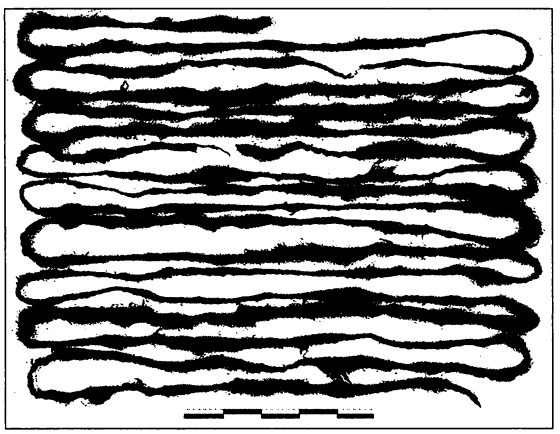
known to have spun fibers for cloth. Moreover, the specimens closely resembled yarns Sutherland had seen while helping to excavate a well-known Norse site, Gården Under Sandet (GUS), in Greenland.

Intrigued, Sutherland sent samples to Penelope Walton Rogers of Textile Research in Archaeology, an independent consulting firm in York, U.K.; Walton Rogers has analyzed many of the Greenlandic Norse textiles, including those from GUS, some of which were made of arctic hare fur and goat hair. She concluded that both Nunguvik samples had also been spun from arctic hare fur, and one had probable goat hairs attached, closely resembling GUS's 13th and 14th century textiles.



Yarn tells the tale. The Dorset didn't spin fiber, but yarn like that used by the Norse turned up in a Dorset site.

As Sutherland continued to pore through the Nunguvik collection, she found other Norse items. Several pieces of wood revealed European carpentry techniques, such as iron-stained holes apparently made by square nails and special kinds of fitted joints called mortise-tenon and scarfing. She also found small, Dorset-style carvings of European-looking faces.

Three other Dorset sites on Baffin Island yielded even more Norse traces. All three sites had produced specimens that the original excavators had described as musk-oxen cordage, but Walton Rogers pronounced two samples to be yarn made from arctic hare fur. One piece was infused with oil and pigment, suggesting a form of oilcloth. All three sites also yielded unusually worked wood similar to that from Nunguvik. One piece with a cut Norse-style design has been identified by conservator Greg Young of the Canadian Conservation Institute in Ottawa as fir, a southern tree rarely if ever found in arctic driftwood.

The number of Norse objects suggests that the Norse were frequent visitors to Canada's far north, argues Sutherland. "The contact was possibly sufficient to have influenced local technology. Some of the stuff might clearly be identified as Norse. Some might be the Norse stuff modified by the Dorset, and some might be a combination of the two technologies," she says.

Other researchers, although they agree there was some kind of contact, aren't yet sure how extensive it was. "Is this just the tip of the iceberg?" wonders William Fitzhugh, an archaeologist at the Smithsonian's Arctic Studies Center and the curator of the Viking show. "Or are we finding just a few things from a few chance encounters?"

Conclusively dating the artifacts, moreover, is proving difficult. At the moment, Sutherland believes the evidence points to the late 13th and early 14th centuries, as indicated by radiocarbon dates she obtained on one of the nail-pierced wood pieces from Nunguvik. But other radiocarbon dates, including on the Nunguvik yarn, are as early as the 7th and 8th centuries, and those dates fit the original excavators' estimates of the age of the Dorset sites.

But such early dates—more than a century before the great sea voyages were thought to have begun—would rewrite Viking history. Thus most archaeologists favor the medieval dates. "My qualified guess is that the yarn tells us about early Norse contacts with the people of the Late Dorset culture, between A.D. 1000 and 1300," says Hans Christian Gullov, an archaeologist at the Danish National Museum. Fitzhugh agrees, noting that bad times in the 13th century may have led the Norse to try their hand at trading walrus ivory, which was much coveted in Europe. That might spur a journey to the high Arctic and contact with the walrus-hunting Dorset.

