



The Antarctic Society

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SHOULDN'T THE WORLD BE RUN BY SCIENTISTS?

Read it and weep. The icebreaker story on page 8 makes it so straightforward. The Coast Guard should block-buy four heavy icebreakers, just like the technocrats at the National Academy of Engineering say it should, but the Coasties lean toward three heavies and three mediums, more expensive. Maybe something, well, political is going on when the Commandant says the budget request for three and three (or is it just three heavies, or four?) might possibly be susceptible to some amount of flex at some future date.

Another example: Jerry Marty's fine reminiscence on page 3 about the dedication a decade ago of the new Pole Station refers to a blue ribbon study run on NSF's behalf that told the agency to ask Congress for a 110-bed station when we needed 150 beds. Norm Augustine, a technocrat who has a knack for politics, headed the panel. We followed the advice after years of getting nowhere, got the 110-bed size, and later won Congress's support for the remaining 40 beds. Norm knew how to pursue the art of the possible.

In 1960 the nascent Antarctic Treaty, formulated by geopolitical specialists with some push from scientists, got off the ground (see my story on page 2), but not before politicians kicked it around. Scientists would have made it happen better, faster. Wouldn't they?

Over time, decisions tend to be good ones. But a worrying trend seems afoot. At the end of World War 2 the USA had so many icebreakers we lent three sturdy *Wind* class ones to the Soviet Union. Half a century later, our own polar fleet disabled, we had to recruit a Russian icebreaker to open the McMurdo channel for us. Now the Russian fleet dominates the world, and the new *Arktika* (see pages 8-9) is the biggest ever. Would scientists and technocrats running the U.S. Government kick us back into gear? Dream on.

Guy Guthridge

Maine Gathering approaching!

The next Antarctic Gathering is at Paul Dalrymple's house in Port Clyde, Maine, Friday-Sunday, 20-22 July 2018. Friday evening, fish chowder; Saturday, Garage Theater; Sunday, lobster brunch.

If you have not done so yet, (1) Tell Treasurer Paul Dalrymple or newsletter editor Guy Guthridge you're thinking of coming or know you are coming; see our emails on the front page. (2) If you're not going to tent in Paul's yard, reserve a spot in a hotel or cottage. Nearby hotels know about the event and are holding space; tell them that's why you are coming.

While you are at the Gathering, cash or check donations to cover the cost of food and drink will be enthusiastically accepted.

The controversial Antarctic Treaty

by Guy Guthridge

With 57 years of science, environmental preservation, and peace behind it and a membership that has grown over the decades to 4½ times its original 12 nations, the Antarctic Treaty is secure in its achievements. And because the U.S. Government championed the treaty's principles for decades and hosted the 1959 negotiations that resulted in its signing, one might expect official U.S. Government approval to have been without controversy.

Such was not the case as the process of ratification took place in the United States Senate. "This treaty," Senator Strom Thurmond of South Carolina stated on the floor on 9 August 1960, "would, in effect, surrender a valuable possession which belongs to all of our people; and from a study of the history of the explorations and various bases of claims in Antarctica, it is obvious that we would receive little, if any, consideration for our surrender of rights."

Thurmond was not at all alone in disliking the proposed treaty, but it's still not

obvious to me that the U.S. ratification was seriously threatened. In addition to the Department of State, Senator J. William Fulbright, who headed the Senate Foreign Relations Committee, strongly favored ratification and worked for months to get it to the Senate floor for a vote.

A 23 June 1960 report by Fulbright's committee considered the objections raised by Thurmond and other Senators. It "did not find them at all persuasive" and concluded that the treaty "will serve the best interests of the United States and its friends and allies, and will promote the overall cause of world peace."

Each nation approves a treaty in its own way. In the United States, Article II of the Constitution provides that the President "shall have Power, by and with the Advice and Consent of the Senate, to make Treaties, provided two thirds of the Senators present concur." Article VI says, "all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land."

On the Senate floor that day Mr. Fulbright said, "I have heard rumors to the effect that considerable opposition to the treaty—more than I had anticipated—has developed. But I deeply regret that during the discussion of the treaty today, I find in the Chamber only 8 or 10 Senators, who seemingly are in favor of the treaty, or at least understand it. But the Members of the Senate who oppose the treaty are, apparently, not interested in discussing it."

Territorial claims and Russia were at the center of the opposition. "The Union of Soviet Socialist Republics greedily anticipates our favorable action on this question," Senator Thurmond said. Other senators lamented the failure of the United States to stake a claim, despite its considerable work in the area. "Unless we know what we intend to lay claim to, and know what Russia and other countries intend to lay claim to, then I fear we will wind up with nothing but an ice shelf, while others will

become heir to whatever value there is," said Senator Johnson of South Carolina.

Senator Dodd of Connecticut gave negative testimony occupying five pages of that day's *Congressional Record*. For average Americans, the summer of 1960 had nothing to do with Antarctica and everything to do with the political parties' selection of Richard M. Nixon and John F. Kennedy as their Presidential candidates. "I do not believe that our colleagues have had the time, because of the two great political conventions, to delve into the subject," the Senator said. "Oh, it would be a great pity if, through lack of a full understanding and a deep appreciation of all that is here involved, we were to rush headlong into this dreadful kind of agreement."

