

## PERIODICALS COVERED

<u>S. No.</u>	<u>Name of the Journal</u>	<u>Vol./ Issue No.</u>	<u>Month</u>	<u>Year</u>	<u>Pages</u>
1.	Aakrosh	19/70	January	2016	01
2.	American Biology Teacher	77/07-08	Sept.-Oct.	2015	02-03
3.	American Journal of Physics	84/01	January	2016	04-05
4.	BioScience	65/12	December	2015	06-07
5.	Campus Counsellor	09/06	February	2016	08
6.	Current Science	110/02-04	Jan.-Feb.	2016	09-16
7.	Desh (B)	59/07-08	2&17 <sup>th</sup> Feb.	2016	17
8.	Down to Earth	24/18-19	February	2016	18-21
9.	Economic and Political Weekly	51/04-09	Jan.-Feb.	2016	22-23
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# AAKROSH

ASIAN JOURNAL ON TERRORISM AND INTERNAL CONFLICTS

JANUARY 2016

VOLUME 19 . NUMBER 70

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FORUM FOR STRATEGIC AND SECURITY STUDIES  
NEW DELHI

# THE AMERICAN BIOLOGY TEACHER



## About Our Cover

These barnacles, now dried and hanging from driftwood on the beach, tell an interesting story in the nature of science, the theme of this month's issue. These marine animals live as adults attached to a hard surface, usually in shallow or tidal water. Barnacles come in two basic forms. Those in the Order Sessilia grow directly on a surface such as a rock, a shell, or even a whale and are often called "acorn barnacles." The others (Order Pedunculata) are attached by a stalk.

The animals in this image are a species of Goose Barnacles, classified in this second group. This stalk that is now little more than a dried ribbon was, in life, a thick, fleshy, flexible support that allowed these animals some degree of mobility. Barnacles are arthropods related to crabs and lobsters. Unlike their relatives, barnacles live upside down, typically surrounded by calcified plates, and look, at first glance, more like mollusks than arthropods. Their six pairs of limbs project upward and outward and have been modified into long, feathery arms that beat constantly to bring water and food toward the mouth.

Reproduction is relatively straightforward. In some species, sperm are shed into the water and fertilize females or, in the case of the sessile group, males use their extremely long penis to transmit sperm to fertilize the eggs of nearby females. The larvae that develop are free-living until they settle down and attach to a substrate.

The "nature of science" story begins with the issue of how barnacles should be classified. These animals were thought by Linnaeus and Cuvier to be mollusks. In 1830, when John Thompson showed that the larvae, which looked like those of crustaceans, changed into adult barnacles, the original classification was questioned. Charles Darwin entered the fray in 1846 when he dedicated the next four years of his life to investigating the group and writing a series of monographs describing these creatures. Darwin was motivated to study one group completely in order to provide evidence in support of his theory of evolution by natural selection, published in *On the Origin of Species* in 1859. The history of science is replete with examples such as this, showing how ideas have changed with more evidence and how multiple researchers have added their own lines of evidence, allowing an increasingly more accurate picture of nature to be drawn.

This image was taken with a Nikon D800 with a Nikon VR lens at Cathedral Cove, a beach on the Pacific Ocean located on the Coromandel Peninsula of the North island of New Zealand. The photographer is William F. McComas, the Parks Family Professor of Science Education at the University of Arkansas College of Education and Health Professions (mccomas@uark.edu) and Editor of *ABT*.

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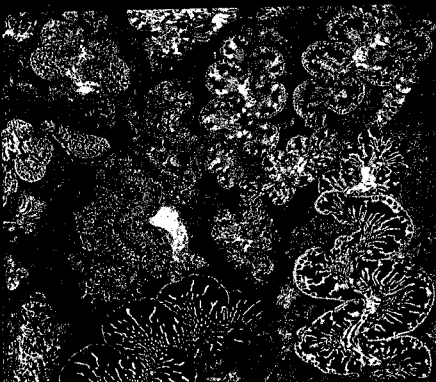
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# THE AMERICAN BIOLOGY TEACHER



## About Our Cover

These colorful creatures are the famous giant clams – the world's largest living bivalve mollusk (genus *Tridacna*; locally called *pā'ua*, their Maori name), with a wide distribution across the Indo-Pacific region. They are seen here in a tank at a breeding facility on the atoll of Aitutaki, one of the Cook Islands.

According to the Ministry of Marine Resources in the Cook Islands, there are two native species of giant clam in the islands' waters. A smaller rugose variety (*Tridacna maxima*) is commonly found in lagoons, and a larger fluted clam (*T. squamosa*) is found outside the reef. The largest of the giant clams, *T. gigas*, is not native but was introduced to Aitutaki from Australia in 1990. These clams have all experienced population declines because of overharvesting, but attempts are being made to grow these animals in captivity and release them to the wild. The largest of these creatures found to date had a shell 137 cm long and weighed as much as 250 kg when alive.

The larval clams are planktonic but quickly settle to the ocean floor as they begin to produce a calcium carbonate shell after just two days. These animals are primarily filter feeders, but their mantle supports a remarkable ecosystem of symbiotic algae (zooxanthellae). During the day, the clam extends its mantle tissue so that the algae can photosynthesize and, in the process, provide the clams with a supplemental nutrient source.

