PubDate: 07-03-07 Page: 4 B Edition: 1 Replate: User: dclark Color:K

SCIENCE BRIEFS

Some female cheetahs get around, study says

When it comes to relations between the sexes, the cheetah is not your typical wild carnivore. The males have larger territories and mate with multiple partners. But among cheetahs in Serengeti National Park in Tanzania, it's the females that have larger territories and, a study shows, it's the females that are promiscuous. Dada Gotelli of the Zoological Society of London, Sarah M. Durant of the Wildlife Conservation Society and others performed genetic and statistical analyses involving fecal samples from cheetahs in the park for nine years to establish paternity patterns. The researchers found that in 43 percent of litters with two or more cubs, there was more than one father. Females mated with multiple males during a given reproductive cycle, and did not appear to remain faithful to mates from year to year.

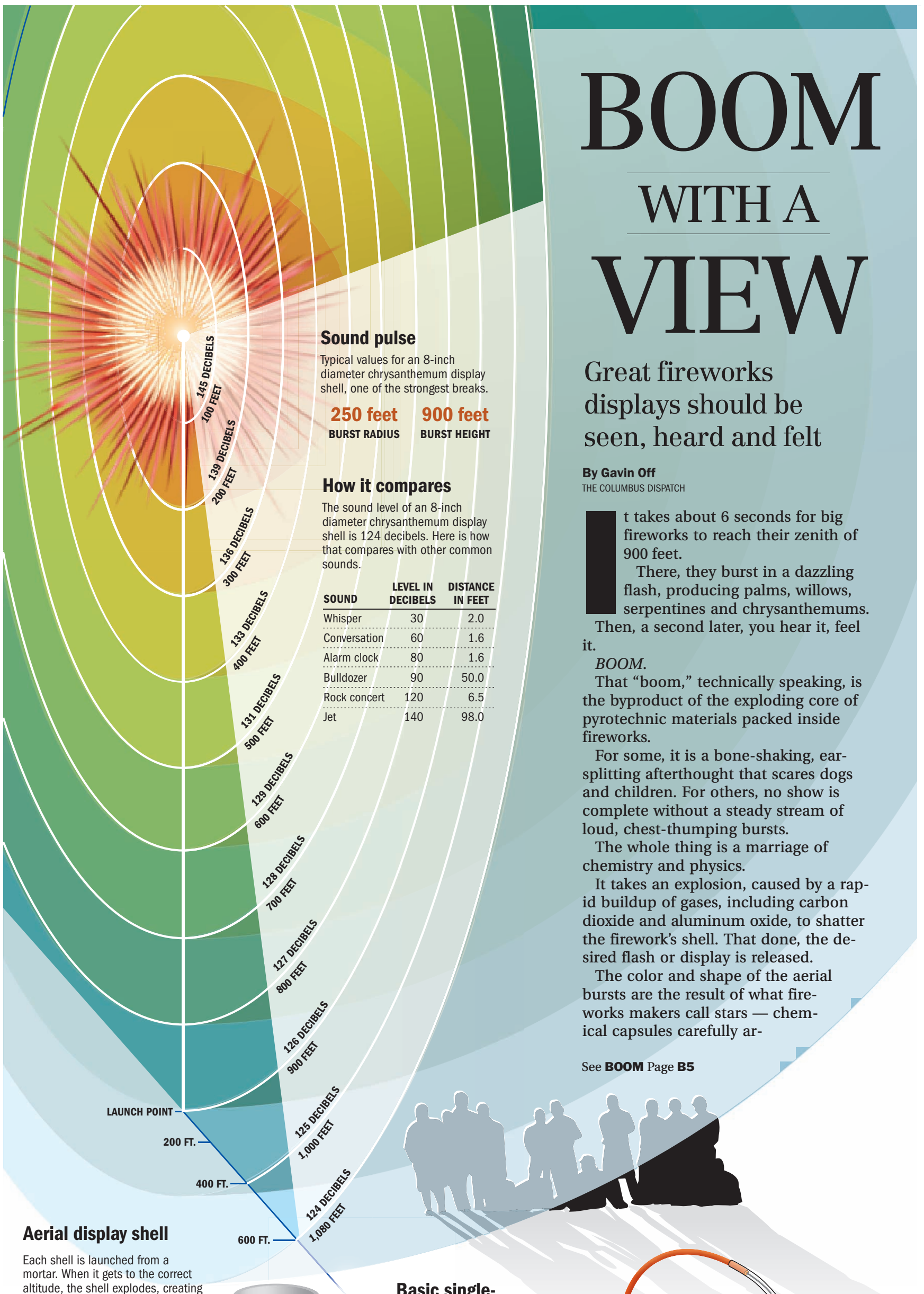
Researchers' new material can fix itself

Creation of polymer composites that can seal cracks as they appear has long been a goal of chemists and engineers. Such materials could be useful in airplane wings, for example, which can develop cracks under the stress of flight. Scientists at the University of Illinois at Urbana-Champaign are reporting progress toward that goal. Inspired by skin, they have developed a material that can repair itself. Nancy R. Sottos, a professor of materials science and engineering, said the research built on earlier work on a system that uses microcapsules filled with a healing agent and embedded throughout the material. When a crack occurs, nearby capsules release the chemicals, which flow into the crack.

