

MAY 2020

Tuesday
May 12, 2020



Greenland Has a Grand Canyon Beneath Its Ice, Carved by Ancient Floods

Ancient topography lurks beneath the white expanse.

BY ISAAC SCHULTZMAY 1, 2020

Greenland Has a Grand Canyon Beneath Its Ice, Carved by Ancient Floods



Northern Greenland is covered in rock and ice. The longest and deepest canyon on the landmass is buried miles below. MICHAEL STUDINGER, NASA / CC BY 2.0

In This Story

DESTINATION GUIDE

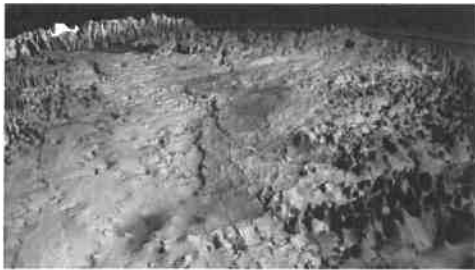
Greenland

ON ITS SURFACE, GREENLAND DOESN'T exactly live up to its name. It's very cold and covered in a massive ice sheet that's nearly two miles thick in places. But beneath that sheet there is a giant, rocky island that wasn't always frozen over, with an undulating topography of valleys and river corridors, including one canyon as deep as the Grand Canyon in places and longer than its famous cousin—spanning the distance from New York to Washington, D.C., twice over.

“The Grand Canyon is something you can stand on the edge and see,” says Benjamin Keisling, a geologist and lead author of a new study on the formation

of Greenland's canyon published in the journal *Geology*. "The Greenland canyon we only know about through radar that can see through three kilometers of solid ice."

According to the study, the canyon in northern Greenland came to be through repeated heavy flood events that forced water through the bedrock. "The canyon has been mapped before by other teams, but it's also been enigmatic why it exists, and what relationship it has with the ice sheet itself," says Keisling, a geologist now at Columbia University's Lamont-Doherty Earth Observatory, who conducted the work as a graduate student at the University of Massachusetts at Amherst. "We proposed a mechanism for how the canyon may have formed."



Greenland's massive canyon, the dark red-brown feature at center, is as big as the Grand Canyon, but entirely beneath the island's ice sheet. NASA'S GODDARD SPACE FLIGHT CENTER / PUBLIC DOMAIN

Temperatures on Earth have long fluctuated, most recently in the famous ice ages of the Pleistocene, which ended a little over 10,000 years ago. Over the course of many older fluctuations, dating back more than two million years, the Greenland ice sheet—the second largest in the world, to Antarctica's—has had the chance to thaw, refreeze, and thaw again. Keisling's team proposes that in times of rapid thawing, water may have collected in the depressed bedrock, and then broken through ice dams in diluvian outbursts, scouring the land with immense pressure.

The alternative theory for the shaping of the canyons would be the scraping erosion of glacial retreat and advance, the same process that created the Great Lakes and left big scrape marks in the schist of New York's Central Park. But the canyon is too old for Greenland's most recent ice sheet, and its veiny offshoots suggest a more liquid origin.



Deep below the flat swath of ice, there's a lot going on, geologically, at least. SILVAN LEINSS / CC BY-SA 4.0

“We know also from previous work that when you map out the canyons underneath Greenland in a detailed fashion, they look more like river networks than if they were eroded by ice,” Keisling says.

He adds that the Greenlandic ice sheet was previously thought to have been frozen 2.7 million years ago and just stayed that way since, a concept now being challenged from multiple angles. Digging into the ancient climate through the events that shaped the land under Greenland's ice has useful implications for the understanding of modern climate.

“We know from studies of the bedrock in Greenland that the ice sheet has disappeared in the past,” Keisling says. “Before that, a lot of people didn't think that was possible. It revolutionizes our understanding of how the ice sheet behaves, which gives us a better understanding of how the ice sheet will behave in the future.”

At least as long as we have it.



THE DAILY CHRONICLE

TUESDAY, MAY 12, 2020

On This Date

1935 – Bill Wilson and Dr. Bob Smith (founders of Alcoholics Anonymous) met for the first time in Akron, Ohio. With other early members, they developed the Twelve Step program of spiritual and character development.

1957 – A.J. Foyt won his first major race, a midget car event in Kansas City. He went on to win 67 championship races, including four at the Indianapolis 500.



1978 – The U.S. National Oceanic and Atmospheric Administration (NOAA) decided that hurricanes would no longer be given only female names. In 1979, Hurricane Bob battered the Gulf Coast.

