

## **Wolbach Library: CfA in the News ~ Week ending 13 September 2009**

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Record - 1

DIALOG(R)

**Data on science reported by V.A. Acciari and co-researchers**,  
Science Letter, p2180,  
Tuesday, September 15, 2009

TEXT:

According to a study from the United States, "The accretion of matter onto a massive black hole is believed to feed the relativistic plasma jets found in many active galactic nuclei (AGN)."

"Although some AGN accelerate particles to energies exceeding  $10^{12}$  electron volts and are bright sources of very-high-energy (VHE) gamma-ray emission, it is not yet known where the VHE emission originates. Here we report on radio and VHE observations of the radio galaxy Messier 87, revealing a period of extremely strong VHE gamma-ray flares accompanied by a strong increase of the radio flux from its nucleus," wrote V.A. Acciari and colleagues (see also ).

The researchers concluded: "These results imply that charged particles are accelerated to very high energies in the immediate vicinity of the black hole.."

Acciari and colleagues published the results of their research in Science (Radio Imaging of the Very-High-Energy gamma-Ray Emission Region in the Central Engine of a Radio Galaxy. Science, 2009;325(5939):444-448).

For additional information, contact M. Beilicke, Harvard Smithsonian Center Astrophysics, Fred Lawrence Whipple Observ, Amado, AZ 85645, USA.

The publisher of the journal Science can be contacted at: American

Association Advancement Science, 1200 New York Avenue, NW, Washington, DC 20005, USA.

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Record - 2

DIALOG(R)

For September 6, 2009, CBS - Part 1

Charles Osgood, Rita Braver

Voxant CBS Newswire

Sunday, September 6, 2009

TEXT:

Show: CBS NEWS SUNDAY MORNING

Date: September 6, 2009

CHARLES OSGOOD: For thirty years, we have been brightening up our SUNDAY MORNING`S with artistic suns sent in from all over the country. Time now for Martha Teichner and a close-up look at the real thing.

(Begin VT)

MARTHA TEICHNER: Some show-off that sun performing its fire dance not just on Sunday but every day, morning and night, the world over, for all of us earthlings--rich and poor, old and young, no ticket required. What exactly is the sun?

OWEN GINGERICH: It`s a big ball of hydrogen gas.

MARTHA TEICHNER: Not so big, in fact, kind of middling for a star but enormous compared to the earth.

OWEN GINGERICH: This is going to be the earth. Would you like to hold the earth?

MARTHA TEICHNER: Okay. I`ve got the whole world in my hand.

OWEN GINGERICH: Right. And I`m going to make the sun out of this meteorological balloon.

MARTHA TEICHNER: Owen Gingerich is professor of astronomy and history of

science emeritus at the Harvard Smithsonian Center for Astrophysics.

OWEN GINGERICH: It's one thing to say, Well, the diameter of the sun is a hundred times the diameter of the earth. But you don't really get the impression of how big the sun really is unless you can see it in three dimensions.

MARTHA TEICHNER: How old is the sun?

OWEN GINGERICH: About five billion years. It's just about halfway through its lifetime.

MARTHA TEICHNER: It's really hot, approximately twenty-eight million degrees Fahrenheit at its core, and it's burning up. There are nuclear reactions going on inside it all the time. When that energy works its way to the surface, we see it as sunshine. At the relatively safe distance of ninety-three million miles away, the earth orbits around the sun. It takes three hundred sixty-five days--a year--life-giving time for planting and growing and harvesting crops. No wonder so many civilizations built great monuments, like Stonehenge in England, to plot the seasonal doings of the sun or Chichen Itza in Mexico or the Konark Sun Temple in India. No wonder the sun was a god to the ancient Egyptians, the Greeks, the Romans, the Incas. They knew then that the sun influenced almost every aspect of their existence. We know now it even determined the color of our skin.

NINA JABLONSKI: Our ancestors who evolved close to the equator have very darkly pigmented skin, adapted to very high levels of solar radiation.

MARTHA TEICHNER: Nina Jablonski is head of the anthropology department at Penn State University and an expert on skin.

NINA JABLONSKI: And then as we dispersed away from the equator in our evolution, we evolved lightly pigmented skin to cope with less solar radiation.

MARTHA TEICHNER: Around the equator, the earliest humans developed a kind of permanent suntan. This dark coloring containing something called melanin. How's this for amazing--melanin acted like a natural sunscreen. It blocks ultraviolet radiation but allowed in exactly the right amount of vitamin D.

NINA JABLONSKI: We need vitamin D. So the sun shines, ultraviolet B shines on the skin and makes vitamin D chemically in the skin, right there.

MARTHA TEICHNER: Now fast forward to, say, present-day Scandinavia, where sometime around ten thousand years ago people lost their permanent tans. In northern weather, under a weaker sun, they don't require protective color.