"What would the treaty do? It would invest the Soviet Union," said Senator Engle of California, "which has no rights whatsoever in the Antarctic, with the right to veto the action of the 11 other signatories of the treaty. That is what it all amounts to."



U.S. Senator Harry Byrd

Also against the treaty was Senator Harry Flood Byrd, Richard E. Byrd's brother. During debate Byrd's Antarctic expeditions were brought up often, generally with reference to his having established U.S. preeminence in the region. Historian Kenneth J. Bertrand later wrote (in 1970) that, as a result of Byrd's expeditions in the 1920s and 1930s, "Marie Byrd Land became, in the popular mind, peculiarly American. This attitude undoubtedly encouraged and sustained American activity in the Antarctic which has placed the United States, during the last four decades, in a position of prominence in south polar affairs."

Richard E. Byrd died in 1957, but at the time of the Senate consideration in 1960 his brother Harry was a long-serving Senator with National recognition. The two brothers along with their close friend Franklin Delano Roosevelt had done much to secure favorable support of the early private Byrd Antarctic expeditions as well as to initiate the first hopefully permanent U.S. Government Antarctic expedition just before World War II and the enormous Operation Highjump shortly after.



A roadside plaque in Winchester, Virginia, where both Richard and Harry Byrd were born and grew up, commemorates Richard E. Byrd as “the father of the Antarctic Peace Treaty.” At McMurdo the bust of Richard E. Byrd has his quote, “I am hopeful that Antarctica in its symbolic robe of white will shine forth as a continent of peace as nations working together there in the cause of science set an example of international cooperation.”

None of this stopped Harry Flood Byrd’s rising that August day on the floor of the Senate to say, “I shall vote against the pending Antarctic Treaty because, by its nature, it is certain to be bad for the United States, good for Russia, and contrary to the best interests of free nations in the world. It would freeze into uselessness the hard-earned bases for U.S. claims on the polar overrun areas to which they have neither rightful nor earned access.”

What would Richard E. Byrd have said about his brother Harry’s vote? We have this clue. Dedicating a statue of her famous father in 1997, Mrs. Bolling Byrd Clarke said in a [speech](#), “He worked very hard on the Peace Treaty and would be relieved, overjoyed, to know that it was ratified 2 years ago [sic] after his death.”



Ambassador Paul C. Daniels signing Antarctic Treaty December 1, 1959

On 10 August 1960 the Senate voted 66 to 21 to ratify the Antarctic Treaty. With the U.S. precedent, all remaining uncommitted



**Herman Phleger signing the Treaty
Photo courtesy of The Encyclopedia of New Zealand**

signatory nations approved, and the treaty entered into force on 23 June 1961. The now celebrated document establishes an Antarctica that “shall not become the scene or object of international discord.”

Discord in the U.S. Senate in that ratification year of 1960 may seem quaint, but it’s not farfetched that different Senators in a different political climate might have voted the Antarctic Treaty down.



Vasily Kuznetsov signs treaty

New South Pole Station: 10 years old!

by Jerry Marty

Ten years ago, on 12 January 2008, what even today is called new South Pole Station was dedicated. A U.S. flag that had been on

top of the geodesic dome – since 1975 the station campanile – was raised on the elevated complex of structures that exist today at Earth's southern spin axis: 90°S. The ceremony acknowledged 20 years of planning, construction, and transition of functions from old to new. Relocating a flag in use instead of raising a new one involved 246 people, each of whom passed it on to the next as it went hand to hand from the dome to the elevated station. Builders and scientists alike were filled with pride.



**Lowering the American flag from the old
Domed station**

Over those two plus decades, a team from diverse backgrounds achieved a common goal: to design, construct, and occupy a state of the art research facility. The partnership drew from National Science Foundation, Department of Defense, U.S. Antarctic Program contractors, scientists, university officials, and the design team.



Flag daisy chain handoff



**Raising the flag at the new
South Pole Station**



**South Pole Telescope (10-m dish sub-
millimeter radio telescope)**

The facility became the platform for 21st century science as represented by the Ice Cube, South Pole Telescope, SPRESO and the Clean Air Facility science projects.

At the 2008 ceremony were current and past NSF directors, Congressional and other government officials, a National Science Board member, a scientist, members of a Blue Ribbon Panel that had validated the new station for Congress and others, representatives of the New York Air National Guard and other military, present and former directors of NSF's polar office, contractor personnel, the design team engineer, and design team members, a total of 24. Speakers included Dr. Arden Bement, Director of NSF, who also noted the passing of Sir Edmond Hillary on this



Distinguished Visitors, Guest Speakers, and NSF attendees at the 90 South marker

day and referenced Antarctic and South Pole accomplishments. The other speakers were Department of State Under Secretary Paula Dobriansky, Congressman Rodney Frelinghuysen (New Jersey), and Dr. Karl Erb, Director of NSF's Office of Polar Programs.