Word Trivia

A *pangram* is a sentence that contains all the letters of the alphabet. By far the best-known pangram is “The quick brown fox jumps over the lazy dog.”

Quote of the Day

“Sometimes I wonder if men and women really suit each other. Perhaps they should live next door and just visit now and then.”

~ *Katharine Hepburn*

Happy Birthday!

Katharine Hepburn (1907–2003) was a screen legend. She holds the record for Best Actress Oscar wins with four. She was nominated 12 times. From the very beginning of her career, she was outspoken and intellectual, defying the era’s “blonde bombshell” stereotypes. Her long-time relationship with Spencer Tracy is considered one of Hollywood’s most legendary love affairs. When she died, the lights on Broadway were dimmed for an hour in her honor.





		First Names				Seafood				Birds			
		Joselyn	Lilian	Skylar	Sydney	clams	crab	red snapper	scallops	scarlet tanager	sparrow	warbler	woodpecker
Anniversaries	February 16												
	May 1												
	August 25												
	September 20												
Birds	scarlet tanager												
	sparrow												
	warbler												
	woodpecker												
Seafood	clams												
	crab												
	red snapper												
	scallops												

Logic Puzzles

Presented by Puzzle Baron

Puzzle ID: I574WX

For hints, solutions and more puzzles, go to www.Printable-Puzzles.com!

Anniversaries	First Names	Seafood	Birds
February 16			
May 1			
August 25			
September 20			

- Lilian never saw the scarlet tanager or woodpecker.
- The one who saw the warbler is not Skylar and didn't order crab.
- The one who saw the sparrow is Joselyn.
- The one who saw the sparrow enjoyed scallops for dinner.
- The one who saw the scarlet tanager has an anniversary after Joselyn.
- The one who ordered clams is not Skylar or Lilian.
- The person whose anniversary is on May 1 didn't order red snapper.
- Skylar has an anniversary after the one who saw the woodpecker.
- Either the person whose anniversary is on February 16 or the person whose anniversary is on May 1 is Sydney.
- Of Lilian and the one who saw the scarlet tanager, one enjoyed red snapper for dinner and the other has an anniversary on August 25.
- The person whose anniversary is on February 16 is not Joselyn.

The Celebrated Jumping Frog of Calaveras County

In compliance with the request of a friend of mine, who wrote me from the East, I called on good-natured, garrulous old Simon Wheeler, and inquired after my friend's friend, Leonidas W. Smiley, as requested to do, and I hereunto append the result. I have a lurking suspicion that Leonidas W. Smiley is a myth; that my friend never knew such a personage; and that he only conjectured that, if I asked old Wheeler about him, it would remind him of his infamous Jim Smiley, and he would go to work and bore me nearly to death with some infernal reminiscence of him as long and tedious as it should be useless to me. If that was the design, it certainly succeeded.

I found Simon Wheeler dozing comfortably by the bar-room stove of the old, dilapidated tavern in the ancient mining camp of Angel's, and I noticed that he was fat and bald-headed, and had an expression of winning gentleness and simplicity upon his tranquil countenance. He roused up and gave me good-day. I told him a friend of mine had commissioned me to make some inquiries about a cherished companion of his boyhood named Leonidas W. Smiley Rev. Leonidas W. Smiley a young minister of the Gospel, who he had heard was at one time a resident of Angel's Camp. I added that, if Mr. Wheeler could tell me any thing about this Rev. Leonidas W. Smiley, I would feel under many obligations to him.

Simon Wheeler backed me into a corner and blockaded me there with his chair, and then sat me down and reeled off the monotonous narrative which follows this paragraph. He never smiled, he never frowned, he never changed his voice from the gentle-flowing key to which he tuned the initial sentence, he never betrayed the slightest suspicion of enthusiasm; but all through the interminable narrative there ran a vein of impressive earnestness and sincerity, which showed me plainly that, so far from his imagining that there was any thing ridiculous or funny about his story, he regarded it as a really important matter, and admired its two

heroes as men of transcendent genius in finesse. To me, the spectacle of a man drifting serenely along through such a queer yarn without ever smiling, was exquisitely absurd. As I said before, I asked him to tell me what he knew of Rev. Leonidas W. Smiley, and he replied as follows. I let him go on in his own way, and never interrupted him once:

