

# ANTENNA



The ANZAAS Youth Magazine

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## Editors note

Hi, my name is Rachel Morison and I am the Youth Editor for ANTENNA. This year I plan to study Applied Chemistry: Forensic Science at UTS. I have been to three of the Youth ANZAAS conferences (the first in Adelaide, the second in Perth, where this photo was taken, and the latest in Dunedin). I met many interesting people with a similar passion for science and at the same time, learnt a lot about the study and application of science in our modern world.



## Extinct Tasmanian Tiger's DNA Sequenced

All the genes that the exotic Tasmanian Tiger inherited from its mother have been revealed by an international team of scientists in a research paper in the online edition of Genome Research. The extracted DNA came from two extinct specimens' hair, rather than bone, as hair is a powerful time capsule for preserving DNA over centuries and under a wide range of conditions. This research marks the first successful sequencing of genes from this carnivorous marsupial, which looked like a large tiger-striped dog and became extinct in 1936.

*This is a photograph of two thylacinus in the Washington D.C. National Zoo, c. 1906. (Credit: Photograph by E.J. Keller, from the Smithsonian Institution archives*



## Quirky (and disturbing) Facts.

- The average human brain consumes just 12 Watts of power - one-tenth of what it takes to burn an ordinary light bulb
- Dogs have about 100 different facial expressions. Most of which, are expressed with their ears.
- The world's largest amphibian is the giant salamander. It can grow up to 5 ft. in length.
- The Barn Owl has one ear set higher than the other and has the most acute locational hearing yet measured in any animal.
- The chemical makeup of tears of joy is different than that of tears of sadness.
- Thumbnails grow slower than fingernails
- The manufacture of bottle tops in the United States uses more steel than is used in building car bodies

## ATTENTION ALL STUDENTS- YOUTH ANZAAS '09

The next Youth ANZAAS will be held in Melbourne, Australia during the July school holidays this year. All students from years 10- 12 are welcome to apply for this wonderful experience. Flyers and Application forms will be available on the ANZAAS site (<http://www.anzaas.org.au/youth.html>) shortly. Enquiries and expressions of interest can also be directed to Dr. Mike Murray at [chair@anzaas.org.au](mailto:chair@anzaas.org.au).

## Did you know ...?

Dolphins and certain whales blow bubble rings. Dolphins can be seen playing with these silver coloured rings which they have the ability to make under water. It isn't known how they learn this, or if they're born with the ability.



*Dolphin playing with bubble ring*

As if by magic, the dolphin does a quick flip of its head and a silver ring appears in front of its beak. The ring is a solid, donut shaped bubble about 2-ft across, yet it doesn't rise to the surface of the water. It stands upright in the water like a magic doorway to an unseen dimension. The dolphin then pulls a small silver donut from the larger one. Looking at the twisting ring for one last time, a bite is taken from it, causing the small ring to collapse into thousands of tiny bubbles which head upward towards the water's surface. After a few moments the dolphin creates another ring to play with. There also seems to be a separate mechanism for producing small rings, which a dolphin can accomplish by a quick flip of its head.

An explanation of how dolphins make these silver rings is that they are 'air-core vortex rings'. Invisible, spinning vortices in the water are generated from the tip of a dolphin's dorsal fin when it is moving rapidly and turning. When dolphins break the line, the ends are drawn together into a closed ring. The higher velocity fluid around the core of the vortex is at a lower pressure than the fluid circulating farther away. Air is injected into the rings via bubbles released from the dolphin's blowhole. The energy of the water vortex is enough to keep the bubbles from rising for a few seconds of play time. Another way of creating such rings is by letting a ring out of their blow hole. Humans are also able to do this.

To learn about the physics behind these bubble rings and to learn to make them yourself, go to <http://www.deepocean.net/deepocean/index.php?science09.php>

## Science Helps Archaeologists To Examine History

*Tutankhamen, a young Egyptian Pharaoh, ruled from 1333 BC – 1324 BC and died in his late teens. His tomb was discovered by archaeologist Howard Carter in 1922.*

The fetuses of *Tutankhamen's* two still born daughters were found in the treasury of his tomb... Both fetuses show signs of scoliosis (curvature of the spine) and Klippel-Feils Syndrome from which Tutankhamen suffered.



