

The July 26th, 2017 Edition of THE REVENGE HUMP DAY!

Page 1 of 46

Welcome to the July 26th, 2017 Edition of THE REVENGE HUMP DAY!

This week has been remarkably calm. About the only thing of note is that I ended up with a chest infection and I am back on antibiotics steroids. No big deal really because I get these periodically. Jamie, Jason and Bubba Bear got back from Uncle Bobby's condo early on Monday morning and from what I have heard, they had a ball. Bubba had his 7th birthday down at Uncle Bobby's, but we will probably be holding him another birthday party next weekend. I see cake in our future.

On the LibertyCon front, we still haven't got next year's hotel situation straightened out. Sigh, I wish there was another perfect hotel in the Big Nooga area that wanted to talk to us. But thankfully, that is up to Brandy to work out.

I have been messing with SHE WHO MUST BE OBEYED'S laptop that went boom. Since next weekend is free tax weekend, I plan on getting her a new one from Amazon. She doesn't need a powerful one, just one to do he email and Facebook on. I think I have narrowed it down to an HP with 15.4" screen, a Quad Core processor, 500 gb harddrive and 8 gb of dram. It should work fine for her.

One thing I have noted is that Summer vacation is almost over for the kids and they start back the 2nd week of August. I remember when I was a kid how much I enjoyed my long summer vacations and going back to school after Labor Day. I really feel sorry for the kids nowadays because it doesn't seem that they have the time to be kids. Oh well, I guess some of the educators out there think this is progress. I really don't.

So on that "thoughtful note", why don't y'all sit back and relax because here's the best in gossip, jokes and science for your reading pleasure!

Uncle Timmy

<G>~<O>~<S>~<S>~<I>~<P>~<S>~<T>~<A>~<R>~<T>~<S>~<H>~<E>~<R>~<E>~<I>

1966 THE COMPLETE BATMAN GUEST STAR WINDOW CAMEOS (14) ON THE BATCLIMB

From: "Jim Woosley" jimwoosley@aol.com

https://www.youtube.com/watch?v=PE_CM3tvkys

<L>~<I>~~<E>~<R>~<T>~<Y>

ASSORTED VIDEOS

WEIRD AL - JURASSIC PARK (VICE MCARTHUR'S PARK)

<https://www.youtube.com/watch?v=qh4zvQfDhi0>

THOR RAGNAROK - COMICCON TRAILER

<https://www.youtube.com/watch?v=ue80QwXMRHg>

THE INHUMANS (NEW TV SERIES, IMAX PREMIER) COMICCON TRAILER

<https://www.youtube.com/watch?v=xU9Z6cKsbY0#t=49.45225>

JUSTICE LEAGUE - COMICCON TRAILER

https://www.youtube.com/watch?v=q_6yBZKj-eo#t=3.578333

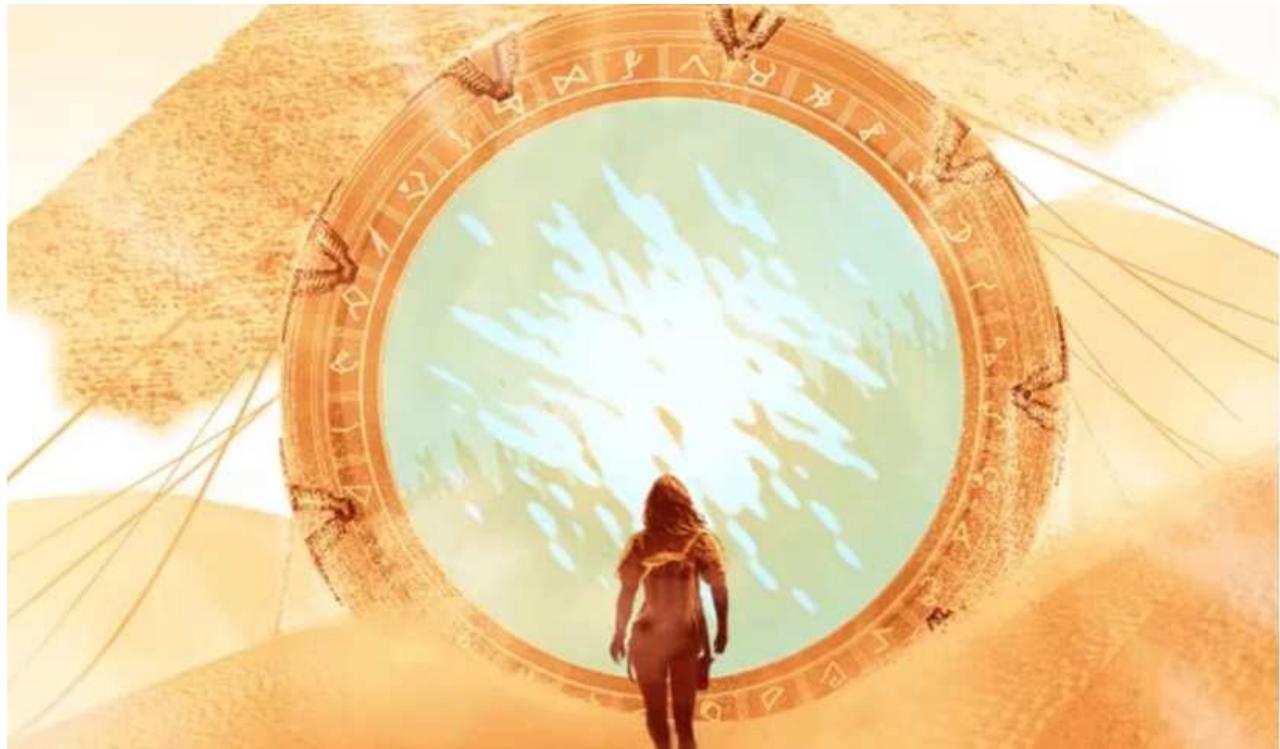
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'STARGATE' FRANCHISE IS COMING BACK WITH 'STARGATE ORIGINS'

From: "Tim Bolgeo" tbolgeo@epbf.com

By Tariq Malik, Space.com Managing Editor | July 22, 2017 01:04pm ET

<https://www.space.com/37586-stargate-origins-new-tv-series-announced.html>



"Stargate Origins," a 10-episode prequel series to the Stargate science fiction franchise, will debut on MGM's Stargate Command digital streaming service launching in Fall 2017. Credit: Stargate Origins/MGM

Fans of "Stargate," rejoice! The science fiction franchise is getting a revival with "Stargate Origins," a new digital series that will serve as a prequel to the existing Stargate universe, which celebrates the 20th anniversary of its TV debut this year.

MGM announced the new Stargate TV series at San Diego Comic-Con, debuting a teaser trailer on Friday (July 21) for new show. The series will follow the character of Catherine Langdon during the early years of the titular Stargate's discovery in 1928. It will be a 10-episode series available on Stargate Command, a digital streaming site MGM will be launching this fall. So Stargate fans will likely have to sign up for the streaming service to

see the new show, much like how CBS's digital streaming service CBS All Access will host the upcoming "Star Trek: Discovery" series.

"'Stargate Origins' will explore a brand new chapter in Catherine Langford's early history surrounding the extraordinary portal," MGM representatives said in July 20 statement. "Young Catherine embarks on an unexpected adventure to unlock the mystery of what lies beyond the Stargate in order to save Earth from unimaginable darkness."

MGM representatives said that Stargate Command will offer fans "exclusive access to a variety of Stargate assets and content from the franchise's nearly 25-year history." The franchise began with the 1994 feature film "Stargate" and debuted on television with the series "Stargate: SG-1."

"We've been eager to revisit the Stargate franchise, and create an all-new story that honors the founding mythos and gives loyal fans more mystery and adventure," said Kevin Conroy, President of Digital & New Platforms at MGM in the statement. "We view 'Stargate Origins' as a thank you to fans who have been keeping the spirit of the franchise alive for nearly 25 years. With the increasing popularity of digitally native content that can be streamed to any device, MGM is committed to the production of premium linear mid-form content and are proud to launch with 'Stargate Origins.'"

<L>~<I>~~<E>~<R>~<T>~<Y>

GUCCI'S STAR TREK-THEMED FASHION REVEAL LOOKS BETTER THAN STAR TREK: DISCOVERY

Andrew Liszewski, July 25, 2017, Filed to: GUCCI

<http://io9.gizmodo.com/guccis-star-trek-themed-fashion-reveal-looks-better-tha-1797224876>



GIF: YouTube

You don't see Gucci mentioned on io9 that often, given the Italian fashion house isn't really into props or cosplay. But to help introduce its 2017 Fall and Winter fashion campaign, the brand created a short film inspired by the original Star Trek series. It's wonderful, and we'd happily trade Star Trek: Discovery for a whole series of this.

The film also incorporates other elements from '50s and '60s science fiction, including the Creature from the Black Lagoon, Lost in Space, and The Valley of Gwangi, complete with Ray Harryhausen-like stop-motion dinosaur effects. There's even a UFO that reminds of the 1986 film Flight of the Navigator, but without Paul Reubens.

The actual fashions in the film were designed by Alessandro Michele, and will presumably be showing up on catwalks, at Hollywood movie premieres, and hopefully more episodes of this video.

THERE IS A GREAT 1:14 VIDEO AT THE WEBSITE. CHECK IT OUT.

[YouTube via Hypebeast]

<L>~<I>~~<E>~<R>~<T>~<Y>~<C>~<O>~<N>

Re: Reply in last week's Revenge Concerning the Chattanooga Choo Choo

From: "Rod McFadden" rgmcf@yahoo.com

Jeez, Uncle Timmy, do you have to SHOUT!?

"FRANK, THE HOTEL YOU ARE DESCRIBING DOES NOT EXIST IN THE CHATTANOOGA AREA. I HAVE NEVER SEEN A PERFECT HOTEL FOR A CONVENTION IN ALMOST 40 YEARS. AS A MATTER OF FACE, WILSON 'BOB' TUCKER USED TO JOKE ABOUT..."

<U><T><'><s><*><C><O><M><M><E><N><T>

Actually Rod, I am not shouting. When I started the predecessor to the Revenge decades ago it was all in text. Since then I have saved in text and then changed the basic font to Arial. But I would still reply in capitalizations to a question or a comment. Honestly, I wasn't yell. I guess I can change my way of doing this now that I a getting older and use Monotype Corsiva for my comments and a header in the future. UT

<L>~<I>~~<E>~<R>~<T>~<Y>~<C>~<O>~<N>

Re: Cataract Surgery

From: "Richard Morehouse" richard@pantherfish.com

Both Liz and I have had primary and secondary cataract surgeries on both

eyes. I had the primary surgery in October of 2015 and the secondary in May of 2016. Liz had hers a couple of years before that.

The secondary surgery is no big deal. In our case it took five minutes each time and you only have to do it once per eye. You might have 'floaters' for a little while afterwards but they usually go away after a few days. My recovery time for the secondary surgery was a lot shorter than the primary.

My distance vision is now 20/25 but I need readers for close up stuff.

It takes a bit of getting used to but it not that bad.

<L>~<I>~~<E>~<R>~<T>~<Y>~<C>~<O>~<N>

Re: The July 19th, 2017 Edition of THE REVENGE HUMP DAY!

From: "Frank @ home Brayman"
afranklin3@gmail.com

COIN Aircraft Development

The Counter-Insurgency aircraft in last week's REVENGE isn't the first such effort. The WW-II P-51D Mustang was used by the Air National Guard through the mid 1950s. In the 1960s, surplus aircraft were the subject of COIN conversions for foreign air forces, and new airframes were produced by Piper for their Enforcer turboprop variant. A few Turbo Mustangs still survive in museums. The conversions have mostly been restored to their original P-51D configuration.

(Picture - Mustang Development)

Also: A few LibertyCons back, someone described to me an aircraft in development specifically for Third World air forces (John Ringo maybe - he was part of the discussion anyway.)