*T. gigas* reproduce sexually and are hermaphrodites. The giant clams use a technique of broadcast spawning whereby sperm and eggs are shed into the water. This action is synchronized with the assistance of a transmitter chemical called *spawning induced substance* (SIS).

Sorry to report that there is no truth to the claim that the giant clams are "man-eaters." If one were foolish enough to stick an arm or leg into the giant clam, it would be possible to be trapped and drown, but the shell closes very slowly and only as a defensive response.

The photographer is William F. McComas (mccomas@uark.edu), the Parks Family Professor of Science Education in the College of Education and Health Professions, University of Arkansas, and editor of *The American Biology Teacher*.

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Cover figure: An acoustic antenna apparatus constructed from an array of aluminum cans gives rise to an intensity that depends on direction. The directionality is shown here for an array separation of  $\lambda/4$  (top) and for  $\lambda/2$  (bottom). See the article on page 14 for more detail.

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This endowment fund was created to enhance the internationalization of AAPT membership and is intended to be beneficial to physics teachers in developing countries with nonconvertible currencies.

- The countries eligible for funded memberships is taken from the World Bank list of Eligible Developing Countries for Scholarship and Fellowships Programs. This decision was approved by the Membership and Benefits Committee. This list of countries from which nominees will be solicited will be periodically revised by the AAPT Membership and Benefits Committee based on this list.
- Requests for nominations are directed to the Committee on International Education in Physics, international conference participants, and other appropriate individuals. The deadline for nominations is May 31 of each year.
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**AAPT**  
PHYSICS EDUCATION

**NEWS AND OPINION**

## EDITORIAL

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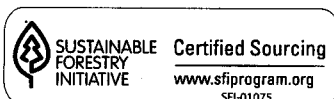
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Cover: As shrubs expand in Arctic ecosystems, herbivores such as the caribou shown grazing here may moderate the expansion of preferred species and unintentionally perpetuate the growth of others. In an article in this issue, Katie Christie and her colleagues synthesize information about the relative influence of climate and vertebrate herbivory on different shrub species. They show that, at moderate densities, herbivores are more likely to damage palatable species such as willows (*Salix* spp.) compared with chemically defended species, such as resinous dwarf birch (*Betula nana exilis*) and Siberian alder (*Alnus viridis*). As a result, these species may be at an advantage as the climate continues to warm. Photograph: Katie Christie.



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*Sea otters vanished from central California's Elkhorn Slough a few decades before intense pollution from farm runoff smothered eelgrass beds, an important nursery habitat for fish. The otters' return to the slough set off a trophic cascade that revived eelgrass. The role of predators in restoring damaged coastal ecosystems is discussed in this month's Feature.*

*Photograph: Ron Eby.*

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- Pharaoh's Dream Revisited: An Integrated US Midwest Field Research Network for Climate Adaptation of Global Agriculture

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Empowering the new generation

Vol. 09 - Issue. 06 - February 2016

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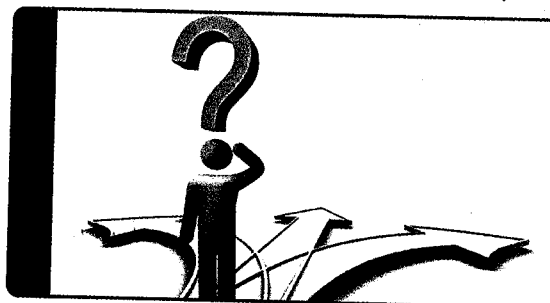
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Publisher

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Dr. C.T. Luislatty

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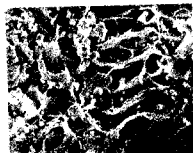
Empowering the New Generation

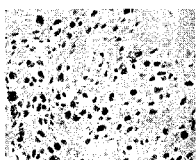
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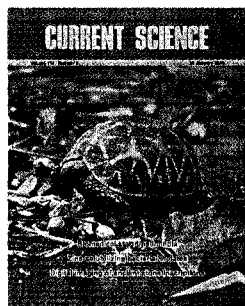
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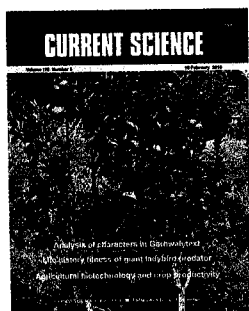
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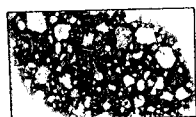
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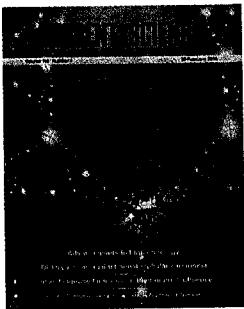
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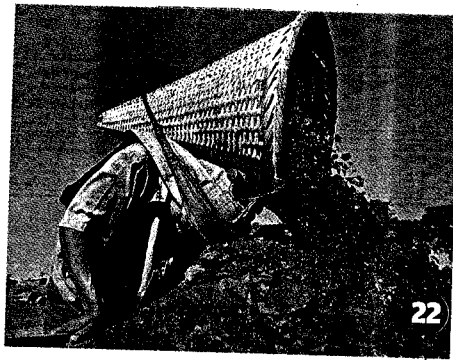
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