sidering manufacturing or importing their own generic versions of anti-HIV drugs. A report released at the meeting by Médecins Sans Frontières suggests that generics could cut annual costs of a cocktail of anti-HIV drugs to as little as $200 per person. The experience of Brazil—which, along with India, is already manufacturing anti-HIV generics—shows both the promise and the difficulties of this approach.

Help needed. Hospital workers demand access to HIV drug treatments for poor patients.

Paulo Roberto Teixeira, a dermatologist based in Brasília who heads the country's National AIDS Program, said the Brazilian government manufactures eight anti-HIV drugs that were patented before 1996, the year the country began observing international patent law. (All developing countries have until 2006 to comply with these laws.) Teixeira said Brazil spends $4500 per patient on state-of-the-art treatment that would cost perhaps three times as much on the commercial market. But 81% of that cost pays for anti-HIV drugs that Brazil does not manufacture because of patent problems. And although Brazil offers free treatment to all of its 530,000 HIV-infected citizens, only 90,000 take these drug cocktails. The government, Teixeira said, could not produce enough drugs to supply everyone in the country, let alone export them.

Even when cheap drugs exist, many countries lack the infrastructure to deliver them reliably. Joy Phumaphi, Botswana's minister of health, explained that the new Merck-Gates program there will help build infrastructure as well as supply free drugs, and that providing one without the other makes little sense. Others worry that people in poorer countries will have a difficult time adhering to the complicated treatment regimens, which can require taking dozens of pills each day on a tight schedule. They fear that drug-resistant viruses will proliferate. David Serwadda of Makerere University in Kampala, Uganda, noted, for example, that HIV treatment "can't be any easier than tuberculosis, and we have 35% failure with TB." Even if "antiretrovirals were $1 a day, it wouldn't make much difference," he said, adding that right now, he would rather have cheaper drugs to treat the opportunistic infections of AIDS. This could dramatically prolong life.

After a rocky start, when South African President Thabo Mbeki enraged many attendees by implying that poverty, rather than HIV, caused the AIDS epidemic (*Science*, 14 July, p. 222), the meeting moved to common ground. Many felt it was the least divisive in the 15-year history of these mammoth gatherings. Former South African President Nelson Mandela helped unify the audience when he closed the proceedings with an impassioned speech that brought down the house. Mandela, after entering the conference hall to thunderous applause, with thousands of South Africans singing his name, whistling, and chanting, praised both Mbeki and his country's scientists. He stressed that the poor, "if anybody cared to ask their opinions, wish that the dispute about the primacy of politics or science be put on the back burner and that we proceed to address the needs and concerns of those suffering and dying." He urged South Africa to adopt measures to thwart transmission of the virus from mother to child, and he promoted the use of condoms, aggressive treatment of sexually transmitted diseases, and investments in voluntary HIV counseling and testing services. Mandela concluded: "We want to move away from rhetoric to practical action."

Moving from rhetoric to practical action is the challenge that now faces the thousands of AIDS researchers and activists as they return from Durban to labs and offices. The next international meeting 2 years from now in Barcelona, Spain, will assess just how much progress the world has made in confronting a disease that today threatens to kill nearly 1% of the global population. In the meantime, Justice Cameron's harsh verdict on today's efforts will be ringing in their ears.

—JON COHEN

ECOLOGY

Food Fight Drives Evolution

Even in the rainforest, couples squabble over dinner. When it's time to dine on St. Lucia, an island in the West Indies, male purple-throated carib hummingbirds horde the nectar from the short, sweet flowers of a plant called *Heliconia caribaea*. Female caribs are stuck with the less productive blossoms of *H. bihai*. But new research shows that both sexes make the most of this jungle buffet—thanks to evolution.

On page 441 of this issue, evolutionary biologist Ethan Temeles and students at Amherst College in Massachusetts showcase these hummingbirds as a rare example of food supply—in this case, flower shape—spurring the evolution of a sexual dimorphism, or a feature that differs between males and females. On St. Lucia, female caribs sport bills a third longer and twice as curved as their male counterparts—one of the most extreme bill differences between the sexes in any hummingbird species. In the paper, Temeles links these "whoppingly dimorphic bills" to the specific flowers the male and female caribs frequent. "This is the best example we've got of male and female animals evolving to use different food," Temeles says.

Other researchers call the study impressive. "This is delightfully strong evidence that ecology sometimes drives differences between males and females," remarks evolu-

Symmetry. This female hummingbird's bill is shaped to fit its favorite flower.

tionary biologist Richard Shine of the University of Sydney in Australia. Larry Wolf, a behavioral ecologist at Syracuse University in New York, adds that researchers have long thought that carib bills might closely match their favorite flower's shape. "Now someone has actually gone out and shown it," Wolf says. "That's pretty neat."

Across the wild kingdom, of course, animals compete for food. And Charles Darwin long ago suggested that food competition could cause, or maintain, different male and female hummingbird bills. But the scientific evidence has remained scanty. Most evolutionary studies explain male-female differences by sexual selection. Male peacocks, for instance, grow flashier plumes than females in order to attract mates. By comparison, few studies have shown that the sexes might, when faced with a new environment, evolve differently in order to divvy up food. One unappreciated example may be mosquitoes: In some species, male mouthparts pucker perfectly to slurp nectar, whereas female mouthparts are specialized for sucking blood. Some water snakes, too, have varying head sizes for swallowing lunch.