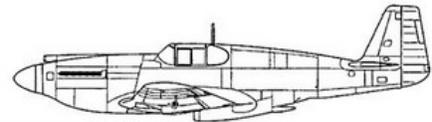
Here's what WAS NOT required:

- launch and recover on an aircraft carrier
- supersonic capability
- all weather capability
- MIL-SPEC instrumentation, avionics and propulsion
- sophisticated long-range search radar
- sophisticated radar gun sight
- multi million dollar missiles

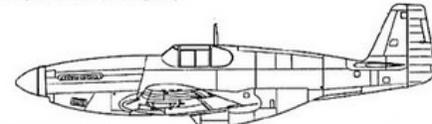
Here's what WAS required:

- user-friendly flight characteristics

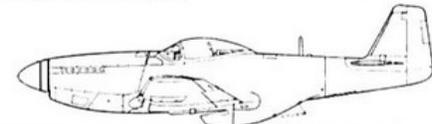
P-51 DEVELOPMENT



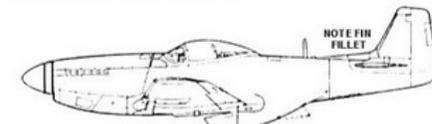
P-51A (Allison V-12 engine)



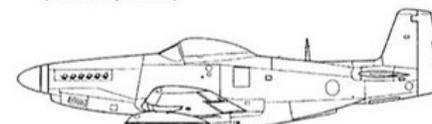
P-51B/C (Merlin V-12 engine)



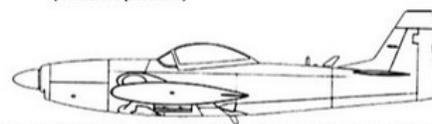
P-51D (Packard Merlin V-12 engine)
(early production - most later modified as below)



P-51D (Packard Merlin V-12 engine)
(late wartime production)



P-51H (light-weight version - Merlin V-12 engine)
(late wartime production)



Cavalier Turbo-Mustang III / Piper Enforcer (turboprop engine)
(produced as COIN aircraft, 1960s)

- robust, very tough airframe
- short field/rough field takeoff and landing
- optical gun sight
- useful gun armament, NATO 20mm or Soviet 23mm, with option to add a gun up to 40mm
- hard points for "dumb" bombs or rockets
- commercial airline grade instrumentation, radar, avionics and propulsion, so that parts and maintenance services are available from commercial sources

I thought that one over. Looks to me like they're inventing a slightly improved MiG-15, a late 1940s design used against us with success in the Korean War.



<T>~<H>~<E>~~~<J>~<O>~<K>~<E>~<S>~~~<S>~<T>~<A>~<R>~<T>~~~<H>~<E>~<R>~<E>

From: "Bob Bolgeo" bbolgeo@aol.com

A VERY SHORT GUN STORY

A wild eyed (and butt ugly) old woman walked into a crowded bar in downtown Washington, DC waving an un-holstered pistol and yelled out, "I have a .45 caliber Colt 1911, with a seven round magazine, plus one in the chamber. I want to know who's been sleeping with my husband?"



A female voice from the back of the room called out, "You Need More Ammo Hillary!"

<J>~<O>~<K>~<E>~<S>~<of>~<the>~<W>~<E>~<E>~<K>

From: "Mike Waldrip" waldripk@gmail.com

NAVY CHIEF GOES FISHING

The rain had stopped and there was a big puddle in front of the bar just outside the American Legion Post.

A rumped old Navy Chief was standing near the edge with a fishing line in the puddle.

A curious young Marine fighter pilot came over to him and asked what he was doing.

"Fishing," the old Chief simply said.

"Poor old chief," the Marine officer thought to himself and invited the old Navy Chief into the bar for a drink.

As he felt he should start a conversation while they were sipping their spirits, the young jet pilot winked at another pilot and asked the Chief, "How many have you caught today?"

"You're number 14," the old Chief answered, taking another sip from his double shot of 12-year-old Scotch, "2 Air Force, 3 Navy and 9 Marines."

<J>~<O>~<K>~<E>~<S>

CONCERNED OLD LADY

A sweet grandmother telephoned St. Mary's Hospital. She timidly asked, "Is it possible to speak to someone who can tell me how a patient is doing?"

The operator said, "I'll be glad to help, dear. What's the name and room number of the patient?"

The grandmother in her weak, tremulous voice said, "Norma Findlay, Room 302."
The operator replied, "Let me put you on hold while I check with the nurse's station for that room."

After a few minutes, the operator returned to the phone and said, "I have good news. Her nurse just told me that Norma is doing well. Her blood pressure is fine; her blood work just came back normal, and her Doctor, Dr. Smith has scheduled her to be discharged tomorrow."

The grandmother said, "Thank you. That's wonderful. I was so worried. God bless you for the good news."

The operator replied, "You're more than welcome. Is Norma your daughter?"

The grandmother said, "No, I'm Norma Findlay in Room 302. No one tells me shit."

WORST NIGHTMARE



<J>~<O>~<K>~<E>~<S>~<of>~<the>~<W>~<E>~<E>~<K>

From: "Karen Boyd" abtales@comcast.net

AN UNEXPECTED FUNNY

Amy and Jamie are old friends. They have both been married to their husbands for a long time.

One day Amy was upset because she thought her husband didn't find her attractive anymore. "As I get older he doesn't bother to look at me!" Amy cried.

"I'm so sorry for you, as I get older my husband says I get more beautiful every day." replied Jamie.

"Yes," answered Amy, "but your husband's an antique dealer!"

<J>~<O>~<K>~<E>~<S>~<of>~<the>~<W>~<E>~<E>~<K>

From: "Jim Woosley" Jimwoosley@aol.com

WANNA BE A SEAGOING SAILOR?

1. Buy a steel dumpster, paint it gray inside and out, and live in it for six months.
2. Run all the pipes and wires in your house exposed on the walls.
3. Repaint your entire house every month using gray paint, but first remove all old paint with a chipping hammer.
4. Renovate your bathroom. Lower all showerheads to four and one-half feet off the deck.
5. When you take showers, make sure you turn off the water while you soap down.
6. On Mondays, Wednesdays, and Fridays, turn water heater temperature up to 300 degrees. On Tuesdays and Thursdays, turn water heater off.
7. On Saturdays and Sundays tell your family they used too much water during the week, so no bathing will be allowed.
8. Put 5W-20 lube oil in your humidifier, instead of water, and set it on high.
9. Leave your lawn mower running in your living room 24 hours a day to maintain proper ambient noise and air quality level.
10. Once a month, disassemble all your major appliances and electric garden tools, inspect them and then reassemble them. Do this every week with your lawnmower, weed whacker and other gasoline powered tools. Have a clipboard labeled for each tool with an initial sheet for record purposes.
11. Once a week blow compressed air up through your chimney, making sure the wind carries the soot across and onto your neighbor's house. Laugh at him when he curses you.
12. Raise the thresholds and lower the headers of your front and back doors, so that you either trip or bang your head every time you pass through them.
13. Raise your bed to within 6 inches of the ceiling so you can't turn over.
14. Have a fluorescent lamp installed on the bottom of your coffee table and lie under it to read books.
15. Sleep on the shelf in your closet. Replace the closet door with a curtain. Have your spouse whip open the curtain about 4 hours after you go to sleep, shine a flashlight in your eyes, and say "Sorry, wrong rack."
16. Make each member your family qualify to operate each appliance in your house i.e., dishwasher operator, blender technician, etc.

The July 26th, 2017 Edition of THE REVENGE HUMPHDAY!

Page 10 of 46

17. Find the dumbest guy in the neighborhood and make him your boss for the next two years.
18. Have your neighbor come over each day at 5 am, blow a whistle so loud Helen Keller could hear it, and shout "Reveille, reveille, all hands heave out and trice up."
19. Have your mother-in-law write down everything she's going to do the following day, then have her make you stand in your back yard at 0600 (6 A.M.) while she reads it to you.
20. Empty all the garbage bins in your house and sweep the driveway three times a day, whether it needs it or not.
21. Have your neighbor collect all your mail for a month, read your magazines, and randomly lose every 5th item before delivering it to you.
22. Watch no TV except for movies played in the middle of the night. Have your family vote on which movie to watch, and then show a different one.
23. When your children are in bed, run into their room with a megaphone shouting that your home is under attack and ordering them to their battle stations.
24. Post a menu on the kitchen door informing your family that they are having steak for dinner. Then make them wait in line for an hour. When they finally get to the kitchen, tell them you are out of steak, but they can have dried ham or hot dogs. Repeat daily until they ignore the menu and just ask for hot dogs.
25. Bake a cake. Prop up one side of the pan so the cake bakes unevenly. Spread icing real thick to level it off.
26. Get up every night around midnight and have a peanut butter and jelly sandwich on stale bread.
27. Set your alarm clock to go off at random times during the night. At the alarm, jump up and dress as fast as you can, making sure to button your top shirt button and tuck your pants into your socks. Run out into the back yard and uncoil the garden hose. (This my favorite - been there, done that.)
28. Every week or so, throw your cat or dog into the pool and shout, "Man overboard port side!" Rate your family members on how fast they respond.
29. Put the headphones from your stereo on your head, but don't plug them in. Hang a paper cup around your neck on a string. Stand in front of the stove, and speak into the paper cup "Stove manned and ready." After an hour or so, speak into the cup again "Stove secured." Roll up the headphones and paper cup and stow them in a shoebox.
30. Place a podium at the end of your driveway. Have your family stand watches at the podium, rotating at 4-hour intervals. This is best done when the weather is worst. January in Minnesota is a good time.

The July 26th, 2017 Edition of THE REVENGE HUMPHDAY!

Page 11 of 46

31. When there is a thunderstorm in your area, get a wobbly rocking chair, sit in it and rock as hard as you can until you become nauseous. Make sure to have a supply of stale crackers in your shirt pocket.
32. Buy a trash compactor but only use it once a week. Store up garbage in your bathtub.
33. Invite at least 375 people, most of whom you don't really like, to come and live with you for about 6 months.
34. Lock-wire the lug nuts on your car wheels.
35. Start your car and let it run for 4 hours before going anywhere, to ensure the engine is properly "lit off".
36. Walk around your car for 4 hours checking the tire pressure every 15 minutes by hitting them with a heavy hammer.
37. Make coffee using eighteen scoops of budget priced coffee grounds per pot, and allow the pot to simmer for 5 hours before drinking.
38. Have the paperboy give you a haircut with sheep shears.
39. Submit a request form to your father-in-law, asking if it's OK for you to leave your house before 1500 (3 PM).
40. Take a two-week vacation visiting Adak, and call it "world travel".
41. Lock yourself and your family in the house for six weeks. Tell them that at the end of the 6th week you are going to take them to Disney World for "liberty." At the end of the 6th week, inform them the trip to Disney World has been canceled because they need to get ready for an inspection, and it will be another week before they can leave the house.
42. Needle gun the aluminum siding on your house after your neighbors have gone to bed.

Now qualified, you're ready to go to sea?

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And that children is why I joined the Air Force in the bad old days. UT

<YOU>~<>~<JUST>~<>~<CAN'T>~<>~<MAKE>~<>~<THIS>~<>~<STUFF>~<>~<UP!>

YOU JUST CAN'T MAKE THIS STUFF UP!

From: "Tim Bolgeo" tbolgeo@epbfi.com

EARLY POLL: KID ROCK UP 4 POINTS ON STABENOW IN MICHIGAN SENATE RACE

by IAN MASON24 Jul 20171,230

http://www.breitbart.com/big-government/2017/07/24/poll-kid-rock-4-points-stabenow/?utm_source=newsletter&utm_medium=email&utm_term=daily&utm_content=links&utm_campaign=20170724



Facebook

Robert Ritchie, better known to the world as Kid Rock, is leading the 2018 U.S. Senate race in Michigan, according to an early poll released Sunday.

The Delphi Analytica poll puts support for the Trump-supporting Michigan-native entertainer at 30 percent, four points ahead of incumbent Democrat Debbie Stabenow. Forty-four percent of respondents declined to pick a candidate. Among those who did state a preference, Kid Rock led 54-46 percent.

Kid Rock, whose nearly three-decade career has spanned and melded the rap, rock, and country genres, threw his hat into the 2018 ring this month with a series of posts on social media. Final confirmation appeared to come with a Facebook post including an image implying Kid Rock was completely out of “F***s” to give.

While he initially endorsed fellow Michigander Dr. Ben Carson for president, Kid Rock quickly became an enthusiastic Donald Trump supporter, reprising his 2012 role by playing at the Republican National Convention in Cleveland after Trump accepted the GOP’s

nomination for president. He later came under fire for his own pro-Trump apparel brand that sold such irreverent gems as shirts emblazoned with “_onald Trump: The ‘D’ is missing because it’s in every hater’s mouth.”

Never a stranger to controversy, Kid Rock made headlines for sticking to his guns on using the Confederate flag on stage even as the media establishment engaged in a nation-wide condemnation campaign in the wake of 2015’s North Charleston shootings.

So far as a Senate hopeful, Kid Rock has carved out a highly pro-Second Amendment stance and outlined his hopes for healthcare and tax reform.

Democrats, meanwhile, are doing anything but treating Ritchie’s run as a joke. “Well, maybe this is all a joke — but we all thought Donald Trump was joking when he rode down the escalator at Trump Tower and announced his campaign, too,” Sen. Elizabeth Warren (D-MA) told supporters in a fundraising email.

The 46-year old Kid Rock has a long road ahead of him if he hopes to prevail in the polls just under 16 months from now. This early polling, however, adds a degree of seriousness to his campaign, which has had no shortage of playful hype.

<?>~<YOU JUST CAN’T MAKE THIS STUFF UP!>~<?>



<U><T><'><s><*><C><O><M><M><E><N><T>

Before I got me degree in Electrical Engineering from Christian Brothers College in Memphis, Tennessee, I was an electronic technician in the Air

Force and an electrician for the US Post Office. I know what it's like to get my hand dirty and it is a great career for some who are not suited to go to college. Parents, you send your children to college to prepare for a career, not to find themselves. UT

<YOU>~<>~<JUST>~<>~<CAN'T>~<>~<MAKE>~<>~<THIS>~<>~<STUFF>~<>~<UP!>

YOU JUST CAN'T MAKE THIS STUFF UP!