There was a feller here once by the name of Jim Smiley, in the winter of '49 or may be it was the spring of '50 I don't recollect exactly, somehow, though what makes me think it was one or the other is because I remember the big flume wasn't finished when he first came to the camp; but any way, he was the curiosest man about always betting on any thing that turned up you ever see, if he could get any body to bet on the other side; and if he couldn't, he'd change sides. Any way that suited the other man would suit him any way just so's he got a bet, he was satisfied. But still he was lucky, uncommon lucky; he most always come out winner. He was always ready and laying for a chance; there couldn't be no solittry thing mentioned but that feller'd offer to bet on it, and -take any side you please, as I was just telling you. If there was a horse-race, you'd find him flush, or you'd find him busted at the end of it; if there was a dog-fight, he'd bet on it; if there was a cat-fight, he'd bet on it; if there was a chicken-fight, he'd bet on it; why, if there was two birds setting on a fence, he would bet you which one would fly first; or if there was a camp-meeting, he would be there reg'lar, to bet on Parson Walker, which he judged to be the best exhorter about here, and so he was, too, and a good man. If he even seen a straddle-bug start to go anywheres, he would bet you how long it would take him to get wherever he was going to, and if you took him up, he would foller that straddle-bug to Mexico but what he would find out where he was bound for and how long he was on the road. Lots of the boys here has seen that Smiley, and can tell you about him. Why, it never made no difference to him he would bet on any thing the dangdest feller. Parson Walker's wife laid very sick once, for a good while, and it seemed as if they warn's going to save her; but one morning he come in, and Smiley asked how she was, and he said she was considerable better thank the Lord for his inftnit mercy and coming on so smart that, with the blessing of Providence, she'd get well yet; and

Smiley, before he thought, says, "Well, I'll risk two- and-a-half that she don't, any way."

Thish-yer Smiley had a mare the boys called her the fifteen- minute nag, but that was only in fun, you know, because, of course, she was faster than that and he used to win money on that horse, for all she was so slow and always had the asthma, or the distemper, or the consumption, or something of that kind. They used to give her two or three hundred yards start, and then pass her under way; but always at the fag-end of the race she'd get excited and desperate- like, and come cavorting and straddling up, and scattering her legs around limber, sometimes in the air, and sometimes out to one side amongst the fences, and kicking up m-o-r-e dust, and raising m-o-r-e racket with her coughing and sneezing and blowing her nose and always fetch up at the stand just about a neck ahead, as near as you could cipher it down.

And he had a little small bull pup, that to look at him you'd think he wan's worth a cent, but to set around and look ornery, and lay for a chance to steal something. But as soon as money was up on him, he was a different dog; his underjaw'd begin to stick out like the fo'castle of a steamboat, and his teeth would uncover, and shine savage like the furnaces. And a dog might tackle him, and bully- rag him, and bite him, and throw him over his shoulder two or three times, and Andrew Jackson which was the name of the pup Andrew Jackson would never let on but what he was satisfied, and hadn't expected nothing else and the bets being doubled and doubled on the other side all the time, till the money was all up; and then all of a sudden he would grab that other dog jest by the j'int of his hind leg and freeze on it not chew, you understand, but only jest grip and hang on till they thronged up the sponge, if it was a year. Smiley always come out winner on that pup, till he harnessed a dog once that didn't have no hind legs, because they'd been sawed off by a circular saw, and when the thing had gone along far enough, and the money was all up, and he come to make a snatch for his pet bolt, he saw in a minute how he'd been imposed on, and how the other dog had him in the door, so to speak, and he 'peered sur- prised, and then he looked

sorter discouraged-like, and didn't try no more to win the fight, and so he got shucked out bad. He give Smiley a look, as much as to say his heart was broke, and it was his fault, for putting up a dog that hadn't no hind legs for him to take bolt of, which was his main dependence in a fight, and then he limped off a piece and laid down and died. It was a good pup, was that Andrew Jackson, and would have made a name for hisself if he'd lived, for the stuff was in him, and he had genius I know it, because he hadn't had no opportunities to speak of, and it don't stand to reason that a dog could make such a fight as he could under them circumstances, if he hadn't no talent. It always makes me feel sorry when I think of that last fight of his'n, and the way it turned out.

