



The Antarctic Society

VOLUME 18-19

APRIL

NO. 3

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IT TAKES GUTS

When the geodesic dome station at the South Pole was opened in January 1975, the director of the National Science Foundation, H. Guyford Stever, said, "One couldn't go two steps across this station today without realizing that every piece of scientific data, every paper that's written, has a partnership of authors not listed which is very large. It's been the spirit of Antarctica since the beginning."

The remark is an understatement. The heroics that go into keeping the U.S. Antarctic Program running seem never-ending. In January (see story below), personnel wore dive gear *inside* the bilge of the icebreaker *Polar Star* to repair a leak caused when ice struck a propeller shaft and broke a seal. In 1986, when a small team of civilians dug a Navy LC-130 out of East Antarctic ice 15 years after it had crashed there, the one mechanic worked days at a time, outdoors, repairing broken equipment. He changed the track on a bulldozer alone, a task that usually required a team in a heated building.

After 22-year-old Russell Robinson in September 1933 convinced his mom to let him join *Bear of Oakland* supporting Richard E. Byrd's second expedition (see the story below), the ship hit a hurricane off North Carolina. Wet coal dust clogged the pumps. Crew (perhaps young Russell being one) crawled into the bilges to scrape the coagulated coal dust away from the pumps with their hands. "It must have been a terrible night, especially for a green crew," Byrd wrote in *Discovery* (1935), his book about the expedition.

In June 1994, McMurdo personnel set 32 foundation blocks weighing 584,000 pounds for a new satellite earth station at Black Island. The thickest shim needed was the width of a computer keyboard key. "I hope the eventual users of this radome have some appreciation for the effort involved in setting the foundation in the dead of winter," wrote engineer Douglas Brinkman.

People grow when they commit themselves to a cause larger than themselves. The Antarctic, as probably every member of this Society would agree, has proved itself to have produced more than its share of heroes, even if all they did was scoop coal dust away from a bilge pump in a hurricane.

Guy Guthridge

The family side: Richard E. Byrd and his wife Marie

by Eleanor Byrd



Marie and Richard Byrd in front of their cabin in Maine

What most people do not understand is that there is a cost to fame. The enormous hullabaloo surrounding a famous figure may seem quite exciting. In truth, it is extremely difficult on the family of the celebrity.

Marie was a petite lady, a true lady, taught to be so by her Ames family as well as in finishing school in France. In the wake of Richard's North Pole flight, she dedicated herself to remaining behind the scenes, so much so that most people never recognized her. She rarely had her picture taken; she did not want to be known due to her efforts in protecting their four children from the public. This is why there are so few pictures of her.

After the North Pole flight, reporters camped out at Richard and Marie's house in Boston hoping to get a glimpse of one or the other and an interview. Members of the public, so enthralled, also were there. This went on for days and was frightening for the children. The family found themselves prisoners in their own home. Having no experience with this, the question was, what to do?

Marie would have none of it and Richard in full support agreed with her and asked the media not to approach his family. They did not stop. One day when Richard was away, a reporter came to the house and threatened to print a lie about Richard and Marie if she did not grant him an interview. The reporter was not able to gain access to the house but the threat would be carried out if she did not do anything about it.

So she called all the newspapers in Boston and asked that a reporter from each be sent to the house at a specific time. She met them all, invited them into the living room, had them sit, and told all of the reporters about the threat. There was complete silence in the room. The reporter who had made the threat looked somewhat sheepish as all turned to look at him. Marie, a soft spoken woman, in the ladylike calm but firm manner in which she had been taught, cut right to the chase. She looked at each and said, "I think it quite disgraceful to print a lie in order to get a story. It shows a great lack of integrity."



Marie and Richard Byrd and their four children at their 9 Brimmer Street home in Boston. Photo courtesy of Ohio State University.

The reporters looked chastised but remained quiet. "This is the only time you will see me. I hope that you all will understand my need to protect my children, as I am sure you would want to protect yours in a situation like this. Exposure will potentially put the children in harm's way.

