average scores of men and women in tests of mental abilities, in most areas of intellectual activity. The big exception was that the average man did far better than the average woman on vocational aptitude tests for mechanical reasoning, electronics information, and auto and shop information. Otherwise, the differences were generally slight: women did a little better than men on tests of reading comprehension, perceptual speed, and associative memory, while men did somewhat better on tests of mathematics and social studies. One of the surveys indicated that the male edge in science and mathematics has narrowed over the years.

What may be more important than average scores, however, is the fact, illustrated by the various national surveys, that the test scores of males are much more *variable* than those of females. In mathematics, science, and social studies, as many as 3.4 times as many males as females scored in the top 10 percent. Females were somewhat overrepresented in the bottom 10 percent.

The result: even though average scores are not so far apart, only one-half to one-seventh as many women excel in science and mathematics as men. That makes the goal of numerical equity between the sexes in those fields seem daunting indeed.

Family Matters

"Kin Recognition" by David W. Pfennig and Paul W. Sherman, in *Scientific American* (June 1995), 415 Madison Ave., New York, N.Y. 10017–1111.

As shown by the use of surnames (not to mention family reunions), humans attach a lot of importance to knowing who their relatives are. So, it seems, do wasps, wildflowers, and many other members of the plant and animal kingdoms. Pfennig, a biologist at the University of Illinois, and Sherman, a professor of animal behavior at Cornell University, explain how—and perhaps why—the process works.

Some organisms, such as primates and frogs, recognize their kin by their distinctive physical characteristics, sensing these directly by sight, sound, or smell. Other organisms pick up indirect clues from place or time as to who their relatives are. Bank swallows, which nest in colonies on sandbanks, use both methods to identify their young. For about three weeks after hatching, parent bank swallows will feed any nestlings they find in their burrow. After the chicks learn to fly, however, broods mix extensively, and the parents are forced to turn to direct means of identification, picking out their own young by the distinct vocal signatures that chicks develop by the time they are 20 days old.

Such recognition "labels" can reflect genetic traits, as in the case of certain sea squirts. These brainless marine animals, the authors write, "begin life as planktonic larvae that eventually settle on a rock and multiply asexually to form an interconnected colony of structurally and genetically identical animals." Sometimes, two genetically similar colonies merge. If a colony tries to join another unrelated one, however, the latter emits poisonous substances to repel the invader.

Other organisms use ID "labels" acquired from their environment. Certain types of the common garden insects known as paper wasps, for example, build open comb nests composed of wafer-thin plant fibers. Each wasp early on "assimilates from its nest an odor specific to the insects that live there," Pfennig and Sherman say, and this smell, derived from the plant fibers, is locked into the insect's skin before it hardens. Colonies of paper wasps typically consist of a queen and her daughter workers. When wasp visitors show up, their smell labels make it possible to distinguish between homeless relatives whose nests have been destroyed and alien wasps bent upon stealing eggs to feed the larvae in their own colonies. The kin are welcomed, the others repulsed.

Why is favoritism shown to relatives other than offspring? There may be more than one evolutionary reason, but Pfennig and Sherman say that according to the now-standard "inclusive fitness" theory developed by William D. Hamilton of the University of Oxford in 1964, natural selection favors organ-

isms that help their relatives, "because by doing so they increase their total genetic representation." Nepotism, it would seem, may be an almost universal fact of life.

Beyond Recycling

"Time to Dump Recycling?" by Chris Henrickson, Lester Lave, and Francis McMichael, in *Issues in Science and Technology* (Spring 1995), University of Texas at Dallas, P.O. Box 830688, Mail Station AD13, Richardson, Texas 75083–0688.

Recycling, that seemingly unimpeachable symbol of environmental virtue, has become standard practice in much of the nation. Unfortunately, contend professors Henrickson (civil engineering), Lave (economics), and McMichael (environmental engineering), all of Carnegie-Mellon University, recycling today is both extremely uneconomical and a detriment to the environment.

As an economic venture, recycling has several serious problems, the authors note. One is that the overall demand for recycled glass, plastic, metal, and newsprint fluctuates widely. According to a recent study, the price (in constant 1992 dollars) of a typical set of recyclable materials dropped from $107 per ton in 1988 to $44 per ton four years later. A bigger—and often overlooked—problem is the cost of collecting the recyclable materials. In Pittsburgh, for example, it cost $94 per ton in 1991 to collect regular garbage, but it cost $470 per ton to collect recyclables. The recyclables, being less dense, take up more space in collection trucks, and the trucks also pick up much smaller amounts at each house. That translates into more truck travel to collect the same tonnage. In Pennsylvania and elsewhere, many urban officials have begun to realize that and to scale down their recycling programs.

Recycling is also environmentally costly. Every mile of truck travel in the pursuit of cast-off newspapers and aluminum cans adds carcinogenic diesel particles, carbon monoxide, organic compounds, oxides of nitrogen, and rubber particles to the environment. The construction and upkeep of trucks and recycling facilities also use energy and other limited resources. Overall, the authors suspect, recycling consumes more resources than it saves.

The basic problem, the three analysts argue, is that Americans each generate 1,600 pounds of solid waste annually. They are consuming "too much of our natural resources" and degrading the environment. The key to solving that problem, the authors believe, is not mandated recycling but making prices for raw materials and products reflect "their full social cost, including resource depletion and environmental damage."

ARTS & LETTERS

Sexuality and The Sculptor

"Auguste Rodin" by Millicent Bell, in *Raritan* (Spring 1995), Rutgers Univ., 31 Mine St., New Brunswick, N.J. 08903.

Auguste Rodin (1840–1917) was already in his forties when he began to taste success with masterpieces such as *The Thinker* (1880) and *The Kiss* (1886). Much of his subsequent work was given over to bold and searching depictions of his female models. His contemporaries seldom failed to link this turn in his art to the sculptor's notorious womanizing. Bell, an emeritus professor of English at Boston University, sees more profound forces at work. Sexuality played a role in *all* of Rodin's work, early and late, she says, and it emerged as a theme "not only from his personal life but from his deep sense of a whole culture's becoming what we call *modern*."

When as a 20-year-old, Rodin failed to