Welcome to the November 22nd, 2017 Thanksgiving Edition of THE REVENGE HUMP DAY!

Happy Turkey Day to all of you out there. This week I am going to pontificate on music. Specifically on a new Blu-Ray DVD I just bought that contained one of the greatest concerts I have ever heard of seen. The concert happened in 2014 at Hyde Park in London England. The band that was performing was Jeff Lynne's Electric Light Orchestra. ELO was one of the most successful groups of the 70's and 80's and was, to me, one of the greatest of the ages. Yes, I know that some of you out there would say the Beatles were the best. Or the Rolling Stones, or the Who, or the etc. But ELO was in a class all by itself. In my middle 20's to my middle 30's I wasn't into music very much until I saw a class 'B' movie called 'Xanadu' with Olivia Newton John, Michael Beck and Gene Kelly. The movie was so so, but the music blew me away. I found out that most of it was from Jeff Lynne and ELO. Ever since that time I was a fan. Then I saw Mr. Lynne again come to fame as a member of the Traveling Wilburys. OMG were they great.

On the Blu-Ray DVD, 'Jeff Lynne's ELO live in Hyde Park', is a biography of Mr. Lynne and his impact on modern music. You would not believe who he collaborated with. The Beatles, Tom Petty and the Heart Breakers and the Eagles are just a few. I mean, this guy is a genius. T he Blu-Ray DVD, 'Jeff Lynne's ELO live in Hyde Park', is only around $16 from Amazon and I would strongly recommend you pick it up and enjoy it like I have. I have already watched it 4 times and it keeps getting better.

Before I go, I want to wish all of you a happy Thanksgiving. The whole Bolgeo Clan is gathering at Casa Spraker to celebrate the day and I am looking forward to spending it with the children and grandchildren.

So on that "happy 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

From: "Bob Bolgeo" bbolgeo@aol.com

These old photographs are truly remarkable in my opinion. Be sure to read the information below each of them.

I think you will find them to be interesting and informative.

http://douglascountygensoc.org/photos002.html

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

WATCHMOJO TOP 10 ICONIC FIGURES IN SF LITERATURE

From: "Jim Woosley" jimwoosley@aol.com

VIDEO: Top 10 Iconic Figures in Sci-Fi Literature

https://www.youtube.com/watch?v=8BUAV7ZPMQA

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

As with most of these lists, I don't agree with a lot of their picks. What about Robert A. Heinlein, Anne McCaffrey, Andre Norton, Murray Leinster, Edgar Rice Burroughs, and this doesn't even include the modern master of SF. David Weber, John Ringo, Lois McMaster Bujold, etc. You get the idea. UT

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

From: "Pam Adams" <pamcrippenadams@gmail.com>

Wow! I'm always so proud of what LibertyCon accomplishes in charitable work.

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

I can't disagree with a word you say. UT

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

From: "Mike Waldrip" waldripk@gmail.com

PROOF SOMEONE SLAMMED ON THE BAKES

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

SOUP OF THE DAY..I'd Like Two Large Bowls Please

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

A LITTLE HUMOR

I dialed a number and got the following recording:
"I am not available right now,
but thank you for caring enough to call.
I am making some changes in my life.
Please leave a message after the
Beep.
If I do not return your call,
You are one of the changes."

~~~~~~~

My wife and I had words,
But I didn't get to use mine.

~~~~~~~

Frustration is trying to find your glasses without your glasses.

~~~~~~~

The irony of life is that, by the time you're old enough to know your way around, you're not going anywhere.

~~~~~~~

God made man before woman so as to give him time to think of an answer for her first question.

~~~~~~~

**I was always taught to respect my elders,
But it keeps getting harder to find one.**

~~~~~~~

**A woman asks a man who is traveling with six children, "Are all these kids yours?"
The man replies, "No, I work in a condom factory and these are customer complaints".**

~~~~~~~
Nominated as the best short joke this year...

**A three-year-old boy was examining his testicles while taking a bath.
"Mom" he asked, "are these my brains?"
"Not yet," she replied.**

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

HONESTY

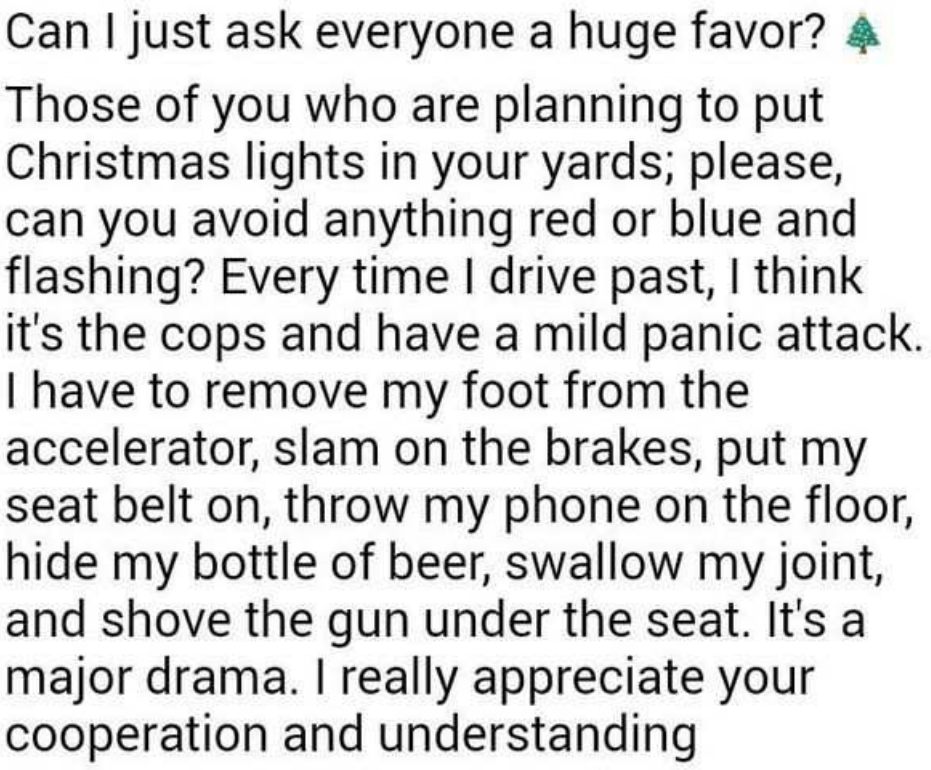
<J>~<O>~<K>~<E>~<S>

EATING IN THE FIFTIES

Pasta had not been invented. It was macaroni or spaghetti.
Curry was a surname.
A take-away was a mathematical problem.
Pizza? Sounds like a leaning tower somewhere.
Bananas and oranges only appeared at Christmas time.
All chips were plain.
Oil was for lubricating, fat was for cooking.
Tea was made in a teapot using tea leaves and never green.
Cubed sugar was regarded as posh.
Chickens didn't have fingers in those days.
None of us had ever heard of yogurt.
Healthy food consisted of anything edible.
Cooking outside was called camping.
Seaweed was not a recognized food.
'Kebab' was not even a word, never mind a food.
Sugar enjoyed a good press in those days, and was regarded as being white gold.
Prunes were medicinal.
Surprisingly muesli was readily available. It was called cattle feed.
Pineapples came in chunks in a tin; we had only ever seen a picture of a real one.
Water came out of the tap. If someone had suggested bottling it and charging more than gasoline for it, they would have become a laughing stock.
The one thing that we never ever had on/at our table in the fifties ... was *elbows, hats and cell phones.*

Eating in THE FIFTIES

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



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

AMAZINGLY SIMPLE HOME REMEDIES

1. IF YOU'RE CHOKING ON AN ICE CUBE, SIMPLY POUR A CUP OF BOILING WATER DOWN YOUR THROAT. PRESTO! THE BLOCKAGE WILL INSTANTLY REMOVE ITSELF.

**2. AVOID CUTTING YOURSELF WHEN SLICING VEGETABLES BY GETTING SOMEONE ELSE
TO HOLD THE VEGETABLES WHILE YOU CHOP.**

3. AVOID ARGUMENTS WITH THE FEMALES ABOUT LIFTING THE TOILET SEAT BY USING THE SINK.

**4. FOR HIGH BLOOD PRESSURE SUFFERERS ~ SIMPLY CUT YOURSELF AND BLEED FOR A
FEW MINUTES, THUS REDUCING THE PRESSURE ON YOUR VEINS. REMEMBER TO USE A TIMER.**

5. A MOUSE TRAP PLACED ON TOP OF YOUR ALARM CLOCK WILL PREVENT YOU FROM ROLLING OVER AND GOING BACK TO SLEEP AFTER YOU HIT THE SNOOZE BUTTON.

6. IF YOU HAVE A BAD COUGH, TAKE A LARGE DOSE OF LAXATIVES. THEN YOU'LL BE AFRAID TO COUGH.

7. YOU ONLY NEED TWO TOOLS IN LIFE - WD-40 AND DUCT TAPE. IF IT DOESN'T MOVE AND SHOULD, USE THE WD-40. IF IT SHOULDN'T MOVE AND DOES, USE THE DUCT TAPE.

8. REMEMBER - EVERYONE SEEMS NORMAL UNTIL YOU GET TO KNOW THEM.

9. IF YOU CAN'T FIX IT WITH A HAMMER, YOU'VE GOT AN ELECTRICAL PROBLEM.

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

LITTLE BOBBY

**Little Bobby and Jenny are only ten years old, but they know they are in love.
One day they decide that they want to get married, so Bobby goes to Jenny's father to ask him for her hand.**

Bobby bravely walks up to him and says, "Mr. Smith, me and Jenny are in love and I want to ask you for her hand in marriage."

Thinking this was simply adorable, Mr. Smith replies, "Well, Bobby, you are only 10; Where will you two live?"

Without even taking a moment to think about it, Bobby replies, "In Jenny's room. It's bigger than mine and we can both fit there nicely."

Mr. Smith says with a huge grin, "Okay, then how will you live? You're not old enough to get a job. You'll need to support Jenny."

Again, Bobby instantly replies, "Our allowance. Jenny makes five bucks a week and I make ten bucks a week. That's about 60 bucks a month, so that should do us just fine."

Mr. Smith is impressed Bobby has put so much thought into this.

"Well, Bobby, it seems like you have everything figured out. I just have one more question: What will you do if the two of you should have little children of your own?"

Bobby just shrugs his shoulders and says, "Well, we've been lucky so far."

Mr. Smith no longer thinks the little shit is adorable.

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

THE DIVORCE
The day before Thanksgiving, a guy in Phoenix calls his son in New York and tells him,"Son, I'm really sorry but I have to tell you that your mother and I are splitting up. We can't live with each other any more."

The son is distraught and shouts down the phone at his father, "Pop, what are you talking about?"

The father replies, "It's just that we can't stand the sight of each other any more. And I'm sick of talking about this, so will you call your sister in Chicago and tell her?"

The father than hangs up, and the son frantically calls his sister, who's equally distraught and exclaims, "Like heck they're getting divorced! Leave it to me, I'll take care of this."

So she calls her father and shouts down the phone at him, "You are NOT getting divorced! Don't you dare to do a single thing until I get there. I'm calling my brother, and we'll both be there tomorrow. Until then, don't you dare do a thing about this. Do you hear me?"

She then hangs up, at which point the father hangs up his phone, turns to his wife and says, "Okay dear, they're both coming for Thanksgiving and paying their own way."

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

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

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

From: "Bob Bolgeo" bbolgeo@aol.com

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


My Living Will
Last night, my kids and I were sitting in the living room and I said to them,
'I never want to live in a vegetative state, dependent on some machine and fluids from a bottle. If that ever happens, just pull the plug.'
They got up, unplugged the computer and threw out my wine!!
The little bastards.
Geezer Planet

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


Secrets to a long happy marriage
A old woman was sipping on a glass of wine, while sitting on the patio with her husband, and she says, "I love you so much, I don't know how I could ever live without you"... Her husband asks, "Is that you, or the wine talking?"... She replies, "It's me... talking to the wine."

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


International Symbol for Marriage

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

From: "Mike Williamson" mzmadmike@gmail.com

https://scontent-atl3-1.xx.fbcdn.net/v/t34.0-12/23667379_10208138294973759_290386834_n.jpg?oh=dc7553b39ad3864009cc583997c06a2f&oe=5A1197D4

Outside of Whole Foods in San Diego

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

From: "Chris Cowan" cowanc1028@earthlink.net

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

From: "Ray Beloate" beerman@rittermail.com

VERY FUNNY SIGNS

A SIGN IN A SHOE REPAIR STORE IN VANCOUVER THAT READ:
"We will heel you
We will save your sole
We will even dye for you."

AT AN OPTOMETRIST'S OFFICE:
"If you don't see what you're looking for, you've
come to the right place."

ON A PLUMBER'S TRUCK:
"We repair what your husband fixed."

On an Electrician's truck:
"Let us remove your shorts."

On another Plumber's truck:
"Don't sleep with a drip. Call your plumber."

At a Car Dealership:
"The best way to get back on your feet – miss a car payment."

Outside a Muffler Shop:
"No appointment necessary. We hear you coming...."

In a Veterinarian's waiting room:
"Be back in 5 minutes. Sit..... Stay.."

At the Electric Company:

**"We would be delighted if you send in your payment on time.
However, if you don't, YOU will be de-lighted.**

**In the front yard of a Funeral Home:
"Drive carefully. We'll wait."**

**In a Chicago Radiator Shop:
"Best place in town to take a leak."**

**Sign on the back of a Septic Tank Truck:
"Caution - This truck is full of Political Promises...."**

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

YOU JUST CAN'T MAKE THIS STUFF UP!

From: "Tim Bolgeo" tbolgeo@epbfi.com

Unfortunately I thought this was a joke article. But then I found out that it was true. I think that the parents of Otto Wambier would have appreciated the President of the US trying to help get their child out of jail. And for those who might think President Trump was not gracious enough not to mention the slight given to him by LaVar Ball, tough noogies to you. Bad manners should be called out always so that it is minimized. VT
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PRESIDENT TRUMP BLASTS FATHER OF RECENTLY RELEASED UCLA PLAYER FOR BEING UNAPPRECIATIVE OF HIS HELP IN GAINING SON'S RELEASE

**by DYLAN GWINN19 Nov 2017
http://www.breitbart.com/sports/2017/11/19/president-trump-blasts-father-recently-released-ucla-player-unappreciative-help-gaining-sons-release/**

LaVar Ball, father of LiAngelo Ball, a UCLA basketball player recently released by the Chinese after being detained on shoplifting charges, has taken issue with President Trump's role in his son's release.

Now, President Trump has taken issue with LaVar Ball.

**On Saturday, LaVar Ball scoffed at the notion that President Trump's meeting with Chinese Premier Xi Jinping had played any role in his son's release. Ball went on to say that shoplifting is no big deal, and that his son would have been released anyway.
On Sunday, President Trump took to Twitter to criticize the elder Ball:**

**Donald J. Trump ?@realDonaldTrump
Now that the three basketball players are out of China and saved from years in jail, LaVar Ball, the father of LiAngelo, is unaccepting of what I did for his son and that shoplifting is no big deal. I should have left them in jail!
12:42 PM - Nov 19, 2017**

Ball spoke with ESPN about Trump's involvement in his son's release, and was critical of the notion that the Chinese released his son due to Trump's intervention:

"Who?" Ball said when Markazi raised the topic. "What was he over there for? Don't tell me nothing. Everybody wants to make it seem like he helped me out," he added.

Ball also insisted that the crime his son was accused of was no big deal.
"As long as my boy's back here, I'm fine," Ball said, continuing:

I'm happy with how things were handled. A lot of people like to say a lot of things that they thought happened over there. Like I told him, "They try to make a big deal out of nothing sometimes." I'm from L.A. I've seen a lot worse things happen than a guy taking some glasses. My son has built up enough character that one bad decision doesn't define him. Now if you can go back and say when he was 12 years old he was shoplifting and stealing cars and going wild, then that's a different thing.

"Everybody gets stuck on the negativity of some things, and they get stuck on them too long," he concluded. "That's not me. I handle what's going on, and then we go from there."

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

Here is the other side of the coin about Judge Roy Moore. After being on the wrong side of the Social Justice Warriors who were spouting lies and BS about me, I can understand how the Judge would feel if he is innocent. Since I do not know Judge Moore, I believe that we should listen to both sides. VT
~~~~~~