Well, thish-yer Smiley had rat-tarriers, and chicken cocks, and tom-cats, and all of them kind of things, till you couldn't rest, and you couldn't fetch nothing for him to bet on but he'd match you. He ketched a frog one day, and took him home, and said he cal'klated to edercate him; and so he never done nothing for three months but set in his back yard and learn that frog to jump. And you bet you he did learn him, too. He'd give him a little punch behind, and the next minute you'd see that frog whirling in the air like a doughnut see him turn one summerset, or may be a couple, if he got a good start, and come down flat-footed and all right, like a cat. He got him up so in the matter of catching flies, and kept him in practice so constant, that he'd nail a fly every time as far as he could see him. Smiley said all a frog wanted was education, and he could do most any thing and I believe him. Why, I've seen him set Dan'l Webster down here on this floor Dan'l Webster was the name of the frog and sing out, "Flies, Dan'l, flies!" and quicker'n you could wink, he'd spring straight up, and snake a fly off'n the counter there, and flop down on the floor again as solid as a gob of mud, and fall to scratching the side of his head with his hind foot as indifferent as if he hadn't no idea he'd been doin' any more'n any frog might do. You never see a frog so modest and straightforward as he was, for all he was so gifted. And when it come to fair and square jumping on a dead level, he could get over more ground at one straddle than any animal of his breed you ever see. Jumping on a dead level was his strong suit, you understand; and

when it come to that, Smiley would ante up money on him as long as he had a red. Smiley was monstrous proud of his frog, and well he might be, for fellers that had traveled and been everywhere, all said he laid over any frog that ever they see.

Well, Smiley kept the beast in a little lattice box, and he used to fetch him down town sometimes and lay for a bet. One day a feller a stranger in the camp, he was come across him with his box, and says:

"What might it be that you've got in the box?"

And Smiley says, sorter indifferent like, "It might be a parrot, or it might be a canary, may be, but it an't it's only just a frog."

And the feller took it, and looked at it careful, and turned it round this way and that, and says, "H'm so 'tis. Well, what's he good for?"

"Well," Smiley says, easy and careless, "He's good enough for one thing, I should judge he can outjump any frog in Calaveras county."

The feller took the box again, and took another long, particular look, and give it back to Smiley, and says, very deliberate, "Well, I don't see no p'int about that frog that's any better'n any other frog."

"May be you don't," Smiley says. "May be you understand frogs, and may be you don't understand 'em; may be you've had experience, and may be you an't only a amature, as it were. Anyways, I've got my opinion, and I'll risk forty dollars that he can outjump any frog in Calaveras county."

And the feller studied a minute, and then says, kinder sad like, "Well, I'm only a stranger here, and I an't got no frog; but if I had a frog, I'd bet you."

And then Smiley says, "That's all right that's all right if you'll hold my box a minute, I'll go and get you a frog." And so the feller took the box, and put up his forty dollars along with Smiley's, and set down to wait.

So he set there a good while thinking and thinking to hisself, and then he got the frog out and prized his mouth open and took a tea- spoon and filled him full of quail shot filled him pretty near up to his chin and set him on the floor. Smiley he went to the swamp and slopped around in the mud for a long time, and finally he ketched a frog, and fetched him in, and give him to this feller, and says:

"Now, if you're ready, set him alongside of Dan'l, with his fore- paws just even with Dan'l, and I'll give the word." Then he says, "One two three jump!" and him and the feller touched up the frogs from behind, and the new frog hopped off, but Dan'l give a heave, and hysted up his shoulders so like a Frenchman, but it wan's no use he couldn't budge; he was planted as solid as an anvil, and he couldn't no more stir than if he was anchored out. Smiley was a good deal surprised, and he was disgusted too, but he didn't have no idea what the matter was, of course.

The feller took the money and started away; and when he was going out at the door, he sorter jerked his thumb over his shoulders this way at Dan'l, and says again, very deliberate, "Well, I don't see no p'int about that frog that's any better'n any other frog."

Smiley he stood scratching his head and looking down at Dan'l a long time, and at last he says, "I do wonder what in the nation that frog throw'd off for I wonder if there an't something the matter with him he 'pears to look mighty baggy, somehow." And he ketched Dan'l by the nap of the neck, and lifted him up and says, "Why, blame my cats, if he don't weigh five pound!" and turned him upside down, and he belched out a double handful of shot. And then he see how it was, and he was the maddest man he set the frog down and took out after that feller, but he never ketchd him. And-

[Here Simon Wheeler heard his name called from the front yard, and got up to see what was wanted.] And turning to me as he moved away, he said: "Just set where you are, stranger, and rest easy I an't going to be gone a second."

But, by your leave, I did not think that a continuation of the history of the enterprising vagabond Jim Smiley would be likely to afford me much information concerning the Rev. Leonidas W. Smiley, and so I started away.

At the door I met the sociable Wheeler returning, and he button- holed me and recommenced:

"Well, thish-yer Smiley had a yeller one-eyed cow that didn't have no tail, only jest a short stump like a bannanner, and "

"Oh! hang Smiley and his afflicted cow!" I muttered, good-naturedly, and bidding the old gentleman good-day, I departed.