



in Atlanta last April, the reason more women don't go into engineering is obvious: "Because they don't want to." But women evidently do want to go into psychology: 60 percent of psychologists are women, according to National Science Foundation figures for 1995. "On average," says Linda Gottfredson, a sociologist at the University of Delaware, Newark, citing studies of vocational preferences, "women are more interested in dealing with people and men with things."

That's essentially what Vanderbilt University researchers David Lubinski and Camilla Benbow have found in their three-decade study of "mathematically precocious" youths. The boys early on inclined toward the "theoretical," while the girls were more people oriented—and these preferences have

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The Costs of Fish Farming

"Effect of Aquaculture on World Fish Supplies" by Rosamond L. Naylor *et al.*, in *Nature* (June 29, 2000), Porters South, 4 Crinan St., London N1 9XW, UK.

Fish farming (a.k.a. aquaculture) looks at first glance like a sure-fire way to take some pressure off the world's overfished oceans.

Not necessarily, warn Naylor, a senior research scholar at Stanford University's Center for Environmental Science and

Policy, and her nine co-authors. The problem, they explain, is that some aquaculture *increases* the pressure on ocean fisheries.

Aquaculture has grown rapidly in recent years, producing 29 million metric tons of farmed fish and shellfish in 1997, more than twice the tonnage of a decade earlier (but still no more than a third or so of the 85 to 95 million metric tons of wild fish caught each year.) Roughly 90 percent of the world's fish farming is done in Asia, particularly China. Family and cooperative farms raise carp for local or regional consumption, while commercial farms produce salmon, shrimp, and other highly valued fish for tables in Europe, North America, and Japan.

But aquaculture's *net* contribution to the world's fish supplies has been much smaller than its gross one, the authors point out. In 1997, about 10 million metric tons of small wild fish—Atlantic herring, chub mackerel, Japanese anchovy, and other species—were taken from the oceans and used in compounds fed to the farmed fish. Modern compound feeds are not much used in the farming of carp (which are plant eaters), but they are needed in intensive commercial aquaculture. Commercially farmed fish are so crowded together that they cannot subsist on natural food sources alone. With the 10

types of fish most commonly farmed, nearly two kilograms of wild fish are required, on average, for every kilogram of fish ultimately harvested.

Taking ever-increasing amounts of small fish from the ocean to expand the supply of salmon and other commercially valuable fish, say Naylor and her co-authors, "would clearly be disastrous for marine ecosystems." Using small fish for fish food also reduces the supplies available for human consumption. Though humans find some small fish, such as menhaden, distasteful, they eat other varieties, such as sardine, anchovy, and mackerel. In Southeast Asia, these fish serve as important sources of protein.

Aquaculture also can adversely affect wild fisheries indirectly, Naylor and her colleagues say. Hundreds of thousands of acres of mangroves and coastal wetlands in Asia have been transformed into fish and shrimp ponds, resulting in the loss of "essential ecosystem services," including nursery habitats for fish, coastal protection, and flood control.

If aquaculture is to remain a net plus for global fish supplies, conclude the authors, governments must prevent it from degrading coastal areas, and fish farmers must curtail their use of wild fish as feed.

ARTS & LETTERS

Toasting a Black Russian

"Soul Man" by Anne Lounsbery, in *Transition* (2000: No. 84),
69 Dunster St., Cambridge, Mass. 02138. (www.TransitionMagazine.com)

It's a curious fact, often ignored in the past by white Americans, that Alexander Pushkin (1799–1837), the celebrated father of Russian literature, was descended from a black African slave. Pushkin himself was proud of his African heritage—and African Americans have long been proud of *him*, writes Lounsbery, a lecturer in Russian literature at Harvard University.

Pushkin's great-grandfather, Avram Petrovich Gannibal, "was probably born in what is now Cameroon, just south of Lake Chad," she says. "By his own account, he was the son of a local prince. Abducted as a child from his native city and taken to Constantinople around 1705, Gannibal was acquired as a slave

by a Russian diplomat." At the court of Peter the Great, his intelligence so impressed the tsar that he made him his godson and sent him to France to be educated. Under Peter's daughter, the Empress Elizabeth, Gannibal became an engineer and a general in the Russian army. His son also became a general, and his granddaughter, "known in high society as 'the beautiful Creole,'" Lounsbery says, became Pushkin's mother.

In *Eugene Onegin* (1831), Pushkin reflected on his heritage, representing himself as an African in exile longing to live again "under the skies of my Africa," only then to sigh for "gloomy Russia, where I suffered, where I