Four groups with different starting locations toured the station. The tour included the Dark Sector (astrophysics), NOAA laboratories (atmospheric sciences), summer camp (living quarters), and the satellite ground station (communications).

The South Pole cooking staff, led by James Brown, executive chef, prepared a masterpiece, food one might not expect at the bottom of the planet. South Pole meals had become known as the best. We Polies

realized that ingredients were the same as at other U.S. stations and recognized the extra efforts of our cooking staff. The menu ranged from appetizers of chilled roasted duck breast with spicy mango chutney to desserts of mascarpone cheesecake with fresh berries.

A packet given to each visitor and all personnel on station consisted of commemorative cast brass coins, patches, and stickers along with commemorative stamped postage envelopes hand cancelled at the South Pole post office and dated January 12, 2008. Envelopes went to project members who were not at the South Pole ceremony.

The visitors' day was far from over. We escorted them to the skiway and saw them off in LC-130s for McMurdo (as far as Chicago to Washington), and they changed there to a C-17 that took them on to Christchurch, New Zealand.

At South Pole that evening, for most it was back to business. A presentation by John Rand and Jerry Marty chronicled the events, challenges, and data (cargo, fuel, etc.) of the project. Then came a party in the gym with the Polie Band playing.

The 20-year project cost \$174.3-million for a 110-person facility with infrastructure adequate for future expansion to 150 (which has happened). The cargo came from McMurdo in 907 LC-130 flights of 26,000 pounds each: 23.6 million pounds.

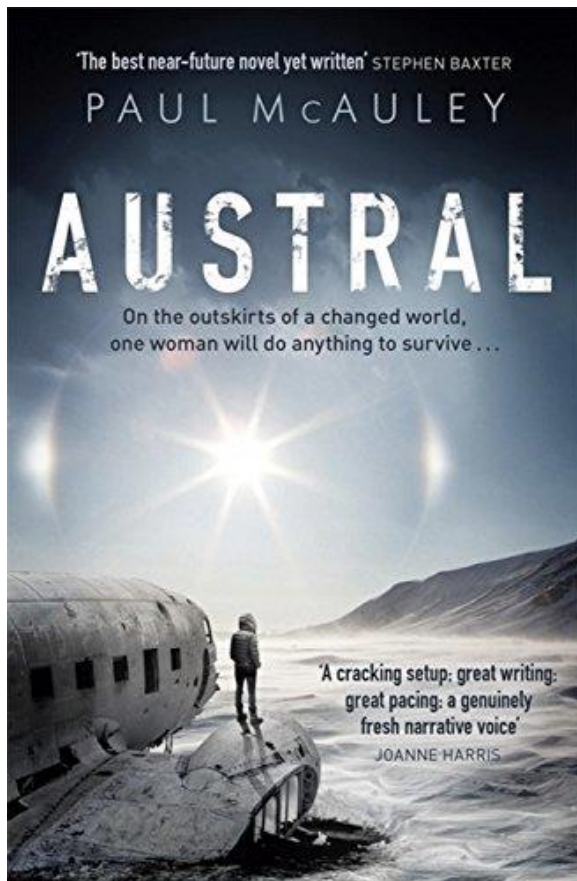
That's infrastructure. Science made possible by the new station is extraordinary. One South Pole astrophysics project, Ice-Cube, involves more than 100 National Science Foundation funding awards since 2008 that add up to more than the cost of the station rebuilding, and that's just NSF. Four other nations and other U.S. sources also fund this one project; scientific participation involves 49 institutions in 12 countries. Research results are at the forefront of ground- and space-based world astrophysics.

Book review: *Austral*, Paul McAuley

by Joan N. Boothe

“Beautifully written, thought-provoking, and well worth reading”

I’ve read a great deal of set-in-Antarctica fiction over the years, and, sadly, I’m been disappointed in most of it. Poor writing, unrealistic plots, little or no grasp of the Antarctic world — these and other failings are so common in my experience that I almost expect them when I pick up Antarctic fiction. *Austral*, happily, is an exception, a book that deserves the enthusiastic reviews it has received since publication, including being named one of *The Economist*’s Books of the year for 2017.



Set in the early to mid-22nd century, *Austral* takes place on the Antarctic Peninsula, a place much changed from what it is today. Climate change has resulted in massive glacial retreat, so much so that there are

now free-flowing rivers and large areas of open ground ripe for greening. Scientists and environmental activists called ecopoets have introduced grasses, flowers, trees genetically altered to survive the cold, and similarly altered fauna. Forests are developing. Following collapse of the Antarctic Treaty in 2048, minerals exploitation has become big business. The Antarctic Peninsula is now an independent country with two major cities and numerous small towns. Esperanza, the former Argentine base, is a city of 100,000 with 50-story apartment buildings, shopping malls, banks, and a criminal class. A railroad is being built along the west coast of the peninsula.

