TROPICAL DISEASES

Dispute Clouds the Future of U.S. Naval Lab in Indonesia

A United States naval laboratory in Jakarta that studies tropical diseases may fall victim to Indonesia's determination to develop its own research capabilities and take control of its H5N1 viral samples. Negotiations over the lab's status have dragged on for more than 2 years, and now some Indonesian politicians are calling for it to be closed or taken over by Indonesia. Recently, the Indonesia Ministry of Health ordered institutions to stop sharing all medical samples with the facility, which has severely limited what it can do.

Opened in 1970, the U.S. Naval Medical Research Unit No. 2 (NAMRU-2) is one of five U.S. tropical disease research labs scattered around the world. NAMRU-2's main function is to study infectious diseases that might affect U.S. troops, although it has taken on a wider public health role in working with Indonesia's Ministry of Health, for instance, in supporting efforts to help curb malaria and dengue. In addition, NAMRU-2's staff of about 20 Americans and 150 Indonesians has trained hundreds of Indonesian health workers, researchers, and students in lab techniques. It also monitors emerging diseases throughout Southeast Asia in collaboration with local institutes.

Responding to e-mailed questions, Trevor Jones, NAMRU-2's commanding officer, wrote, "The U.S. benefits because American scientists have the opportunity to study tropical disease transmission where it is actually occurring." He added that the restrictions have slowed the lab's work, but he hopes this is temporary.

One of the most worrisome diseases circulating in the world is the H5N1 strain of avian influenza, and Indonesia is by far the hardest-hit country, with 132 confirmed human cases and 107 deaths. NAMRU-2 performed the lab diagnosis of all human cases of H5N1 in Indonesia from June 2005 to January 2007, when Indonesia's Ministry of Health labs took over the duties. Since then, Indonesia has only sporadically shared samples of the H5N1 virus with the World Health Organi-

In the spotlight. Officials opened the U.S. Naval Medical Research Unit No. 2 to the public in Jakarta to show that most employees are Indonesians.

CREDIT: ERIK KURNIAWAN/U.S. EMBASSY JAKARTA

PALEOECOLOGY

Fossils Help Figure Out Food Webs Old and New

The watery world 540 million years ago abounded with exotic life forms rivaling those created by Dr. Seuss. Ecologists have long wondered how these worms, seaweeds, sponges, trilobites, snails, and meter-long beasts with rings of teeth interacted. Now, a daring analysis of fossils from China and Canada shows that these marine plants and animals from the Cambrian Period formed food webs on par with those existing today. These ancient networks follow the same rules seen among inhabitants of current reefs, deserts, and bays, report Jennifer Dunne, an ecologist at the Santa Fe Institute in New Mexico, and colleagues online 28 April in *PLoS Biology*.

"I was surprised that something like this [study] is really possible," says Volkmar Wolters, an ecologist at Justus Liebig University in Giessen, Germany. "The result is a thought-provoking, highly informative, and breathtaking paper on the potential structure of Cambrian communities."

Food webs are the complex networks of feeding interactions among the plants, animals, and microbes in a particular ecosystem. Over the past 30 years, researchers have learned that food webs share certain patterns, irrespective of the habitat or the particular species involved. The number of species making up the web and their degree of connectedness dictate certain elements—for example, the number of top predators, the percentage of omnivores, and so on. Dunne wondered how early these patterns emerged, but the fossil record had seemed too sketchy to provide detailed enough information about who eats whom.

Douglas Erwin, a paleontologist at the Smithsonian National Museum of Natural History in Washington, D.C., knew of two exceptions. After a lunchtime conversation with Dunne, he offered to help compile the necessary data from two Cambrian fossil beds, the Burgess Shale in Canada and the Chengjiang Shale in China. At both sites, soft as well as hard body parts were preserved. He and Rachel Wood of the University of Edinburgh, U.K., combed the literature for descriptions of gut contents, bite marks, teeth, and other structures indicative of particular eating habits. They established links among herbivores, predators, and prey for 142 plants and animals in the Burgess Shale and 85 in the Chengjiang formation and rated how confident they were of each link.

Dunne and her colleagues Richard Williams of Microsoft Research Limited in Cambridge, U.K., and Neo Martinez of the Pacific Ecoinformatics and Computational Ecology Lab in Berkeley, California, used these data to compare the two Cambrian ecosystems to eight modern ones, including a reef, an island, and a pond. They calculated the total number of links for each species in each ecosystem and the nature of those connections, for instance, how many were predator-prey, or herbivore-plant. They plugged the number of species and links into a mathematical model that describes modern feeding systems to see if it could accurately predict what the Cambrian food webs would look like.

It showed that the food-web structure—the numbers of organisms at each level, for example—was quite similar in all ecosystems studied. And it also showed that in some ways,

Published by AAAS

zation (WHO), demanding more equitable access to any vaccines or other benefits derived from those samples, which are used to monitor virus evolution, drug resistance, and pandemic risk (*Science*, 23 February 2007, p. 1065).

Now that dispute has extended to NAMRU-2 and is hampering its research on all tropical diseases. When the lab's Memorandum of Understanding expired in December 2005, U.S. officials assumed negotiating a new agreement would be routine. NAMRU-2 continued its work until the Ministry of Health halted all sample sharing on 31 March. Tensions escalated further after an early April visit by U.S. Health and Human Services Secretary Michael Leavitt, who wrote on his blog on 14 April that Indonesia's Minister of Health, Siti Fadilah Supari, "has used the sample-sharing debate and the negotiations over the status of NAMRU-2 in Indonesia to set herself up as an antagonist of the United States." Last week, several Indonesian politicians joined the fray, calling for NAMRU-2 to be closed or taken over by Indonesia.