From: "Pam Adams" pamcrippenadams@gmail.com

SURGEONS REMOVE 27 CONTACT LENSES FROM WOMAN'S EYE

Doctors find 'hard mass' of lenses stuck together in 67-year-old's eye during routine cataract surgery

Press Association, Monday 17 July 2017 10.07

<https://www.theguardian.com/society/2017/jul/17/surgeons-remove-27-contact-lenses-from-womans-eye>



Doctors said the patient had worn monthly disposable lenses for 35 years. Photograph: MediaforMedical/Jean-Paul Chasse/Alamy

A 67-year-old woman has had 27 contact lenses removed from one eye.

The discovery was made after the woman went to Solihull hospital in the West Midlands for routine cataract surgery.

In a report for the British Medical Journal (BMJ), experts from the hospital said “a bluish foreign body” emerged during the procedure “as a hard mass of 17 contact lenses bound together by mucus”.

Ten more were found under further examination.

The experts wrote: “The patient had worn monthly disposable lenses for 35 years. She had poorer vision in the right eye and deep-set eyes, which might have contributed to the unusually large number of retained foreign bodies.”

Rupal Morjaria, a specialist trainee in ophthalmology, told Optometry Today: “None of us have ever seen this before.

“It was such a large mass. All the 17 contact lenses were stuck together.

“We were really surprised that the patient didn’t notice it because it would cause quite a lot of irritation while it was sitting there.

“She was quite shocked. She thought her previous discomfort was just part of old age and dry eye.”

<YOU>~<>~<JUST>~<>~<CAN’T>~<>~<MAKE>~<>~<THIS>~<>~<STUFF>~<>~<UP!>

YOU JUST CAN’T MAKE THIS STUFF UP!

From: “Jim Woosley” jimwoosley@aol.com

THE 19TH-CENTURY LITHUANIANS WHO SMUGGLED BOOKS TO SAVE THEIR LANGUAGE

They banded together against book burnings to fight an empire.

BY MICHAEL WATERS, JULY 19, 2017

[http://www.atlasobscura.com/articles/lithuanian-book-smugglers?utm_source=Atlas+Obscura+Daily+Newsletter&utm_campaign=43c5a59bba-EMAIL_CAMPAIGN_2017_07_21&utm_medium=email&utm_term=0_f36db9c480-43c5a59bba-63378349&ct=t\(Newsletter_7_21_2017\)&mc_cid=43c5a59bba&mc_eid=4c73fa18f4](http://www.atlasobscura.com/articles/lithuanian-book-smugglers?utm_source=Atlas+Obscura+Daily+Newsletter&utm_campaign=43c5a59bba-EMAIL_CAMPAIGN_2017_07_21&utm_medium=email&utm_term=0_f36db9c480-43c5a59bba-63378349&ct=t(Newsletter_7_21_2017)&mc_cid=43c5a59bba&mc_eid=4c73fa18f4)

In 1899, a pair of smugglers were crossing the border between Lithuania and East Prussia. Clutching their packs, they lay on a bank along the Prussian part of the river Šešupe, and for hours they studied the movements of the guards on the other side. They could not afford to get caught.

When it was dark, they pushed across the Šešupe and ran 10 miles to a distribution center in the Lithuanian village of Pilviškiai. There they discovered that Russian authorities were searching for them.



Jurgis Bielinis (1846-1918). PUBLIC DOMAIN

Soon they would return to Prussia, where they would hide out for several weeks before deciding to abandon the region entirely. Within a year, they would be on a boat to Scotland.

But that first night, before they fled, they needed to drop off their smuggled goods—the very reason that authorities were after them. They opened their packs, and out poured books.

Map of Lithuania under Russian control. PUBLIC DOMAIN

In 2004, a Lithuanian man named Jonas Stepšis recounted this story. The two smugglers were his father and uncle, and they had joined what became a nationwide book-smuggling movement as a part of their opposition to the Russian Empire.

Tsarist Russia had dominated Lithuania after Poland-Lithuania, a Commonwealth formed in 1569, was annexed and divided up among Prussia, Austria, and Russia in 1795. The majority of Lithuania fell under Russian control.

Tsars tried early on to enforce loyalty, finding a particular target in the Roman Catholic Church—an historic Lithuanian institution that Russia saw as a threat to its power. Russian authorities demolished numerous chapels and prohibited the construction of wayside shrines, which were essentially omnipresent throughout Lithuania (there were roughly two shrines per kilometer). Not prepared to give up their culture, Lithuanians built new shrines anyway.

Though a group of Lithuanian university students and clergy led a violent uprising against Russia in 1831, resistance had long operated on a small scale. Lithuania had a tiny

population (around one million people) and stood little chance of defeating a military power like the Russian Empire.

But by the middle of the 19th century, that was changing. The resistance had intensified.

In 1863, a massive insurrection: some 66,000 Lithuanians serfs, traders, and clergy took up arms against the Russian government. Soon after their rebellion was crushed, leaving thousands dead or exiled to Siberia, Tsar Alexander II issued a harsh crackdown.

In 1864, the Governor General of Lithuania, Mikhail Muravyov, forbade the use of Latin Lithuanian language primers—a proclamation that, two years later, led to a total ban on the Lithuanian press.

Language had long been a point of contention in Tsarist Lithuania. In the middle of the 19th century, in order to assimilate the peasant class, the Russian scholar Alexander Hilferding proposed that the Lithuanian language, which uses a Latin alphabet, be converted to a Russian Cyrillic alphabet.

The Lithuanian press ban was therefore an attempt to eradicate the Lithuanian language and promote loyalty to the Russian cause. Lithuanian children were also required to attend Russian state schools, where they would learn the Cyrillic alphabet through books printed by the Russian government.

According to historians, Russia thought little of the ban when they first initiated it. They didn't see Lithuanians as belonging to a unique nationality, and they assumed that resistance, if anything, would be minimal.

They were wrong.

Almost immediately, individuals sprung up to spread Lithuanian writing. Since they couldn't publish books in their homeland, many Lithuanians began printing them abroad and smuggling them back into their own country.

Thus appeared the first of the knygnešiai—or book-carriers—who, in a desperate bid to save their language, transported books across the border and illegally disseminated them throughout Lithuania.

Initially, the knygnešiai worked alone. They carried books in sacks or covered wagons, delivering them to stations set up throughout Lithuania. They performed most of their operations at night, when the fewest guards were stationed along the border. Winter months—especially during blizzards—were popular crossing times.

Lithuanians went to great lengths to conceal their illegal books. The *Forty Years of Darkness* by Juozas Vaišnora reports of female smugglers who dressed as beggars and hid books in sacks of cheese, eggs, or bread. Some even strapped tool belts to their waists and pretended to be craftsmen, disguising newspapers under their thick clothes.

Bishop Motiejus Valančius, a historian and author of religious and secular works who later earned the label “the greatest Lithuanian personality in the 19th century,” organized the first large-scale attempt to smuggle books across the Lithuanian border. In a bid to publish more prayer books, he sent money to neighboring Prussia to construct a printing press

there. Beginning in 1867, he tasked a number of priests with bringing the books back into Lithuania and distributing them to locals.

Though at first Valan?ius only published Latin reprints of religious texts, as his operation grew, so did his ambitions. He began to commission original works, including many he had written, and his burgeoning team shuttled them across the border.

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From: "Tim Bolgeo" tbolgeo@epbfi.com

NASA TAKES FIRST DEEP SPACE PROPULSION STEPS

Jul 19, 2017 Guy Norris | Aerospace Daily & Defense Report

http://aviationweek.com/space/nasa-takes-first-deep-space-propulsion-steps?NL=AW-05&Issue=AW-05_20170720_AW-05_992&sfvc4enews=42&cl=article_3&utm_rid=CPEN1000003019593&utm_campaign=10983&utm_medium=email&elq2=de1246faa03a4ff88704d371a6cfb565

LOS ANGELES—NASA has issued a request for information (RFI) for in-space electric propulsion concepts which could potentially power the agency's proposed Deep Space Gateway, a research station that would serve as a waypoint for human missions to the Moon and Mars.

The RFI is a key step toward further development of the Deep Space Gateway, which would be a lunar-orbiting, crew-tended, fully-mobile spaceport to facilitate exploration missions farther from Earth. Outlined by NASA in April, the gateway concept would ultimately pave the way for flights to Mars in the 2030s.

NASA is specifically seeking data for the power and propulsion element (PPE) which would be capable of propelling the spaceport into transfer orbits as well as maintaining various lunar orbital paths for at least 15 years. As the first planned element of the research station, the PPE—which could work with solar electric propulsion (SEP) and/or ion thrusters—would launch as a co-manifested payload with the Orion crewed vehicle on the Space Launch System (SLS) Exploration Mission-2 in 2022.

Artist's concept of Deep Space Gateway: NASA

In addition to being capable of refueling on-orbit, the PPE would be expected to demonstrate an advanced integrated, 50 kW-class SEP capable of supporting future human Mars missions. It would also have the capability of inserting the spaceport into a highly elliptical lunar polar orbit. Described as a near rectilinear halo orbit (NRHO), this rotates at the same rate as the Moon around the Earth and would be optimized for inserting crew as well as for moving into other orbits better suited to support lunar landings and departures for Mars.

In addition to the RFI, NASA says it will seek proposals from industry next month for follow-on PPE concept studies specifically related to SEP applications. The solicitation will be made under the Next Space Technologies for Exploration Partnerships-2 (NextSTEP-2) program, through which Boeing and Lockheed Martin already have Phase 2 contracts to

develop ground prototypes of the habitation—and other modules—that could give Orion crews a destination in lunar orbit. In addition to the power unit, the gateway would include a habitat to extend Orion crew time as well as a docking capability. The facility would be serviceable by logistics modules to enable research and replenishment for deep space transport infrastructure.

“Through the RFI, we hope to better understand industry’s current state-of-the-art and potential future capabilities for deep space power and propulsion,” says Michele Gates, NASA PPE director. Through the forthcoming NextSTEP-2 announcement, he adds that NASA “will fund industry-led studies to identify the most urgent areas for focus over the next several years, for the benefit of human spaceflight as well as commercial applications.”

“The power propulsion bus will be a derivative of the system that was being built for the asteroid redirect mission,” says William Gerstenmaier, associate administrator at NASA for human exploration and operations. Speaking July 12 at the American Institute of Aeronautics and Astronautics Power and Energy forum in Atlanta, he says the PPE concept will have “lots of commonality with commercial satellite communications buses, and we are going to Intelsat and other companies asking them what is available bus-wise.”

The outline plan is to launch the electric propulsion bus to “the vicinity of the Moon on EM2,” Gerstenmaier says. The next flight, EM-3, which would be the second SLS flight to use the extra volume in NASA’s Exploration Upper Stage (EUS), would deliver the habitation module to the Deep Space Gateway. The outpost would then be completed with a logistics module flown on EM-4. “This allows us to have crews in the vicinity of the Moon for anywhere between 20 and 60 days,” he adds.

“We are busy doing the propulsion activity right now and figuring out how to get it acquired to support EM-2 in roughly 2022,” Gerstenmaier says. “What’s exciting is that with electric propulsion it doesn’t have to stay in one orbit around the Moon. It can be equatorial, polar or halo (NRHO) to allow telerobotic activities. So this is not a space station. It is a research facility that can be moved to alternate locations with the power propulsion bus and which stays in orbit for roughly 20 to 30 years. It is also the transportation node potentially for going to Mars.”

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SPACEX APPEARS TO HAVE PULLED THE PLUG ON ITS RED DRAGON PLANS

Musk said his company has come up with a “far better” approach to landing on Mars.

ERIC BERGER - 7/19/2017, 3:20 PM

ERIC <https://arstechnica.com/science/2017/07/spacex-appears-to-have-pulled-the-plug-on-its-red-dragon-plans/>

In recent weeks, there have been rumors that SpaceX is no longer planning to send an uncrewed version of its Dragon spacecraft to Mars in 2020, or later. Now those rumors about the Red Dragon concept have been largely confirmed.

The company had planned to use the propulsive landing capabilities on the Dragon 2 spacecraft—originally developed for the commercial crew variant to land on Earth—for



Mars landings in 2018 or 2020. Previously, it had signed an agreement with NASA to use some of its expertise for such a mission and access its deep-space communications network.

On Tuesday, however, during a House science subcommittee hearing concerning future NASA planetary science missions, Florida Representative Bill Posey asked what the agency was doing to support privately developed planetary science programs. Jim Green, who directs NASA's planetary science division, mentioned several plans about the Moon and asteroids, but he conspicuously did not mention Red Dragon.

After this hearing, SpaceX spokesman John Taylor didn't return a response to questions from Ars about the future of Red Dragon.

MUSK CONFIRMS

SpaceX seems to no longer be planning to land its Dragon spacecraft on Mars. SpaceX

Then, during a speech Wednesday at the International Space Station Research and Development Conference, Musk confirmed that the company is no longer working to land Dragon propulsively for commercial crew. (Although initially the company had moved to water landings, SpaceX had maintained that in future crew contracts with NASA, it would use Dragon's thrusters to land on land.)