It is in this changed world that the action of the book takes place. At its most simple level, this is a chase thriller story. Austral, a genetically edited human — a so-called “husky” who is specially adapted to deal with the cold of the Antarctic — has kidnapped the daughter of a powerful government official and is on the run from bad guys who are trying to get the girl back. Complicating things, the girl’s father is Austral’s uncle, from whom Austral’s family is bitterly estranged. Early on, Austral, who narrates her story, tells us that she is writing this account so that her daughter will know the truth about her past. Austral herself is a beautifully developed character with depth and nuance.

But the chase is only a part of the story. *Austral* is also the tale of the new, changed Antarctic Peninsula, what it has become, and how it has gotten there. McAuley weaves in this element in two ways. First, as he describes the landscape that Austral travels as she tries to outrun her pursuers. Second, with interwoven chapters about Austral’s grandparents and parents that provide not only background to the kidnapping, but also political and scientific context for the changes to the Antarctic Peninsula world in which Austral lives.

To characterize this book simply as an exciting chase thriller, as some reviewers

have, shortchanges this book. McAuley has written thought-provokingly about the potential for and challenges to ecological evolution in a world where climate change has had a powerful impact. To me, the Antarctic world that McAuley creates and sets his story in is the most interesting aspect of *Austral*. Not only that, I found myself responding much more powerfully to his writing when he's telling the story of Austral's background and how it was linked to this changed Antarctica. As for the chase thriller story that is the central core of the book, although well written with lots of action, I found this to be weak. There are good guys, bad guys, unexpected betrayals, twists and turns, etc. In short, all the expected elements of a chase, sometimes too much so.

Well written, at times beautifully so, and often deeply thought-provoking. These are the true strengths and value of *Austral*. If you just want an absorbing story, it's worthwhile on that front as well. In short, this is a worth-reading work of Antarctic fiction.

Running away – memoir of an OAE

by Alfred J. Oxton

An old metaphor has it that boys run away to join the circus. I ran away twice in my younger days, the first time when I was six. We lived on Overlook Road in Weymouth, and I was fed up with harvesting icicles for water the winter my third brother was born. In the spring one Monday morning my mother packed me a lunch and reminded me of school. Away in the back yard, near the overlook that gave our road its name, was an old convertible in the overgrowth. Early on I'd discovered a way in and would sit there for hours. Now I sat there, ate my lunch, and went home before dark.

When my mother went 'round the bend with Alzheimer's in 1987 was the second time I ran away. Earlier, in the 'sixties, I'd turned down my first opportunity to go to The Ice. When opportunity knocked the

second time I was living and working at the Mount Washington Observatory. My sisters were debating who would take in Mom, my father was distraught that he was unable to care for his wife of more than forty years, and my 1967 Chevy G-10 van, after two engine transplants, had finally succumbed to road rot and died of a broken frame.

Little Jon and Dennis Tupick were already on The Ice when Dennis called from McMurdo one afternoon via the ten-dollar a minute Inmarsat. "We have work for you here," he said, "and bring your lineman's belt." I jumped at the chance. My last shift on the Rock Pile was Thanksgiving; I called my sister Susan and told her: "I can't take it anymore. I'm running away to Antarctica." A week later I was in Paramus getting acquainted with a whole new vocabulary.

Little Jon wrote hints. When the Navy shrink asked, "What are you going to do about sex?" I was ready with the correct reply: "I understand there's a penguin behind every tree." The circus was waiting.

How many OAEs does it take to change a light bulb? During my first winter at McMurdo I could do that job on my own. I'd walk to the carp shop and grab a step-ladder, stop off at my office in the Jamesway uphill from the FOC for a screwdriver or two, then fetch a fluorescent tube of the appropriate wattage and arrange everything under the offending fixture. Up and down the ladder a few times and the job was done. Everything returned and put away in time for lunch at the galley.

Ten years on, during my last winter at McMurdo, inflation had increased the number of OAEs required for this tasking. First, someone had to notice the bulb was misbehaving and file a work order. Order in hand, Maintenance would assemble a team: an electrician to open the fixture and change the bulb, an assistant to take the bad bulb from the electrician and pass it to the Hazmat person before passing up the new bulb (carried by a materials person). If the electri-

cian didn't have a ladder, someone from the carp shop would. Are you counting?

Strange things happen in the dark Antarctic night. I met the stress of that first winter by writing. Random notes gradually took on rhyme and reason.

At some point in those dark ages before the greenhouse, the galley served up the last of the freshies. This was a tipping point. I found my Self writing on napkins, tearing the flyleaves out of paperbacks, begging pencils from strangers...