Melting icebergs lead to new sources of life

Scientists have documented that global warming is causing the Antarctic ice sheet to shrink, with large chunks breaking off and forming free-floating icebergs in a trend that could portend substantial rises in global sea levels. A team of California-based researchers has discovered that those new islands of ice are breeding grounds for life in the Weddell Sea. As the icebergs melt, they release bits of debris, which enhance the growth of phytoplankton. Those microscopic plants attract krill — small crustaceans that feed on them — and the krill draw fish and birds, and so on up the food chain, creating what the scientists call "hot spots" for ocean life.

— From wire reports



BOOM WITH A VIEW

Great fireworks displays should be seen, heard and felt

By Gavin Off
THE COLUMBUS DISPATCH

It takes about 6 seconds for big fireworks to reach their zenith of 900 feet.

There, they burst in a dazzling flash, producing palms, willows, serpentines and chrysanthemums.

Then, a second later, you hear it, feel it.

BOOM.

That "boom," technically speaking, is the byproduct of the exploding core of pyrotechnic materials packed inside fireworks.

For some, it is a bone-shaking, ear-splitting afterthought that scares dogs and children. For others, no show is complete without a steady stream of loud, chest-thumping bursts.

The whole thing is a marriage of chemistry and physics.

It takes an explosion, caused by a rapid buildup of gases, including carbon dioxide and aluminum oxide, to shatter the firework's shell. That done, the desired flash or display is released.

The color and shape of the aerial bursts are the result of what fireworks makers call stars — chemical capsules carefully ar-

See **BOOM** Page **B5**

A short history of fireworks

The discovery of gunpowder is thought to have occurred by chance about 2,000 years ago in China, where a cook mistakenly mixed three common kitchen ingredients, according to the Royal Society of Chemistry.

When dried, the powder burned with a loud bang.

The Chinese named this black powder *huo yao* (fire chemical) and developed it further. The mixture was placed in the hollow of a bamboo stick. When the stick was thrown into a fire, the gases produced by the burning powder caused an immense buildup of pressure and blasted the tube apart.

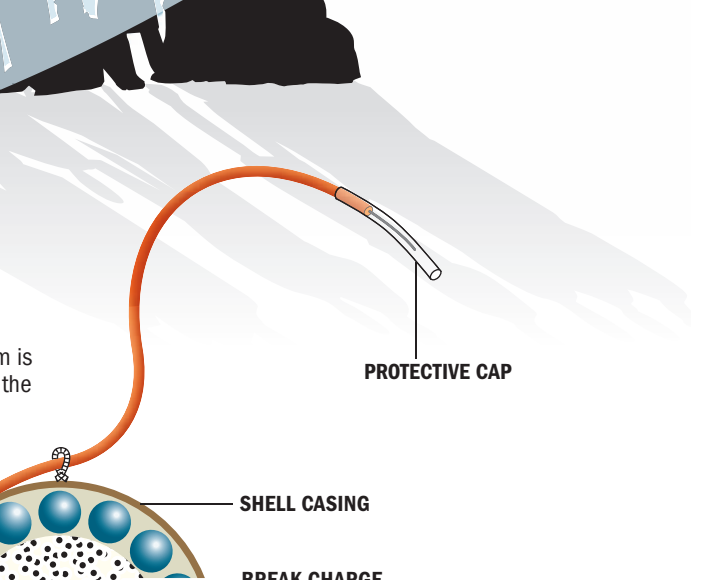
The firecracker was born, and the Chinese began to refine the process to make fuel for wooden rockets.

It is thought that Marco Polo, during one of his many trips to China, transported this invention to the Middle East, where European crusaders brought it to England.

In 1560, European chemists made gunpowder into an explosive by experimenting with the ratios of the ingredients. The final proportion was set as follows: 75 percent salt peter, 15 percent charcoal and 10 percent sulphur.

It remains pretty much the same today.

Credit for developing fireworks into an art form goes to the Italians, who developed aerial shells that exploded into a fountain of color.



FILE PHOTO

A worker connects the wires on the tubes that hold the shells used in a past Red, White & Boom fireworks show Downtown.

HOW TO REACH US

ASSISTANT CITY EDITOR
Mark Somerson.....614-461-8508
msomerson@dispatch.com

SCIENCE REPORTER
Kevin Mayhood.....614-461-5256
kmayhood@dispatch.com