CHARACTER WITNESSES: FORMER GIRLFRIENDS, EMPLOYEES, AND CHILDHOOD FRIENDS STEP UP TO DEFEND ROY MOORE

by PENNY STARR18 Nov 2017
http://www.breitbart.com/big-government/2017/11/18/character-witnesses-former-girlfriends-employees-childhood-friends-defend-moore/

AP/Phillip Rawls

A dozen women who know Alabama Senate candidate Judge Roy Moore personally have come forward to express their support and speak out about his good character.

Over the past week, several women have claimed that Moore made sexual advances when they were teenagers. Another woman said she was in her twenties when Moore groped her in his office.

Moore has denied the allegations and

has vowed to stay in the race against Democrat Doug Jones in a special election next month to fill the Senate seat Attorney General Jeff Sessions vacated.

Several media outlets reported on the statements, which the Roy Moore campaign distributed.

All of the women live in Alabama and some in the same county where Moore and his wife, Kayla, live.
The women range from Moore's sister-in-law to a former receptionist, from women he once dated to women who have known him since childhood.
A "Women for Moore" rally took place Friday outside the Alabama State Capitol.
The statements follow below:

*** "I have known Roy for over 30 years," said Kandi Kisor Smith, sister of Moore's wife. "I met him in 1984 when he met my sister in church and began dating her. He has always showed honor and dignity. I truly can't even begin to grasp that people would question his character. He has lived by what he preached since the day I met him."**

*** "I was the receptionist for Roy Moore the first time he was Chief Justice and I am proud of our history," said Marianne Rhodes, who was Moore's receptionist from 2000-2003. "I saw everything that went on in that office and I've never worked for anybody who was more considerate, honest, or kind. We all enjoyed our tenure there. He was always up and above board. If any of these people who are slandering the good name of Roy Moore had ever worked with [him], they would know what a fine person he is. My history with Judge Moore was nothing but pleasurable and this is all upsetting to me."**

*** "I have known Roy Moore for about forty years," Jennie Klingenbeck of Birmingham, who dated Moore, said. "Roy and I briefly dated when I was in my twenties. While I was around Roy, either just the two of us or with other people, he was always a true gentleman treating me with respect and courtesy. I can honestly say that I never have seen or heard any inappropriate remarks or behaviors while he was around me. I believe that Roy lives by his Christian beliefs and is a good man."**

*** "I worked at Uncle Sam's BBQ (closed now) for 10 years while in my 20's and waited on Roy Moore and his family," Jaime Moses said. "Mr. Moore and his wife were nothing but friendly and respectful. The children were the same, which is a sign of great parenting. He knew many people dining there and spoke and shook hands with everyone. Not once did he make me feel uncomfortable. Working in the food industry can be hard sometimes and Mr. Moore's kindness to myself and staff did not go unnoticed."**

*** "I feel it my duty to say that I have known Roy Moore since I was a kid," Elaine Conner Watson said. "I worked closely with Roy (adjoining offices) when I was 16 years old. I went to school half a day and worked at the bank half a day. NEVER did he in any way make me feel uncomfortable, flirt, or make advances towards me. He was always a kind and respectable man. We are still friends to this day and I would put my life in his hands if need be. There is no way that these statements these people are making are true. Someone is getting some hefty perks coming from the lies that are being told. I appreciate and respect everything that Roy has done for our state and citizens."**

*** "My first remembrance of Roy Moore was grammar school," Sharon Lamkin said. "He was probably in Jr High school but all of us Gallant kids rode the same bus," Sharon**

Lamkin said. "He was always a gentle, kind boy and grew into an even more admirable man. He was my softball coach in my high school days and was always such a kind person, never a mean or hateful word to any of us. Only kindness and utmost respect! Have been friends with all of his family for many, many years. NEVER heard ANY mention of any such behavior in all these years. Have seen him at the local church several times with his knees bowed in prayer at the altar. Takes time to listen to people. Just a wonderful, Christian man in a small rural community. Devoted to family, friends and most of all God. Proud to know him and will continue to support him with our presence and prayers."