THE ONE HUNDRETH THREE BEAN SALAD ANTARCTIC CUISINE

*A paper I must quickly find,
To jot these words that crowd my mind:
The galley lined,
The mess defined,
Three Bean Salad- One.
It means the freshies are all done.
Soon, with the passing of the sun,
We'll Three Bean Salad all the way
'Til by its light the planes find day
To bring us lettuce for our pay.
One sock two sock
Blue sock blue sock;
Every foot here wears the same socks
Except the ones who've cut the tops off.
Of Three Bean Salad there is more,
It's getting to be such a bore;
One bean two bean three bean
Mung bean string bean fling bean!
They're piled in the corner, and
Strewn upon the mess hall floor,
Hanging tapestry from the I beam
My night-mares are like three bean dreams.
Quoth the skua even: "No more!"
Can't we have four bean?
The cook I implore,
Or, how about two bean.
The cook points: the door!
It is said strange things happen
In the dark Antarctic Night,
A man will do most anything
For a head of lettuce not too ripe;
Or an apple,
Or a celery, wither'ed or not,*

*Ahh- what I can think of for a carrot!
Fresh of course, not canned-
Not sliced nor diced, but whole.
I would carry it to my garret
Hoard it smell it revere and marry it!
Wait! Its June. The Midnight Moon lights
Mid-winters endless night and
Airdrop comes with eggs all scrambled
And mail is in such a shambles.
The mail we can sort and read
(Thank God for those who care to write.)
But as Humpty Dumpty learned,
No glue will egg shell seal tight.
And lettuce! Let us find the lettuce;
They said to us they'd send freshies
To ward off Three Bean Salad crazies
In the dark Antarctic night.
"Where's the lettuce?
Where's the Lettuce!"
Oh NO! That chute din't open
And the pallet's made a crater
And the freshies are all crushed;
Lettuce, toms and celery,
Carrots, rads and apples too?!
Quick, get a dozer over here,
I know just what we will do.
A great big bowl the crater makes,
We'll toss it with the dozer;
The splintered pallet use for toothpicks
When the salad feast is over.
Be quick now boys
And bring the dressing,
A hundred gallons should do just fine;
What's that, it's mayonnaise you want?
This line is Russian, that's Blew Cheese,
We don't have time for mayo please
The salad is about to freeze.
Jump right in!
Eat your fill!
Stuff it in your shirt and pockets,
Pack it under bed and lock it;
Eat and eat and eat until
We finish with this ballad
And it's back to Three Bean Salad.*

I scrounged up an early PC and a case each of yogurt cups and granola bars and locked my Self in my room for a week.

And wrote. At first my output was personal, fantastical, biographical. Deep dark teen-aged angst morphed to become. . .

*COAL AND ICE
NOT SO NICE*

*Don't you think that that's a lot of ice?
Coal and mountains
But no fountains,
Nine thousand feet straight up
From sea to air;
It's just not fair
To be so bare
Of flowers trees and hare.
The dust and rock,
It's not a crock,
There's naught that makes home here.
Except a lichen
Or a krill
Or a penguin,
Seal or whale.
But People!
People struggle to survive,
People build to stay alive,
People try and buy and cry and fly
To get back home where they may die;
But they don't Live
Out on the Ice.
It's not so nice.
There are no trees
To please and ease,
There are no girls and boys to tease,
No cats and rats nor oliphaunts;
Noah's Ark would be so empty
If he had started here.
To what use is all of this but
For a place to sell more beer?*

Eventually I ran out of yogurt and granola. Next was Pirate Radio, Ham radio and Super Bowl Sunday

In 1992, shuttle astronauts aboard STS-45 would be looking to Work All Continents during their 10-day mission. They would have only one or two opportunities where their orbit would put them in view of Palmer Station. Through the NASA God-

dard Amateur Radio club I relayed the message that KC4AAC would be waiting; when the spacecraft was indicated to be above my horizon I called: STS-45 this is Palmer Station! STS-45 answered right away, and after pleasantries of call signs the first words of the pilot, N5WQW, were: "You made our day!" Palmer Station; KC4AAC/k1oIq, was their seventh continent.

When AFRTS transferred all their programming from shortwave to satellite I used the Inmarsat spares at Palmer to retransmit Super Bowl Sunday to SPOLE and other stations along the Peninsula. But those adventures are told in other stories.

Followups (China, icebreakers)

China (October 2017 newsletter). A review of the book *China as a Polar Great Power* describes China's increasing activity in, and regarding, Antarctica.

Followup. "What's coming up in 2018," an article in the 5 January *Science*, says: "China's push to become a scientific and economic leader is sure to affect how, and where, research is done."

A two-page advertisement in the same issue states that Qingdao (China) National Laboratory for Marine Science and Technology, Texas A&M University (TAMU), and the U.S. National Center for Atmospheric Research (NCAR) are establishing a laboratory for high-resolution earth system prediction. The collaboration, starting in January 2018, will include study of mesoscale ocean eddies and their interactions with atmosphere and sea ice.

Coincidentally, Expedition 374 of the TAMU-operated deep earth drilling ship *Joides Resolution*, in the Ross Sea January-March 2018 to sample for West Antarctic Ice Sheet history, includes an inorganic chemist from Qingdao.

At Qingdao itself, research areas include polar oceans. A collaboration with Australia has established a Center for

Southern Hemisphere Oceans Research, to include Antarctic observations and research.