All the same, Sutherland is not ready to rule out the early dates entirely. Crossing the Atlantic may not have been beyond the capabilities of Europeans at that time. "So we shouldn't be unwilling to consider something earlier." –HEATHER PRINGLE

Heather Pringle is the author of *In Search of Ancient North America.*

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ECOLOGY

Does Biodiversity Help Fend Off Invaders?

As nonnative species such as cheatgrass in the western United States and rosy wolf snails in Hawaii have swept over native ecosystems, ecologists have wondered why some ecosystems are more vulnerable to invasions than others. Theory suggests that an ecosystem rich in biological diversity should be better able to resist invasions, but contradictory studies have led to a heated debate

ScienceScope

English Seoul Mates Seoul National University (SNU), South Korea's finest, is hoping to lure talented students from beyond the Korean Peninsula with a new policy that encourages professors to teach as many classes as possible in English. Officials hope to triple the percentage of foreign undergrads, to 6%, over 3 years, and hike the share of foreign graduate students to 30%. Exchange students won't consider attending SNU until at least 20% of its classes are conducted in English, says one administrator. The recent repeal of a law against hiring foreigners has opened the door for English-speaking faculty at SNU and other state institutions.

Students are "excited and worried" about the change, says Kim Ha Seok, a professor of electrochemistry who has already started lecturing in English. Whereas Kim finds the shift to English has meant more time spent preparing lessons and greater use of visual tools, other scientists say they are able to cover more material and avoid awkward translations of technical terms. Says microbiologist Yim Jeong Bin: "It's a step in the right direction."

Prion Hunting Many Britons are breathing easier now that a preliminary study has cast doubt on predictions of a deadly epidemic. In early April, *The Sunday Times* of London reported findings showing that variant Creutzfeldt-Jakob disease (vCJD), a brain-wasting disorder that is the human form of mad cow disease, might spread to hundreds of thousands of people. But the British Department of Health said last week that the first spurt of data from a survey of 18,000 tonsils and appendices showed no sign of vCJD's hallmark: an abnormally folded protein known as a prion.

The early finding—from 3000 tissue samples warehoused since the late 1980s—is "welcome news," said Liam Donaldson, the government's chief medical officer. But the "results should not be taken as an indication of an 'all clear,' " he warns. There are still 15,000 samples to go, he noted, and researchers couldn't use the most sensitive techniques on archived tissue, leaving a chance of undetected prions.

Future studies, however, should help shed light on the prevalence of vCJD, which is already blamed for 55 deaths in the U.K. Results from a study of 2000 freshly removed tonsils, along with final numbers from the bigger study, could be ready by the end of the year.

over whether biodiversity matters at all. A study on page 852 may help bring the two camps together by showing that both arguments can hold true—depending upon whether one looks at microcosms or across an entire ecological community. "It's a nice paper," says David Tilman, an ecologist at the University of Minnesota, Twin Cities. "It resolves what's been a brewing controversy the last few years."

As far back as Darwin, biologists have suggested that exotic species should have a harder time taking root in a diverse ecosystem, because a whole web of species should more efficiently tie up such critical resources as nutrients, light, and water than would a single species, leaving fewer resources for the invaders. That notion has been supported by theoretical models as well as experiments with plots of grasses and a marine microcosm, among others (*Science*, 19 November 1999, p. 1577).

Flip-flop. Natural tussocks *(inset)* richer in species were more invaded, but the reverse pattern held in manipulated tussocks.

But in large-scale settings such as parks, many land managers and scientists have found that the reverse holds true: Invaders tend to be more successful in diverse ecosystems. Diversity might matter within small experimental plots, biologists have suggested, but in nature other factors that operate across a broad scale—such as good soil and lots of water and sun—seem to swamp the effects of biodiversity and enable both native and exotic plants to flourish.

To explore these two ideas, Jonathan Levine, an ecology graduate student at the University of California, Berkeley, studied a stretch of the South Fork Eel River in northern California that's dotted with tussocks of a sedge called *Carex nudata*. Anchored on rocks where they trap soils, these tussocks are miniecosystems containing other grasses, forbs, and mosses. These tiny islands, about two-thirds the size of a sheet of letter paper, are being invaded by three European plants: Canada thistle, common plantain, and creeping bent grass.