*** "I have known Roy Moore and his family for over thirty years," Amanda Pearce said. I spent a great deal of time as a child with his nieces, who lived in close proximity to Mr. Moore's residence. There was never a time I felt uncomfortable or witnessed any inappropriate behavior by him. We have attended the same church for over twenty years and I have always had the utmost respect for the life he leads and the principles he stands for."**
*** "I have known Roy Moore for over 50 years. I first met him when I started dating his first cousin, Dennis Mason," Doris Mason said. "Dennis and I married in 1965, eventually had 4 children (3 of whom are girls) and we frequently visited his childhood home prior to our marriage. Roy has been nothing short of a true gentleman toward me, my daughters, and anyone else I have witnessed his interaction with. He spent many evenings in our home around our dinner table. Roy has spent time with all of our children at length and he has always displayed integrity, honesty and impeccable character. It is my belief that the accusations against Roy are completely false! Do I believe that Roy is perfect? Certainly not. No human is. What I do know is that he is a man that I trust and offer my utmost respect to because he has never been anything but respectful towards me and my family!"**

*** "I have known Roy Moore for 25 years," Brenda Parrish said. "Roy has always been a kind, caring and generous Man of God. I have never heard anything bad said about Roy. He is a wonderful spiritual leader to his family and has exceptional character."**

*** "We have known Roy Moore and his family for more than 25 years," Angie Johnson said. "His son was coached on a ball team by my husband …a team player alongside my son. Roy also helped with coaching the team. My husband and I have been guests in his home, in his office in Gadsden as well as Montgomery. I am acquaintances with several members of Roy's family. I have never known Roy to exhibit anything other than appropriate behavior during our times together. Further I was raised and lived in Gadsden all of my 50+ years and I have never been aware of any of the incidents that have been spoken of about Roy. I worked in a fast food establishment that Roy frequented during the time period in question. Again …no behavior exhibited other than respect and mannerful … during that time Roy had written and recorded a 45 record which he brought over and gifted to my mother. I do not understand waiting years and years to make accusations unless there are political or monetary gains to be made. It is a sad day when someone can take a person's character and attempt to discredit them by making accusations that cannot be proven. How quick everyone is to take the position of judge, juror, and executioner. What if the shoe was on the other foot. I would never condone sexual harassment against anyone if proven."**

*** "I had the pleasure of meeting Roy Moore around 15 years ago," Linda Whitt said. "He is related to my husband's brother-in-law. I have never known Roy to be anything other than a gentleman. With that being said, it saddens me that there are those who seek to tarnish the reputation of a good man."**

Jennifer Price of Gallant said, "I have known Roy Moore all my life. He is one of the most godly men I've even known. I would trust him with my life and I could call on him for anything and I know he'd be there. He's a wonderful husband, father and granddaddy and loves his family dearly."

<S>~<C>~<I>~<E>~<N>~<C>~<E>~~~<S>~<T>~<A>~<R>~<T>~<S>~~~<H>~<E>~<R>~<E>

From: "Tim Bolgeo" tbolgeo@epbfi.com

NASA CONDUCTS SUCCESSFUL TEST FOR MARS 2020 PARACHUTE SYSTEM

Michael Irving, November 15, 2017
https://newatlas.com/mars-2020-parachute-test/52194/

NASA has successfully conducted the first test of the parachute system for the Mars 2020 mission(Credit: NASA/Wallops)

While the Curiosity rover continues to explore the Red Planet, NASA is gearing up to launch its successor. The Mars 2020 mission is well into the testing phase, and now the organization has successfully conducted the first test of a supersonic parachute that will (hopefully) allow the craft to safely touchdown on Mars in early 2021.

The first flight of the parachute test series, which NASA calls the Advanced Supersonic Parachute Inflation Research Experiment (ASPIRE), launched last month from Wallops Flight Facility in Wallops Island, Virginia. The parachute used was almost exactly the same as the one that delivered Curiosity to the Martian surface in 2012, but a stronger version will be tested in later experiments, and data from the whole run will be used to finalize the design of the Mars 2020 parachute.

On October 4, a 58-ft (17.7-m) Black Brant IX rocket was launched, carrying a payload that included the parachute, its deployment mechanism, and a suite of data-gathering instruments, including cameras. The parachute deployed 42 seconds after launch while at an altitude of 26 miles (42 km) and traveling at a velocity of 1.8 times the speed of sound. The test was successful and 35 minutes after launch, the payload splashed down into the Atlantic Ocean, about 34 miles (54 km) away from the launchpad.

"Everything went according to plan or better than planned," says Ian Clark, technical lead for the project. "We not only proved that we could get our payload to the correct altitude and velocity conditions to best mimic a parachute deployment in the Martian atmosphere, but as an added bonus, we got to see our parachute in action as well."

NASA has released the following video of the test, which gives a rover's-eye view of the launch, deployment and landing. The next ASPIRE test is scheduled for February next year and, if all goes as planned, the mission will launch in July 2020.

Source: JPL NASA

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EARTHBOUND ANTIMATTER MYSTERY DEEPENS AFTER SCIENTISTS RULE OUT PULSAR SOURCE

By Harrison Tasoff, Space.com Staff Writer | November 16, 2017 02:01pm ET
https://www.space.com/38796-earthbound-antimatter-mystery-pulsars-not-source.html?utm_source=sdc-newsletter&utm_medium=email&utm_campaign=20171116-sdc%201

The HAWC gamma-ray observatory detects cosmic rays from its altitude of 13,500 feet in Mexico's Pico de Orizaba National Park. The Sierra Negro volcano looms large in the background. Credit: HAWC

More antimatter particles stream toward Earth than scientists can explain — and new research from a mountaintop observatory in central Mexico deepens the mystery by crossing off one possible source.

The Earth is constantly showered by high-energy particles from a variety of cosmic sources. Physicist Victor Hess used a balloon to provide the first evidence of the extraterrestrial nature of cosmic rays in 1912. Since then, scientists have identified and accounted for a variety of different types, but the origin of some of these particles continues to elude experts.

The recent finding, detailed in the journal Science today (Nov. 17), concerns positrons, the antimatter complements of electrons. High-energy particles, usually protons, traveling across the galaxy can create pairs of positrons and electrons when they interact with dust and gas in space, study co-author Hao Zhou, at Los Alamos National Lab, told Space.com. In 2008, the space-based PAMELA detector measured unexpectedly high numbers of earthbound positrons. This was about 10 times what they were expecting to see, according to Zhou.

After years of work, camps coalesced around two distinct explanations, according to a statementby Michigan Technological University, which was involved in the new study. One hypothesis suggests the particles come from nearby pulsars, rapidly spinning cores of burnt-out stars, which can whip particles like electrons and positrons to incredible speeds. The other group posits a more exotic origin for the excess positrons, perhaps involving dark matter, an unknown yet pervasive entity that accounts for 80 percent of the universe's mass.

Particles like positrons that carry an electric charge are difficult to detect on Earth since they can be deflected by the planet's magnetic field. But scientists have a workaround. The particles also interact with the cosmic microwave background — an ever-present stream of low-energy photons left over from the birth of the universe. "The high-energy electron, or positron, [will] kick the low-energy photon ... so this the photon becomes a high-energy gamma-ray," Zhou said. "These gamma-rays, which have no electric charge, can pass right through the magnetic field and make it all the way to Earth's surface.

Zhou's team made detailed measurements of the gamma-rays coming from the direction of two nearby pulsars — Geminga and its companion PSR B0656+14 — that are the right age and distance from Earth to account for the excess positrons. To do this, the scientists used the High-Altitude Water Cherenkov (HAWC) Gamma-Ray Observatory, located about 4 hours east of Mexico City. HAWC comprises more than 300 tanks of extra-pure water. When gamma-rays plow into the atmosphere, they create a cascade of high-energy particles. As this shower of particles passes through HAWC's tanks, it emits flashes of blue light, which scientists can use to determine the energy and origin of the original cosmic ray.

The data from HAWC revealed that particles are streaming away from the pulsars too slowly to account for the excess positrons, according to a statement by the University of Maryland, whose researchers also contributed to the work. In order to have arrived here by now, the particles would have needed to leave before the pulsars had formed, Zhou said.

Zhou's colleagues are quick to point out an important caveat. "Our measurement doesn't decide the question in favor of dark matter, but any new theory that attempts to explain the excess using pulsars will need to match the new data," University of Maryland physicist Jordan Goodman, the lead investigator and U.S. spokesman for the HAWC collaboration, said in the statement from Maryland.

By observing the rotations of galaxies, scientists determined that the universe contains more mass than the objects we can observe. They call this mysterious extra mass dark matter. Aside from seeing dark matter's gravitational influence from afar, no one has directly detected it otherwise. However, a popular model of the substance involves weakly interacting massive particles, or WIMPS, which interact with regular matter solely through gravity. If these proposed particles were to decay, or be annihilated somehow, they could conceivably generate pairs of electrons and positrons, Zhou said.

There are other astrophysical processes to consider as well. Supernova remnants and microquasars — extremely bright objects formed as matter spirals toward a black hole — can produce positrons, Zhou said. And there's the possibility that the initial model of particle interactions with the cosmic microwave background is inaccurate. "In order to confirm a detection of dark mater, I guess, there's still a long way to go," Zhou said. "We have to rule out all these astrophysical processes."

Zhou's team plans to take advantage of HAWC's incredibly wide field of view to narrow down these alternatives in future studies.

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NEW ZEALAND'S WAR ON RATS COULD CHANGE THE WORLD

The nation wants to eradicate all invasive mammal predators by 2050. Gene-editing technology could help—or it could trigger an ecological disaster of global proportions.

ED YONG, NOV 16, 2017
https://www.theatlantic.com/science/archive/2017/11/new-zealand-predator-free-2050-rats-gene-drive-ruh-roh/546011/

Stas Kulesh / Getty Images

The first thing that hit me about Zealandia was the noise.

I was a 15-minute drive from the center of Wellington, New Zealand's capital city, but instead of the honks of horns or the bustle of passersby, all I could hear was birdsong. It came in every flavor—resonant coos, high-pitched cheeps, and alien notes that seemed to come from otherworldly instruments.

Much of New Zealand, including national parks that supposedly epitomize the concept of wilderness, has been so denuded of birds that their melodies feel like a rare gift—a fleeting thing to make note of before it disappears.