They too will have no photographs taken of them or interviews. My husband is the one to seek out and he is happy to talk to you. This is our decision and it is firm. I hope to never see any of you at this house again.” With that, she quietly showed the reporters to the door.

Richard was proud of his wife and said in an interview, “Marie is averse to publicity, and I must say that the reporters have been fair. However much they beg her and however provoked they may become over her steadfast refusal to be interviewed or, as one said, ‘humanized,’ they nevertheless respect her attitude; she and the children now bear an almost charmed freedom from the camera. Her protection of the family is absolute.”

Marie, the smart, quiet, petite little wife of Richard E. Byrd, was a powerhouse in her own right. Never one to yell or be nasty in any way, she handled kidnapping threats to her children, keeping them safe and unknowing of the threats while allowing them independence.

She also awoke one morning to a female reporter in her bedroom who had climbed the ivy to the second story to get an interview. She dealt with people breaking into their summer vacation cabins and stealing not only adult items but her children’s toys and stuffed animal for memorabilia.

There is so much more to this woman and the love story between Richard and Marie, one that started when they met at 8 years old, which will be told in my upcoming book, *My Compass and Anchor to Windward*.

Eleanor (Lee) Byrd lectured about her famous grandfather at the Society’s Antarctic Gathering in Port Clyde, Maine, 21 July 2018.

The City of New York visit to Washington, D.C., in 1931

After Richard E. Byrd and his crew completed the scientific work and historic South Pole flight of their 1928-1930 sojourn in Antarctica, the expedition ships got back to New York on 19 June 1930. Articles were published, awards received, and a major motion picture released. Byrd, already thinking about a second expedition, was touring the country lecturing.

The expedition’s ship *City of New York*, a 147-foot three-masted barque with auxiliary engine, did its part, promoting appreciation of the 1928-1930 trip while building public support.



The *City of New York* alongside the Ross Ice Shelf in the Bay of Whales. Photo: Byrd Antarctic Expedition.

Three Washingtonians had been on the Antarctic expedition: Pete Demas, an airplane mechanic, and Malcolm P. Hanson, radio engineer, both with the wintering party, and Charles I. Kessler, aboard the expedition’s second ship, the *Eleanor Bolling*.

John Kelly, *Washington Post*, responding to a reader’s query, wrote on 18 May 2018 that in April 1931 the *City of New York* tied up at the Seventh Street wharf in Washington. Admission to the vessel was 50 cents (25 cents for children). Kelly, quoting from the then other Washington paper, the *Evening Star*, wrote that the ship was on a “tour of the seaport cities to raise sufficient funds to make good the deficit incurred by

the costly exploration of the South Pole regions.”

A 1931 ad in the *Post* promised members of the Byrd expedition would “tell you their own personal experiences in the Antarctic, thrilling tales that will make the two years of struggle and achievement loom in your mind as a living, graphic picture.”

Kennels along the dock held a half-dozen sled dogs. Descending into the ship, visitors passed sleds, tools, photographs, and stuffed seals. Every type of foot and leg covering was to be seen.

A detailed scale model of Little America (Byrd’s coastal wintering station on the Ross Ice Shelf) portrayed “every wireless antennae, every subterranean entrance, and every small building constructed for the year’s residence,” wrote the *Star*.

Thousands of Washingtonians visited the *City of New York* during its month-long stay. It was open daily, 10 a.m. to 10 p.m.

But, as an expedition ship, the *City* was finished. She was “reduced to the state of a floating museum,” Byrd wrote, “towed ignominiously from one exhibition mart to another.”

For BAE II, he found a replacement: the *Bear of Oakland*.

Leaving home for Antarctica in 1933 on the *Bear of Oakland*

Much of the Antarctic story happens not in Antarctica, but back home both before and after an expedition does the glamor work down south.

Society member Margaret McClure writes to tell us she has been putting her Antarctica items into yet another and bigger notebook. Doing so, she found a late September 1933 clip from the *Newark News*.

