

MEET THE \$125 MILLION CHALLENGE TO BUILD UCSF MEDICAL CENTER AT MISSION BAY. [click here](#)



The Campaign for UCSF Medical Center

OBSERVATORY

# In Lake, Photosynthesis Relies on Arsenic



Laurence G. Miller and Shaun Baesman

A pool with arsenic-fueled bacteria at Mono Lake in California.

By HENRY FOUNTAIN

Published: August 18, 2008

Mono Lake in California is a strange place, with eerie spires of calcium carbonate along the shoreline and water that is extremely salty and alkaline.

### Related

Observatory: Razzle Dazzle Markings Can Confuse Predators (August 19, 2008)

Observatory: New Theory on DEET: Mosquito Just Dislikes It (August 19, 2008)

[More Observatory Columns »](#)

### Web Link

[Arsenic \(III\) Fuels Anoxygenic Photosynthesis in Hot Spring Biofilms from Mono Lake, California \(Science\)](#)

### RSS Feed

But Ronald S. Oremland and Thomas R. Kulp of the [United States Geological Survey](#) and colleagues have found something weirder still at the lake: bacteria that use the toxic element arsenic in photosynthesis in the absence of oxygen.

The researchers found films of purple bacteria and cyanobacteria growing in pools fed by hot springs on Paoha Island in the lake. The water in these pools contains very little oxygen but is rich in arsenic-containing minerals that leach out of the rocks.

In laboratory tests, the researchers found that the bacteria use light to produce carbohydrates from carbon dioxide, as

SIGN IN TO E-MAIL OR SAVE THIS

PRINT

REPRINTS

SHARE

ARTICLE TOOLS SPONSORED BY



[More Articles in Science »](#)

### @Times - Inside NYTimes.com by E-Mail

Sign up for regular updates on what's new on NYTimes.com.

Sign Up

[See Sample](#) | [Privacy Policy](#)

**The Ladders®** SEARCH JOBS

ONLY \$100k+ JOBS

### MOST POPULAR

E-MAILED BLOGGED SEARCHED

1. David Brooks: Genius: The Modern View
2. Bob Herbert: Out of Touch
3. 36 Hours in Oakland, Calif.
4. Charles M. Blow: Defecting to Faith
5. Personal Health: Paying a Price for Loving Red Meat
6. Going Dutch
7. Explorer: Gliding Along the 'Forgotten Coast' of Florida
8. Museums: In Berlin, Teaching Germany's Jewish History
9. A Walk in Calcutta
10. Maureen Dowd: How Character Corrodes

[Go to Complete List »](#)

[Get Science News From The New York Times »](#)

...all photosynthesizing organisms do.

But where most organisms use water as the source of electrons to reduce the carbon dioxide, producing oxygen in the process, at least some of the Mono Lake bacteria use arsenite ions as the electron donor, producing arsenate ions. The findings [were reported](#) in the journal Science.

Other photosynthesizing bacteria have been found that use sulfide, nitrite and ferrous ions as electron donors and are also anoxygenic, or non-oxygen-producing. And other bacteria have been found that employ arsenite as a reducing agent, but these microbes do not use light as the energy source. The Mono Lake bacteria appear to be the first example of photosynthesis using arsenite.

A version of this article appeared in print on August 19, 2008, on page F3 of the New York edition.

[More Articles in Science »](#)



### Social networking sites: work or play?

ALSO IN JOBS »

- [Rebooting a career](#)
- [Meet Laura Sen, the C.E.O. of BJ's](#)

**nytimes.com**

**JOBS**



[Click here to enjoy the convenience of home delivery of The Times for less than \\$1 a day.](#)



**The New York Times**  
**The Weekender**  
Save 50% [GO](#)

Ads by Google

[what's this?](#)

#### [Arsenic Removal System](#)

Top Whole House Arsenic Well Water Filter. Free Ship. On Sale 30% Off.  
[www.equinox-products.com](http://www.equinox-products.com)

#### [Arsenic Removal](#)

Drinking Water Purification for Small Water Systems  
[www.AdEdgeTechnologies.com](http://www.AdEdgeTechnologies.com)

#### [Microbiology Testing Lab](#)

Salmonella, Listeria, E. coli Legionella, Bioburden, Sterility  
[www.EMSL.com](http://www.EMSL.com)

Ads by Google

[what's this?](#)

#### [Kill Toothbrush Bacteria](#)

Reduce Exposure To Harmful Bacteria W/a UV Sanitizer for Toothbrushes  
[www.germshappen.philips.com](http://www.germshappen.philips.com)

#### [Activated Alumina DD6F200](#)

Desiccants, Silica Gel, Sorbead Mole Sieve 3A Ethanol, ORDER NOW!  
[www.DeltaAdsorbents.com](http://www.DeltaAdsorbents.com)

#### [Reduce Bacteria in Runoff](#)

The Bio-Skirt from BMP, Inc., is cost-effective, easy to install.  
[www.Bio-Skirt.com](http://www.Bio-Skirt.com)

#### Past Coverage

- [Deep Under the Sea, Boiling Founts of Life Itself \(September 9, 2003\)](#)
- [SCIENCE WATCH: Unusual Bacterium \(December 27, 1988\)](#)

#### Related Searches

- [Bacteria](#)
- [Photosynthesis](#)
- [Oxygen](#)
- [Arsenic](#)
- [Get E-Mail Alerts](#)
- [Get E-Mail Alerts](#)
- [Get E-Mail Alerts](#)
- [Get E-Mail Alerts](#)

#### INSIDE NYTIMES.COM



[THE CITY »](#)



[Fame on the Half Shell for Ex-Stars of 'Top Chef'](#)

[OPINION »](#)



[Op-Ed: In India, Selling Democracy \(and Tea\)](#)

[FASHION & STYLE »](#)



[Weddings and Celebrations](#)

[OPINION »](#)

### Op-Classic: The Danger of David Souter

David H. Souter's 1990 nomination for the Supreme Court alarmed Judith L. Lichtman of the Women's Legal Defense Fund.

[REAL ESTATE »](#)



[When an Online Listing Becomes a Target](#)

[MOVIES »](#)



[Special Section: Summer Movies](#)

[Home](#) | [World](#) | [U.S.](#) | [N.Y. / Region](#) | [Business](#) | [Technology](#) | [Science](#) | [Health](#) | [Sports](#) | [Opinion](#) | [Arts](#) | [Style](#) | [Travel](#) | [Jobs](#) | [Real Estate](#) | [Automobiles](#) | [Back to Top](#)

Copyright 2008 The New York Times Company | [Privacy Policy](#) | [Search](#) | [Corrections](#) | [RSS](#) | [First Look](#) | [Help](#) | [Contact Us](#) | [Work for Us](#) | [Site Map](#)