But Zealandia is a unique 225-hectare urban sanctuary into which many of the nation's most critically endangered species have been relocated. There, they are thriving—and singing. There, their tunes are not a scarce treasure, but part of the world's background hum. There, I realized how the nation must have sounded before it was invaded by mammals.

Until the 13th century, the only land mammals in New Zealand were bats. In this furless world, local birds evolved a docile temperament. Many of them, like the iconic kiwi and the giant kakapo parrot, lost their powers of flight. Gentle and grounded, they were easy prey for the rats, dogs, cats, stoats, weasels, and possums that were later introduced by humans. Between them, these predators devour more than 26 million chicks and eggs every year. They have already driven a quarter of the nation's unique birds to extinction.

Many species now persist only in offshore islands where rats and their ilk have been successfully eradicated, or in small mainland sites like Zealandia where they are encircled by predator-proof fences. The songs in those sanctuaries are echoes of the New Zealand that was.

But perhaps, they also represent the New Zealand that could be.

"It's crazy but it's ambitious, and I think it might be worth a shot. I think it's our great challenge."

In recent years, many of the country's conservationists and residents have rallied behind Predator-Free 2050, an extraordinarily ambitious plan to save the country's birds by eradicating its invasive predators. Native birds of prey will be unharmed, but Predator-Free 2050's research strategy, which is released today, spells doom for rats, possums, and stoats (a large weasel). They are to die, every last one of them. No country, anywhere in the world, has managed such a task in an area that big. The largest island ever cleared of rats, Australia's Macquarie Island, is just 50 square miles in size. New Zealand is 2,000 times bigger. But, the country has committed to fulfilling its ecological moonshot within three decades.

Beginning as a grassroots movement, Predator-Free 2050 has picked up huge public support and official government backing. Former Minister for Conservation Maggie Barry once described the initiative as "the most important conservation project in the history of our country." If it works, Zealandia's fence would be irrelevant; the entire nation would be a song-filled sanctuary where kiwis trundle unthreatened and kakapos once again boom through the night.

By coincidence, the rise of the Predator-Free 2050 conceit took place alongside the birth of a tool that could help make it a reality—CRISPR, the revolutionary technique that allows scientists to edit genes with precision and ease. In its raw power, some conservationists see a way of achieving impossible-sounding feats like exterminating an island's rats by spreading genes through the wild population that make it difficult for the animals to reproduce. Think Children of Men, but for rats. Other scientists, including at least one gene-

editing pioneer, see the potential for ecological catastrophe, beginning in an island nation with good intentions but eventually enveloping the globe.

In 2007, a retiree named Les Kelly returned to New Zealand after 25 years of working in Australia, and marked his homecoming with a four-month walking tour. And during that time, he realized that something had gone horribly wrong. The birds he remembered from his youth were gone. Learning that introduced pests were responsible, he conceived a bold plan to purge them and championed it through a self-created lobby group called Predator-Free New Zealand. Word got around, and in 2011, a regionally famous physicist named Paul Callaghan mentioned the idea in a rousing speech at Zealandia. "It can be done," he said. "It's crazy but it's ambitious, and I think it might be worth a shot. I think it's our great challenge."

Callaghan died a few months later, but those words, delivered by a well-liked celebrity, kept gathering momentum. They certainly lit a fire in James Russell, a young ecologist who was born and raised in New Zealand. "I grew up in suburban Auckland with kakariki—these really rare parakeets that my mother raised," he tells me. "Now, rats kill most of them, and it breaks my heart." In 2015, he and three colleagues wrote a paper in which they laid out the benefits of eradicating pests nationwide, and estimated that a 50-year scheme would cost 9 billion NZD ($6 billion).

From there, the idea became a movement. "It stopped being aspirational," Russell says. The government got on board, setting up a limited company to administer an initial $28 million NZD worth of funds. The public embraced the idea, too. People who had been individually trying to control invasive predators on their own land found common cause behind a unifying theme.

"It was profoundly wrong of me to even suggest it."

There are, of course, naysayers. Some accuse the initiative of ecological xenophobia, unfairly persecuting creatures that didn't hail from New Zealand but sure as hell are part of it now. But Russell notes that these displaced predators are still wreaking havoc. "Something is going to die," he says. "Either a bird is going to be killed by a rat that we brought here, or we're going to kill the rat. And I would rather humanely kill the rat than have the rat inhumanely kill a bird."

Other skeptics say that the task is simply too huge. So far, conservationists have successfully eradicated mammals from 100 small islands, but these represent just 10 percent of the offshore area, and just 0.2 percent of the far larger mainland. It's one thing to cull pests on small, waterlocked pimples of land whose forests are almost entirely owned by the government. It's quite another to repeat the feat in continuous stretches of land, dotted by cities and private homes.

But Russell, ever the optimist, notes that the daunting ascent ahead shouldn't distract people from the path already climbed. In 1963, after decades of unsuccessfully trying to save birds from invasive predators, the legendary conservationist Don Merton finally divested a tiny island of its rats, by poisoning them by hand. In later decades, when the Department of Conservation started dropping poisoned bait by helicopter, larger islands became rat-free. Heavily visited islands just off the coast of Auckland were cleared. The mainland is a much bigger challenge but one that could be tackled gradually, by creating

large sanctuaries like Zealandia and slowly expanding them. "This is a 2050 aspiration," says Russell. "It's not going to be solved in 3 to 5 years."

"It has become less about technical feasibility but about cost," he adds. "We could just use the tech today but it would be infinitely expensive. We need new control techniques that would be orders of magnitude cheaper. And that's when we get into questions about CRISPR."

In 2014, kevin Esvelt, a biologist at MIT, drew a Venn diagram that troubles him to this day. In it, he and his colleagues laid out several possible uses for gene drives—a nascent technology for spreading designer genes through groups of wild animals. Typically, a given gene has a 50-50 chance of being passed to the next generation. But gene drives turn that coin toss into a guarantee, allowing traits to zoom through populations in just a few generations. There are a few natural examples, but with CRISPR, scientists can deliberately engineer such drives.

Suppose you have a population of rats, roughly half of which are brown, and the other half white. Now, imagine there is a gene that affects each rat's color. It comes in two forms, one leading to brown fur, and the other leading to white fur. A male with two brown copies mates with a female with two white copies, and all their offspring inherit one of each. Those offspring breed themselves, and the brown and white genes continue cascading through the generations in a 50-50 split. This is the usual story of inheritance. But you can subvert it with CRISPR, by programming the brown gene to cut its counterpart and replace it with another copy of itself. Now, the rats' children are all brown-furred, as are their grandchildren, and soon the whole population is brown.

Forget fur. The same technique could spread an antimalarial gene through a mosquito population, or drought-resistance through crop plants. The applications are vast, but so are the risks. In theory, gene drives spread so quickly and relentlessly that they could rewrite an entire wild population, and once released, they would be hard to contain. If the concept of modifying the genes of organisms is already distasteful to some, gene drives magnify that distaste across national, continental, and perhaps even global scales.

Esvelt understood that from the beginning. In an early paper discussing gene drives, he and his colleagues discussed the risks, and suggested several safeguards. But they also included a pretty Venn diagram that outlined several possible applications, including using gene drives to control invasive species—like rats. That was exactly the kind of innovation that New Zealand was after. You could spread a gene that messes with the rodent's fertility, or that biases them toward one sex or the other. Without need for poisons or traps, their population would eventually crash.

Please don't do it, says Esvelt. "It was profoundly wrong of me to even suggest it, because I badly misled many conservationists who are desperately in need of hope. It was an embarrassing mistake."
Through mathematical simulations conducted with colleagues at Harvard, he has now shown that gene drives are even more invasive than he expected. Even the weakest CRISPR-based gene drives would thoroughly invade wild populations, if just a few carriers were released. They're so powerful that Esvelt says they shouldn't be tested on a small scale. If conservationists tried to eliminate rats on a remote island using gene drives, it would only take a few strongly swimming rodents to spread the drive to the mainland—and beyond. "You cannot simply sequester them and wall them off from the wider world,"

Esvelt says. They'll eventually spread throughout the full range of the species they target. And if that species is the brown rat, you're talking about the entire planet.

Together with Neil Gemmell from the University of Otago, who is advising Predator-Free 2050, Esvelt has written an opinion piece explicitly asking conservationists to steer clear of standard gene drives. "We want to really drive home—ha ha—that this is a technology that isn't suitable for the vast majority of potential applications that people imagine for it," he says. (The only possible exceptions, he says, are eliminating certain diseases like malaria and schistosomiasis, which affect hundreds of millions of lives and have proven hard to control.)

It's not ready yet, either. Even if gene drives were given a green light today, Gemmell says it would take at least 2 to 3 years to develop carrier animals, another 2 years to test those individuals in a lab, and several years more to set up a small field trial. And these technical hurdles pale in comparison to the political ones. Rats are vermin to many cultures, but they're also holy to some, and they're likely to be crucial parts of many ecosystems around the world. Eradicating them is not something that any single nation could do unilaterally. It would have to be a global decision—and that's unlikely. Consider how much effort it has taken to reach international agreements about climate change—another crisis in which the actions of certain nations have disproportionately reshaped the ecosystems of the entire world. Genetic tools have now become so powerful that they could trigger similar changes, but faster and perhaps more irreversibly.

"In a global society, we can't act in isolation," says Gemmell. "Some of these tools we're thinking about developing will cross international borders. New Zealand is an island nation relatively isolated from everyone else, but what if this was a conversation happening in the United States about eradicating rodents? What if Canadians and Mexicans had a different view? This is something that should be addressed."

"M?ori tend to have a precautionary approach because we've already had many cases of wrongdoing for the right reasons."

Russell agrees with a precautionary approach but he isn't ready to dismiss gene drives yet. For a start, he feels that Esvelt's simulations overestimate the risk that such drives would establish themselves in the wild. Yes, rats are very good at traveling and colonizing new lands, but they're surprisingly bad at invading places where other rats already exist. "Rats have a strong incumbent advantage," he says. "You really have to introduce a lot of individuals" for them to successfully invade an already-established population.

