

A Threat From Afar...



Going back a few years on one of my many trips to Laughlin, Nevada to attend the International UFO Congress, Myself along with Graham W. Birdsall and our families took time out to visit one of the most astounding natural phenomena's on the face of this planet. I am referring to Meteor Crater in Arizona.

I remember commenting in a report for UFO Magazine about the remoteness of the area it literally is the middle of nowhere although the road signs on the only road for miles prior to the site point to 'Crater this way'.

At the bottom of the impact site are remnants from the Apollo moon missions, (the crater was used for training the astronauts to use specialised equipment).

There is an interesting visitor centre and a small café where you can get a welcome hot pot of coffee or a cooling drink depending on the weather outside.

You might be in the middle of the Arizona desert but the weather can be extreme either side of the thermometer.

The crater caused thousands of years ago by the impact of a rouge astronomical visitor is one of several known impact sites here on Earth but it is the only one that is visible on the surface.

Imaging the damage it would have caused if it had hit in the 20th century, it is suggested that the impact might have been responsible for the demise of the Dinosaurs.

UFO Magazine and Graham covered the possibility of a collision from a Near Earth Object (NEO) many times, at a lecture by the UK head of a project to monitor the situation Professor Duncan Steele at Leeds University both Graham and I were amazed by the claims from Prof Steele that in reality we would need some thirty years notice to be able to do anything like the brave boys in the film Deep Impact to use explosives to move an asteroid off it's course, a sobering thought.

However it seems that the possibility of a NEO hitting the Earth should not be simply ignored.

The report below highlights the reality of the threat from out there.

Russel Callaghan.

Source *The Washington Post*

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Science's Doomsday Team vs. the Asteroids

By *Guy Gugliotta*
Washington Post Staff Writer

Astronomer David Tholen spotted it last year in the early evening of June 19, using the University of Arizona's Bok telescope. It was a new "near-Earth object," a fugitive asteroid wandering through space to pass close to Earth.

Tholen's team took three pictures that night and three the next night, but storm clouds and the moon blocked further observations. They reported their fixes to the Minor Planet Centre in Cambridge, Mass., and moved on.

Six months later, Tholen's object was spotted again in Australia as asteroid "2004 MN4." In the space of five days straddling Christmas, startled astronomers refined their calculations as the probability of the 1,000-foot-wide stone missile hitting Earth rose from one chance in

170 to one in 38.

They had never measured anything as potentially dangerous to Earth. Impact would come on Friday the 13th in April 2029.

The holidays and the tsunami in South Asia pushed 2004 MN4 out of the news, and in the meantime additional observations showed that the asteroid would miss, but only by 15,000 to 25,000 miles - about one-tenth the distance to the moon.



(Illustration only)

Asteroid 2004 MN4 was no false alarm. Instead, it has provided the world with the best evidence yet that a catastrophic encounter with a rogue visitor from space is not only possible but probably inevitable.

It also demonstrated the tenacity of the small band of professionals and amateurs who track potential impact asteroids, and highlighted the shortcomings of an international system that pays scant attention to their work.

"I used to say the total number of people interested in this was no more than one shift at a McDonald's restaurant," said David Morrison, an astronomer at NASA's Ames Research Centre

and a student of near-Earth objects for nearly three decades. "Now it's maybe two shifts." Awareness of the apocalyptic potential of near-Earth objects has been slow to develop. It took years for Nobel laureate Luis Alvarez and his son Walter to win acceptance for their 1980 research showing that a near-Earth object impact quite likely caused the extinction of the dinosaurs 65 million years ago.

"The human brain wouldn't grasp reality until it had somewhat more direct evidence," said Colorado-based planetary scientist Clark R. Chapman of the Southwest Research Institute, another longtime expert on near-Earth objects. "Alvarez provided that."



Fireball over Wales
(Illustration only)

The vast majority of near-Earth objects are asteroids - huge rocks or chunks of iron that travel around the sun in eccentric orbits that cross Earth's path periodically. The rest are comets - ancient piles of dust, stones and ice that come in from the edges of the solar system.

"The good news is that comets represent 1 percent of the

danger," said Donald K. Yeomans, who manages NASA's Near-Earth Object Program at the Jet Propulsion Laboratory. "The bad news is that should we find one, there's not a lot we can do about it... We detect them only nine months from impact."

Asteroids, by contrast, generally offer decades or even centuries of warning - unless they are too small to detect, in which case there is no warning at all. But today's technology enables astronomers to get a fix on any asteroid capable of causing a global "extinction event" - six miles in diameter or bigger.

Asteroid 2004 MN4 is a "regional" hazard - big enough to flatten Texas or a couple of European countries with an impact equivalent to 10,000 megatons of dynamite - more than all the nuclear weapons in the world. Even though it will be a near miss in 2029, that will not be the last word.

"You don't know what the gravitational effect of the Earth will be," said Brian G. Marsden, who oversees the hunt for near-Earth objects as director of the Minor Planet Centre at the Harvard-Smithsonian Centre for Astrophysics.

"In 2029, the [close encounter with] Earth will increase the size of the orbit, and the object could get into a resonance with the Earth," he added. "You could get orbit match ups every five years or nine years, or something in between." In fact, 2004 MN4 could come close again in 2034, 2035, 2036, 2037, 2038 or later.

So, what can be done? The first thought, dramatically depicted in the 1998 movies "Deep Impact" and "Armageddon," is to nuke the intruder into small pieces so it will burn up in Earth's atmosphere.

