magma bubbles up from the deep, erupting and adding material to the forming edges of the plates. Because these eruptions occur at a zone where the plates are pulling apart, it is believed that the volcanoes act sort of like mortar, filling the crack. But they are not expected to build up and come exploding out of the ocean someday to touch off a new coastal Oregon real-estate boom.

"That's one of the things we know isn't going to happen," says William Chadwick, a volcanologist and member of the three-man team of scientists.

The new volcanoes were discovered when sonar maps made in 1989 were compared with maps made of the same region in 1981. Close scrutiny found that sometime in that interval the volcanoes popped up.

Scientists still must figure out how to study what they have discovered. That means designing and building instruments that work for extended periods in the intense pressure of the deep. Right now, there is not a single instrument in place anywhere in the whole area. This will have to wait until summer.

Scientists believe that the hot, mineral-rich eruptions hold clues to both the changing chemical makeup of seawater and ocean temperature.

An altogether different type of undersea volcano is more familiar to non-scientists, and it continues to make news in the Pacific region. That's Kilauea on the big island of Hawaii. It has been in a state of virtually continuous eruption since January 1983, destroying nearly 180 homes and adding 120 hectares to the land mass of the island (title held by the state of Hawaii).

Kilauea and the whole Hawaiian chain was not formed on the edge of tectonic plates but emerged from a "hot spot" deep inside the Earth. As the giant Pacific Plate drifts over this hot spot, islands one after another pop up.

The next island in the Hawaiian chain is already forming. Its name will be Loihi when it grows another 1,000 metres or so and emerges from the water in a future century.

A similar hot-spot chain of volcanoes exists off the coast of Washington state, although none yet has made it closer than 45 metres to the surface.

Not all of the Pacific Basin's volcanic news has occurred at sea this autumn. Residents of Washington and Alaska felt their stomachs tighten this November at the stirrings of now-familiar troublemaker volcanoes.

On Nov. 5, an unexpected explosion in the caldera of Mount St. Helens flung refrigerator-sized boulders 800 metres and sent an ash plume toward the stratosphere. The Cascade Volcano Centre in Vancouver, Wash., suggested some possible causes. Perhaps it was merely the result of cooling inside the mountain after the giant 1980 eruption, or water seeping into the plumbing of the still-hot volcano and causing a steam explosion. Or . . . ?

Experts see a high likelihood of another blast from this deadly explosion-prone volcano in the next 50 to 60 years.

And in Alaska, the 3,108-metre volcano Redoubt, 175 kilometres southeast of Anchorage, threw a scare into scientists in early November with a showy display of earthquakes and small blasts that seemed to foreshadow a major eruption.

The mountain last exploded in December 1989, and has been percolating since.

Hot rocks

Geologists studying the Appalachian Mountains suggest that radioactive heat led to the formation of the broad swath of granite that passes through southern Maine, New Hampshire, Massachusetts and Connecticut.

In a report in a recent issue of the journal Science, C. Page Chamberlain and Leslie J. Sonder of the Dartmouth University Department of Earth Sciences suggested that large concentrations of uranium and thorium in the ground helped generate the tremendous heat necessary for the formation of granite 360 million years ago.

The precise process of granite formation has long puzzled geologists. Some scientists have suggested that in the Appalachians, melted rock rising from the earth's mantle and the continuous burial and overlapping of thick sediment deposits together produced the necessary heat.