Esvelt thinks that people would do exactly that. Gene-drive rats may not be able to swim or stow away in sufficient numbers to occupy new lands, but people could carry them. There is precedent for this: In 1997, farmers illegally smuggled a hemorrhagic virus into New Zealand to control rabbit pests. They could just as easily smuggle gene-drive rats in the other direction, to control the rodents in their own particular corners of the world. "New Zealand has very good biosecurity but it's mostly focused on stopping things from getting in," says Gemmell. "I'm not sure we're that good at stopping things from getting out."

If gene drives are deployed, it's not unreasonable to imagine a black market in genetic rodenticide, which is exactly the kind of deliberate malfeasance that Esvelt says scientists rarely anticipate. "We don't consider everything that will happen when technology gets in touch with reality," he says.

All of this assumes that genes drives would be used to spread genes that kill or suppress pests outright. Instead, conservationists could use them to spread genes that are tied to particular ecosystems. "Imagine giving all rats in New Zealand a peanut butter allergy, and then we feed them all peanut butter," Russell says. "Well sure," Esvelt counters, "but then you've just converted all the rats in the world into GMOs without asking other countries." The same problem remains: How do you keep the modification from spreading beyond New Zealand?

Esvelt is working on a couple of tricks for corralling the awesome power of gene drives. In a basic gene drive, a chosen gene has all the components it needs to spread itself. But you could split those components between several genes that are connected in a daisy chain, so that gene C is driven by gene B, B is driven by A, and A is driven by nothing. If rats with these genes were released into the wild, the A-carriers would initially spread the B and C genes, but would eventually disappear themselves. After they go, B would follow. Ultimately, so would C. These "daisy drives," as Esvelt calls them, are self-exhausting. They're designed to run out of steam. If they work, they are tools that countries could justifiably use without involving the entire world.

To be clear, despite the buzz around gene drives in New Zealand's conservation circles, there are no concrete plans to actually use them. "There is currently no research being conducted in New Zealand to develop gene drives for Predator-Free targets, nor are there any plans for such research in the near future," says Andrea Byrom, director of New Zealand's Biological-Heritage National Science Challenge. Indeed, Predator-Free 2050's research strategy mentions only the most exploratory of steps, such as sequencing the genomes of local rats, talking to international experts like Esvelt, and running mathematical simulations. Genuine research into the drives themselves wouldn't begin any earlier than 2020, and would depend on "technological hurdles being surmounted, supportive policy, and New Zealand/international appetite to proceed."

The group has also funded social research looking into how New Zealanders feel about using genetic technologies to control pests. That's the right order, Byrom says: Work out what people want, and act accordingly. The first results, published this week, showed that 32 percent of the 8,000 people surveyed were comfortable with technologies like gene drives, 18 percent felt that they should never be used, and 50 percent were undecided or wanted strong controls.

"Conservation must be something that happens not just in national parks and the backcountry, but in people's backyards."

Much of this work has been done in consultation with M?ori scientists and tribal leaders. But "the conversation happens in pockets, around networks that scientists have," says Maui Hudson from the University of Waikato, who studies M?ori research ethics. That's good for working out the M?ori perspective on gene drives, but not for actually engaging those communities in the debate about the risks. Aroha Te Pareake Mead, a political scientist who has studied indigenous perspectives on biotechnology, agrees that there hasn't yet been a robust and far-ranging discussion with M?ori groups (iwi). "The idea of a predator-free New Zealand is widely endorsed throughout M?oridom," she says. It fits with the concept of kaitiaki or guardianship—the imperative to protect one's biological heritage. But the means of achieving that goal are more contentious.

"We've had many initiatives over the years that have sought to address environmental concerns, with unintended detrimental consequences," Mead says. "M?ori tend to have a precautionary approach because we've already had many cases of wrongdoing for the right reasons. Generally speaking, we are suspicious of any kind of genetic modification."

Despite those reservations, she enjoyed meeting Esvelt two months ago, when he spoke about daisy drives at a community meeting. "I found him to be refreshing as a scientist," she says. "He wasn't defensive and he thought that questioning the risks was essential. That gave the M?ori who were present a lot of comfort because we're used to a very different type of geneticist who comes in, says this is the best thing since sliced bread, and if you question it, you're ignorant and you don't know the science. We want to be given a range of tools and to make an informed decision about the best one for the purpose."

Gene drives are not the only game in town. The people behind Predator-Free 2050 are also working on ways of upgrading tried-and-tested technology. The most commonly used traps, for example, are simple one-use devices that must be manually checked and reset. But some companies have made self-resetting traps that can repeatedly kill dozens of rats with a gas-powered piston to the head, or traps that can spray 100 stoats with toxins before needing to be reset. Others are developing sensors that will tell trappers when their snares have snagged an animal, so they don't have to laboriously check every one.

These traps are typically baited with food, but food goes off in the field and must be frequently restocked. Ironically, it also becomes less effective in well-protected areas where actual prey are common. But stoats, it turns out, are far more attracted to the scent of ferrets—a fellow species of weasel—than they are to food smells. Scientists are now trying to isolate the chemicals that make Eau de Ferret so enticing, to turn them into a super-lure.

Aerial drops of 1080 poison, which have freed so many islands from predators, will almost certainly be part of any mainland campaign. Its use is controversial: It can harm the playful kea parrot, and the occasional unwary pet dog. But conservationists could deploy poisons more effectively if they had better ways of detecting pests, like footpad sensors that could track a rodent's footfalls, or cameras whose images are automatically analyzed by artificial intelligence. One team is also trying to develop more specific toxins, by analyzing the genome of possums to find chemicals that will affect them alone.

And Russell believes that for Predator-Free 2050 to succeed, it has to marshal the most effective tool around: human enthusiasm. Thousands of volunteer groups already exist around the country, monitoring for invasive species and setting traps. That kind of fervor has to spread, especially if mammals are to be exiled from cities. Any pockets of resistance or apathy would create strongholds where pests could thrive. "Conservation must be something that happens not just in national parks and the backcountry, but in people's backyards," Russell says. "They not only allow it but participate in it."

Regardless of the technology that Predator-Free 2050 eventually settles on, there's no question that such measures are needed. Consider the kakapo—New Zealand's endearing, bumbling, giant, flightless parrot. In the 1960s, people thought it was extinct. Now, after the discovery of a surviving population and three decades of intense work, the population stands at 153.

The adults have been relocated to predator-free islands, but "in terms of large sites that would hold a decent population, we've saturated the market," says Deidre Vercoe, a manager at the Kakapo Recovery program. Her team will have to start releasing the birds into places where stoats and rats are still a threat. If Predator-Free 2050 achieved its goal, they could do so with relaxed smiles rather than gritted teeth. Even if Stewart Island, New Zealand's third-largest island, could be stripped of predators, "it would be an answer for kakapo for many, many years," she says.

New Zealand is far from the only country grappling with these issues. Over the last seven centuries, 60 percent of the vertebrates that have disappeared from the planet have disappeared from islands—and in half of those cases, invasive species are the culprits. If Predator-Free 2050 makes the right choices, it can indeed change the world—but not with an unstoppable wave of gene-drive rodents. Instead, it'll show other nations that islands can be protected, that invasive pests can be eradicated, that vanishing wildlife can be saved—even at scales once thought impossible.

"Even if we don't get to the finish line, the fact that we ran most of the marathon will be pretty damn impressive," says Russell.

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From: "Chris Cowan" cowanc1028@earthlink.net

BILL GATES INVESTS $100 MILLION OF PERSONAL MONEY TO FIGHT ALZHEIMER'S

The billionaire philanthropist's contribution will be followed by another $50 million in start-up ventures

By Kate Kelland, Health and Science Correspondent
https://www.scientificamerican.com/article/bill-gates-invests-100-million-of-personal-money-to-fight-alzheimer-rsquo-s/?WT.mc_id=send-to-friend

LONDON, Nov 13 (Reuters) - Billionaire Microsoft co-founder Bill Gates is to invest $50 million in the Dementia Discovery Fund, a venture capital fund that brings together industry and government to seek treatments for the brain-wasting disease.

The investment - a personal one and not part of Gates' philanthropic Bill & Melinda Gates Foundation - will be followed by another $50 million in start-up ventures working in Alzheimer's research, Gates said.

With rapidly rising numbers of people suffering from Alzheimer's and other forms of dementia, the disease is taking a growing emotional and financial toll as people live longer, Gates told Reuters in an interview.

"It's a huge problem, a growing problem, and the scale of the tragedy - even for the people who stay alive - is very high," he said.

Despite decades of scientific research, there is no treatment that can slow the progression of Alzheimer's. Current drugs can do no more than ease some of the symptoms.

Gates said, however, that with focused and well-funded innovation, he's "optimistic" treatments can be found, even if they might be more than a decade away.

"It'll take probably 10 years before new theories are tried enough times to give them a high chance of success. So it's very hard to hazard a guess (when an effective drug might be developed).

"I hope that in the next 10 years that we have some powerful drugs, but it's possible that won't be achieved."

Dementia, of which Alzheimer's is the most common form, affects close to 50 million people worldwide and is expected to affect more than 131 million by 2050, according to the non-profit campaign group Alzheimer's Disease International.

The DDF, which was launched in 2015 and involves drugmakers GlaxoSmithKline, Johnson & Johnson, Eli Lilly, Pfizer and Biogen Idec as well as the UK government, has already invested in at least nine start-up companies investigating potential ways to stop or reverse the biological processes that lead to dementia.

Gates told Reuters the additional $50 million would be put into start-ups working on some "less mainstream" approaches to the disease, but said he had not yet identified these companies.

The philanthropist, whose usual focus is on infectious diseases in poorer countries, said Alzheimer's caught his interest partly for personal reasons, and partly because it has so far proved such a tough nut to crack.

"I know how awful it is to watch people you love struggle as the disease robs them of their mental capacity ... It feels a lot like you're experiencing a gradual death of the person that you knew," he said in a blog post about the dementia investments.

"Some of the men in my family have suffered from Alzheimer's, but I wouldn't say that's the sole reason" (for this investment)," he added.

Jeremy Hughes, chief executive of the Alzheimer's Society charity, welcomed Gates' "significant personal investment", saying it would speed up progress toward a cure and help reduce stigma around dementia: "With Bill Gates now joining all those already united against dementia, there is new hope for advances in the care and cure of dementia," he said in a statement.

Through talking to experts in the field over the past year, Gates said he had identified five areas of need: Understanding better how Alzheimer's unfolds, detecting and diagnosing it earlier, pursuing multiple approaches to trying to halt the disease, making it easier for people to take part in clinical trials of potential new medicines, and using data better.