“BAYONNE—Finally having overcome his mother’s objections,” it starts, “Russell Robinson, 22, of 52 Clark Street, Glen Ridge, sailed today as a seaman aboard the barkentine *Bear of Oakland*, which will carry Rear Admiral Richard E. Byrd, retired,

on his second exploration trip of the Antarctic wastes.”

The voyage had originated in Boston on 25 September. In Bayonne, fresh water, fuel oil, and other oils were loaded. Coal was loaded for the ship’s main boilers.

As the ship left Bayonne, states the article, it sailed down the Kill van Kull into New York Bay and “was given a royal sendoff by the harbor craft. Boat whistles were sounded while hundreds of workmen at oil refineries waved their farewells.”

Bear of Oakland next stopped in Norfolk, Virginia, “to have our bunkers topped with 360 tons of largely crushed coal,” Robinson wrote.

In a hurricane off North Carolina, dust from that crushed coal almost did them in by clogging the bilge pump strainers. Robinson, a recent graduate of MIT, wrote that “we were a sinking sailing ship caught in a hurricane.” They lost power, were able to anchor off Frying Pan Shoals, the weather eventually abated, they restarted the boilers, and the ship made it back to Newport News for repairs before heading south.

Why was Maggie McClure intrigued by that clip from 85 years ago? Robinson had been a childhood friend of her mom, Peggy Royall (Hinck). Finding a letter that he mailed her mom from *Bear of Oakland* started Maggie’s lifelong interest in Antarctica.

History of R/V *Hero*

Society member Charles H. Lagerbom, after reading Richard Wolak’s article in the January newsletter about a memorable passage aboard R/V *Hero*, told us that, in 2015, he wrote and published a 36-page history of the ship in *The New England Journal of History* (volume 71, nos. 1-2, Fall/Spring 2015).

“An Antarctic hero: the history and fate of the NSF research vessel *Hero*” begins by describing the U.S. Antarctic Program’s need for the ship. The National Science

Foundation in 1965 had built a research station, Palmer, off the west coast of the Antarctic Peninsula. The surveyors who selected the site said a dedicated, shallow-draft research ship would be needed for the marine biology that was to be a big part of the research suite.



Research Vessel *Hero* at the Palmer Station pier during the 1968-69 summer. Photo courtesy of NOAA.

The Harvey F. Gamage yard in South Bristol, Maine, built the sail-equipped trawler, delivering it in 1968. The hull was wood, for both resilience in ice and nonmagnetic operations.

“John H. Dearborn [University of Maine] recalled that Harvey Gamage was brutally blunt to visiting dignitaries from Washington, D.C., who came to consult on the construction,” Lagerbom wrote. “‘You can’t do that’ or ‘we don’t build it that way,’ and ‘we’re going to do it right’ are phrases that Dearborn fondly recalled the old shipbuilder repeating in his thickly accented Down East voice.”

Hero served the Antarctic program until its decommissioning in 1986. The government sold the ship to the high bidder, the Port of Umpqua, Oregon, which planned to make it into a museum. The port set up a *Hero* Foundation to make that happen.

But, Lagerbom writes, “as time went by, interest in the vessel waned, and the *Hero* Foundation dissolved.”

Ownership of *Hero* changed hands more than once after that, and by 2008 the ship was tied to a pier in Bay Center, Washington. The new owner “did not appear to have resources” to maintain the old vessel.

“So what is to become of her?” is the first sentence in Lagerbom’s last paragraph written in 2015. The “vessel is in decrepit condition, and the owner has considered scrapping her. This would be a sad fate for such an important piece of Maine maritime history, New England shipbuilding history, National Science foundation history, polar history, and the history of science at large.”

Readers of the online version of Richard Wolak’s article in the January issue will suspect the answer to Chips’s question. In March 2017, *Hero* sank at its pier. To protect nearby oyster beds, the Coast Guard mobilized a \$25,000 oil spill liability trust fund, according to [WorkBoat](https://www.workboat.com/news/coastal-inland-waterways/longtime-research-vessel-hero-sinks-washington-state/) magazine (<https://www.workboat.com/news/coastal-inland-waterways/longtime-research-vessel-hero-sinks-washington-state/>).