*Fetus found in Tutankhamen's tomb*

DNA samples will be compared to the DNA of other mummies, in order to recognise familial connections and to figure out their identities. The DNA will also confirm if the fetuses are those of Tutankhamen's children.

### A Brief History of Poisons

*A poison in a small dose is a medicine, and a medicine in a large dose is a poison.*

— Alfred Swaine Taylor, 19th-Century toxicologist.

.Democritus (460 BC - 370 BC) was probably the first chemist to study poisons, and he communicated some of his findings to Hippocrates.

Many ancient civilisations were intimately acquainted with poisons and their effects. The earliest records of poisoning in Egypt date back to around 3000BC, and document the research of Egyptian king Menes, on the subject of poisonous plants.

Poisons were used both for murder and as a means of execution; the philosopher Socrates was condemned to death by drinking hemlock.

Around 246BC, the Chinese developed the Chou Ritual, of ceremonial dances carried out with feathers. The ritual involved the burning of five poisons: cinnabar (mercury), realgar (arsenic), green vitriol (copper sulphate), lodestone and an unknown poison. The feathers, used externally, were highly toxic.

Persian Queen Parysatis, during the reign of Artaxerxes II (405 - 359BC), killed her daughter-in-law Statira by poisoning a knife used to carve poultry at her dinner table.

The Indians, whose secret service was among the first in the ancient world, used visakanyas ('poison damsels') to assassinate monarchs. Visakanyas' bodies were saturated with gradual doses of poison, or they seduced their victims and poisoned their food

In the Renaissance era the Borgia family name, became synonymous with dinner-party executions. Lucrezia Borgia, formed a poisoners' triumvirate with her father Pope Alexander VI and brother Cesare, and her reputation as a poisoner has achieved mythic immortality.



Ancient Roman civilization had laws against poisoning in 82 B.C. Emperors Vitellius, Domitian, Hadrian, Commodus, Caracalla and Alexander Severus were all poisoned with arsenic.

Arsenic was referred to as inheritance powder in early France.

Modern scientific methods have made it increasingly difficult for poison to remain hidden. In 1814 Matthieu Orfila earned the title of "the father of toxicology" by classifying the common poisons preferred by criminals. The Blandy trial of 1752 was the first instance of an actual chemical test for poison.

In the Victorian era poison was readily available in various forms (from flypaper to rat poison). In 1836 English chemist James Marsh, developed an accurate technique for revealing traces of arsenic. Criminals favoured this poison because arsenic already exists in small traces in a healthy human body. A victim of Arsenic poisoning, however, has traces of the chemical in almost every part of the body as opposed to concentrations in particular organs such as the stomach or liver.

## STOP PRESS: Gas Discovered Around Mars

***Nasa scientists believe ALIEN microbes living just below the Martian soil are responsible for plumes of methane gas around the Red Planet,***

Experts speculate that the methane is being emitted as a waste product by organisms called methanogens living in water beneath underground ice.

The methanogens must be alive today otherwise the methane would have been lost from the Martian atmosphere. The gas implies active biological or geological processes.

### Mars facts

- MARS is the fourth planet from the sun after the Earth.
- DESPITE having a similar terrain — made up of mountains, deserts and polar icecaps — the Red Planet has virtually no water.
- THE planet's reddish appearance is due to iron oxide.
- WITH a surface area of 90million square miles, Mars is less than a third the size of our planet, which is 317million square miles.
- EARTH is 93million miles away from the sun, 135million miles closer than Mars.
- FOR that reason, any inhabitants on the Red Planet will have to put up with average temperatures of -46°C. We earthlings usually bask in an average temperature of 14°C.
- THE atmosphere on Mars is very different from ours — 95 per cent of the air is carbon dioxide, with the Earth's being 78 per cent nitrogen and 21 per cent oxygen.
- MARS does outdo us when it comes to satellites. It has two against our one — the moon.