"My background at Microsoft and my (Gates) Foundation background say to me that a data-driven contribution might be an area where I can help add some value," he said.

Alongside the $50 million investment in DDF and the additional $50 million planned for start-ups, Gates said he would like to award a grant to build a global dementia data

platform. This would make it easier for researchers to look for patterns and identify new pathways for treatment, he said.

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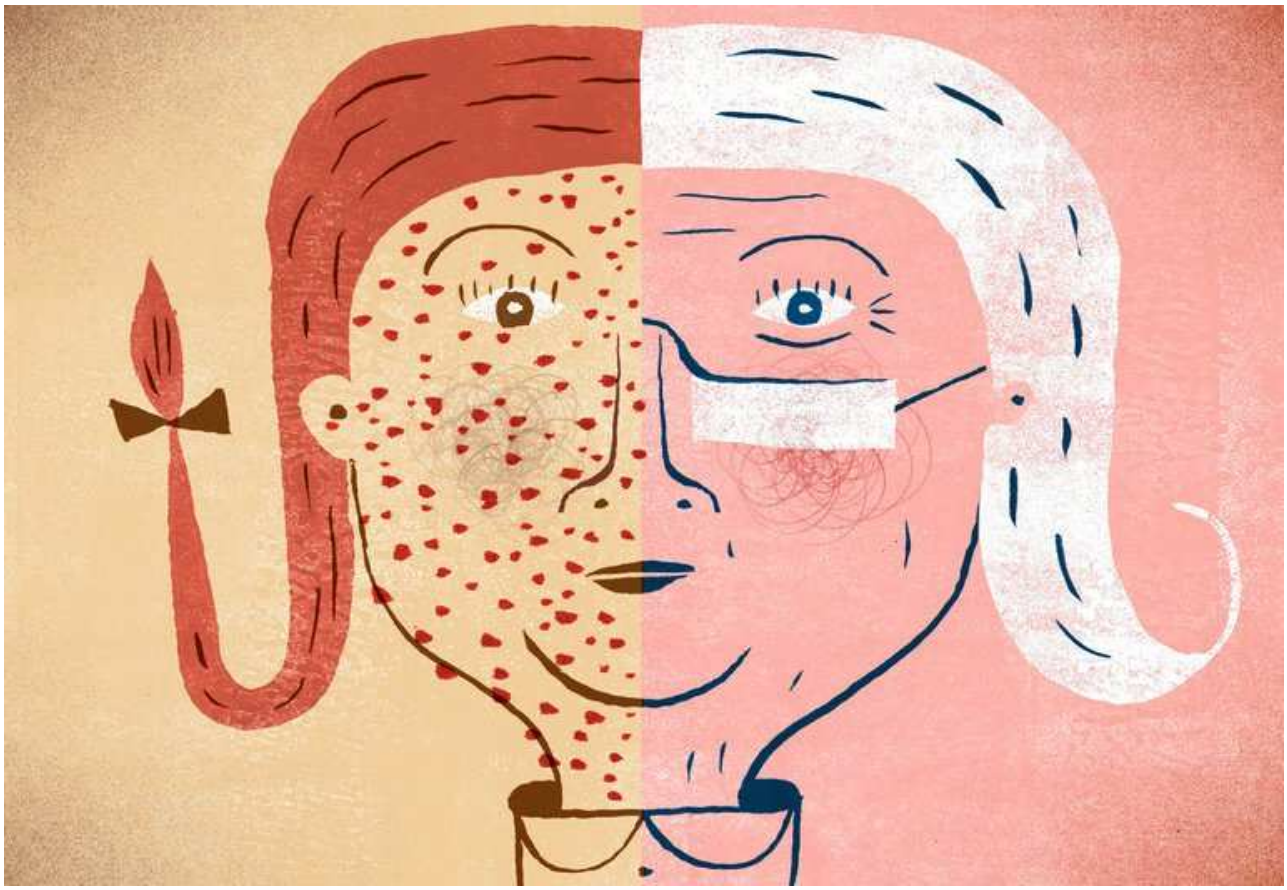
NO EXCUSES, PEOPLE: GET THE NEW SHINGLES VACCINE

Paula Span, THE NEW OLD AGE NOV. 10, 2017
https://www.nytimes.com/2017/11/10/health/shingrix-shingles-vaccine.html?action=click&contentCollection=Opinion&module=Trending&version=Full&region=Marginalia&pgtype=article&_r=1



CreditDavid Plunkert

Medical researchers and government health policymakers, a cautious lot, normally take pains to keep expectations modest when they're discussing some new finding or treatment.

They warn about studies' limitations. They point out what isn't known. They emphasize that correlation doesn't mean causation.

So it's startling to hear prominent experts sound positively excited about a new shingles vaccine that an advisory committee to the Centers for Disease Control and Prevention approved last month.

"This really is a sea change," said Dr. Rafael Harpaz, a veteran shingles researcher at the C.D.C.

Dr. William Schaffner, preventive disease specialist at the Vanderbilt University School of Medicine, said, "This vaccine has spectacular initial protection rates in every age group. The immune system of a 70- or 80-year-old responds as if the person were only 25 or 30."

"This really looks to be a breakthrough in vaccinating older adults," agreed Dr. Jeffrey Cohen, a physician and researcher at the National Institutes of Health.
What's causing the enthusiasm: Shingrix, which the pharmaceutical firm GlaxoSmithKline intends to begin shipping this month. Large international trials have shown that the vaccine prevents more than 90 percent of shingles cases, even at older ages.

The currently available shingles vaccine, called Zostavax, only prevents about half of shingles cases in those over age 60 and has demonstrated far less effectiveness among elderly patients.

Yet those are the people most at risk for this blistering disease, with its often intense pain, its threat to vision and the associated nerve pain that sometimes last months, even years, after the initial rash fades.

Almost all older Americans harbor the varicella zoster virus that causes shingles; they acquired it with childhood chickenpox, whether they knew they had the disease or not.

The virus stays dormant until, for unknown reasons, it erupts decades later. The risk rises sharply after age 50.

Shingles is hardly a minor menace. "A million cases occur in the United States each and every year," Dr. Schaffner said. "If you're fortunate enough to reach your 80th birthday, you stand a one-in-three to one-in-two chance of shingles."

Preventing the great majority of these cases — along with the risk of lingering and debilitating nerve pain, called postherpetic neuralgia — would represent a major advance in public health.

So while the old vaccine will remain on the market, the C.D.C. committee voted to make Shingrix the preferred vaccine and recommended it for all adults over age 50 — a group younger by a decade than those earlier encouraged to get Zostavax.

The committee also recommended Shingrix for adults who've previously gotten Zostavax, since a smaller study in people over age 65 demonstrated effectiveness and safety in those already vaccinated. The Food and Drug Administration approved Shingrix last month.

Once the C.D.C.'s director endorses the committee's recommendations, and the agency publishes them, insurers — including Medicare and Medicaid — will start covering the vaccine.

"By early 2018, it should be broadly available to consumers in the U.S.," said Dr. Thomas Breuer, chief medical officer of GSK Vaccines. (Canada has also approved Shingrix; it awaits approval in Australia, Japan and Europe.)

What makes the new vaccine so promising, especially for older adults?

*** It provides better protection against shingles from the start. Though Zostavax, introduced in 2006, can reduce shingles cases by about half (and postherpetic neuralgia by two-thirds), that overall rate conceals big differences by age.**

That vaccine's effectiveness drops from 64 percent for people in their 60s to 38 percent among those over age 70, and falls still lower for people in their 80s.
But the new vaccine protects nearly as well in older groups as in the middle-aged. Shingrix racked up a 97 percent effectiveness rate in adults over age 50 and, in a separate study of people over age 70, prevented 90 percent of shingles in those 70 to well past age 80.

"In groups such as the elderly, who often don't maintain vigorous responses to vaccines, this represents extremely strong disease protection," said Dr. Kathleen Dooling, an epidemiologist at the C.D.C.

*** Shingrix's protection appears to last longer. Among seniors, the effectiveness of Zostavax wanes with disappointing speed. "After 11 years, the protection was close to zero," Dr. Harpaz said.**

Regulators don't yet have 11 years of data on Shingrix, but in some samples, it remained effective for six years or longer, according to GSK. That should greatly reduce the incidence of postherpetic neuralgia, too, assuming the 42 million people in their 50s start getting vaccinated.

*** The new vaccine may protect people with compromised immune systems.**
A substantial number of older Americans have suppressed immunity because they're undergoing chemotherapy or transplants, have H.I.V. or take steroids. For them, the previous vaccine was off-limits because it was made with a weakened live virus.

Yet immune suppression itself leaves the people vulnerable to shingles. Shingrix, a recombinant vaccine made from a glycoprotein and a combination of immunity boosters called adjuvants, doesn't pose the same danger.

The C.D.C. committee held off on recommending Shingrix for the immunocompromised, because GSK is still running trials with these patients. But since the F.D.A. did not declare Shingrix contraindicated for them when approving it, they can get the vaccine once it's available.

Public health advocates do foresee a couple of potential problems.
First, Shingrix requires two doses, administered at least two months apart. Prodding the older population to get a single shot has proved tough: barely 31 percent of those over age 60 have been vaccinated against shingles. How much harder will it be to persuade people to get two Shingrix injections?

Further, "it tends to be a bit of an ouch-y vaccine," Dr. Schaffner cautioned.

In studies, most older recipients said they'd experienced pain, redness or swelling in their upper arms for a day or two after the shot, and 8.5 percent of those over age 70 deemed those symptoms uncomfortable enough to interfere with normal activities.

About half of those over age 70 reported more systemic side effects like fatigue, fever or aching joints, lasting one to two days. Physicians and pharmacists should prepare people for such reactions, Dr. Schaffner said.

"If people anticipate it, they'll cope with it better. They'll take a couple of Tylenol" — and not worry that something is seriously wrong.

They may feel pocketbook pain, too. Zostavax is the most expensive adult vaccine, and at $140 for each dose (plus the cost of administering the injection), Shingrix will be pricier still.