Looking back a bit with a U.S. Antarctic Program perspective, Dean Cheng of the (U.S.) Heritage Foundation in 2014 issued a report, "[The option for U.S.-China cooperation in Antarctica](#)," that concludes, "The Antarctic is an area where the U.S. and China have much to gain through greater cooperation and little to lose. Antarctic cooperation is therefore well worth exploring, to help improve bilateral ties without infringing upon either side's core interests."

Icebreakers (July 2017 newsletter). An article describes progress toward getting new U.S. polar-class icebreakers (the Coast Guard has asked Congress for three heavies and three mediums), and it notes the launch of a new Russian icebreaker.

Followup. Eugene Van Rynbach of Herbert Engineering Corporation argues that the Coast Guard, to save money without compromising mission, should give up on the medium class icebreakers and instead block-buy four heavies. Each new ship of the same class would cost less than the preceding one, and whatever yard got the job would make more cost-saving up-front investments if just one new class is to be built. Lessons learned from each new ship would be applied to the next one.

Van Rynbach, who was on the National Academy of Engineering study that identified the three heavy/three medium concept as well as the only-four-heavies approach in a July 2017 report, restated his argument at an American Society of Naval Engineers [Arctic Day](#) in November.

The [July study](#) itself favors Van Rynbach's approach. The two designs are almost the same size (132 vs. 128 meters LOA). The July report states, "the suggested acquisition strategy of four heavy icebreakers saves more than \$1 billion compared with the government's request of three heavy and three medium icebreakers."

The three-and-three idea comes from

a Department of Homeland Security mission needs statement approved in July 2013. In October 2017 a draft request for proposals was issued for design and construction of one heavy with options for two more. The Congressional Research Service estimates a block-buy instead would save upwards of \$200-million for all three, compared to the options approach.

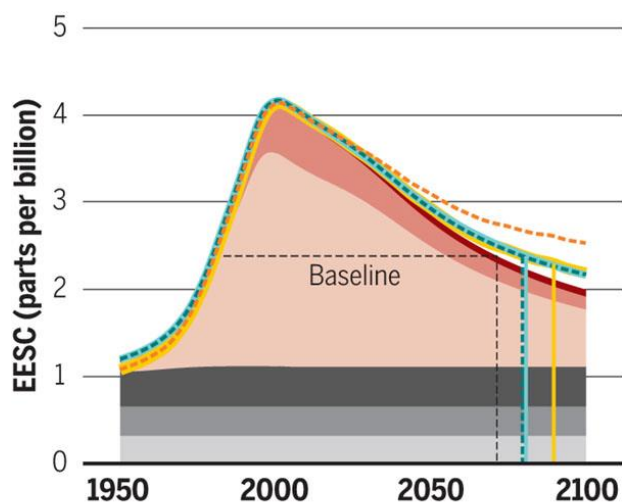
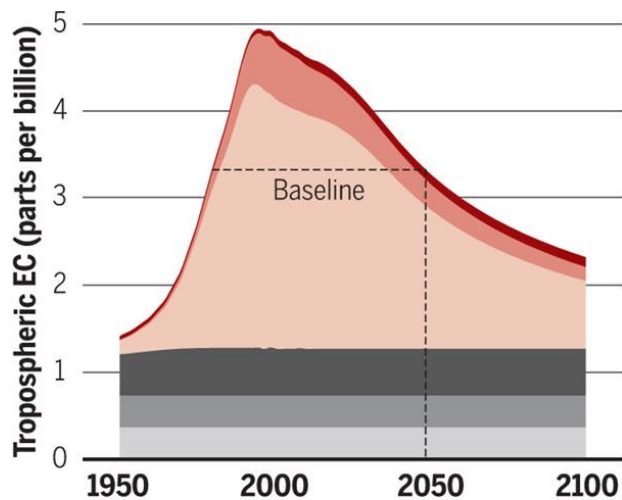
Coast Guard Commandant Admiral Paul Zukunft stated on 10 January that the new class can carry cruise missiles, but won't at first. According to an [article](#) in *Breaking Defense*, a construction contract for the first ship – a heavy – will be awarded early in fiscal 2019 (which starts in October 2018), and a block-buy contract for subsequent ships will follow. "The first ship would be finished in 2023 and enter service soon after," the article states. "Zukunft wants at least three heavy icebreakers and three medium ones, although he's open to trading some or all of the mediums for additional heavies."

As for the new Russian icebreaker *Arktika*, 173 meters LOA and a heavy, it was launched in June 2016 and is to be commissioned in 2019 as the lead ship of a new class of three nuclear-powered icebreakers, the world's biggest. Russia now operates six heavies.

A [chart](#) prepared by the U.S. Coast Guard Office of Waterways and Ocean Policy illustrates that 18 nations own and operate icebreakers. The Russian fleet of 46 operating, under construction, or planned is almost as many as the other 17 nations put together.

Ozone hole recovery is uncertain

Despite the success of the Montreal Protocol in limiting production of substances that cause the Antarctic ozone hole, bringing the chemistry of the stratosphere back to what it was before the ozone hole started lies in decisions yet to be made.