But no longer. "Yeah, that was a tough decision," Musk acknowledged Wednesday with a sigh. It had to be a somewhat humbling one, too, after Musk bragged during the Dragon 2

reveal in 2014 that this vehicle showed how a 21st century spacecraft should land—not with parachutes in the water.

"The reason we decided not to pursue that heavily is that it would have taken a tremendous amount of effort to qualify that for safety for crew transport," Musk explained Wednesday. "There was a time when I thought the Dragon approach to landing on Mars, where you've got a base heat shield and side mounted thrusters, would be the right way to land on Mars. But now I'm pretty confident that is not the right way."

Musk added that his company has come up with a "far better" approach to landing on Mars that will be incorporated into the next iteration of the company's proposed Mars transportation hardware. Musk laid out an initial version of this "Interplanetary Transport System" in 2016, but he has said an updated architecture is coming soon, perhaps at the 2017 International Astronautical Conference in Adelaide, Australia. The event will be held from September 25 to 29.

The new Mars architecture will be "more affordable" and slightly smaller, Musk said. One of the main criticisms of his initial plan, including that of a review by Ars, is that although the concept may have been technically sound, it was not backed by the financial or political resources to see it through development.

The company had planned to use the propulsive landing capabilities on the Dragon 2 spacecraft—originally developed for the commercial crew variant to land on Earth—for Mars landings in 2018 or 2020. Previously, it had signed an agreement with NASA to use some of its expertise for such a mission and access its deep-space communications network.

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SPACEX'S BIG NEW ROCKET MAY CRASH ON 1ST FLIGHT, ELON MUSK SAYS

By Mike Wall, Space.com Senior Writer | July 20, 2017 07:30am ET

<https://www.space.com/37550-elon-musk-spacex-falcon-heavy-maiden-launch.html>

Elon Musk is tamping down expectations about the maiden launch of SpaceX's huge new Falcon Heavy rocket.

There's a "real good chance" the vehicle won't make it to orbit during the liftoff, Musk said Wednesday (July 19) at the 2017 International Space Station Research and Development (ISSR&D) conference in Washington, D.C. That launch is expected to take place later this year from Florida's Space Coast.



Artist's illustration of a SpaceX Falcon Heavy rocket lifting off. Credit: SpaceX

"I hope it makes it far enough away from the pad that it does not cause pad damage. I would consider even that a win, to be honest," Musk told NASA ISS program manager Kirk Shireman, who interviewed the SpaceX CEO onstage at the meeting. "Major pucker factor, really; that's, like, the only way to describe it."

The two-stage Falcon Heavy is based on SpaceX's Falcon 9 rocket, which has been ferrying payloads to space since 2010. The Heavy's first stage consists of two Falcon 9 first stages strapped to a central "core," which is itself a modified Falcon 9 booster.

Like the Falcon 9, the Heavy is designed to be reusable.

When the 230-foot-tall (70 meters) Falcon Heavy is up and running, it will be capable of lofting up to 60 tons (54 metric tons) to low-Earth orbit and 24 tons (22 metric tons) to geostationary transfer orbit, making it the most powerful American rocket since NASA's famous Apollo-era Saturn V launcher, SpaceX representatives have said. (The Soviet Union's short-lived Energia rocket, a shuttle-launching vehicle that flew twice in the late 1980s, was more powerful than the Falcon Heavy will be.)

SpaceX has been developing the Falcon Heavy for years. The work has proven to be "way, way more difficult" than SpaceX originally expected, Musk said.

"At first, it sounds really easy: Just stick two first stages on as strap-on boosters. How hard can that be?" he said. "But then everything changes. All the loads change, aerodynamics totally change, you've tripled the vibration and acoustics."

The loads imparted on the center core during Falcon Heavy launches will be "crazy," Musk said, "so we had to redesign the whole center-core airframe. It's not like the Falcon 9, because it's got to take so much load."

In addition, it's impossible to fully test many aspects of the vehicle on the ground, he said.

So, while Musk stressed that he thinks the Falcon Heavy will prove to be "a great vehicle," the initial liftoff could be rocky.

"I encourage people to come down to the cape to see the first Falcon Heavy mission," he said, referring to Florida's Cape Canaveral. "It's guaranteed to be exciting."

SpaceX has not yet announced an official date for the launch. Musk recently suggested on Twitter, however, that the liftoff may happen in September or October.

Editor's Note: This story was updated to clarify that the Falcon Heavy won't be as powerful as the Soviet Union's Energia rocket, which flew twice in the late 1980s before being discontinued.

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LIVING IN DEEP SPACE: LOCKHEED MARTIN TO BUILD FULL-SCALE PROTOTYPE OF NASA CISLUNAR HABITAT

by Staff Writers, Cape Canaveral FL (SPX) Jul 21, 2017

http://www.moondaily.com/reports/Living_in_Deep_Space_Lockheed_Martin_to_Build_Full_Scale_Prototype_of_NASA_Cislunar_Habitat_999.html

The Deep Space Gateway will rely on many of Orion's advanced capabilities that can be used while astronauts are there, and utilizes capabilities common to Lockheed Martin-built planetary spacecraft like Juno and MAVEN while it's unoccupied.

Refurbishing a shuttle-era cargo container used to transfer cargo to the International Space Station, Lockheed Martin is prototyping a deep space habitat for NASA at Kennedy Space Center. This prototype will integrate evolving technologies to keep astronauts safe while onboard and operate the spacecraft autonomously when unoccupied.

Under a public-private partnership, NASA recently awarded Lockheed Martin a Phase II contract for the Next Space Technologies for Exploration Partnerships (NextSTEP) habitat study contract. As part of Phase II, the team will continue to refine the design concept developed in Phase I and work with NASA to identify key system requirements for the Deep Space Gateway.

Included in this work, the team will build a full-scale habitat prototype in the Space Station Processing Facility at NASA's Kennedy Space Center and a next-generation deep space avionics integration lab near Johnson Space Center.

"It is easy to take things for granted when you are living at home, but the recently selected astronauts will face unique challenges," said Bill Pratt, Lockheed Martin NextSTEP program manager.

"Something as simple as calling your family is completely different when you are outside of low Earth orbit. While building this habitat, we have to operate in a different mindset that's more akin to long trips to Mars to ensure we keep them safe, healthy and productive."

A full-scale prototype of the deep space habitat will be built by refurbishing the Donatello Multi-Purpose Logistics Module (MPLM). Donatello was one of three large modules, flown in the space shuttle payload bay, that were used to transfer cargo to the International Space Station.

The team will also rely heavily on mixed reality prototyping using virtual and augmented reality. Through this approach, the team can reduce cost and schedule, as well as identify and solve issues early in the design phase.

"We are excited to work with NASA to repurpose a historic piece of flight hardware, originally designed for low Earth orbit exploration, to play a role in humanity's push into deep space," said Pratt. "Making use of existing capabilities will be a guiding philosophy for Lockheed Martin to minimize development time and meet NASA's affordability goals."

The work will occur over 18 months and will build upon the concept study performed in Phase I. Phase II will also focus on mixed reality and rapid prototyping, and working on concept refinement and risk reduction. The new results, which will be provided to NASA, will further the understanding of the systems, standards and common interfaces needed to make living in deep space possible.

The Deep Space Gateway will rely on many of Orion's advanced capabilities that can be used while astronauts are there, and utilizes capabilities common to Lockheed Martin-built planetary spacecraft like Juno and MAVEN while it's unoccupied.

Employing NASA's space-proven Orion spacecraft as the Deep Space Gateway command deck early on allows for a safe and practical approach for the incremental build-up of deep space exploration capabilities.

Additionally, Lockheed Martin will build a Deep Space Avionics Integration Laboratory in Houston to demonstrate command and control between the Deep Space Gateway and Orion. The lab will help reduce risk associated with critical data interfaces between Deep Space Gateway elements and provide an environment for astronauts to train for various mission scenarios.

"Because the Deep Space Gateway would be uninhabited for several months at a time, it has to be rugged, reliable and have the robotic capabilities to operate autonomously. Essentially it is a robotic spacecraft that is well-suited for humans when Orion is present," said Pratt.

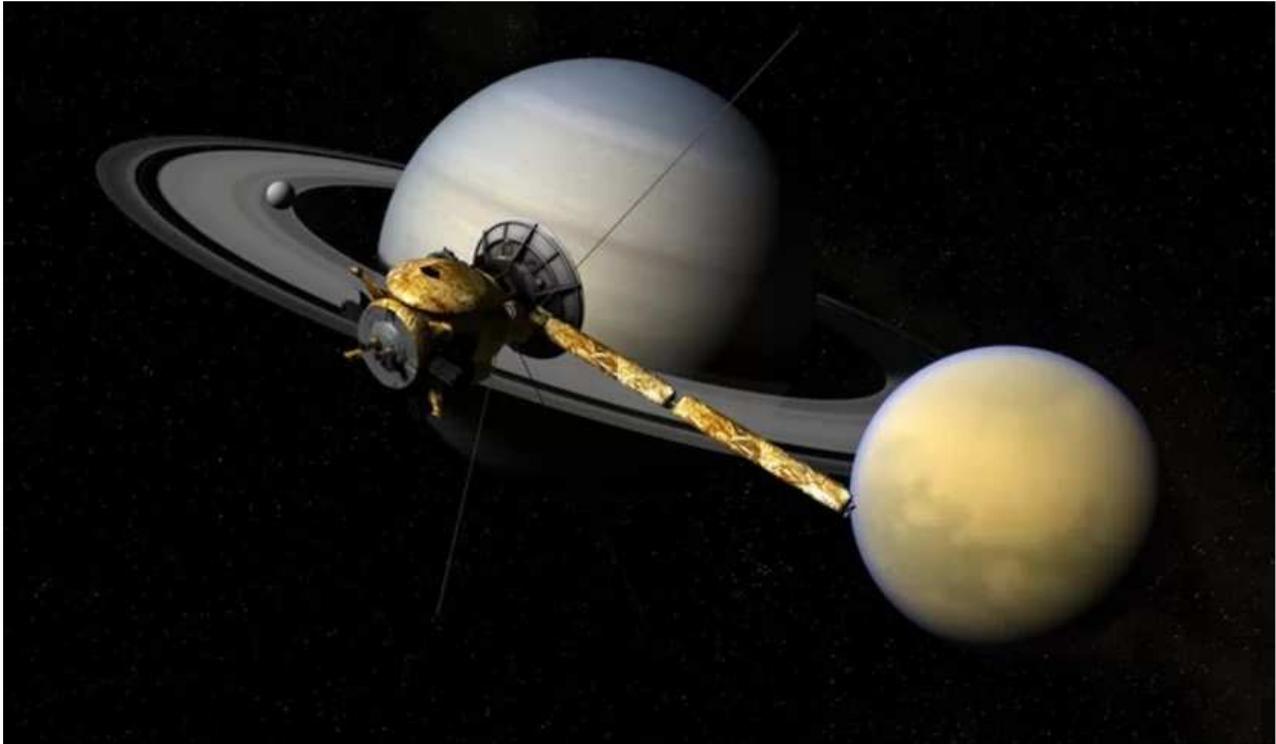
"Lockheed Martin's experience building autonomous planetary spacecraft plays a large role in making that possible."

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FUTURE SPACE COLONY? MAYBE WE SHOULD LOOK BEYOND MARS TO SATURN'S TITAN MOON

By Elizabeth Howell, Seeker | July 19, 2017 12:13pm ET

https://www.space.com/37544-future-space-colony-on-titan.html?utm_source=sd-newsletter&utm_medium=email&utm_campaign=20170721-sdc



NASA's Cassini spacecraft, Saturn, and Titan, Saturn's largest moon. Credit: Cassini Model: Brian Kumanchik, Christian Lopez. NASA/JPL-Caltech. Migrated to Maya & materials updated by Kevin M. Gill

NASA and Elon Musk's SpaceX are focused on getting astronauts to Mars and even one day establishing a colony on the Red Planet — but what if their attention is better directed elsewhere? A new paper in the *Journal of Astrobiology & Outreach* suggests that humans should instead establish a colony on Titan, a soupy orange moon of Saturn that has been likened to an early Earth, and which may harbor signs of "life not as we know it."

"In many respects, Saturn's largest moon, Titan, is one of the most Earth-like worlds we have found to date," NASA says on its website. "With its thick atmosphere and organic-rich chemistry, Titan resembles a frozen version of Earth, several billion years ago, before life began pumping oxygen into our atmosphere."

To be clear, Titan could have microbes — or, at the least, chemistry that resembles prebiotic life — but it is no Earth. The moon is perpetually covered in an orange cloud, and its atmosphere is not human-friendly. But Titan's gravity is walkable (14 percent that of Earth), radiation on the surface is less than on Mars due to its thick clouds, and it offers various sources from which visitors might generate energy.

As the paper's author, Amanda Hendrix, pointed out in a previous book that she co-authored, *Beyond Earth: Our Path to a New Home in the Planets*, Titan has massive deposits of hydrocarbons — compounds generally associated with petroleum and gas.

