SETTLEMENT OF THE PACIFIC

Heaven or Hellhole? Islands' Destinies Were Shaped by Geography

When Polynesians spread across the Pacific, some flourished in what became island paradises. Others deforested the islands they colonized and, as on Easter Island, sank into warfare and cannibalism. Archaeologists have long wondered what went wrong. Now a unique, Pacific-wide analysis teases out the environmental factors that stacked the deck against some colonists.

"It's a nice step forward," says archaeologist Patrick Kirch of the University of California (UC), Berkeley. "They are hitting on some key factors." Archaeologists had studied many of those factors—including rainfall, size of landmass, and degree of isolation—for a few islands, says ecologist Peter Vitousek of Stanford University. But none had taken such a broad, quantitative look. "It's an original and valuable approach," he says.

The work, by archaeologist Barry Rolett of the University of Hawaii, Honolulu, and geographer Jared Diamond of UC Los Angeles, began after Diamond asked Rolett why the Marquesas, unlike Easter Island, had kept their forests. Rolett has worked in French Polynesia for 20 years, examining Polynesians' environmental impact, with a focus on the Marquesas, 1200 kilometers east of Tahiti. But Diamond's question inspired him to cast a wider net.

To answer it, the pair examined 69 islands across the Pacific. Rolett combed through the journals of early explorers such as James Cook to estimate how well forested the islands were at the time of European contact. For each island, they also quantified a range of environmental variables that might make forests fragile or resilient. After crunching the numbers, the two discovered what mattered most: Warmer, wetter islands were more likely to have resisted deforestation, as were big islands, islands whose high, rugged terrain made it hard to grow crops, and those dusted regularly with soil-enriching volcanic ash.



Breadbasket. Islanders retained tree cover on the Marquesas by planting coconut and breadfruit; rugged mountains preserved native forest.

CREDIT: BARRY ROLETT

The model, described this week in *Nature*, suggests that the troubles of Easter Island's colonists weren't entirely their fault. "They were in one of the most challenging situations, on one of the most environmentally fragile islands," Rolett says. (The only islands more fragile were deforested and abandoned before European contact.) Easter Island's isolation was also a factor, the researchers concluded, by making it less likely that domesticated plants could have survived the voyage. None of the most important food trees, such as breadfruit, made it to Easter Island, for example, forcing the colonists to rely on less sustainable slash-and-burn agriculture to grow bananas, sweet potatoes, and sugar cane. In addition, fires used to clear land could easily spread from fields to forests on a small, dry island like Easter.

In contrast, the equally small and dry Marquesas had retained their forests better than the model predicted because the Polynesians there cultivated breadfruit trees, Rolett says. (An island saying goes: "Plant a breadfruit tree when a child is born and no one will ever starve.") With forests providing the main source of food, Marquesas islanders had no need to turn to slash-and-burn agriculture to sustain a growing population. Even today, the Marquesas retain more than half of their pre-contact forest cover.

–ERIK STOKSTAD

RUSSIAN SCIENCE

Academicians React Angrily to Draft Reform Plan

Moscow—After obtaining a leaked document last week, members of the Russian Academy of Sciences (RAS) erupted in an angry discussion about what many viewed as a government plan to slash the research establishment. At a meeting of the RAS presidium here on 14 September, president Yuri Osipov chaired a session on plans—in the works for more than a decade—to trim Russia's network of science institutions. Some argued that the new proposal would eliminate all but 200 of Russia's scientific institutions, including most of RAS's 454 affiliates.

Osipov at first suggested that the group avoid discussing the unofficial document. But RAS vice president Nikolay Plate criticized the reform effort, saying it was designed to take the academy's property. However, a spokesperson said RAS has no plan to send comments on the document to the ministry of science and education.

Andrey Svinarenko, Russia's deputy minister of science and education, confirmed that the paper reflected a presentation he made to the ministry's council. But he argued that it was a reasonable plan, noting that the number of research organizations in Russia has doubled since the 1990s to at least 5000. Svinarenko said that many of these are small, with three to 15 staff members, making them ineffective and costly to maintain.

The draft plan would set a new standard: To receive government research funds, an organization would have to devote at least 35% of its output or services to research or technology development. Any that fail would have to find private money and integrate with universities, be sold, or close down.

Former science minister Vladimir Fortov, now chief of an RAS division, says the reform agenda reflects "an old idea" held by some officials that "there is too much science in Russia." He claims that some "want to eliminate most of our scientific institutions," with a goal of spending money on innovation centers. "The goal is good," Fortov says, but should not be pursued at the expense of basic science. "Innovations must be funded by those who are interested in them, not the government." The best reform would be to support those who continue to do basic research, despite poor funding, low salaries, and lack of equipment.

Svinarenko insists that reform would not damage RAS. But he argues that the government needs to create a nucleus of modern and well-equipped organizations—and that it must concentrate its resources.

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