Anthropogenic

● VLSL_{Cl} ● Controlled Br ● Controlled Cl

Natural

● CH₃Cl ● CH₃Br ● VLSL_{Br}

Scenario estimates

--- DCM --- CCl₄ --- Climate --- Combined

Recovery of the ozone hole depends on lowering halogen emissions (measured by the tropospheric EC, or “equivalent chlorine”), which in turn lowers the amounts transported to the stratosphere (measured by the EESC, equivalent effective stratospheric chlorine). VLSL_{Cl} = very short-lived substances (less than 6 months), chlorine equivalent. DCM = dichloromethane, a VLSL. CCl₄ = carbon

tetrachloride, which lasts in the atmosphere many decades. The baselines show when an earlier study projects ozone-destroying substances to return to the 1980 level in the troposphere (upper chart) and the stratosphere (lower chart). The lower chart shows the years of delay that could result from scenarios discussed in the new study; the “Combined” scenario (red dashes) places ozone hole recovery beyond 2100. Image: *Science*, 8 December 2017, p. 1258

Basically, if societies limit climate-change gases in the troposphere, we’ll help fix the ozone hole too. That, says a NASA Goddard [study](#) in the 8 December 2017 *Science*, is because “the tropospheric equivalent chlorine (EC) abundance is the starting point for calculating the stratospheric halogen budget. . . . The equivalent effective stratospheric chlorine (EESC) in the Antarctic lower stratosphere is a key measure of stratospheric ozone depletion.” Antarctic EESC is calculated from the tropospheric EC, but a lag time is involved. Different gases have different lifetimes; the long-lived ones enter the stratosphere and contribute fully to the EESC, but only 50 to 90 percent of the short-lived ones make it to the top. Some of the short-lived ones are declining slower than expected.

Limited compliance with the Montreal Protocol is another concern. The controlled substances are projected to contribute about 56 percent to the EESC in 2050. If other emissions continue at the present rate the recovery of the Antarctic ozone hole will be delayed 10 years.

Other scenarios project recovery to be delayed 20 years. An irony is that carbon dioxide, a key greenhouse gas, helps to suppress the ozone hole.

The chemistry is vastly more complicated than presented here, but, in the end, “improved compliance and monitoring

of controlled substances and successful efforts to limit climate change are crucial” to close the Antarctic ozone hole.

Peter F. Bermel, 1928-2017



Peter F. Bermel, who was president of the Antarctic Society in 1973-1974, died on 21 October 2017. Before being president, in 1971-1972 Pete was a Director of the Society. During that time he chaired the program committee; in the 1970s many Society members lived and worked in the Washington, D.C., area, and a dynamic program of lectures and social gatherings took place throughout the year.

Following those functions, Pete remained a beloved member, contributing, for example, a 20-question trivia quiz published in a 1979 issue of the newsletter asking such questions as “3. What Chief Scientist went on an unannounced, unplanned swim in Kainan Bay?” and “19. What famous Antarctic dumped 500 fifths of Golden Wedding Whiskey through a hole drilled through the floor of his observatory?” (You can find the other 18 questions, and the answers, in the archived newsletters on the Society’s web site.)

Pete’s professional career included 47 years with the U.S. Geological Survey, where he was a civil engineer, cartographer, and leader in mapping of the United States. The 47 years includes two summers working as a rodman while in school. A 1948

engineering graduate from the Missouri School of Mines and Metallurgy, Pete spent two years in the Army, then joined the USGS at the Topographic Division’s mapping center in Rolla, Missouri. One of Pete’s memorable assignments was the plane-table mapping on Lake Superior’s Isle Royale National Wilderness Park.

In 1960-1961 he co-led a USGS party that surveyed in the Thiel Mountains of Antarctica. The next season he led another USGS survey party extending geodetic control in the Cape Hallett area and the Horlick Mountains. He was on the team that helped establish the first exact position of the geographic South Pole, 90° South. Bermel Escarpment, a snow and rock escarpment 15 nautical miles long in the Thiel Mountains, was named for him by U.S. naming authorities. Bermel Peninsula was named for him by the United Kingdom.

Pete rose from work in the field to become assistant director for plans and programs at the Geological Survey in Reston, Virginia, a position that made him one of three permanent witnesses each year before the Interior Budget Committee. He received the Meritorious Civil Servant Award from President George H.W. Bush and the Distinguished Service Award from the Department of the Interior. He was a charter member of the Senior Executive Service created by President Carter.

Pete was a member of the Explorers Club and, for 54 years, a member of the Society for the Preservation and Encouragement of Barber Shop Quartet Singing in America (aka The Barbershop Harmony Society) as well as other singing groups. He is survived by his wife of 63 years, Barbara “Bobbie” Jean Clark Bermel.

Much of this information came with thanks from the USGS Mapping Retirees Newsletter, Fall 2017, No. 149.

Thomas S. Laudon, 1932-2017

Dr. Thomas Stanzel Laudon died on 1 January 2017 at his home on Lake Winnebago in Wisconsin.



