The Daily Star

SCIENCE & LIFE

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ORION NEBULA

Surprising stellar nursery

THE Orion Nebula, also known as Messier 42, is one of the most easily recognisable and best-studied celestial objects. It is a huge complex of gas and dust where massive stars are forming and is the closest such region to the Earth. The glowing gas is so bright that it can be seen with the unaided eye and is a fascinating sight through a telescope. Despite its familiarity and closeness there is still much to learn about this stellar nursery. It was only in 2007, for instance, that the nebula was shown to be closer to us than previously thought: 1350 light-years, rather than about 1500 light-years.

Astronomers have used the Wide Field Imager on the MPG/ESO 2.2-metre telescope at ESO's La Silla Observatory in Chile to observe the stars within Messier 42. They found that the faint red dwarfs in the star cluster associated with the glowing gas radiate much more light than had previously been thought, giving us further insights into this famous object and the stars that it hosts. The data collected for this science project, with no original intention to make a colour image, have now been reused to create the richly detailed picture of Messier 42 shown here.

This new image of the Orion Nebula was captured using the Wide Field Imager camera on the MPG/ESO 2.2-meter telescope at the La Silla Observatory, Chile.

The image is a composite of several exposures taken through a total of five different filters. Light that passed through a red filter as well as light from a filter that shows the glowing hydrogen gas, were coloured red. Light in the yellow-green part of the spectrum is coloured green, blue light is coloured blue and light that passed through an ultraviolet filter has been coloured purple. The exposure times were about 52 minutes through each filter.

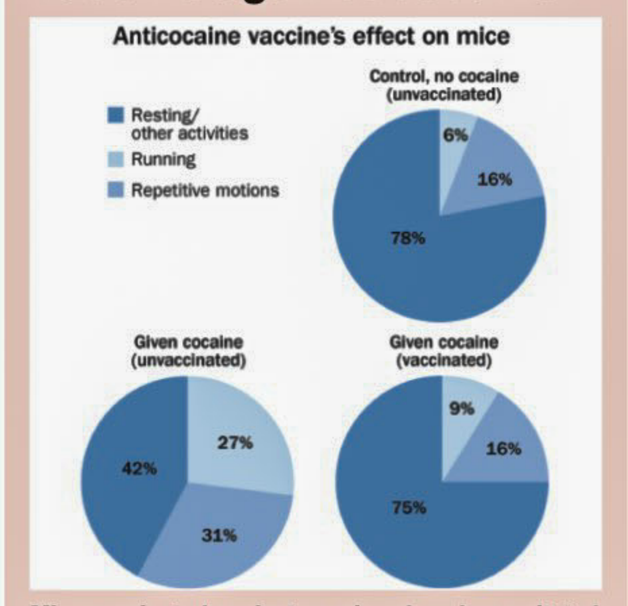
This image was processed by ESO using the observational data found by Igor Chekalin (Russia), who participated in ESO's Hidden Treasures 2010 astrophotography competition, organised by ESO in October-November 2010, for everyone who enjoys making beautiful images of the night sky using real astronomical data.

Igor searched through ESO's archive and identified datasets that he used to compose his image of Messier 42, which was the seventh highest ranked entry in the competition, out of almost 100 entries. His original work can be seen here:http:// www.flickr.com/photos/igorfp/5216868239/in/pool-1562202@N22/ . Igor Chekalin was awarded the first prize of the competition for his composition of Messier 78, and he also submitted an image of NGC3169, NGC3166 and SN 2003cg, which was ranked second highest.

Source: Science daily

ADDICTS BEWARE!

Vaccine against cocaine!



Mice vaccinated against cocaine show less agitated behavior when exposed to the drug

ANTIBODIES generated by a new vaccine can capture molecules of cocaine in the precious few seconds that lapse before the drug reaches the brain, a study in mice shows. Although the antibody brigade doesn't snag all the cocaine, it seems to collar enough to greatly subdue the agitation that mice exhibit when given the drug.

Based on these findings, the researchers are moving on to studies in rats and monkeys in hopes of testing the vaccine in people. The new report will appear in the MarchMolecular Therapy.