In Antarctica, *Hero* was replaced by a larger ship, *Polar Duke*, which in turn was succeeded by the current vessel, the *Laurence M. Gould*. Neither vessel has sails, and neither is made of wood.



The *Harvey Gamage* observed in the Gulf of Maine July 2018. Photo by Lynn Teo Simarski

Back in Maine, just 5 years after *Hero* was put into service – in 1973 – the Harvey F. Gamage yard built the *Harvey Gamage*, a 131-foot wood gaff rigged topsail schooner, to honor the old craftsman who had built *Hero*. The *Harvey Gamage* still plies Maine waters.

Remembering Antarctica by acquiring archival material

by Bill Fox

I spent the 2001-2002 field season on the Ice to examine how artists, architects, writers, and scientists deploy visual imagery, data visualization, design, and stories to interact with a continent writer Barry Lopez finds indifferent to human presence.

My book *Terra Antarctica: Looking Into the Emptiest Continent* (Trinity University Press, 2005, 312 p.) talks about the importance of their work and how it is vital to the collections of the Center for Art + Environment, Reno, Nevada.

“How the human mind transforms space into place, or land into landscape,” I wrote, “is the line of inquiry that I have been following through several books.”

Our center holds Antarctic archives of artists who have travelled to the Ice from the United States, Australia, New Zealand, France, and the United Kingdom. Our Research Library holds titles in Antarctic art, science, and exploration published since the early twentieth century.

We want to expand this area with donations, in particular of rare and historical 19th century accounts. (We also have titles regarding Arctic exploration and art, as well as archives from artists working in the northern polar regions.)

The Center has received donations of Antarctic archive materials, and we are on the lookout for more. We’re interested in exploration artists, military artists, and other professional artists who have worked in the Antarctic. In turn, scholars and artists come from around the globe to study our archives

and books as they write their own books and articles, or prepare to visit the Antarctic.

The Center for Art + Environment at the Nevada Museum of Art in Reno is the only research institute of its kind in the world. The Museum, founded in 1931, has as its overarching theme creative human interactions with natural, built, and virtual environments. The evidence we humans leave behind in those processes includes art, architecture, and narratives.

We collect that evidence. The Center opened its doors in the Museum in 2009. It has in excess of a million archive items from more than 1,000 artists working on all seven continents, including the Antarctic. Archive materials include photographs, paintings, grant applications, press coverage, exhibition announcements, manuscripts, notes, and more—all things that contextualize and make possible the creation of works of art.

Art and environment projects—which include landscape painting and photography, outdoor sculpture, and land art, up to contemporary eco-art projects meant to address environmental problems—are part of a long history of human endeavors to change space into place, land into landscape, or terrain into territory, depending on the context.

Where that process is the most difficult, and therefore the most revealing, is in extreme environments, in particular both hot and cold deserts, in particular Antarctica.

William L. Fox is Director, Center for Art + Environment, Nevada Museum of Art, Reno, Nevada 89501. art@nevadaart.org.

SouthPole-sium in Dublin, June 2019

Member Robert Stephenson has announced the fourth upcoming SouthPole-sium will take place in Dublin, Ireland, 7-9 June 2019. The meeting is “for those who collect, write, publish, buy, sell, and love books relating to Antarctica and the South Polar regions.”

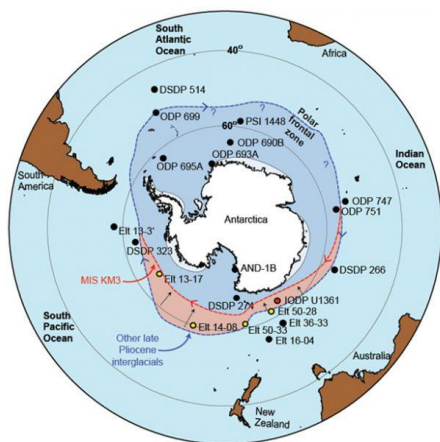
Prior meetings have been held since 2012 in New Hampshire, Scotland, and Norway.

For information about the meeting, please check the Antarctic Circle web site, www.antarctic-circle.org.