Speaking of weather, there is actually solar weather and we're all affected by it.

RICHARD FISHER: This is back at the time in 2003, where there were lots of sunspots.

MARTHA TEICHNER: Richard Fisher heads NASA's heliophysics division, which studies solar activity.

RICHARD FISHER: And these guys are pretty big. They're as big as Jupiter. They are forty thousand kilometers across.

MARTHA TEICHNER: Sunspots are intense magnetic fields. And when a lot of them appear, it's a signal that a season of violent solar weather is on the way. The sun flings out swirling streams of electrical current. They're called solar winds and when they reach the earth's atmosphere, we see the spectacular aurora borealis, the northern lights. And this is a solar storm. NASA simulates eclipses in order to see these great explosions of radiation and magnetic particles erupting from the sun's atmosphere, called its corona.

RICHARD FISHER: We'll see one of these disturbances on the sun, understand its direction, and we just start the stopwatch and say, Well, it's going to be about fifty hours.

MARTHA TEICHNER: Before there's trouble. An astronaut on a space walk could actually die from exposure to the radiation. Communications systems on planes flying over the poles often fail. GPS signals get screwed up. In 1989, a solar storm blew out a transformer in Quebec, leaving six million Canadians without power. For NASA, learning how to predict solar weather so disruptions can be planned for or even prevented is a practical justification for the twenty-seven satellites it has in space already analyzing the sun, with more to come.

RICHARD FISHER: This is going to be our next satellite that we put into orbit and it's the most sophisticated solar observatory that's ever been in orbit.

MARTHA TEICHNER: Its planned launch--November. Its mission--barely thinkable even ten years ago, in effect, a sonogram of the sun's gassy interior.

This is going to look inside.

RICHARD FISHER: Inside the sun.

MARTHA TEICHNER: Yes, deep inside, where solar weather forms. It should send back pictures ten times better than a high-definition television. But

can those images beat this--the sun with the horizon as its stage and the power to move us.

(End VT)

Record - 3

DIALOG(R)

**Rocky start**

Worcester Telegram & Gazette (MA), pA11

Saturday, September 5, 2009

TEXT:

COLUMN: IN OUR OPINION

The recession has hit the solar system.

Four years ago, Congress directed NASA to locate at least 90 percent of near-Earth objects larger than 140 meters in diameter by 2020.

A report last month from the National Academy of Sciences says Congress failed to provide any money for telescopes or other essentials for the mission.

The National Aeronautics and Space Administration estimates there are about 20,000 asteroids, meteoroids and comets that would fit Congress' criteria. NASA has mapped only about 6,300, using the current telescope system and in some cases taking funds from other programs, according to the report. To meet Congress' directive, NASA says it would need about \$800 million for telescope development and for existing key facilities involved in the search, such as the Minor Planet Center at the Smithsonian Astrophysical Observatory in Cambridge.

It's not unusual for sky-high spending to neglect NASA, but this project is worth doing.

Celestial bodies crossing into the atmosphere have done catastrophic damage in the past. A large meteorite collision or collisions is believed to have caused or contributed to the demise of the dinosaurs. An object that might have been as small as 30 or 40 meters wide created the tremendously powerful Tunguska explosion over Siberia in 1908. Near-misses of varying surprise and seriousness have made the news in recent years, as have impact probability calculations reaching sometimes centuries into the future for certain named rocks out there. For example, astronomers know of a 130-meter object, VK184, with a 1-in-3,000 chance of hitting Earth in 2048.

In July, an amateur astronomer in Australia called attention to a new dark spot on Jupiter, created by the impact of an object of unknown size and origin, and forming a bruise bigger than the United States.

Although NASA so far knows of about 145 potentially hazardous near-Earth objects, there's absolutely no reason to lose any sleep over possible threats to our planet from outer space. The odds are astronomically low, of course. Still, they do happen, and a predicted impact could be prepared for and possibly counteracted. Among various ideas that have been considered over the years, a team from Britain is developing preliminary plans for a 10-ton "gravity tractor" spacecraft that could fly to a hurtling asteroid and nudge its trajectory years before a potential collision with Earth. This anti-catastrophe contraption would be costly, of course, and would have to be launched 15 years in advance. But this sort of thing is not merely science fiction anymore.

The mandate Congress gave NASA in 2004 has its softer side as well. Whatever problems are hurting Americans in the here and now, there's value in keeping scientific eyes and wondering minds trained on the thrilling, mysterious threads of existence that extend far beyond politics and budgets, whether those eyes are looking through telescopes or microscopes. Recession or not, staring into space enriches us.

Enlisting the help of amateur astronomers and other data sources as much as possible, NASA should continue to discover and monitor the potential threats in the near-Earth vastness.

And Congress ought to kick some asteroid-hunting money into NASA's orbit.  
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