The purple-throated carib makes a prettier case study, with its small, black body tucked inside iridescent emerald wings. "Sitting in the rainforest," says Temeles, "you see this gorgeous glittering green just shooting through the canopy." And he's had plenty of time to see it. Last summer, Temeles and three students hiked through four rainforest reserves on St. Lucia. To see whether male and female caribs dined differently, they spent 4 weeks watching the birds at distinct patches of *Heliconia* plants. A pattern soon emerged: 15 of 15 males fed on patches of *H. caribaea*, whereas 11 of 18 females chose *H. bihai* instead. The birds are the sole pollinators of these plants.

To learn how closely the carib bills and their favored flowers fit, the team measured both. The male birds sport short bills that curve down at a slight 15° angle. Their preferred flower, *H. caribaea*, averages just 38 mm long and curves out at about 21°. By contrast, the bills of female caribs are 30% longer than male bills and curve down twice as much, at a 30° angle. Accordingly, their favored flower, *H. bihai*, averages 44 mm long, with a 31° curve. What's more, Temeles says, both male and female caribs feed more quickly—and presumably efficiently—at the flower that best matches their bill. Bolstering the case, notes Temeles, in some rainforest areas, another plant has essentially replaced *H. caribaea*, again attracting male birds with its similarly shaped flowers.

How, exactly, did the hummingbirds evolve such pointed differences? Temeles speculates that thousands of years ago, when hummingbirds first arrived on St. Lucia, the larger, dominant males probably favored *H. caribaea*, a plant that bears more flowers. That left females with the less effusive *H. bihai*. Over time, Temeles says, the bills of both male and female caribs have adapted to fit their flower of choice, enabling the birds to make the most of their food source. "Food is really running the show," he suggests, although he cautions that biologists can never really know what, exactly, kick-started a chain of evolutionary events so long ago.

There's more to learn from these birds and blossoms, Temeles says. Does this hummingbird-*Heliconia* relationship hold up season after season? What about on other islands? And how have the flowers also evolved, welcoming caribs with just the right curves? Hunting for answers, he intends to return to the West Indies next summer.

–KATHRYN BROWN

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TOXICOLOGY

Mercury Report Backs Strict Rules

The debate, finally, seemed to be settled. After an 18-month review, a panel of the National Academy of Sciences (NAS) last week weighed in on the health risks of mercury, endorsing strict safety levels adopted by the Environmental Protection Agency (EPA) in 1995. But already some scientists are contesting the panel's conclusions, and federal agencies are grappling with how to reconcile competing regulations.

Released largely from coal-burning power plants, mercury is converted by bacteria to a form called methylmercury that accumulates in the aquatic food chain. Humans are exposed when they eat fish. Although the neurotoxic effects of methylmercury are well

CREDIT: KEN HAMMOND/USDA

Fishy findings? Experts can't agree on the risk of eating fish containing mercury.

ScienceScope

Defining Distress The U.S. Department of Agriculture (USDA) is asking for help in developing a better system to document the pain and distress experienced by lab animals. In a 10 July *Federal Register* notice, USDA's Animal and Plant Health Inspection Service (APHIS) notes that many critics consider the current system "outdated and inadequate." Among the flaws: no definition of "distress" and no scale to measure the intensity or duration of pain. APHIS is asking concerned outsiders to study pain classification systems used elsewhere and suggest how to modify existing rules. "Change is coming," a USDA official predicts. Comments, however painful or distressing, are due by 8 September.

Boom Times U.K. scientists can look forward to 3 years of prosperity. A government-wide spending plan announced on 18 July gives the Office of Science and Technology a budget boost averaging 7% per year for the years 2001–04. In addition to increases for grad student stipends and stemming lab decay (*Science*, 14 July, p. 226), the plan calls for spending more than $100 million to commercialize university research. The various research councils are now vying for their shares of the spending, which will be decided in the next few months.

Environmental Royalty A proposal to create a science czar at the U.S. Environmental Protection Agency (EPA) is winning support from Congress and even the agency itself. Last month, a National Academy of Sciences panel recommended creating the position to bolster EPA's use of science (*Science*, 16 June, p. 1943). Now, Congress and the Administration seem to be listening.

At a House subcommittee hearing last week, Representative Vernon Ehlers (R–MI) announced that he's drafting legislation to create the deputy-level science position and institute other recommendations, such as one to set a 6-year term for the head of EPA's Office of Research and Development. Says Ehlers: "Scientists need more clout." In the Senate, George Voinovich (R–OH) has told EPA chief Carol Browner that he foresees similar legislation. And EPA deputy administrator Michael McCabe wrote Congress that the agency likes the report, too. "Perhaps most significantly, we agree" with creating the deputy science position, he wrote. But don't look for anything to happen quickly because of a packed congressional calendar and the need to navigate any bill through several committees.