The site itself is a noncommercial forum and resource on historical, literary, bibliographical, artistic and cultural aspects of Antarctica and the South Polar regions.

Rob says the meeting will bring together an informal international group of scholars and knowledgeable amateurs interested or involved in nonscientific Antarctic studies.

Plotting the Pliocene Polar Front



Likely position of the “polar front” where cold Antarctic waters meet the warmer waters of the Subantarctic during the late Pliocene interglacial intervals. Source: Paleoceanography and Paleoclimatology.

Society member Art Ford called our attention a year ago to an article in *EOS*, the news publication of the American Geophysical Union, “Plotting the Pliocene Polar Front.” He thought member Hal Borns could say something interesting about the topic.

Hal wrote to us (also last year) that the paper is a bit out of his field as a land-based glacial geologist, but “I’ve learned something from it! It’s one answer to the question I was often asked, ‘Why waste your time working on the glacial history of

Antarctica, when that continent plays no role in our modern environmental problems?’”

With climate seeming to get even more attention, even in the political sphere, it seems useful to give attention to how scientists are thinking things through from the basic research point of view. Hal provided the following perspective:

The Polar Front, which encircles Antarctica, is defined by the joining of cold Antarctic waters with the relatively warmer waters of the Subantarctic. Its ever shifting north/south position is primarily driven by global climate change.

In Earth history, late Pliocene time (3.3 to 3.0 million years ago) is the most recent time when global temperatures rose to the range predicted for our 21st Century. At that earlier time, CO₂ levels in the atmosphere reached 400 parts per million, which is the most recent time in Earth’s history that that level has been reached. It is a value that we have now exceeded!

During that earlier warm time the Polar Front was closer to Antarctica, and sea ice was less extensive than today. That fact, and the tracking of the southern movement of the Polar Front, were determined from diatoms recovered from deep sea sedimentary cores collected in the Southern Ocean.

Climate models, and resulting global climate reconstructions using these data, indicate that summer sea surface temperatures of the late Pliocene were, on average, 2°C warmer relative to those of the present. This conclusion indicates that analysis of the late Pliocene warm period is crucial to testing the current ice sheet’s stability in light of our current and predicted even higher levels of near future anthropogenic atmospheric warming.

Hal’s primary source was Taylor-Silva, B.I., and Riesselman, C.R., 2018, “Polar frontal migration in the warm late Pliocene: diatom evidence from the Wilkes Land margin, East Antarctica,” *Paleoceanography and Paleoclimatology*, 33. Ellen

Thomas, editor in chief of that journal, wrote the *EOS* summary, which was published 29 January 2018.

Black hole image uses data from South Pole Telescope

The largest telescope ever deployed at Amundsen-Scott South Pole Station – the South Pole Telescope (SPT) – was one of the eight telescopes at six locations worldwide that contributed data to development of the first image of a black hole that made headlines around the world in early April.

SPT was built in 2006 and 2007 to study the cosmic microwave background; it explores dark energy, the mysterious phenomenon that may be causing the universe to accelerate.

For the black hole investigation, astronomers used it and the seven other instruments to create a planet-scale array of ground-based radio telescopes. The collaboration resulted in a virtual telescope with unprecedented resolution and sensitivity.

Assembly of what is termed this Event Horizon Telescope, which took years, offers a new way to study the most extreme objects in the universe. It provides an angular resolution of 20 micro-arcseconds, equivalent to reading a newspaper in New York from a sidewalk café in Paris.

SPT is one of several astrophysical instruments located in what is termed the Dark Sector adjacent to South Pole Station. The extremely dry air makes the atmosphere exceptionally transparent for a millimeter-submillimeter telescope such as SPT.

But they don't only look up at the South Pole. An array of photomultiplier tubes buried in the extremely clear ice beneath the station looks at cosmic background radiation coming all the way through Earth to collide with ice particles and, on rare occasion, to produce what's called Cherenkov radiation that the instrument array, called IceCube, can see.

This project is not part of the Event Horizon Telescope.

