SCIENCE NEWS®

The Weekly Newsmagazine of Science

A Science Service Publication
Volume 135, No. 6, February 11, 1989

This Week

Research Notes

Articles

Cover: Biologists once thought this species of deep-Atlantic shrimp was blind. Now, they have discovered that the animal possesses an unusual pair of misplaced eyes. Located on the back of the shell, these eyes appear as bright spots in a photograph of shrimp swarms taken from the submarine *Alvin* more than two miles below the ocean's surface. The novel eyes have researchers wondering what there is to see at such a depth. (Photo: Peter A. Rona/ National Oceanic and Atmospheric Administration, Miami)

Departments

Editorial and Business Offices,
1719 N St., N.W., Washington, D.C. 20036.

Subscription Department
231 West Center Street, Marion, Ohio 43305

Subscription rate: 1 yr., $34.50; 2 yrs., $58.00. (Foreign postage $6.00 additional per year.) Change of address: Four to six weeks' notice is required. Please state exactly how magazine is to be addressed. Include zip code. For new subscriptions only call **(1) 800-247-2160.** Printed in U.S.A. POSTMASTER: Send address changes to Science News, 231 West Center Street, Marion, OH 43305. Second class postage paid at Washington, D.C., and additional mailing offices. Title registered as trademark U.S. and Canadian Patent Offices. Published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington, D.C. 20036. (202-785-2255)
ISSN 0036-8423

Letters

Biowar: Who's the enemy?

In "Germ Wars" (SN: 12/17/88, p.392) no one pointed out that the human race is in a perpetual biological war with microorganisms of all sorts, and that in dealing with a hitherto unknown biological organism we have to detect it, identify it, devise a vaccine or other countermeasure, distribute it to the population at risk and then continue to monitor it for variations.

This is precisely what the CBW components of the Armed Services are designed to do. This procedure is also essential to our national defense. In my opinion the defense against outside aggressors is a relatively minor reason to support our germ detection and neutralization program – this program would be essential even if there were no threat from external sources.

Naturally the research has military implications – but so do computer design and software development. We ought to increase our CBW capability, if that's the way to get more funding for research into protecting ourselves from the mutations of microorganisms and learning how to protect the population. The BDRP opponents do not see the forest for the trees.

Raphael G. Kazmann
Professor Emeritus, Civil Engineering
Louisiana State University
Baton Rouge, La.

"Germ Wars" provides a timely reminder of the real and potential dangers of biological weapons research. Such weapons are valued by military planners since destruction of property is avoided – an important consideration if one hopes to "win" a war. Lest SCIENCE NEWS readers forget, the only country to wage biological warfare against the United States is – you guessed it – the United States. In the 1940s the U.S. military sprayed San Francisco with a harmless soil and water bacterium, *Serratia marcescens,* presumably to measure the pattern of dispersal. This fact was uncovered only as a result of the Freedom of Information Act.

Weapons development and secrecy are inextricably interwined.

Gordon Edlin
Professor of Genetics
University of California
Davis, Calif.

If the DOD really believes defensive biological weapons research is needed, then I suggest that President Bush declare the United States will unilaterally place all such research under the auspices of the United Nations. He could then call on other powers to follow the U.S. lead.

Since President Reagan offered to share the "star wars" shield with the Soviet Union, I can't see any reason why universal "germ shields" should not be shared also.

Michael Sullivan
Austin, Tex.

Letters continued on p.93

adapted to the dark, could probably detect [thermal] radiation from a 375°C oven, but that doesn't mean we principally use our eyes to look at ovens," he says.

Szuts thinks the shrimp use their unusual eyes to sense a different source of light – one in the blue end of the spectrum, which is better matched to the animal's rhodopsin. "I think there's lots of blue-green light down there that we must have not yet found," he says.