Data from NASA's Cassini probe has shown that Titan has hundreds of times more liquid hydrocarbons than all of the known oil and natural gas reserves on Earth.



A simulation of the view from the ground on Titan. Credit: Kevin M. Gill

Beyond Earth points out that people on Titan could get energy from these compounds if they use a separate combustion source that helps circumvent that fact that there's no oxygen in the moon's atmosphere. But Hendrix's new research also discusses other ways of generating chemical energy, such as treating acetylene (an abundant compound) with hydrogen.

"In this paper, I wanted to dig into the chemical energy options a bit deeper and also look into alternative energy possibilities," said Hendrix, a staff scientist at the non-profit Planetary Science Institute. "My co-author, Yuk Yung, and I looked at chemical, nuclear, geothermal, solar, hydropower, and wind power options at Titan. The paper is designed to be a high-level first look at some of these topics."

While Hendrix said it's possible to generate such energy using technology that we have available today, she noted that there are ways that we could get even more out of Titan's environment with the proper study. For example, more solar power would be generated if we learned about the capabilities of different photovoltaic cell materials — and most importantly, how they would behave on Titan.

Hydro power would require better mapping of Titan's abundant lake regions, including their topography and their flow rate. Even wind power would require some research into airborne wind turbines — but Hendrix said all of these options are promising.

"I imagine that, as here on Earth, a combination of energy sources will be useful on Titan," she said. "In particular, solar energy (using large arrays) and wind power (using airborne wind turbines) may be particularly effective."

Delivered properly, the energy needs would be more than enough for a small outpost. Instead of just sending humans on a one-shot mission to look for life on the surface, for example, Hendrix envisions a future that could generate power for years. One scenario — solar arrays over 10 percent of Titan's surface area — would generate power needs of a population of roughly 300 million, equivalent to that of the United States.

"This is just an initial estimate, of course, but what we're talking about is something much larger than a short-term human science mission to Titan," Hendrix said.

With NASA's stated goal of sending humans to Mars by the 2030s, however, space agencies remain focused on Mars exploration. While the Cassini robotic mission at Saturn and its moons wraps up observations this September, NASA and the European Space Agency are planning even more missions to Mars in the coming years. Saturn doesn't really figure into the plans, although NASA is thinking about eventual missions to Uranus, Neptune, and Jupiter's moon Europa.

Originally published on Seeker.

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FULL-SCALE CISLUNAR HABITAT PROTOTYPE TO BE BUILT FROM OLD SPACE SHUTTLE CARGO CONTAINER

David Szondy July 21, 2017

<http://newatlas.com/lockheed-martin-space-cislunar-habitat/50581/>

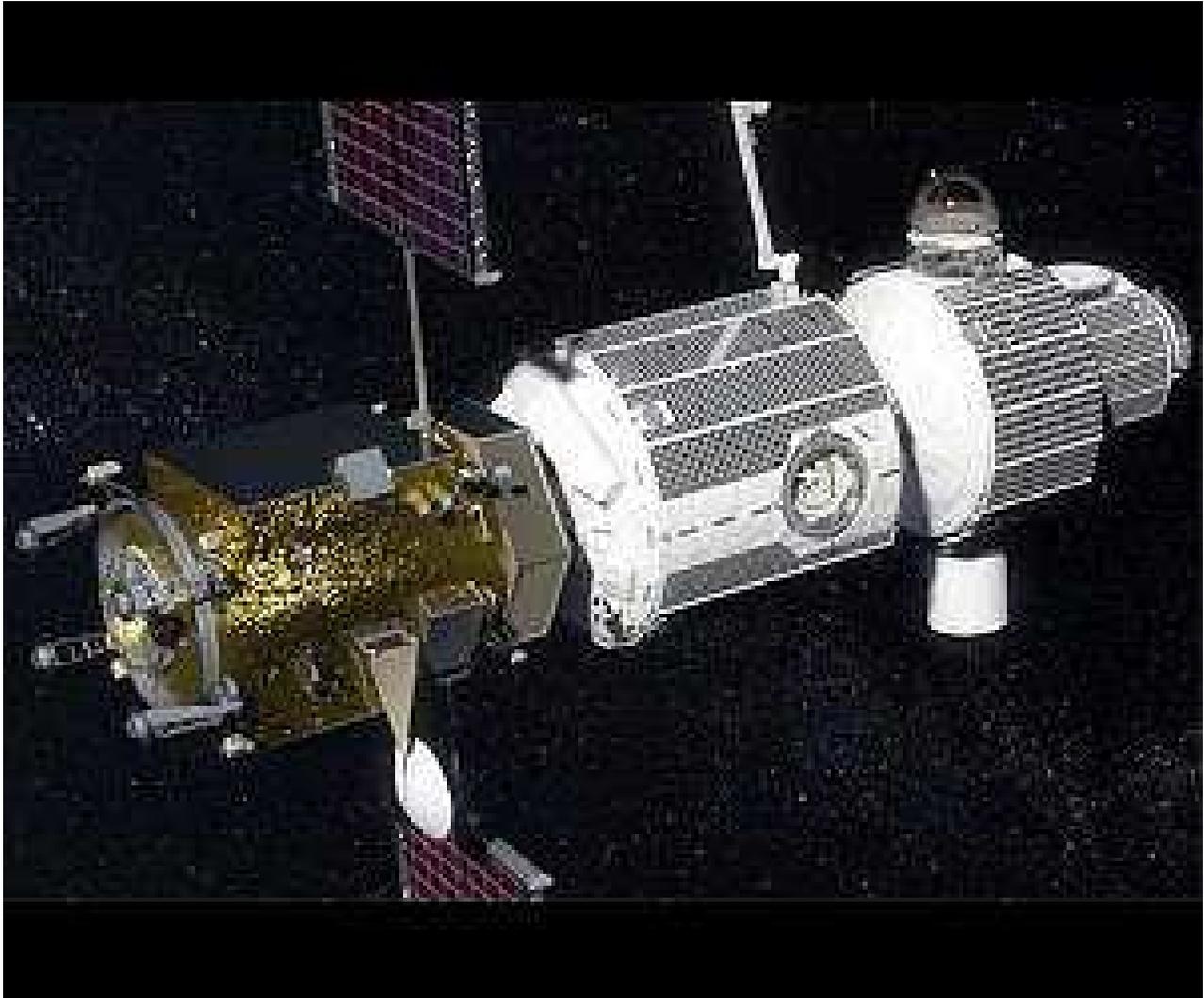
In a mix of the old and the new, Lockheed Martin is recycling a Space Shuttle cargo container to create a prototype deep space habitat for NASA. The full-scale experimental module to be built at the Kennedy Space Center in Florida will be used to test technologies to provide astronauts with a safe living space that can operate autonomously when there is no one on board.

Part of the Phase II contract for the space agency's Next Space Technologies for Exploration Partnerships (NextSTEP) habitat study, the new habitat module will upgrade the concepts produced in Phase I and identify key system requirements for the Deep Space Gateway. This space station is to be placed in cislunar orbit and serve as a jumping off point for missions to explore the Moon, Mars, and the asteroids.

Space stations aren't new to NASA, which has been developing and operating orbital habitats since the Skylab missions of the 1970s, but these have all been set in low Earth orbit, where home is only a quick re-entry flight away if an emergency arises. As the US moves back to manned deep space missions where the Earth is days or weeks away, these habitats have to be much more robust, reliable, and capable of operating autonomously between visits instead of being mothballed.

According to Lockheed, the prototype will be built using one of the three Donatello Multi-Purpose Logistics Module (MPLM) that was used to transport cargo aboard the Space

Shuttle to the International Space Station (ISS). To keep down costs and speed up development over the next 18 months, the team will use mixed reality prototyping with virtual and augmented reality.



Artist's concept of the NextSTEP habitat docked with Orion in cislunar orbit (Credit: Lockheed Martin)

In addition, the prototype will help to develop common interfaces and incorporate technology from Lockheed Martin-built unmanned deep space probes like Juno and MAVEN to allow it and the Deep Space Gateway to function autonomously. The Orion crew capsule will act as the command center for the Gateway and Lockheed is building a Deep Space Avionics Integration Laboratory at Houston, Texas to demonstrate new command and control interfaces between the capsule and Gateway. The lab will also be a place where astronauts can train for different scenarios.

"Because the Deep Space Gateway would be uninhabited for several months at a time, it has to be rugged, reliable and have the robotic capabilities to operate autonomously. Essentially it is a robotic spacecraft that is well-suited for humans when Orion is present," says Bill Pratt, Lockheed Martin NextSTEP program manager. "Lockheed Martin's

experience building autonomous planetary spacecraft plays a large role in making that possible."

Source: Lockheed Martin

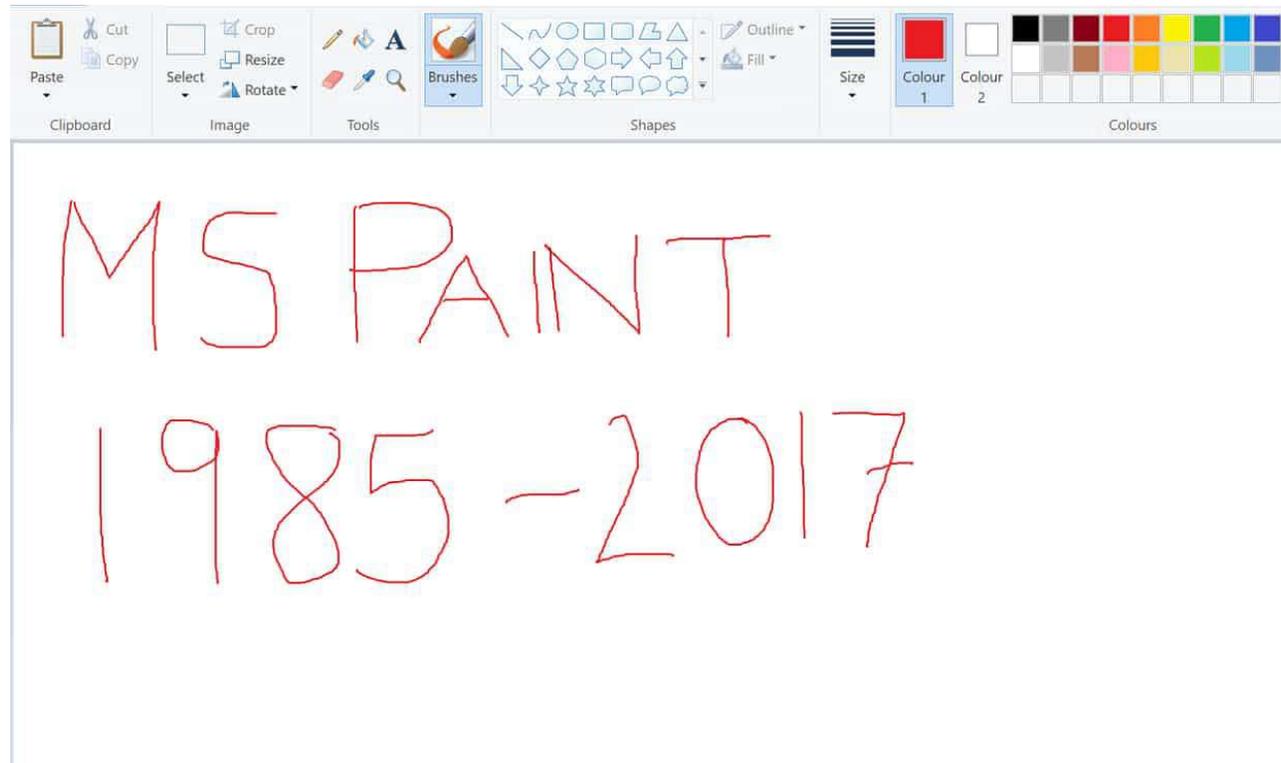
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MICROSOFT PAINT TO BE KILLED OFF AFTER 32 YEARS

Long-standing basic graphics editing program, used throughout childhoods since the 1980s, has been marked for death

Samuel Gibbs, Monday 24 July 2017

<https://www.theguardian.com/technology/2017/jul/24/microsoft-paint-kill-off-after-32-years-graphics-editing-program>



Microsoft Paint to be 'deprecated' after 32 years. Photograph: Samuel Gibbs for the Guardian

Microsoft's next Windows 10 update, called the Autumn (or Fall in the US) Creators Update, will bring a variety of new features. But one long-standing stalwart of the Windows experience has been put on the chopping block: Microsoft Paint.

First released with the very first version of Windows 1.0 in 1985, Paint in its various guises would be one of the first graphics editors used by many and became a core part of Windows. Starting life as a 1-bit monochrome licensed version of ZSoft's PC Paintbrush, it wasn't until Windows 98 that Paint could save in JPEG.

With the Windows 10 Creators Update, released in April, Microsoft introduced the new Paint 3D, which is installed alongside traditional Paint and features 3D image making tools as well as some basic 2D image editing. But it is not an update to original Paint and doesn't behave like it.