Icebreaker *Polar Star* completes 105-day McMurdo mission, limps home

The U.S. Coast Guard icebreaker *Polar Star* returned 11 March 2019 to its homeport of Seattle following a 105-day deployment to open a channel through sea ice so the annual cargo ship could resupply McMurdo Station.

The channel breakout, and resupply by sea, are critical to the large fraction of the overall U.S. Antarctic Program that uses McMurdo as operational base.

This year is the 63rd iteration of the annual operation. *Polar Star* left Seattle 27 November, traveled 11,200 nautical miles to Antarctica, and broke through 16.5 nautical miles of ice, 6 to 10 feet thick, to open a channel to the McMurdo pier.

On 30 January, the icebreaker escorted the containership *Ocean Giant* through the channel, enabling a 10-day offload of 499 containers with 10 million pounds of goods that will resupply McMurdo, Amundsen-Scott South Pole, and field camps for the coming year. *Ocean Giant* is ice-strengthened, but not able to break ice.

Unusually this year, an annual tanker resupply was not required since an adequate supply for another winter is in McMurdo Station tanks.

As in years past, the 43-year-old 'breaker had engineering casualties. Commissioned in 1976, it is beyond its expected 30-year service life and is scheduled for a service life extension project starting in 2021.

During the transit to Antarctica, an electrical system began to smoke, damaging wiring, and one of the two evaporators used to make drinkable water failed. Crew repaired the wiring at sea. The evaporator was repaired after parts were received during a port call in Wellington, New Zealand.



At McMurdo, divers repair a leaking shaft seal on the *Polar Star*.

During ice operations, the cutter's centerline propeller shaft seal was impacted, allowing water to flood into the ship. Divers applied a patch outside the hull, then the ship's engineers repaired the seal from inside, donning dry suits and diver's gloves to enter the 30-degree water of the still slowly flooding bilge. They used special tools fabricated onboard. Amazingly, the leak was fixed, and the vessel resumed icebreaking.

Shipwide power outages while breaking ice forced crew members to spend 9 hours shutting down the power plant and rebooting the electrical system.

On 10 February the crew spent 2 hours putting out a fire in the incinerator room. The fire damaged the incinerator, and firefighting water damaged some of the electrical wiring.

Polar Star is the United States' only heavy icebreaker. By contrast, notes the Coast Guard, Russia operates more than 50 icebreakers.

Reserved for Operation Deep Freeze each year, *Polar Star* spends the Southern Hemisphere summer breaking ice near Antarctica. When the mission is complete, the ship returns to dry dock for maintenance and repairs in preparation for the next Operation Deep Freeze mission. Out of dry dock, the ship returns to Antarctica, and the cycle repeats.

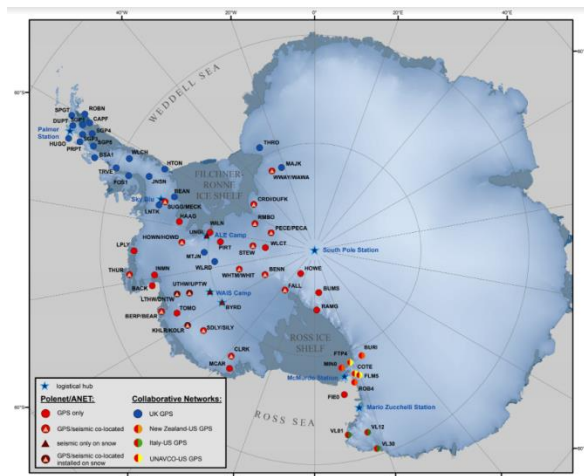
The Coast Guard is seeking to increase its icebreaking fleet with six new polar icebreakers. It has not yet determined whether the first new polar security cutter (PSC) being procured (schedule still not firm – see the January newsletter) will replace *Polar Star* on Antarctic runs or take on ice in the Arctic.

“TBD,” said Vice Adm. Daniel B. Abel, the Coast Guard's deputy commandant for operations, when *Seapower Magazine* asked to which polar region would the first PSC deploy.