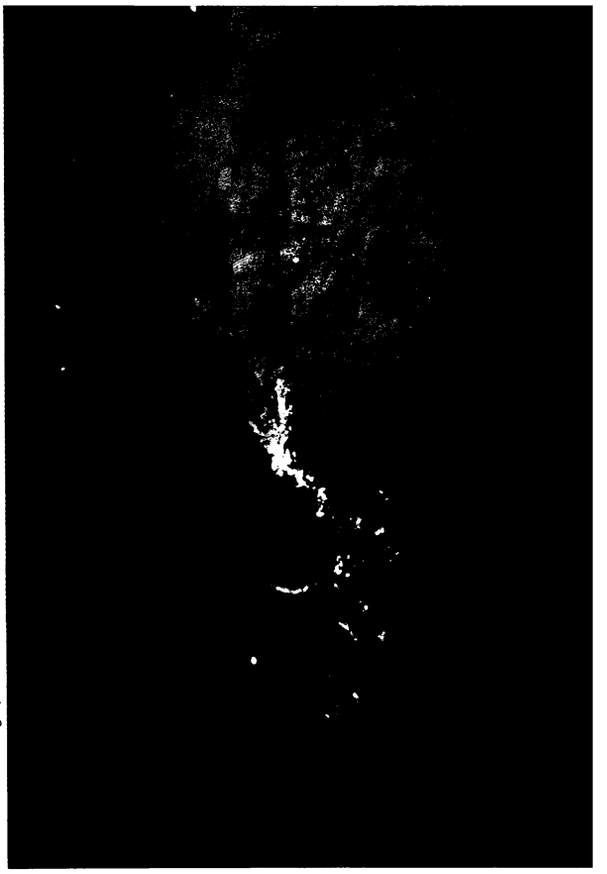
It is quite possible, says Szuts, that blue-green light from an unknown source has escaped detection because scientists have spent relatively little time looking for light near the vents.

Alternatively, the answer might be bioluminescence after all. In an editorial accompanying the two NATURE papers, biologist Michael F. Land from the University of Sussex in England notes that several other deep-sea creatures have "naked-retina" eyes, similar in structure to those of *R. exoculata*. He finds it hard to believe that all these animals live near hot vents. Instead, he proposes this type of lens-less eye may provide enough information to let shrimp sense the direction of bioluminescent organisms.

At this point, the *R. exoculata* saga awaits an ending, and it may be a while before a resolution comes into sight. While physicists and chemists may soon determine what process actually creates the vent light, biologists will have a more difficult time telling whether the shrimp actually use their eyes to sense this energy. And if *R. exoculata* is indeed relying on such light to steer clear of the hot plumes, scientists will have to answer why the shrimp never evolved a more appropriate form of rhodopsin.

Certainly, behavioral studies using live specimens will offer important lessons concerning the habits of the shrimp, but biologists have never had the opportunity to study living examples, and it is not clear whether these animals can survive in a laboratory environment. It may also be quite difficult to study the shrimp's activity in their natural home because bright light, such as that from the *Alvin*, seems to damage their eyes. It will take some ingenuity to study the shrimp without blinding them, or to collect samples without harming the very structures researchers are trying to study.

Moreover, Chamberlain raises the possibility that the shrimp act differently when the submarine's lights are not trained on them. Perhaps "it's the shrimp version of the Heisenberg Uncertainty Principle," he says. "As soon as humans look at them, they don't do what they normally do." □



Woods Hole Oceanographic Institution

Clouds of hot water and dissolved minerals spew out from black smoker chimneys on the East Pacific Rise that are similar to Atlantic chimneys around which the shrimp have been found.

Letters continued from p. 83

In "Germ Wars," Melissa Hendricks accurately portrays the work of Army microbiologists striving to provide a medical defense against the threat of biological attack. The fact that she also catalogs all available criticisms of that work is not taken as a slight against the Army program. She told us from the outset that she was writing about the controversy over the work, not just about the work.

However, she concludes her piece with a call for "openness," as if there were more of the program to be revealed at some future point of rapprochement, presumably to be brought about by the critics of the BDRP program.

Ms. Hendricks, and the many other writers who have covered this story, have had unimpeded access to the Army medical defense program, through interviews with key investigators and laboratory managers, copies of documents and tours of facilities. It's an unclassified program, conducted by investigators whose careers will benefit most from published results, and not at all from nefarious and secret perversions of biotechnology. Openness is already here, in a much greater degree than any of the myopic critics can bear to admit.

Charles Dasey
Public Affairs Specialist
U.S. Army Medical Research & Development Command
Fort Detrick
Frederick, Md.