Many scientists say, however, that this is unacceptably sloppy - instead of obliterating the target, the bomb could break the asteroid into large radioactive chunks capable of transforming huge stretches of Earth into wasteland.

Or the explosion could deflect but not destroy the asteroid, putting it on a future collision course. A nuclear strategy would also forever require a stockpile of doomsday weapons.

"The cure's worse than the disease," said former Apollo astronaut Russell L. "Rusty" Schweickart. He is a board member of the B612 Foundation, a group of experts promoting a space mission by 2015 to send a "tugboat" spacecraft to a near-Earth object, dock with it and gently alter its speed enough to change its orbit - to show that it can be done. (B612 is the name of the asteroid home of "The Little Prince," in the Antoine de Saint-Exupery story.) "You want to delay or speed up the asteroid a little," said Berlin-based Alan Harris, chairman of the European Space Agency's Near-Earth Object Mission Advisory Panel. "What kind of surface do you have: Is it rocky? Dusty? Rubbly? How much force can I apply? I don't want to break it up - unless I really break it up."

B612 has a design but little money, while ESA has spent only

a nominal amount to study the feasibility of a reconnaissance mission to an asteroid. NASA, at \$4 million a year, is currently the big spender for near-Earth object research.

With this, NASA maintains a database at JPL to plot and record orbits for all known near-Earth objects, and contributes money to the Minor Planet Centre and to sky surveys underway at telescopes in Arizona, California, Hawaii, New Mexico and Australia.

The money was authorized after a push from Congress led by Rep. Dana Rohrabacher (R-Calif.), a conservative, and former House Science Committee chairman George E. Brown Jr. (D-Calif.), known as one of Congress's most liberal members before his death in 1999. "I have a vision of something terrible happening, and I feel compelled to see that it doesn't happen," Rohrabacher said.

NASA's task - which Congress imposed in 1998 - is to find 90 percent of the estimated 1,100 near-Earth objects that are one kilometer (0.6 miles) or greater in diameter by 2008. As of mid-March, JPL's database included 762 of these.

On March 1, Rohrabacher introduced the George E. Brown Jr. Near-Earth Object Survey Act, mandating \$40 million for a two-year start-up to survey every object 100 meters (328 feet) across or larger, of which there may be 300,000. To date, Marsden has registered 3,265 near-Earth objects of all sizes.

Tholen, of the University of

Hawaii, is a frequent contributor in the search for threatening objects. He specializes in "Atens," a subspecies that orbit mostly between the Earth and the sun and are difficult to see in the glare of the sun. To spot Atens, astronomers must work at dawn or dusk.

Tholen's team, on a field trip to the University of Arizona's Steward Observatory, had booked an hour on the evenings of June 19, 20, 23 and 24, 2004. They found a new Aten on the first evening and saw it again on the second evening. It was about 106 million miles away.

The team recorded the sightings and sent them electronically to Marsden, who published the object's position, which he named 2004 MN4 in accordance with a complicated coding system based on the date of discovery.

Tholen waited for another opportunity, but rain clouds cloaked the sky. When the storm passed, the moon was squatting right where the team wanted to look. For the next six months, nobody looked for it.



Perseid over Japan (Illus only)
Then, on Dec. 18, astronomer Gordon Garradd, working at the Siding Springs telescope in

Coonabarabran, Australia, 240 miles northwest of Sydney, spotted what he thought was a new near-Earth object, "brightly lit and traveling fast," he recalled. He took four images in his first set, then followed up with two more sets.

Marsden's team put Garradd's data on the center's Web page, a signal for astronomers to get more fixes. On Dec. 20, JPL produced its solution. Chance of impact was one in 2,500 - nothing to get excited about. "Usually the probability goes down with more observations," Marsden said. Not this time. On Dec. 23, the risk rose to one in 270, and rose steadily over Christmas and beyond. "We'd never had anything this big come this close, and we'd never predicted anything like it," Marsden said. "It was quite fantastic." The asteroid was 9 million miles away - about as close as it would get this trip.

By Dec. 26, the impact probability had risen to one chance in 38. What the plotters needed was a "precovery," an overlooked observation from before Tholen's initial June fixes to yield a more precise orbital solution.

In Tucson, astronomers at the Spacewatch Project, at the University of Arizona's Lunar and Planetary Laboratory, started searching their archive. Spacewatch has been surveying the solar system for 20 years, and precovery is a specialty.

"We store [our images] on DVDs," Spacewatch leader Robert S. McMillan said. "If there's something that wasn't

automatically sorted by our software, we can usually find it - if we were looking in the right place at the right time."

They were. On Dec. 27, Spacewatch astronomers Jeffrey Larsen and Anne Descour found 2004 MN4 in a series of images taken March 15, more than three months before Tholen's sighting.

They passed the word to JPL, which issued a news bulletin: "An Earth impact on 13 April 2029 can now be ruled out."



Asteroidi 2004 MN4 NASA

Since then, astronomers have continued to observe 2004 MN4 whenever possible, but most of the time it is obscured.

"It would be awfully nice to have information so we don't get surprised," said Schweickart, who advocates flying a small interceptor mission to plant a transponder on 2004 MN4 that would constantly radio its location, tagging it like a grizzly bear. "Our favorite little asteroid might provide enough reality here to provoke people. Maybe we should get serious."

Credits:

Meteor Crater image © Karen Kerr

<http://www.wcnet.org/~kmkerr/>

Intro animation

<http://www.bellatrixobservatory.org/neo.html>

(Near Earth Objects Corner)

Perseid

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