Now Microsoft has announced that, alongside Outlook Express, Reader app and Reading list, Microsoft Paint has been signalled for death having been added to the "features that are removed or deprecated in Windows 10 Fall Creators Update" list.

Falling under the deprecated column for apps that are "not in active development and might be removed in future releases", Microsoft Paint's ticket has been called and now it's only a matter of time before it is removed like your favourite piece of old furniture from your childhood home.

Paint was never one of the most capable apps, and was limited to the bitmap (BMP) and PCX formats until 1998, but if you wanted to scribble something out using your mouse or make a quick cut and paste job, Paint was always there, even on work computers.

The most recent version of Paint for Windows 7 and later was much improved, but still considered feature poor compared to other free alternatives such as the third-party Paint.NET.

When Microsoft Paint will officially be removed from Windows has yet to be confirmed, while a precise date for the release of the Windows 10 Autumn Creators Update is equally up in the air. Whether, like Clippy, Windows users will celebrate or decry Paint's removal, it will be a moment in the history of Windows as one of its longest-standing apps is put out to pasture.

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NASA UNVEILS 2018 LAUNCH TARGETS FOR PRIVATE SPACESHIPS BUILT BY BOEING, SPACEX

By Jeff Foust, SpaceNews Writer | July 24, 2017 07:37am ET

<https://www.space.com/37593-nasa-boeing-spacex-2018-launch-targets.html>

NASA, SpaceX and Boeing expect test flights of their Crew Dragon and CST-100 Starliner vehicles to take place next year after extensive delays. Credit: SpaceX artist's concept and Boeing

WASHINGTON — Both NASA and the two companies developing commercial crew vehicles say those efforts remain on schedule for test flights that are in some cases less than a year away.

NASA published July 20 what it called "the most recent publicly-releasable dates" of the test flights of Boeing's CST-100 Starliner and SpaceX's Crew Dragon vehicles. Each company, under terms of Commercial Crew Transportation Capability (CCtCap) contracts awarded in September 2014, are required to first fly an uncrewed test flight of their spacecraft, followed by one with astronauts on board.



The latest SpaceX schedule calls for an uncrewed test flight in February 2018, followed by a crewed test flight in June 2018. Boeing's schedule anticipates an uncrewed test flight in June 2018 and a crewed test flight in August 2018.

Those scheduled have slipped considerably from the original CCtCap announcement. At that time, NASA expected both vehicles to have completed their test flights and be certified for regular crew transportation missions to the International Space Station by the end of 2017. Both companies have suffered technical problems that have pushed back those flights, in some cases by more than a year.

A leading NASA official, though, sounded more confident about the companies' efforts towards those 2018 test flights. "Commercial crew is making great progress," said Kirk Shireman, ISS program manager, in a July 18 speech at the ISS Research and Development Conference [here](#).

"By the next ISS R&D Conference, I expect to have flown the first Boeing CST-100 Starliner and SpaceX Crew Dragon flight," he said. The 2018 conference is scheduled for late July in San Francisco.

In an on-stage interview with Shireman at the conference July 19, SpaceX Chief Executive Elon Musk also expressed confidence his company's schedule. "Our primary focus will be on, particularly over the next year or so, our Dragon 2 spacecraft," he said, using the company's name for what NASA calls Crew Dragon.

"What's our primary focus? Making sure we stay on track for getting crew to station, as we promised NASA, around the middle of next year," he said. "That's going to be real exciting."

Musk acknowledged that developing the Crew Dragon spacecraft has been "way more difficult" than the cargo version of Dragon currently flying. "As soon as people enter the picture, it's really a giant step up in making sure things go right," he said. "The oversight from NASA is much tougher."

"We have some debates going into next year about some of the technical details," he said of SpaceX's relationship with NASA. However, he later described those debates as minor "technical bones of contention" on unspecified "esoteric" issues.

Boeing is also confident in its ability to maintain its schedule. "We are in the middle of a very aggressive test program," said Chris Ferguson, director of Starliner crew and mission systems at Boeing, during a July 20 panel session at the conference. Prior to the flight tests, he said, is a pad abort test planned for early 2018 at White Sands, New Mexico, as well as ongoing parachute and drop tests.

Ferguson, in his presentation, said the flight test program would run from June through December of 2018, followed by NASA certification, and in an interview earlier in the day said those launches would take place in the "latter part of next year." He clarified, though, that the schedule of June and August test flights remains in place.

"Our schedule hasn't changed from June," he said in the interview. "That said, we've got challenges we've got to deal with and we'll let the schedule fall out where it will."

Boeing may offer more clarity about that test flight schedule in the near future. Ferguson said that United Launch Alliance, who will launch the CST-100 on Atlas 5 rockets, requires a "non-handshake type of agreement" about 12 months before launch. "If there's going to be movement, of which there's been nothing planned yet, it's going have to occur soon just to keep it consistent with what ULA wants," he said.

Another upcoming milestone is the selection of a NASA astronaut to fly on the crewed flight test along with a Boeing test pilot. "Traditionally it's been about [launch] minus 12 months," he said of prior crew selections. "I think what they would like to do is have some schedule assurance before they go ahead and assign crews. Once they feel comfortable that they're about 12 months out from a crewed flight launch, I think you can see an assignment come out."

Ferguson said the first operational, or post-certification mission (PCM) for the CST-100 could fly as soon as next December, but that schedule is dependent on both the vehicle's development as well as ISS needs. "I think the next crewed mission to be assigned would launch in May of 2019," he said. "We're keeping a close eye on that. NASA has a void they'd like to fill there. We'd like to be there to fill it for them."

Originally published on SpaceNews.

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REEBOK UNVEILS SLEEK NEW SPACE BOOTS FOR FUTURE ASTRONAUTS

By Hanneke Weitering, Space.com Staff Writer | July 20, 2017 07:40am ET

<https://www.space.com/37553-reebok-space-boots.html>



Reebok has designed new-and-improved space boots for crewmembers on future missions to the International Space Station. Credit: Courtesy of Digital Trends

Reebok is really stepping up its footwear game with these awesome new space boots.

The athletic-apparel company — which until now has only made shoes for people on Earth — just unveiled a sporty new design for space boots that astronauts will wear during upcoming missions on Boeing's CST-100 Starliner, a spacecraft that will begin ferrying astronauts to and from the International Space Station by the end of next year.

These blue-and-white ombré boots nicely complement the blue spacesuits Boeing revealed in January. Both the boots and the suits are more lightweight, flexible and comfortable than the bulky, traditional spacesuits worn by astronauts today.

"Space travel is something our team has always been interested in, so we called the David Clark Company (DCC), and that's how it started," Hobson told Digital Trends. DCC is the same manufacturing company that designed Boeing's blue spacesuits. It also made pressurized spacesuits for crewmembers participating in NASA's Gemini program and space shuttle missions.

Rather than looking to traditional, clunky moon boots for inspiration, Reebok and DCC modeled their new space boot after Reebok's Floatride Run athletic shoes, which contain ultralight foam that adds comfort without adding too much weight to the midsole. "On the space boot, the rubber traction, the float foam and the stabilizing foam that sits above the

float foam are identical to the Floatride Run, so the feel underfoot will feel very similar," Hobson explained. Reebok named its new boot the Floatride SB-01.



Floatride SB-01 space boots by Reebok. Credit: Courtesy of Digital Trends

Much like Boeing's Starliner spacesuits, the boots are designed to fit every individual astronaut like a glove. "The inside uses a special mesh that stretches to a certain point, then locks out when the suit inflates, which allows the boot to always fit comfortably," Hobson said.

With their matching boots and spacesuits, astronauts will be riding in style on Boeing's future flights to the space station. But more importantly, the new apparel will help make spaceflight more comfortable for astronauts than ever before.

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From: "Jim Woosley" Jimwoosley@aol.com

NEW RULES FOR EXERCISING IF YOU'RE OVER 50

What you need to know to adjust to your body and stay in shape

By, LINDA MELONE, NextAvenue.org. Published: July 12, 2017 7:59 a.m. ET

<http://www.marketwatch.com/story/new-rules-for-exercising-if-youre-over-50-2017-07-03>



Bloomberg - Resistance training and stretching become more crucial as you age.

A funny thing happens on the way to 50 and beyond: Your body doesn't respond to exercise as it did earlier in your life. Fatigue, muscle and joint aches and increased injuries seem to happen with greater frequency.

Unfortunately, it's not your imagination. It happens to the best of us as a natural consequence of aging. In fact, some of the "standard" fitness rules no longer apply, at least not in the same way as they did in your 30s and even 40s. Here's how the rules change after 50 and how to stay injury-free as you age.

OLD RULE: STRETCH A FEW DAYS A WEEK

NEW RULE: STRETCH AFTER EVERY WORKOUT, AND THEN SOME

Stretching is no longer an option after 50. Staying flexible becomes more important as you age, says Michele Olson, adjunct professor of exercise science at Huntingdon College in Montgomery, Alabama.

"Flexibility, because it's related to the collagenous tendons, which is a part of our lean body mass, starts to decrease," she says. "Since our tendons connect our muscles to our bones, the perfect time to stretch is after your weight training sessions."
"

Olson recommends a total body stretch, involving all major muscle groups, a minimum of two to three times a week. This would ideally be done after each workout when muscles are warm.

WHAT TO DO IN YOUR 50S TO BUILD WEALTH FOR YOUR RETIREMENT

OLD RULE: FOCUS ON CARDIO

NEW RULE: RESISTANCE TRAINING TAKES CENTER STAGE

Bone density and muscle mass drops rapidly after 50, says Olson, making resistance training a crucial part of a complete exercise program. In addition to the link between muscle mass and metabolism — muscle burns more calories at rest than fat — increasing muscle and bone strength also prevents falls and fractures.

You still need cardio, of course, for reducing heart disease risk, which accelerates after 50, says Olson.

“And, as we increase lean mass — bones and muscle — the war against belly fat must also begin,” she says. Plus, a 2014 study shows a single 20-minute bout of weight training may enhance memory. Strive for eight to 12 repetitions per set, two to three times a week. If you can easily perform more than 12 reps, increase the resistance, says Olson.

OLD RULE: SLOW AND STEADY CARDIO WORKS BEST

NEW RULE: USE INTERVAL TRAINING TO PUMP UP THE FAT BURN

Going for an easy stroll with a friend may be a good way to get fresh air, but it won't do much for calorie burning, says Olson.

“Continue cardio for its heart health benefits, but focus on intervals since interval training for 30 minutes versus moderate, continuous exercise decreases belly fat,” she says. “Moderate, continuous cardio does not.”

Interval training involves alternate bouts of higher intensity cardio with “rest” or easier periods. Intervals create an “after burner” effect called EPOC, which stands for “excess post-exercise oxygen consumption.” That's a state in which your body continues to burn a higher rate of oxygen and calories after you've finished your workout. How many calories and for how long depends on the intensity of the intervals.

OLD RULE: TAKE ONE DAY IN BETWEEN EACH WEIGHT TRAINING WORKOUT

NEW RULE: YOU MAY NEED LONGER THAN A DAY BETWEEN WORKOUTS

Taking a day off in between workouts gives muscles time to recover, but you may need more recovery time after age 50, says Dr. David W. Kruse, a sports medicine specialist with Hoag Orthopedic Institute in Irvine, Calif.

“You need to focus more on recovery after 50. Tissue recovery takes more time and more effort to support that recovery,” he says. “The exact amount of time depends on your baseline fitness level.”

How do you know when you've had enough rest? “Look at trends,” says Kruse. “If you find soreness isn't going away and is impacting your next workout this may indicate early signs

of injury or not enough recovery time.” Being unable to decrease your time or improve whatever markers you’re using to gauge progress may also indicate you need to allow more recovery time, says Kruse.

OLD RULE: WARMING UP IS OPTIONAL

NEW RULE: ALWAYS INCLUDE A THOROUGH WARM-UP

Warming up before a workout increases circulation, raises heart rate and body temperature, prepares muscles for exercise and increases joint range of motion. Warm-ups are particularly beneficial after 50 to mediate some of the changes that occur with aging, mainly decreased tendon elasticity, says Kruse.

“It’s best to warm up with a combination of light cardio and light stretching, although the specifics can vary,” he says. Although it’s best to warm up the specific muscles you’re about to use, a general lower body warm-up such as a light treadmill workout will benefit all muscles, including upper body.

“It will benefit you no matter what your workout,” says Kruse.

Next Avenue contributor Linda Melone is a California-based freelance writer and certified personal trainer specializing in health, fitness and wellness for women over 50.