Levine started with a broad look across the ecological community, counting how many exotic plants had invaded the tussocks along a 7-kilometer stretch of river. The more diverse a tussock was, the more invaders it had, he found, as practical experience had suggested. Although that implied a limited role for diversity at the community level, Levine still suspected that diversity could be a major factor at the local scale. To decouple biodiversity from other factors, he manipulated the number of species on individual tussocks. He weeded 65 tussocks along a few dozen meters of river of everything except the sedge, then transplanted onto them anywhere from one to nine native species, creating tussocks with similar plant cover but differing levels of diversity. The next spring, he added seeds of the three invading plants to each tussock. This time, the opposite was true: The more native species there were, the fewer weeds took hold. In short, diversity does matter in fending off invasives, says Levine, but its effects are wiped out by other factors at larger scales.

Levine wanted to know what those factors might be. One clue was that in the natural ecosystem, the tussocks that had the greatest natural diversity and the highest number of invasive species tended to lie farther downstream. Levine wondered if, compared to upriver plants, downstream tussocks were simply deluged with more seeds of both native and exotic plants washing downriver. To find out, Levine added vast quantities of seeds—enough to wipe out any differences in seeds coming from upstream—from the three invaders to 190 tussocks that varied naturally in diversity along 7 kilometers of river. This time, the invaders were equally successful in colonizing diverse and less diverse communities. The upshot, says Levine, is that in this particular large-scale system, the most important factor influencing invasion abundance was the number of seeds—as opposed to either diversity or resource conditions. Levine says his findings support growing suspicions that the most effective way to stem invasions is not just to try to maintain diversity but to stop nonnative seeds or organisms from getting into an ecosystem in first place. "A lot of people are coming down to propagule pressure," or seed number, as the critical factor across large ecosystems, he says.

Not everyone buys that conclusion, however. Philip Grime of the University of Sheffield in the United Kingdom, for example, believes that if one looks across all studies on invading species, resource supply is just as important as seed number in giving invasives a leg up, and biodiversity doesn't play a role at any scale. So the argument over the role of diversity seems likely to continue.

—JOCELYN KAISER

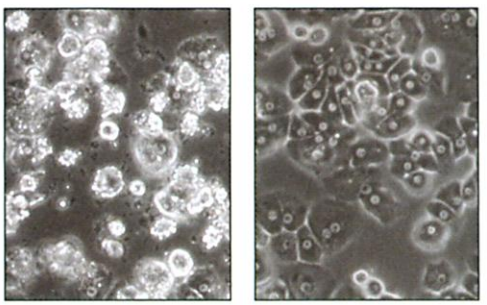
CANCER RESEARCH

Caution Raised About Possible New Drug

For the past 4 years, the protein known as TRAIL has dazzled cancer researchers with its discriminating ability. The molecule appears to kill off many types of cancer cells while leaving normal cells unscathed. And it does the job without any measurable toxicity in animals. Not surprisingly, drug developers have been eager to move the protein into human trials. But now TRAIL's march to the clinic may have hit a roadblock.

In work reported in this month's issue of *Nature Medicine*, a team led by cell biologist Stephen Strom at the University of Pittsburgh in Pennsylvania found that, previous studies notwithstanding, TRAIL kills normal human liver cells, both in culture and in tissue slices from normal individuals and patients with hepatitis or other liver diseases. "The data are clear and convincing," says molecular biologist Shigekazu Nagata of Osaka University Medical School in Japan, who wrote an accompanying commentary on the study. "TRAIL can kill human [liver cells], but it does not kill monkey or mouse liver cells."

If the results hold up, they could dash plans by the biotech firms Genentech in South San Francisco and Immunex in Seattle to jointly develop the potential anticancer drug, dubbed TRAIL/Apo2L. The study also points up a possible pitfall in the standard drug-discovery strategy. Researchers test po-



CREDITS: (TOP PHOTOS) JAY LEVINE; (BOTTOM) M. JO *ET AL.*, *NATURE MEDICINE* 45, 564 (2000)

Warning sign. Human liver cells at left die from apoptosis after TRAIL treatment. Untreated cells are at right.