Thanks to the Coast Guard and to *Seapower Magazine* for this information, and greater thanks to the enterprise and guts of the crew of *Polar Star* for remarkable service in keeping the old vessel operational. Society member Bruce Dewald unfailingly keeps us abreast of this continuing drama involving a critically important component of the U.S. Antarctic Program.

Good news (sort of) and bad news from West Antarctica

Polenet, short for the Polar Earth Observing Network, collects GPS and seismic data from remote autonomous systems on the Greenland and Antarctic ice sheets. The intent is to answer questions about ice sheet behavior.



Polenet locations in the Antarctic. Courtesy polenet.org.

It's humbling, the scientists say. They "work from tiny field camps incongruously airdropped onto a vast plain of kilometers-thick glacial ice. It is initially difficult to conceive that this vast polar desert could drastically change over the course of a human lifetime."

While study after study has shown that the West Antarctic Ice Sheet is losing mass at an accelerating rate, Polenet provides a "rare bit of good news." The data show that the bedrock is lifting faster than previously thought. "This rebound effect – the land underneath the ice uplifting as the ice melts – is a result of a newly recognized Earth structure, and can possibly slow melting."

The relatively warm and hydrated mantle beneath the ice sheet is less viscous than cold and dry mantle that is common throughout much of the world. Instead of occurring on time scales of millennia, the uplifting response "can occur over just decades to centuries."

The Polenet work, reported last June in *Science*, establishes that this glacial isostatic adjustment uplift in West Antarctica is among the fastest ever measured: up to 41 millimeters a year. The investigators predict that the rate should accelerate in coming decades.

If society succeeds in limiting greenhouse concentrations of the atmosphere enough to slow the expected rate of ice loss caused by global change, the bedrock uplift may slow ice retreat enough for it to stabilize at a smaller volume rather than disintegrate.

But: if we don't limit emissions and warming, the uplift, even if rapid, will be "insufficient to stabilize the West Antarctic Ice Sheet grounding line and, ultimately, insufficient to stabilize the ice sheet."

Turning to the bad news, researchers have known for some years that West Antarctica is losing ice not just because the atmosphere overhead is warming. The region's ice shelves – floating glacial extensions into the ocean – also are losing

mass at their bottoms because shifting ocean currents are pushing warmer water closer to the continent.

Now, 2 years of mooring observations at the edge of the continental shelf, deployed at depths of 600 to 800 meters, show that on frequent occasions Circumpolar Deep Water as warm as 1.5°C reaches the western front of the Getz Ice Shelf front. This is some of the warmest ever observed at an ice shelf front in Antarctica. And the Getz Ice Shelf is a big one, stretching 650 kilometers along the West Antarctic coast.

The authors of the paper, in *Geophysical Research Letters*, 4 January 2019, caution that the paucity of data from the region limits their ability to draw robust conclusions. But an 11 April summary article in *EOS* says the work "is likely to be of great interest to oceanographers and climate scientists."

Shorts

Ozone hole. Last May a paper in *Nature* documented that emissions of CFC-11, which destroys ozone in the stratosphere and is prohibited by the Montreal Protocol, increased during the 2014-2016 period by 25 percent over the average measured from 2002 to 2012. Someone, probably in China, was emitting the chemicals illegally, scientists suspected. In November last year, the parties to the protocol, responding to the unexpected rise, strengthened the agreement. Then China reported its discovery of sites illegally producing the CFCs. [*EOS*, 22 January 2019.]

South Pole traverse. "Thor's Trail Notes" reported on 10 January that the South Pole Oversnow Traverse "is in the books," having completed its delivery of fuel and cargo from McMurdo to South Pole and returned to the coast. Total miles: 2,027. Total days: 45. Fuel burned: 43,066 gallons. Fuel delivered: 110,058 gallons. Cargo delivered: two 20-foot shipping containers. Recycle brought back to McMurdo: 40,000

pounds of scrap steel. Internet data used: 275 mb (via Iridium). “More desserts consumed than is healthy. Too many laughs to count.”