The 50- to 65-year-old cohort, many of whom have coverage under employee health plans, may not find that much of a barrier. At older ages, cost matters more.
Medicare will cover Shingrix under Part D (like its predecessor), not under Part B like the flu vaccine. That complicates reimbursement for those seeking vaccination in doctors' offices, so Medicare patients will probably find it simpler to head for a pharmacy.

But not all Medicare recipients have Part D, and those that do could face co-payments.

Still, it's no contest: The hazards of shingles and its complications dwarf any problems yet reported with Shingrix.

"Compared to shingles, a little arm pain for a day or so is a small price to pay," Dr. Schaffner said. "If you know people who've had this illness, you'll be first in line for this vaccine."

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NEW ROBOTIC HAND NAMED AFTER LUKE SKYWALKER HELPS AMPUTEE TOUCH AND FEEL AGAIN

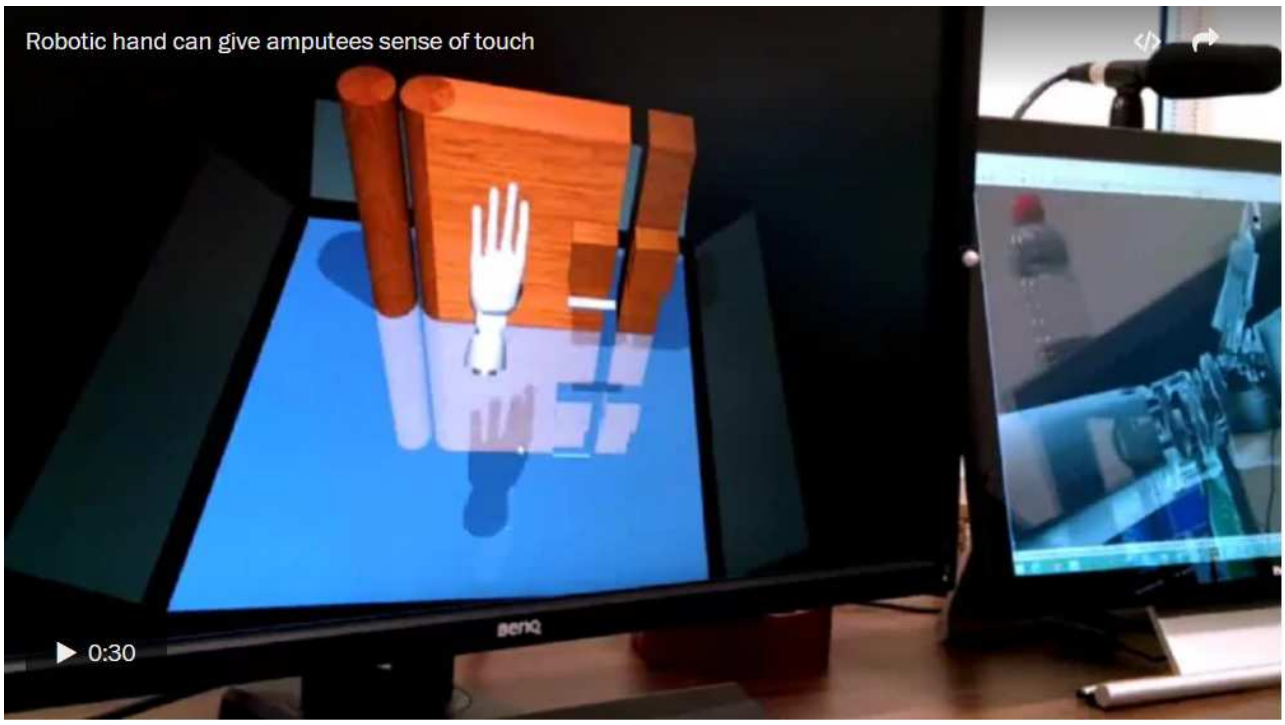
By William Wan November 15
https://www.washingtonpost.com/news/speaking-of-science/wp/2017/11/15/new-robotic-hand-named-after-luke-skywalker-helps-amputee-touch-and-feel-again/?utm_term=.382dbfa664d5&wpisrc=nl_optimist&wpmm=1

A volunteer in the experiment clasps his hands together and can feel one hand with the other for the first time since his left hand was amputated. (University of Utah)

Keven Walgamott wasn't sure what to expect when scientists first hooked up what was left of his arm to a computer.

Last year — 14 years after he lost his hand and part of his arm in an electrical accident — he heard about a team at the University of Utah working on an experimental robotic arm. The prosthetic hand and fingers would be controlled by an amputee's own nerves. Even more challenging, researchers were trying to restore the sense of touch to amputees through that robotic hand.

Walgamott volunteered for the experimental program. A few weeks after surgeons implanted electrodes into the nerves of his arm last year, he found himself hooked up to a computer getting ready to touch something with his left hand for the first time in more than a decade.



Robotic hand can give amputees sense of touch

The Utah researchers had created a computer program to simulate the feel of touching a virtual wall — an early test to prepare Walgamott for the robotic arm.
As Walgamott moved his arm, a virtual hand on the computer screen before him moved as well, plunking down the ridges of the corrugated wall.

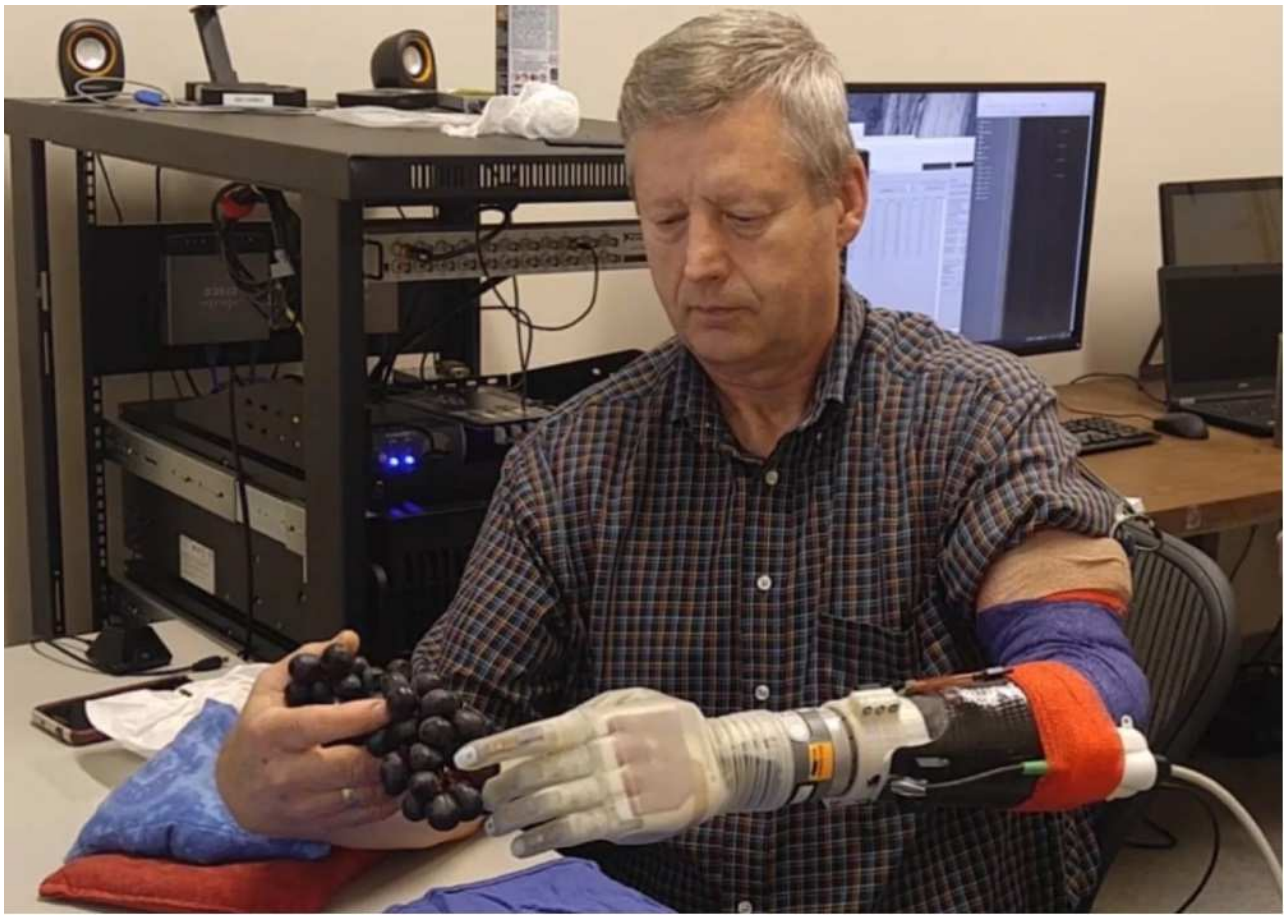
“It was stunning. I could actually feel the wall. I could feel the bumps along it,” he said. “It almost brought tears to my eyes.”

Researchers at the University of Utah are developing an experimental robotic arm that allows amputees to control it using their own nerves. (University of Utah)
Then researchers attached the robotic arm itself, putting Walgamott through a battery of tests over 14 months that had him touch and manipulate objects with it.

“When I went to grab something, I could feel myself grabbing it. When I thought about moving this or that finger, it would move almost right away,” he said. “I don’t know how to describe it except that it was like I had a hand again.”

At the Society for Neuroscience conference in Washington on Tuesday, the University of Utah team presented part of their work on adding the sense of touch and movement to prostheses — the latest step in the rapidly developing field of neuroprosthetics.

Over the course of the past year, while working with Walgamott as their key subject, they have found adding touch to prostheses markedly improves motor skills of amputees compared with robotic prostheses on the market. Adding the sense of touch to prosthetic hands also appears to reduce a painful feeling many amputees experience called phantom pain, and it creates a sense of ownership over the device, researchers said.



Using a robotic arm that allowed him to feel objects again, Keven Walgamott was able to pick a grape without crushing it. (University of Utah)

"By adding sensory feedback, it becomes a closed-loop system that mimics biology," said Jacob George, a bioengineering PhD student at the University of Utah and lead author of Tuesday's study. The goal, he explained, is to get prosthetic technology to a point where someone using a prosthesis wouldn't have to think through every movement to pick up a cup. They wouldn't even have to look at the cup. They would simply move the hand toward it using their brain and existing nervous system, feel it and pick it up.