"When someone takes cocaine whether snorted, smoked or injected you don't have much time," says study coauthor Ronald Crystal, a pulmonary physician at Weill Cornell Medical College in New York City. "It takes about six second to pass from the lungs to the blood to the brain."

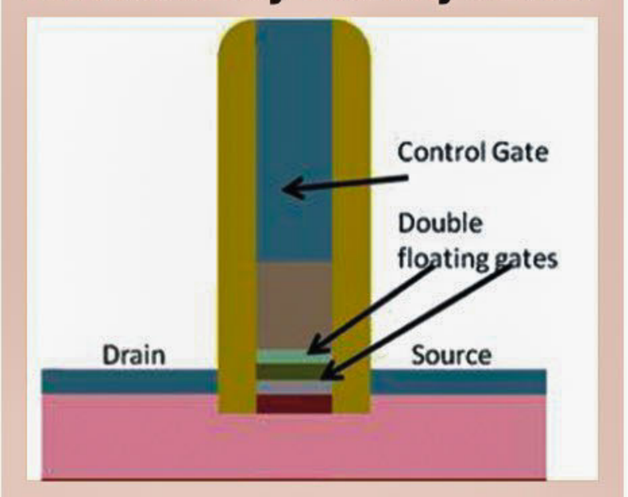
A vaccine would need to elicit a standing army poised to intercede. "You need avid antibodies, at high levels," Crystal says.

In the new study, Crystal and his colleagues gave mice three injections over six weeks. Some of the animals received a placebo while the others got the experimental vaccine, which combines a cocainelike substance with noninfectious portions of an adenovirus that stimulate an immune response but don't cause disease. Four weeks later, all the mice were exposed to cocaine by injection.

Source: Science News

FASTER, BETTER

Revolutionary memory device



Researchers have developed a single "unified" device that can perform both volatile and nonvolatile memory operation

RESEARCHERS from North Carolina State University have developed a new device that represents a significant advance for computer memory, making large-scale "server farms" more energy efficient and allowing computers to start more quickly.

Traditionally, there are two types of computer memory devices. Slow memory devices are used in persistent data storage technologies such as flash drives. They allow us to save information for extended periods of time, and are therefore called nonvolatile devices. Fast memory devices allow our computers to operate quickly, but aren't able to save data when the computers are turned off. The necessity for a constant source of power makes them volatile devices.

But now a research team from NC State has developed a single "unified" device that can perform both volatile and nonvolatile memory operation and may be used in the main memory.

"We've invented a new device that may revolutionize computer memory," says Dr. Paul Franzon, a professor of electrical and computer engineering at NC State and co-author of a paper describing the research.

Source: Science daily

Enigmatic Sunda leopard

THE "newest" cat species described to science, the Sunda clouded leopard, actually exists in two distinct forms, scientists have confirmed.

This big cat is so enigmatic that researchers only realised it was a new species - distinct from clouded leopards living elsewhere in Asia - in 2007. The first footage of the cat in the wild to made public was only released last year.

Now a genetic analysis has confirmed that the cat comes in two forms, one living in Sumatra, the other on Borneo.

Clouded leopards are the most elusive of all the big cats, which include lions, tigers, jaguars, snow leopards and normal spotted leopards.

Living across south-east Asia, into China and India, the leopards have larger cloud-like spots than ordinary leopards.

Until 2006, all clouded leopards were thought to belong to a single species.

However, genetic studies revealed that there are actually two quite distinct clouded leopard species.

As well as the better known clouded leopard living on the Asian mainland (Neofelis nebulosa), scientists determined that a separate clouded leopard species lives on the islands of Borneo and Sumatra.

The two species are thought to have diverged over one million years ago.

This leopard is now known as the Sunda clouded leopard (Neofelis diardi), though it was previously and erroneously called the Bornean clouded leopard.

Since 2008, it has been listed as vulnerable by the International Union for the Conservation of Nature.

Did Bornean clouded leopards evolve new spots?

In 2010, a team of scientists working in the Dermakot Forest Reserve in Malaysia released the first footage of the cat in the wild to be made public.

Led by Mr Andreas Wilting of the Leibniz Institute for Zoo and Wildlife Research in Berlin, Germany, the researchers captured images of a Sunda clouded leopard walking along a road.