Member Dave Bresnahan reminds of us of the advantage of using tractors instead of airplanes to do these deliveries: “LC-130 delivered 5.47 pounds of cargo per gallon of fuel burned. Traverse delivered 19.73 pounds of cargo per gallon of fuel burned.”

Warm again in 2018. NASA and NOAA have documented that 2018 is the fourth hottest year on record. It was cooler only than 2015, 2016, and 2017. The El Niño pattern suggests that 2019 is likely to be warmer. For 2018 (actually the 2014-2018 average), the most conspicuously warmer region in the entire Southern Hemisphere is the Antarctic Peninsula and the coast of West Antarctica.

Send in the clown. This year’s annual meeting, in Washington, of the American Association for the Advancement of Science looked into personal problems that could come up during a trip to Mars. Reporting on the several sessions devoted to that topic, *The Economist* (23 February) writes, “Understanding how teams function, how they go wrong, and how to prevent social problems will be a critical element of any successful mission to Mars.”

Researchers have figured out that a good group needs a leader, a social secretary, a storyteller, and both introverts and extroverts. But “by far the most important role seems to be that of the clown.”

Enter Jeffrey Johnson, an anthropologist at the University of Florida who studies relations among crews wintering at the South Pole. The clown is not just funny, he observes. He or she is smart, knows each member of the group well enough to defuse tensions, and is the bridge between different groups. At Pole, the clown links scientists with the tradesmen who also work there. In groups that tended to fight most or to lose coherence, Dr. Johnson found, “there was usually no clown.”

Mildred Rodgers Crary, 1925-2018

The Antarctican Society has dwindled in recent years from over six hundred members to only three hundred and twenty-two, two-thirds of whom are electronic members. The Society started in the 1960s with a framework of International Geophysical Year scientists, most of whom have now perished.

A recent loss was Mildred Rodgers Crary. Mildred was the widow of the famed polar scientist Albert “Bert” Crary, who was the first person to have set foot on both North and South poles.



Albert P. Crary and Mildred Rodgers Crary

Mildred was one of four daughters born and raised in North Carolina. She graduated from the University of North Carolina at Greensboro. She then moved to Vienna, Austria, where she studied physics, philosophy, and German, and worked for the International Atomic Energy Agency. She later received her M.A. in English and an M.F.A. in creative writing from the University of Maryland.

Upon returning to the States, she settled in the Washington, D.C., area and was a writer/editor for four major scientific organizations. She was also a phenomenal and gifted photographer and traveled extensively throughout her life, going over

the Khyber Pass on a camel at age 85 and traveling to China shortly before that with her sister, Suzanne.

Mildred married the love of her life, Bert Crary, late in life and had their only child, Dr. Frank Judson Crary. Frank is a noted astrophysicist and researcher who works at the University of Colorado in Boulder. Mildred and Bert lived a diverse and quiet life in their house on New Mexico Avenue in Washington, D.C., while they raised their son. Bert died from cancer in his late seventies. Mildred mourned him deeply and spent many years editing a book by him, which even today awaits publication.

Mildred continued to travel, and she wrote many short stories and a novel. One of her most satisfying diversions was visiting the Cosmos Club, where she found many friends who shared her scientific life. She also visited her son at Berkeley, University of Michigan, and University of Colorado, and went skiing in her seventies while visiting her niece in Colorado. As do all of us, she had some health issues as she got older and moved to North Carolina late in life. She died in October 2018 in Greensboro, North Carolina, after living a full and bold life that began in 1925.

The Antarctic Society is pleased that Mildred had some happy days when she attended several Antarctic gatherings at the house of Paul Dalrymple in Port Clyde, Maine, where hundreds of Antarticans appeared every other year for celebrations of their halcyon Antarctic days. Here she joined many of Bert's Antarctic colleagues for gala reunions. Mildred herself became famous for her heavy consumption of oysters! She loved to meet with friends and hear them tell stories about her beloved Bert. Mildred lost one of her dearest friends with the passing of geologist Charlie Bentley in 2017.

Paul C. Dalrymple provided this obituary. Jeanne Regh, Mildred's niece, very kindly added factual information derived from family records and recollections.