The most cutting-edge prosthetic hands available can make sophisticated movements, but they require complicated — and often imprecise — methods of operation. Some rely on tilt motions by the user's foot and others on movements by the muscles remaining in a user's arm.

The Utah research group's approach, however, relies on a device called the Utah Slanted Electrode Array. The device is implanted directly into the nerves in a subject's arm. The USEA, along with electrodes implanted in muscles, allows amputees to control a robotic hand as if they were flexing or moving their original hand. The approach also allows signals like sensation to be transmitted back to the subject's nervous system, creating a "looped system" — like in a human limb — where the hand's feeling and movements inform each other.

"We often think of touch as one thing, but it's more than that. It's pressure, vibration, temperature, pain," said Gregory Clark, the bioengineering professor leading the Utah research team. Because of that, it has required painstakingly slow work from a multidisciplinary team of experts — over the course of years — to build those sensations into the robotic arm, figure out which spot on the hand corresponds with which nerve fiber in the arm and the algorithms required to send touch signals back into the nervous system.

University of Utah researchers have developed technology that allows users to feel through this robotic arm. In one experiment, they were able to use the hand to distinguish soft foam from hard plastic. (University of Utah)

Clark's team is part of a larger effort funded by the U.S. military's Defense Advanced Research Projects Agency. DARPA launched its neuroprosthetic program in 2014 — called HAPTIX — with the goal of developing an advanced robotic arm within years that would help amputees feel and move intuitively. The researchers received additional funding from National Science Foundation.

The robotic arm the Utah researchers have been working with was developed under the HAPTIX

program by the company DEKA (the company founded by Segway inventor Dean Kamen). The state-of-the-art robotic limb was dubbed the "Luke" arm by its makers, after the advanced prosthesis wielded by Luke Skywalker in "Star Wars."

The "Luke" arm, a robotic prosthetic created by DEKA and named after the sci-fi robotic hand wielded by Luke Skywalker. (University of Utah)

The results of the Utah group's experimental tests so far have been both gratifying and inspiring, the researchers said.

Walgamott — a real estate agent in Utah — described the joy of being able to do everyday mundane tasks again with his left hand — like picking up an egg without crushing it, clasping his hands together and holding his wife's hand.

But the highlight of his entire 14 months in the experimental program, he said, was being able to put a pillow into a pillowcase on his own.

"When you have just one hand, you learn to adapt," he said, describing the infuriatingly slow process he usually uses for pillowcases, pulling them on inch by inch on each side, rotating the whole time. "To just take a pillow in one hand and put the pillowcase on with the other. I know it sounds simple, but it's amazing."

The experimental robotic arm allowed Keven Walgamott to hold and feel his wife's hand again. (University of Utah)

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From: "William Green" whgconsulting@gmail.com

AN INTERSTELLAR ASTEROID HAS BEEN STUDIED FOR THE 1ST TIME... AND IT LOOKS REALLY ODD

Miriam Kramer, Mashable, November 20, 2017
https://www.yahoo.com/news/interstellar-asteroid-studied-1st-time-172900764.html

In October, astronomers using a powerful telescope in Hawaii caught sight of something they'd never seen before: an asteroid from interstellar space hurtling through our solar system.

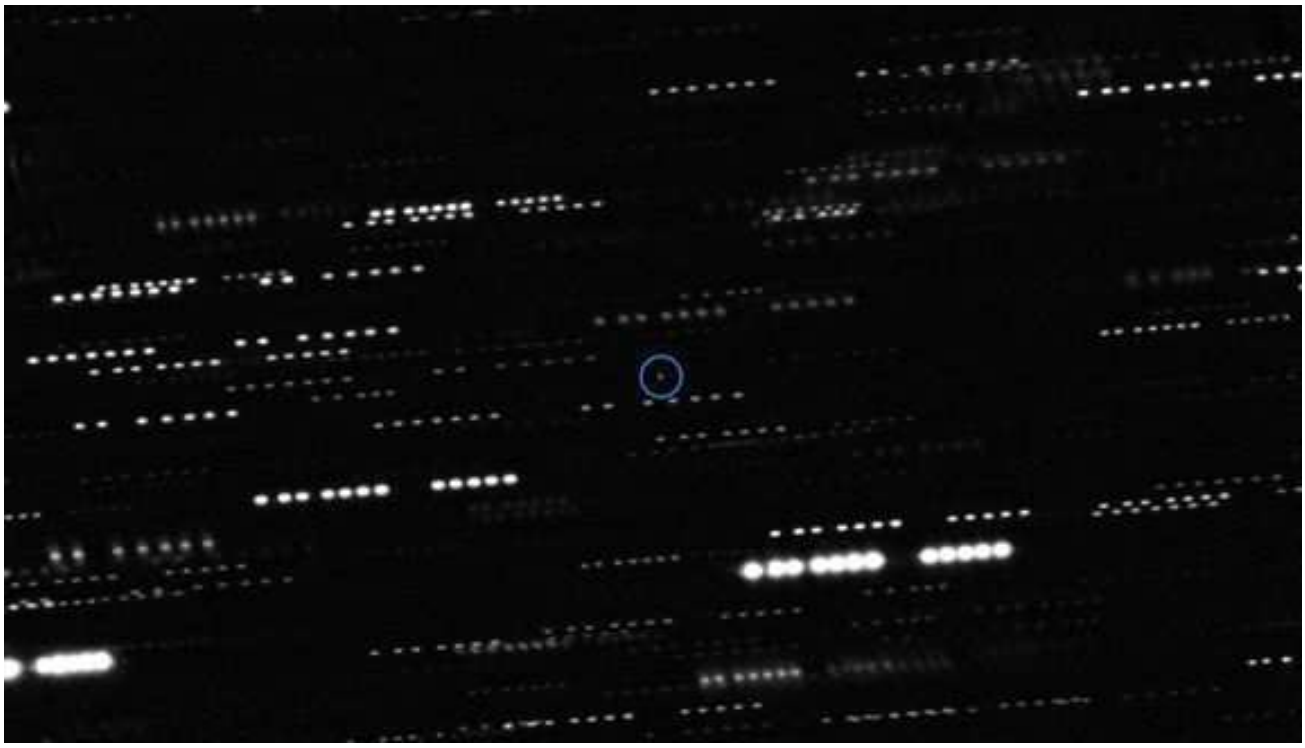
Now, about a month later, we have some sense of what that far-flung object looks like, and it's unlike anything we've seen in our solar system.

According to a new study published in the journal Nature this week, the asteroid, named `Oumuamua, is "about 10 times as long as it is wide, with a complex, convoluted shape," Karen Meech, an astronomer with the Institute for Astronomy in Hawaii, said in a statement.

`Oumuamua, which is the first interstellar visitor of its kind to be seen by Earthlings, appears to have come from the general direction of where the Vega star system is now. This fact should make any space nerd squeal with glee as it's the same star featured in the novel and movie Contact.

Unfortunately, Vega wasn't actually in that part of the sky when the asteroid was there 300,000 years ago, according to the European Southern Observatory.

"We also found that it has a dark red color, similar to objects in the outer solar system, and confirmed that it is completely inert, without the faintest hint of dust around it," Meech, one of the authors of the new study, added.



This very deep combined image shows the interstellar asteroid ‘Oumuamua at the center of the picture. Image: ESO/K. Meech et al.

The asteroid appears to be about 1,312 feet, or 400 meters, long, meaning that if you stood it up on its end, it would be just slightly shorter than the Empire State Building.

Initially, scientists thought that `Oumuamua was a comet, but the new observations appear to confirm that it is, in fact, an asteroid.

"The name, which was chosen by the Pan-STARRS team, is of Hawaiian origin and reflects the way this object is like a scout or messenger sent from the distant past to reach out to us (‘ou means reach ou for, and mua, with the second mua placing emphasis, means first, in advance of)," according to the Minor Planet Center.

`Oumuamua also seems to be pretty dry, according to the new data. The asteroid doesn't seem to play host to much ice or water, but it could be rocky or metallic. Its red color comes from being bombarded by radiation during its millions of years wandering the Milky Way through interstellar space.

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From: "Robert Kennedy" Robert.Kennedy@tetratech.com

Timmy,

Holy cr*p - the lead author just told me this morning:

***

From: Andreas Hein <andreas.hein@i4is.org>
Sent: Sunday, November 19, 2017 4:52 AM
Cc: Kennedy, Robert <Robert.Kennedy@tetratech.com>; Kennedy, Robert <Robert.Kennedy@i4is.org>; [snip]
Subject: Project Lyra paper featured in MIT Technology Review

'I am proud to announce that the prestigious MIT Technology Review has picked our Project Lyra paper as "The Best of the Physics arXiv (week ending November 18, 2017) - This week's most thought-provoking papers from the Physics arXiv." '

https://www.technologyreview.com/s/609504/the-best-of-the-physics-arxiv-week-ending-november-18-2017/

PROJECT LYRA: SENDING A SPACECRAFT TO 1I/'OUMUAMUA (FORMER A/2017 U1), THE INTERSTELLAR ASTEROID

Andreas M. Hein, Nikolaos Perakis, Kelvin F. Long, Adam Crowl, Marshall Eubanks, Robert G. Kennedy III, Richard Osborne

(Submitted on 8 Nov 2017)
https://arxiv.org/abs/1711.03155

The first definitely interstellar object 1I/'Oumuamua (previously A/2017 U1) observed in our solar system provides the opportunity to directly study material from other star systems. Can such objects be intercepted? The challenge of reaching the object within a reasonable timeframe is formidable due to its high heliocentric hyperbolic excess velocity of about 26 km/s; much faster than any vehicle yet launched. This paper presents a high-level analysis of potential near-term options for such a mission. Launching a spacecraft in a reasonable timeframe of 5-10 years requires a hyperbolic solar system excess velocity between 33 to 76 km/s for mission durations between 30 to 5 years. Different mission durations and their velocity requirements are explored with respect to the launch date, assuming direct impulsive transfer to the intercept trajectory. Several technology options are outlined, ranging from a close solar Oberth Maneuver using chemical propulsion, and the more advanced options of solar and laser sails. To maximize science return decelerating the spacecraft at 'Oumuamua is highly desirable, due to the minimal science return from a hyper-velocity encounter. It is concluded that although reaching the object is challenging, there seem to be viable options based on current and near-term technology.