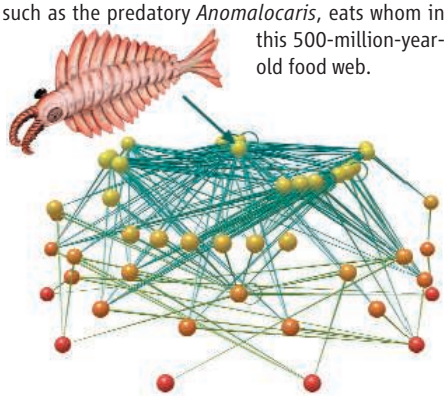
The U.S. Embassy and NAMRU-2 are now trying to reassure Indonesians of the lab's good intentions and negotiate a new agreement. John Heffern, deputy U.S. ambassador, held a press conference on 24 April to defend the lab's activities, and NAMRU-2 held a media open house on 25 April. One remaining point of contention, Heffern told the press, is providing diplomatic immunity for the Americans working at the lab, which the U.S. believes to be standard practice but many in Indonesia are now questioning. Local newspapers have reported that other issues pertain to technology transfers. (Calls seeking comment from Indonesia's Ministry of Foreign Affairs were not returned.)

The outcome of the negotiations will also affect NAMRU-2's status as a WHO collaborating center for emerging diseases. That designation, in effect since 1997, is on hold pending the resolution of its status. David Heymann, who heads WHO's pandemic influenza efforts, says the lab has been "very important" but adds that Indonesia's own lab capabilities are advancing rapidly. "We are encouraging developing country labs to become collaborating centers," he says.

Jones declined to comment on the negotiations. But he emphasized that "we do not have plans to move to another Asian country. We are dedicated to a future here in Indonesia." **–DENNIS NORMILE**

the Chengjiang food web—15 million years older than Burgess—was more primitive. The researchers found more "loops" in the Chengjiang web, wherein the same species appears twice in a particular food chain. By contrast, the Burgess Shale and modern food webs tend to be more hierarchical, a trait considered important for stability, Dunne notes. Another analysis revealed that the Chengjiang food web was more loosely connected than the rest. Today, any species in a web is so closely connected to others that a change in one tends to affect most of the web members. In China, that may have not been the case.

On the menu. Ball-and-stick diagram shows who, such as the predatory *Anomalocaris*, eats whom in this 500-million-year-old food web.



But 15 million years made a difference. "The younger Burgess Shale web looks incredibly like the modern food webs," Dunne points out.

The work is "an excellent contribution to both paleoecology and food-web theory, showing the relevance of the fossil record to understanding current ecosystem states," says Peter Roopnarine, a paleontologist at the California Academy of Sciences in San Francisco.

However, he and Wolters wonder whether Dunne and colleagues were overly bold in assuming fossils at a particular locale really coexisted, as the beds cover millions of years, and whether the sampling was comprehensive enough for this sort of analysis. Just because the structure of the food webs seems similar doesn't mean they functioned the same way, cautions Roopnarine, who says that the paper "falls short on some of its claims." Nonetheless, he thinks the work will have an impact: "The questions emerging from this paper should encourage paleontologists to think more seriously about the need to develop theoretical and modeling approaches to fossil ecologies." **–ELIZABETH PENNISI**

CREDITS (TOP TO BOTTOM): WIKIPEDIA; N. D. MARTINEZ

Business Boost Thwarted

A congressional Democrat with clout and a Republican with conviction have teamed up to block a plan to give small businesses a bigger slice of the federal research pie. Last week's vote by the House of Representatives came on a bill to reauthorize two research programs that fund peer-reviewed proposals from start-up companies through a tax on 11 science agencies. Of greatest concern to science lobbyists was language raising the share going to the SBIR (Small Business Innovation Research) and STTR (technology transfer research) programs from a combined 2.8% to 3.6%, an increase that would have siphoned off an additional $650 million a year. But representatives David Obey (D–WI), chair of the powerful appropriations committee, and Vernon Ehlers (R–MI), a former physics professor who had failed to derail the increase during an earlier committee vote, argued successfully on the House floor that this was the wrong time to tap already stressed science budgets.

A larger SBIR program "does no harm for a large agency whose budget has been rising, such as the Department of Defense," Obey said shortly before last week's vote, "but it can do immeasurable harm to the crown jewel of our research agencies in this country, the National Institutes of Health." The White House also opposed the increase. A proposal for an even larger boost has stalled in the Senate. Both programs are set to expire this fall unless Congress reauthorizes them.

–JEFFREY MERVIS

Campaign Bailout for Arecibo?

Senator Hillary Clinton (D–NY) has introduced legislation (S. 2862) to keep federal funds flowing to the Arecibo Observatory in Puerto Rico. Her support for the world's largest single-dish radio telescope, which is slated to lose National Science Foundation support by 2011 (*Science*, 21 September 2007, p. 1663), would benefit both her home state of New York—the observatory is operated by Cornell University—and the economy of Puerto Rico, which holds a presidential primary on 7 June. Clinton, who trails Barack Obama in the race for the Democratic nomination, hailed Arecibo's "remarkable tools" for understanding the universe and "the path-blazing accomplishments of these New Yorkers." Puerto Rico's delegate introduced a similar bill last fall in the House of Representatives. A Cornell spokesperson said the university was "absolutely pleased" by Clinton's move.

–ANDREW LAWLER

Published by AAAS