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From: "Chris Cowan" cowanc1028@earthlink.net

EARTH'S TECTONIC ACTIVITY MAY BE CRUCIAL FOR LIFE--AND RARE IN OUR GALAXY

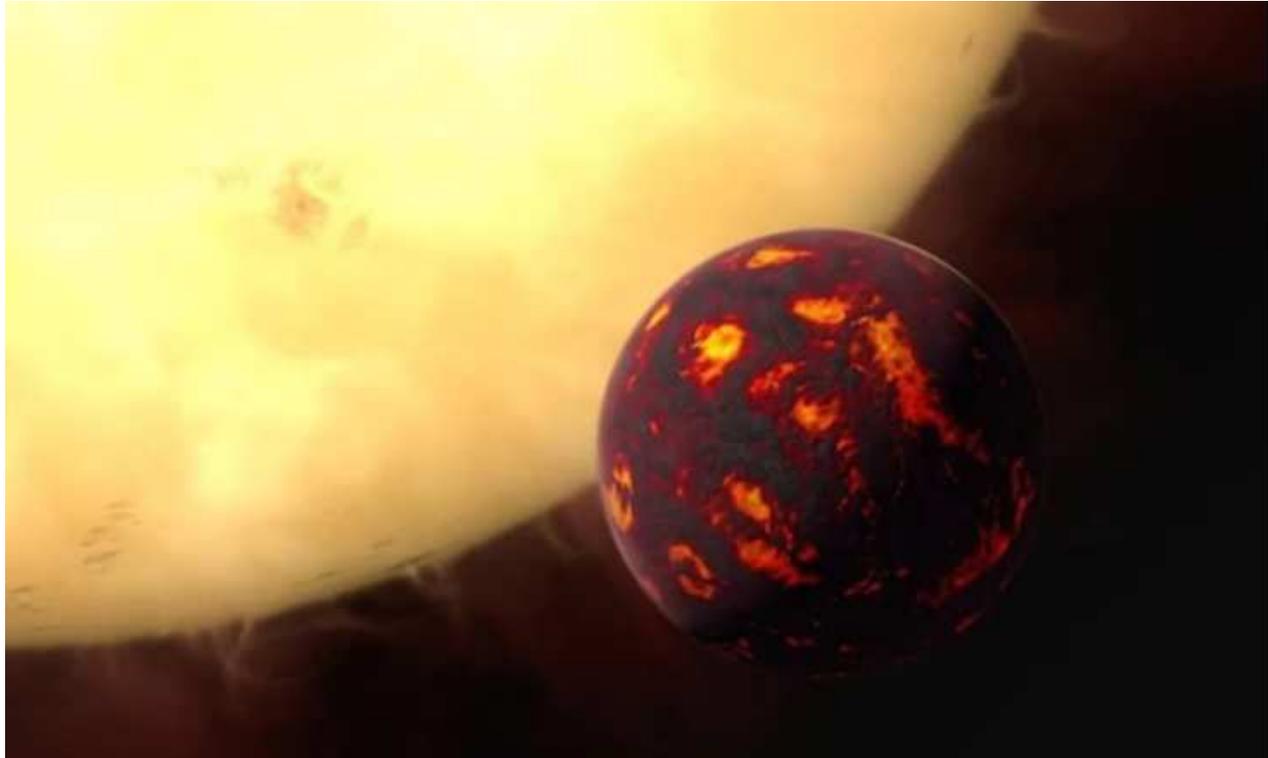
A new study finds plate tectonics may be hard to sustain on exoplanets

By Shannon Hall on July 20, 2017

https://www.scientificamerican.com/article/earths-tectonic-activity-may-be-crucial-for-life-and-rare-in-our-galaxy/?WT.mc_id=send-to-friend

Our planet is in constant flux. Tectonic plates—the large slabs of rock that divide Earth’s crust so that it looks like a cracked eggshell—jostle about in fits and starts that continuously reshape our planet—and possibly foster life.

These plates ram into one another, building mountains. They slide apart, giving birth to new oceans that can grow for hundreds of millions of years. They skim past one another, triggering earth-shattering quakes. And they slip under one another in a process called subduction, sliding deep into the planet’s innards and producing volcanoes that spew gases into the atmosphere. And not only is Earth alive, it is a vessel for life. Because it is the only known planet to host both plate tectonics—that ongoing shuffling of tectonic plates—and life, many scientists think the two might be related. In fact, some researchers argue that shifting plates, which have the ability to help regulate a planet’s temperature over billions of years, are a crucial ingredient for life.



This artist's conception shows 55 Cancri e—a world that might be overrun by flowing lava. Credit: ESA / Hubble, M. Kornmesser

This connection raises the tantalizing possibility that if scientists could find exoplanets that quake and rumble, they might be able to find life beyond our Pale Blue Dot. So, Cayman Unterborn, an astronomer at Arizona State University, set out to determine the likelihood that distant exoplanets undergo plate tectonics. In a paper posted July 3 to the preprint server arXiv and currently undergoing peer review, he and his colleagues found that the majority of exoplanets are probably unable to sustain plate tectonics over long periods of time. Their results are still uncertain because scientists do not fully understand how plate tectonics began on Earth (let alone on how they would other planets), but they do suggest that even if the process does begin, it may not last. That means Earth is not only the sole planet known to host moving plates in the solar system (although some recent evidence suggests Mercury might as well), it might also be one of a low number of such planets across the Milky Way. “If you do need plate tectonics [for life], this paper sounds like bad news,” says John Armstrong, an astronomer at Weber State University who was not involved in the study. Still, astronomers suspect that as many as 40 billion potentially habitable Earth-size planets dot the galaxy. Even if only a third of these planets can sustain plate tectonics (as Unterborn’s study suggests), those roughly 13 billion planets, Armstrong says, are “still a lot of possible habitable worlds!”

But just how essential is plate tectonics for life? Hints can be found from our own planet’s history. Around 2.5 billion years ago the sun was so cold that Earth’s liquid oceans should have been frozen in a snowball-like state—only they were not. Scientists think plate tectonics, which acts as a global thermostat, might have been our savior by creating volcanoes that spewed carbon dioxide into the atmosphere, helping it to retain more heat. Then, as the sun grew brighter and hotter, rainfall scrubbed the carbon dioxide from the atmosphere and plate tectonics later subducted it into the Earth’s mantle (the layer of hot

rock above the core), locking it away. It is this cycle, which acts on million-year timescales, that helps keep Earth's temperature stable enough to support life.

Yet Earth's example does not prove plate tectonics is a requirement for life. Planets can, after all, be geologically active without plate tectonics. Just take a look at Mars, which boasts the largest volcano in the solar system. Still, that volcano no longer rumbles to life. In fact, most solar system planets (and even dwarf planets and moons) that were once geologically active are now quiet. Without plate tectonics, volcanism declines rapidly (with some notable nontectonic exceptions such as Jupiter's Io and Saturn's Enceladus). As such, Mars's numerous but extinct volcanoes do not have the ability to belch carbon dioxide into the atmosphere, leaving the Red Planet quite chilly today. Such examples suggest plate tectonics—particularly long-lasting plate tectonics—is the best method of regulating a planet's temperature and is therefore a useful ingredient in the cocktail of life.

SLIDING PLATES

The latest study seems to contradict some previous investigations of whether or not exoplanets might shake like Earth. In 2007 planetary scientist Diana Valencia, then at Harvard University, concluded that super-Earths (rocky planets larger than ours) are so likely to host plate tectonics, it is practically inevitable. Because planets more massive than Earth would retain significantly more internal heat from their initial formation, and because heat drives plate tectonics (via the conveyor belt of sinking and rising rock within the mantle), plate activity should be prolonged on such planets. The trouble is that Valencia's study (and many studies that came later) analyzed only one parameter: a planet's size. Unterborn's study is among the first to address plate tectonics based on a planet's composition.

To carry out this analysis, Unterborn and his colleagues needed to determine what an exoplanet's chemical composition might look like. Although astronomers can currently decipher the elements within an exoplanet's atmosphere, there is no way to peer deep into an exoplanet's rocky interior—yet. So Unterborn and his team turned toward the planets' host stars. Because the stars and their planets are built from the same swirling disk of dust and gas, they tend to be made of the same stuff. The researchers looked at nearly 1,500 stars (including 123 stars observed with the Kepler space telescope that astronomers know have orbiting exoplanets) and then used computer models to discover how rocks of these varying compositions would react to the high interior temperatures and pressures formed in a planet.

Once they had an idea of what an exoplanet's mantle and crust might look like, geochemically speaking, the scientists were able to determine whether that exoplanet's crust would be dense enough to sink into the mantle, just as Earth's oceanic plates do at places like the Cascadia subduction zone—North America's 1,000-kilometer-long chain of volcanoes built as one plate takes a deep dive beneath another. Making the calculation involved rigorous modeling: As pressures and temperatures mount during a plate's descent, atoms in the plate undergo a reorganization that makes the plate denser. Should the plate remain denser than the surrounding mantle then the plate would continue to sink. If that is the case, plate tectonics might thrive for billions of years. But if it does not and the plate stalls, then plate tectonics would shut down, crippling life's chances.

The results paint a rather depressing result as far as habitability is concerned: At least two thirds of the simulated planets build a crust that is too buoyant to sink. "If subduction were

to happen, and [the plate] were to go down, it would just pop back up,” Unterborn says. “It’s like trying to push an inner tube underwater.” If these plates are on the move, they might crash into each other and crumple upward to form mountain chains as tall as the Himalayas, Unterborn says. But one plate will never subduct below another to remove excess carbon dioxide or form the volcanoes that spew more carbon dioxide into the atmosphere. As such, the planet will not be able to regulate its own temperature and will easily escalate into a world that resembles a snowball or a sauna.

THE NEW FIELD OF EXO GEOLOGY

The results highlight that a planet’s habitability cannot be defined only by the Goldilocks zone—that sweet spot in a planetary system where a planet’s orbital distance from its star keeps it neither too hot nor too cold. Nor can density alone determine what counts as an “Earth-like” planet. “Density is not destiny when it comes to planets,” Unterborn says. “The Earth is much more than a one-Earth mass, one-Earth radius planet” in the sun’s habitable zone. Just think back 2.5 billion years: Earth would not have been considered habitable to alien astronomers unless they took its geology into account.

Bradford Foley, a geologist at The Pennsylvania State University who was not involved in the study, agrees with the paper’s ultimate point—that the majority of rocky exoplanets likely cannot host plate tectonics—but he argues that finer details, such as the exact percentage of those planets, cannot yet be pinned down. “I would take everything beyond the big-picture view with a grain of salt because there are uncertainties wrapped up in there that are subject to change as more studies come out,” he says.

One of those uncertainties, Foley notes, is geologists still argue over how plate tectonics ignited on Earth and what continues to drive it today. The issue is that even if a plate is dense enough to sink into the mantle, the lithosphere—the strong and rigid outer shell of the planet—has to crack first. But what causes the lithosphere to crack is hotly debated in the field. Unterborn sidestepped this complication by looking for planets that might be able to undergo plate tectonics for billions of years—should it begin in the first place. Foley agrees that it is a clever workaround, and Unterborn argues that it is more interesting from a scientific point of view because we are more likely to find life where it has evolved over billions of years. But the assumption plate tectonics magically begins does show that even the proper elemental cocktail does not guarantee a shifting and rumbling surface. Still, Unterborn argues it does maximize our chances of finding plate tectonics and therefore life.

Unterborn views the work as a step forward in a new field—one where geology meets astronomy in a discipline one might call exogeology—that began just 10 years ago with Valencia’s paper. Just last week Foley, Unterborn and Driscoll (who agrees that exogeology will be a “hot topic in the future”) submitted a proposal to the NASA Astrobiology Institute to further assess how materials of different compositions react under high pressures and temperatures. Whereas Unterborn’s study was based on theoretical calculations, the new team would like to synthesize these rocks in the lab and physically subject them to those conditions. That would allow them to paint a more accurate picture and even explore how changing the composition might crack the lithosphere—the other important criterion for kick-starting plate tectonics. “I think it’s definitely the future,” Unterborn says. “I’m glad to be at the forefront of it.

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From: "Pam Adams" pamcrippenadams@gmail.com

Pam Adams: Biology textbooks tell us that lichens are alliances between two organisms—a fungus and an alga. They are wrong.

HOW A GUY FROM A MONTANA TRAILER PARK OVERTURNED 150 YEARS OF BIOLOGY

Biology textbooks tell us that lichens are alliances between two organisms—a fungus and an alga. They are wrong.

ED YONG, JUL 21, 2016

http://www.theatlantic.com/science/archive/2016/07/how-a-guy-from-a-montana-trailer-park-upturned-150-years-of-biology/491702/?utm_source=eb



I'm lichen your style. Conor Lawless / Flickr

In 1995, if you had told Toby Spribille that he'd eventually overthrow a scientific idea that's been the stuff of textbooks for 150 years, he would have laughed at you. Back then, his life seemed constrained to a very different path. He was raised in a Montana trailer park, and home-schooled by what he now describes as a "fundamentalist cult." At a young age, he fell in love

with science, but had no way of feeding that love. He longed to break away from his roots and get a proper education.

At 19, he got a job at a local forestry service. Within a few years, he had earned enough to leave home. His meager savings and non-existent grades meant that no American university would take him, so Spribille looked to Europe.

Thanks to his family background, he could speak German, and he had heard that many universities there charged no tuition fees. His missing qualifications were still a problem, but one that the University of Gottingen decided to overlook. "They said that under exceptional circumstances, they could enroll a few people every year without transcripts," says Spribille. "That was the bottleneck of my life."