Now Mr Wilting and colleagues have published new research which reveals even more about this mysterious cat.

They sampled 15 Sunda clouded leopards living on Borneo and 16 living in Sumatra, conducting molecular and genetic studies to reveal their origin.

The researchers also examined the skulls of 28 further Sunda clouded leopards and the fur coats of 20 specimens held in museums, as well as the coats of cats photographed on both islands.

"Although we suspected that Sunda clouded leopards on Borneo and Sumatra have likely been geographically separated since the last Ice Age, it was not known whether this long isolation had caused them to split up into separate sub-species," explains Wilting.

RARE CATS: FIND OUT MORE Ghostly photographs of the rare Saharan cheetah were revealed last monthA "lost" population of tigers has been filmed living in the Himalayas by the BBCOnly the second known photos of the elusive African golden cat were taken in the wild in 2009Watch more videos of wild cats here

But his team's analysis confirms that the latest "new" species of cat to be discovered actually comes in two forms, a Bornean subspecies N. d. borneensis and the Sumatran subspecies N. d. diardi.

Their results are published in the journal Molecular Phylogenetics and Evolution.

Source: BBC

'WORM PORN'

Evolution of sperm

WATCHING hours upon hours of worms having sex (yes essentially worm porn), has helped scientists figure out why some flatworms have simple, thin, squiggly sperm, while others sport larger sex cells with bristles and a feeler in the front.

The new findings shed light on the evolution of all animal sperm, the researchers said.

In the study, a team that included Lukas Schärer and his wife Dita Vizoso, both of the University of Basel in Switzerland, linked the evolutionary loss of the bristles which they think keep the sperm lodged in the female reproductive tract as well as the feelers, to the adoption of a new mating strategy that renders the bristles useless.

Schärer described the methodology that led to their discovery: "You take time-lapse movies and sit there and look at worms mating for some hours," Schärer said.

Some were more obliging than others, mating all the time, while other healthy specimens didn't get down to business when placed together, he said.

The team also examined the worms' sperm, the stylet (the organ used to deliver sperm), the antrum (the female sperm-receiving organ) and the evolutionary relationships among the worms. (These worms are equipped simultaneously with both male and female genitalia.)

The implications of this research go beyond just the worms, and help explain why animal sperm come in so many shapes, according to Scott Pitnick, an evolutionary biologist at Syracuse University, who was not involved in the study.

"When most people think of sperm, they think of a tadpole-looking thing," Pitnick said. "There is no such thing as a typical sperm cell when you look at sperm diversity throughout the animal kingdom. It is just unbelievable, the outrageous, dramatic forms that have evolved."

Source: Live science

OUT OF A JOB

Tevatron to shut down?

An aerial view of the 6.4-kilometer-long racetrack of Fermilab's Tevatron

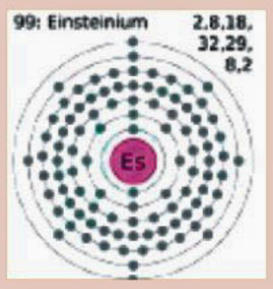
The Fermi National Accelerator Laboratory's Tevatron will shut down by the end of September, the U.S. Department of Energy has announced, dashing hopes that the 25-year-old atom smasher in Batavia, Ill., might win a transatlantic race to find the most sought-after elementary particle in high-energy physics.

Fermilab received the news from the Department of Energy on January 10 that the agency could not come up with an annual $35 million to keep the Tevatron running until 2014. The department's advisory panel on high energy physics had recommended that the Tevatron operate for an additional three years after the European consortium CERN announced in early 2010 that its more powerful Large Hadron Collider would close down during all of 2012 for repairs.

Source: Science News

DID YOU KNOW?

What's the atomic number of Einsteinium?



The name of the element is 'Einsteinium', its symbol is Es and the atomic number is 99. Named in honour of Albert Einstein, it is the seventh transuranic element and does not occur naturally in any measurable quantities. Einsteinium was first identified in December 1952 by Albert Ghiorso, with co-workers at the University of California, Berkeley, when he was examining debris from the first hydrogen bomb test of November 1952.

Some hermaphroditic Macrostomum lignano flatworms mate, then suck out unwanted sperm. These worms' sperm have bristles to help them stay in place.