Dr. Thomas Laudon at Byrd Station 1960

He worked in Antarctica on 10 geological expeditions in the Crary Mountains, the Ellsworth Mountains, and elsewhere. He led the 1965-1966 University of Wisconsin Ellsworth Land Geology Expedition and coordinated publication of results. His Antarctic work resulted in 17 scientific papers that he wrote or co-wrote from 1962 to 1997. The U.S.-designated Mount Laudon, in southern Palmer Land, acknowledges Tom's Antarctic work.

Tom was born on 14 June 1932, graduated from high school in 1950, and received the BS, MS, and PhD in geology from the University of Wisconsin, Madison.

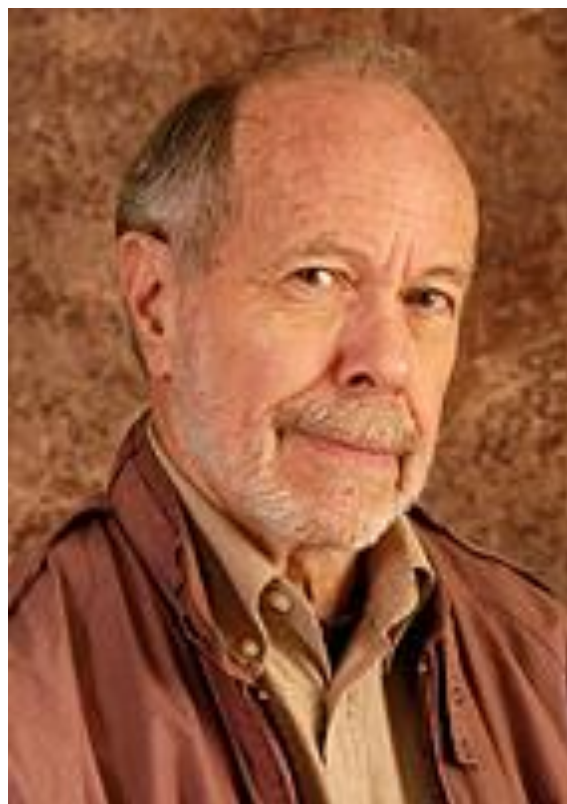
He served two years of active duty in the USAAF and 25 years in the reserves as an Air Force Academy liaison officer.

In 1963, Tom accepted a job at UW Oshkosh as the second geology professor in the department. He retired in 1999. At UW-O, Tom established a geology summer field camp. Over the course of 35 summers, he led hundreds of students through the Canadian Rockies to the Yukon Territory. He passed to his students his knowledge of geology, passion for the outdoors and mountaineering, and love of cheap whiskey, cigars, and campfire revelry.

He spent most of his career at the University of Wisconsin Oshkosh campus, but took study leave in 1994 at the University of Tasmania in Hobart.

Pat Quilty, Honorary Research Professor, University of Tasmania, contributed to this obituary.

Robert L. de Zafra, 1932-2017



Dr. Robert deZafra

Robert L. de Zafra, a Stony Brook University (New York) physicist who, with others, confirmed that the chemicals in some aerosols and refrigerants were responsible for the Antarctic ozone hole, died 10 October 2017 of respiratory complications following surgery.

He and other researchers during the McMurdo-based National Ozone Expeditions 1 and 2 in the 1986 and 1987 austral winters confirmed that chlorofluorocarbons, used worldwide in refrigerants and as propellants in aerosol cans, had entered the planet's stratosphere and were causing chemical reactions that reduce ozone. Together with natural phenomena unique to the Antarctic, the introduced chemicals nearly destroyed the region's springtime stratosphere ozone.

Susan Solomon, then of the National Oceanic and Atmospheric Administration and now at MIT, led the Antarctic expeditions. She told the *New York Times*, which published an obituary on 23 October, "Bob and his colleagues were the first to measure chlorine monoxide in the region of the ozone hole over Antarctica in 1986. They showed that this chemical was present in much larger amounts than at other latitudes. This and subsequent work established that the ozone hole is due to human production of chlorofluorocarbon chemicals."

"These chemicals are now no longer produced anywhere in the world," Dr. Solomon stated, "and the Antarctic ozone hole is expected to heal slowly over the next 50 years or so. Bob's work was key in helping save the planet's ozone layer."

Robert Lee de Zafra was born on 15 February 1932 in Scarsdale, New York. He graduated from Princeton in 1954, received the Ph.D. at the University of Maryland in 1958, and began teaching at Stony Brook in the early 1960s.

On retiring in 1999 from 38 years of teaching, Bob posted this on the Stony Brook web site: "I am a physicist who has been concerned for over three decades with

developing and applying accurate, sensitive methods for making remote measurements of stratospheric trace gases (such as those involved in ozone depletion chemistry) and stratospheric transport. I and colleagues at Stony Brook developed a unique ground-based remote sensing spectrometer, able to identify and quantitatively measure molecular rotational emission spectra from stratospheric trace gases present in as little as a few tenths of a part per billion of ambient air pressure. With this technique, we have been measuring and monitoring the destructive effects of chlorofluorocarbons on stratospheric ozone since 1981, and more recently concentrating on other aspects of stratospheric chemistry and transport."