Throughout his undergraduate and postgraduate work, Spribille became an expert on the organisms that had grabbed his attention during his time in the Montana forests—lichens.

You've seen lichens before, but unlike Spribille, you may have ignored them. They grow on logs, cling to bark, smother stones. At first glance, they look messy and undeserving of attention. On closer inspection, they are astonishingly beautiful. They can look like flecks

of peeling paint, or coralline branches, or dustings of powder, or lettuce-like fronds, or wriggling worms, or cups that a pixie might drink from. They're also extremely tough. They grow in the most inhospitable parts of the planet, where no plant or animal can survive.

Lichens have an important place in biology. In the 1860s, scientists thought that they were plants. But in 1868, a Swiss botanist named Simon Schwendener revealed that they're composite organisms, consisting of fungi that live in partnership with microscopic algae. This "dual hypothesis" was met with indignation: it went against the impetus to put living things in clear and discrete buckets. The backlash only collapsed when Schwendener and others, with good microscopes and careful hands, managed to tease the two partners apart.

Schwendener wrongly thought that the fungus had "enslaved" the alga, but others showed that the two cooperate. The alga uses sunlight to make nutrients for the fungus, while the fungus provides minerals, water, and shelter. This kind of mutually beneficial relationship was unheard of, and required a new word. Two Germans, Albert Frank and Anton de Bary, provided the perfect one—symbiosis, from the Greek for 'together' and 'living'.

"That was the eureka moment. That's when I leaned back in my chair."

When we think about the microbes that influence the health of humans and other animals, the algae that provide coral reefs with energy, the mitochondria that power our cells, the gut bacteria that allow cows to digest their food, or the probiotic products that line supermarket shelves—all of that can be traced to the birth of the symbiosis as a concept. And symbiosis, in turn, began with lichens.

In the 150 years since Schwendener, biologists have tried in vain to grow lichens in laboratories. Whenever they artificially united the fungus and the alga, the two partners would never fully recreate their natural structures. It was as if something was missing—and Spribille might have discovered it.

He has shown that largest and most species-rich group of lichens are not alliances between two organisms, as every scientist since Schwendener has claimed. Instead, they're alliances between three. All this time, a second type of fungus has been hiding in plain view.

"There's been over 140 years of microscopy," says Spribille. "The idea that there's something so fundamental that people have been missing is stunning."

The path to this discovery began in 2011, when Spribille, now armed with a doctorate, returned to Montana. He joined the lab of symbiosis specialist John McCutcheon, who convinced him to supplement his formidable natural history skills with some know-how in modern genetics.

The duo started studying two local lichens that are common in local forests and hang from branches like unruly wigs. One is yellow because it makes a strong poison called vulpinic acid; the other lacks this toxin and is dark brown. They clearly look different, and had been classified as separate species for almost a century. But recent studies had suggested that they're actually the same fungus, partnered with the same alga. So why are they different?

To find out, Spribille analyzed which genes the two lichens were activating. He found no differences. Then, he realized that he was searching too narrowly. Lichenologists all

thought that the fungi in the partnership belonged to a group called the ascomycetes—so Spribille had only searched for ascomycete genes. Almost on a whim, he broadened his search to the entire fungal kingdom, and found something bizarre. A lot of the genes that were activated in the lichens belonged to a fungus from an entirely different group—the basidiomycetes. “That didn’t look right,” says McCutcheon. “It took a lot of time to figure out.”

At first, the duo figured that a basidiomycete fungus was growing on the lichens. Perhaps it was just a contaminant, a speck of microbial fluff that had landed on the specimens. Or it might have been a pathogen, a fungus that was infecting the lichens and causing disease. It might simply have been a false alarm. (Such things happen: genetic algorithms have misidentified plague bacteria on the New York subway, platypuses in Virginia tomato fields, and seals in Vietnamese forests.)

But when Spribille removed all the basidiomycete genes from his data, everything that related to the presence of vulpinic acid also disappeared. “That was the eureka moment,” he says. “That’s when I leaned back in my chair.” That’s when he began to suspect that the basidiomycete was actually part of the lichens—present in both types, but especially abundant in the yellow toxic one.

“Toby took huge risks for many years. And he changed the field.”

And not just in these two types, either. Throughout his career, Spribille had collected some 45,000 samples of lichens. He began screening these, from many different lineages and continents. And in almost all the macrolichens—the world’s most species-rich group—he found the genes of basidiomycete fungi. They were everywhere. Now, he needed to see them with his own eyes.

Down a microscope, a lichen looks like a loaf of ciabatta: it has a stiff, dense crust surrounding a spongy, loose interior. The alga is embedded in the thick crust. The familiar ascomycete fungus is there too, but it branches inwards, creating the spongy interior. And the basidiomycetes? They’re in the outermost part of the crust, surrounding the other two partners. “They’re everywhere in that outer layer,” says Spribille.

Despite their seemingly obvious location, it took around five years to find them. They’re embedded in a matrix of sugars, as if someone had plastered over them. To see them, Spribille bought laundry detergent from Wal-Mart and used it to very carefully strip that matrix away.

And even when the basidiomycetes were exposed, they weren’t easy to identify. They look exactly like a cross-section from one of the ascomycete branches. Unless you know what you’re looking for, there’s no reason why you’d think there are two fungi there, rather than one—which is why no one realised for 150 years. Spribille only worked out what was happening by labeling each of the three partners with different fluorescent molecules, which glowed red, green, and blue respectively. Only then did the trinity become clear.

“The findings overthrow the two-organism paradigm,” says Sarah Watkinson from the University of Oxford. “Textbook definitions of lichens may have to be revised.”

“It makes lichens all the more remarkable,” adds Nick Talbot from the University of Exeter. “We now see that they require two different kinds of fungi and an algal species. If the right

combination meet together on a rock or twig, then a lichen will form, and this will result in the large and complex plant-like organisms that we see on trees and rocks very commonly. The mechanism by which this symbiotic association occurs is completely unknown and remains a real mystery.”

Based on the locations of the two fungi, it’s possible that the basidiomycete influences the growth of the other fungus, inducing it to create the lichen’s stiff crust. Perhaps by using all three partners, lichenologists will finally be able to grow these organisms in the lab.

In the Montana lichens that Spribille studied, the basidiomycete obviously goes hand-in-hand with vulpinic acid. But is it eating the acid, manufacturing it, or unlocking the ability to make it in the other fungus? If it’s the latter, “the implications go beyond lichenology,” says Watkinson. Lichens are alluring targets for ‘bioprospectors’, who scour nature for substances that might be medically useful to us. And new basidiomycetes are part of an entirely new group, separated from their closest known relatives by 200 million years ago. All kinds of beneficial chemicals might lie within their cells.

“But really, we don’t know what they do,” says McCutcheon. “And given their existence, we don’t really know what the ascomycetes do, either.” Everything that’s been attributed to them might actually be due to the other fungus. Many of the fundamentals of lichenology will need to be checked, and perhaps re-written. “Toby took huge risks for many years,” says McCutcheon. “And he changed the field.”

But he didn’t work alone, Watkinson notes. His discovery wouldn’t have been possible without the entire team, who combined their individual expertise in natural history, genomics, microscopy, and more. That’s a theme that resonates throughout the history of symbiosis research—it takes an alliance of researchers to uncover nature’s most intimate partnerships.

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ABSOLUTELY & TOTALLY POLITICALLY INCORRECT & AS FAR TO THE CENTER AS YOU CAN GO!

From: “Tim Bolgeo” tbolgeo@epbfi.com

STUDY: PERCENTAGE OF ADULTS WITH CARRY PERMITS UP 190 PERCENT, VIOLENT CRIME DOWN 18 PERCENT

by AWR HAWKINS20 Jul 20173

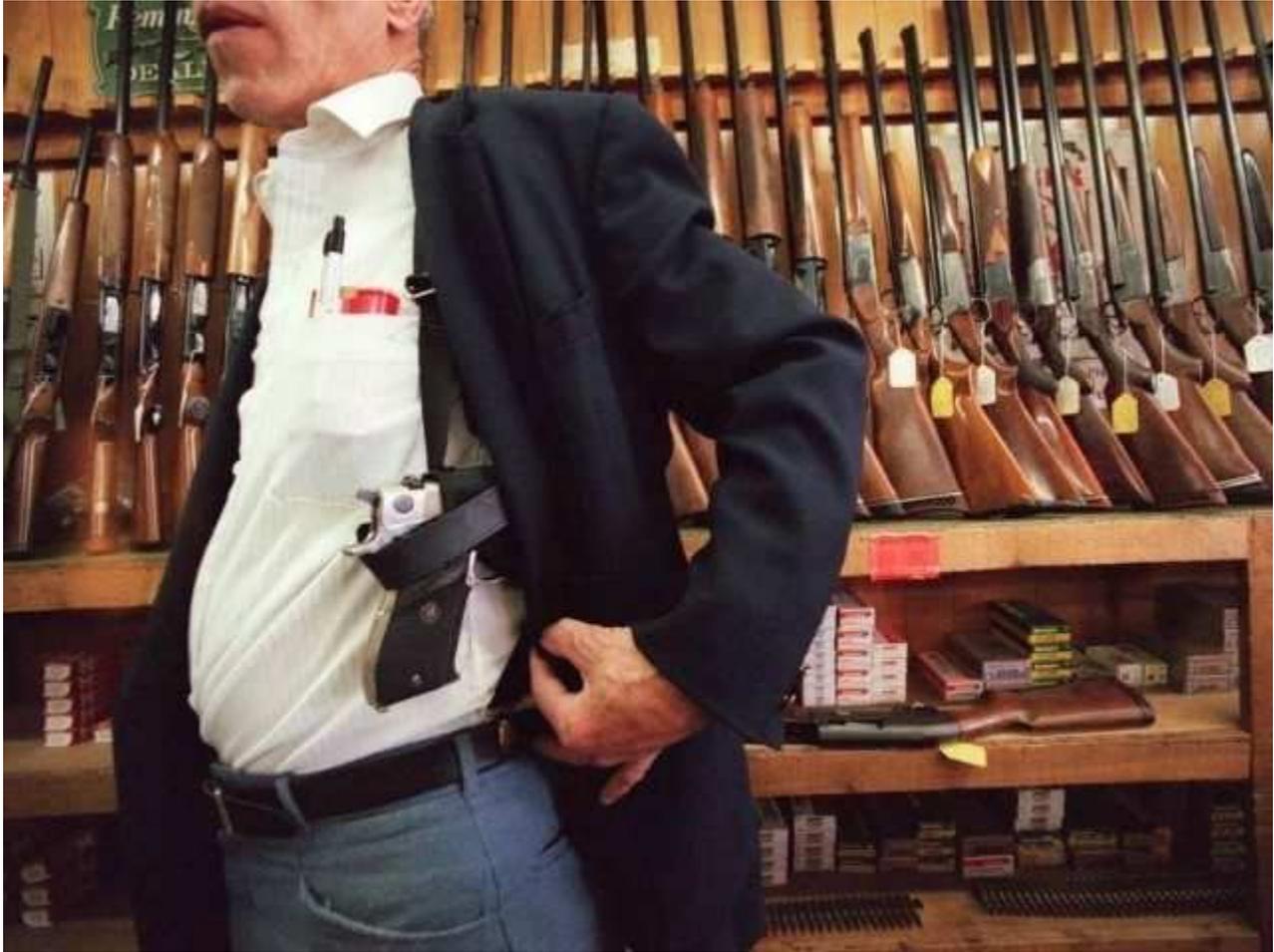
<http://www.breitbart.com/big-government/2017/07/20/study-concealed-carry-see-record-surge-led-women-blacks/>

A study from the Crime Prevention Research Center (CPRC) shows during the time period 2007 to 2015, the percentage of adults with carry permits rose 190% and violent crime fell by 18%.

The cut-off year is 2015 because it is “the last full year that crime data is available.”

According to CPRC, from 2007 to 2015 the “murder rates fell from 5.6 [per 100,000] to 4.9 per 100,000. This represents a 12.5% drop.” At the same time, “overall violent crime fell by

18 percent.” And again, these drops are coinciding with a 190% increase in “the percentage of adults with permits.”



This news comes in the same report in which the CPRC showed that the number of concealed carry permit holders “grew by a record 1.83 million” in 2016. This beats the previous record of 1.73 million, set in 2015, and means “6.53% of American adults have permits.” Moreover, “outside the restrictive states of California and New York, about 8% of the adult population has a permit.”

There are 11 states where over 10% of the adult population possesses a carry permit. Those 11 states are led by Alabama, where 20% are permitted, and Indiana, where 15.8% of all adults have a permit.

CPRC observes:

Regression estimates show a significant association between increased permit ownership and drops in murder and violent crime rates. Each one percentage point increase in rates of permit-holding is associated with a roughly 2.5 percent drop in the murder rate. This holds true even after accounting for incarceration rates, the number of police per capita, and other demographics.

The July 26th, 2017 Edition of THE REVENGE HUMP DAY!

Page 46 of 46

In other words, more concealed carriers, less murder.

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