come to life?" says Christine Nalepa, an entomologist at North Carolina State University in Raleigh.

Zompro turned to two systematicists and anatomists at the Zoological Museum of the University of Copenhagen, Denmark, for help. Niels Peder Kristensen and Klaus-Dieter Klass, who is now at the Zoological Museum in Dresden, Germany, evaluated how closely related the three specimens were to each other and to other insects.

Klass found that all three specimens shared some characteristics with stick insects and an obscure group called ice crawlers. Unlike stick insects, for example, females lack a plate on the underside of the abdomen to cover the egg-laying appendages. They also look different because stick insects have elongated thoraxes, with a stretched-out middle segment, but the new specimens don't have this feature. Furthermore, when Klass dissected the female to look for further similarities and differences, he discovered that the stomach was full of insect parts; stick insects are vegetarians, not carnivores, says Kristensen.

Klass, Kristensen, Zompro, and Plön collaborator Joachim Adis therefore argue that the specimens are three new species that together make up a separate new order. They have named it Mantophasmatodea because of a superficial resemblance to the praying mantis and phasmids, the stick insects. "I am glad this group has a name and a place," says George Poinar, a paleoentomologist at Oregon State University in Corvallis. Until now, he says, "anyone who looked at them really couldn't put them anywhere."

With only three members, Mantophasmatodea is the smallest insect order yet known. Of the 32 other insect orders, only one has less than 20 members and another has more than 300,000. So far, entomologists have placed about 750,000 species into these orders, "but we're probably only halfway there" in finding and classifying the rest, says Wilson.

The three members of Mantophasmatodea may soon have company. "I bet you anything that there are more specimens lurking in museums," Grimaldi predicts. Even more exciting, says Kristensen, Zompro and Eugene Marais of the National Museum of Namibia in Windhoek have just discovered two more species in Namibia. Zompro has brought living specimens of one back to his lab to study their behavior. All these finds just go to show, Kristensen adds, "that we are still very far from knowing the diversity of life on Earth."

–ELIZABETH PENNISI

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AMPHIBIAN DECLINE

Ubiquitous Herbicide Emasculates Frogs

The most heavily used herbicide in the United States makes hermaphrodites of male frogs at concentrations commonly found in the environment, a new laboratory study reports. Its authors urge looking more closely at the possible role of atrazine and similar pesticides in amphibian declines, although a causal role has yet to be demonstrated. Atrazine is banned in many European countries, and some scientists expect this study to influence the U.S. Environmental Protection Agency's (EPA's) ongoing assessment of the chemical.

For more than a decade, scientists have watched with alarm as many amphibian populations have declined and some species have suddenly gone extinct. Although loss of habitat is clearly a culprit, many disappearances have occurred in undisturbed areas such as mountain rainforest reserves. Suggested causes for these mysterious declines include fungal pathogens, increased ultraviolet light, climate change, and pesticide residues.

Toxicologists had come to regard atrazine as one of the more benign pesticides around. Approximately 27 million kilograms of the chemical are applied annually to corn and other crops in the United States, and much of it makes its way into surface water, groundwater, and even rainwater. Past studies with amphibians had shown effects only at abnormally high levels. But researchers had not zeroed in on an apparent amphibian Achilles' heel: the hormone system, which can be disrupted by extremely low concentrations of compounds.

Now researchers led by developmental endocrinologist Tyrone Hayes of the University of California, Berkeley, report that in lab studies, male tadpoles develop extra gonads and become hermaphrodites at concentrations 30-fold lower than EPA's safe drinking water standard. The researchers raised

Sex change. In lab studies, male African clawed frogs become hermaphrodites when exposed to atrazine.

ScienceScope

Lethal Legacy The Republic of Georgia is about to ramp up its hunt for Soviet leftovers. In February, the International Atomic Energy Agency helped the Georgians recover two abandoned canisters (below) packed with dangerous strontium-90 (*Science*, 1 February, p. 777). So far, six of the highly radioactive Soviet-era sources, once used to power portable thermogenerators, have been retrieved from the Ingury River valley. But the agency believes as many as four remain unaccounted for. In June, atomic agency experts and member states will assist Georgia on a 2-week mission to scour the valley for the missing devices by vehicle, horseback, and foot. Also in the planning stage is a countrywide search for other "orphan" radioactive sources.

Barrier Breaker Washington, D.C., high school science teacher Douglas Tyson sees it as a unique opportunity for his students to mingle with the scientific elite. For the National Academy of Sciences (NAS), it's a chance to be a good neighbor and open doors to a group of highly motivated minority students.

This week the academy announced a new partnership program linking it with Benjamin Banneker, the district's only public college-prep high school. This summer four graduating seniors will work in the National Research Council's (NRC's) division of earth and life sciences to kick off a paid internship program, and academy staffers have agreed to spend time in the classroom and on science-related activities. The goal, says NAS President Bruce Alberts, is "to help close the gap in the number of minorities in scientific, engineering, and medical careers."

Banneker's success with a rigorous academic curriculum for students from disadvantaged backgrounds makes it the obvious partner, says NRC division head Warren Muir, who worked with Tyson to lay the groundwork. "You want a school where there's somebody on the other end who cares," he says. Tyson, coach of the school's national championship "It's Academic" team, is looking for something that he can't provide: "We can set high standards, but if students are going to succeed in this world they also need to engage in activities involving the majority population."

tadpoles of the African clawed frog, *Xenopus laevis*—the lab rat of amphibians—in water with levels of atrazine varying from 0.01 to 200 parts per billion (ppb). The EPA standard is 3 ppb. At and above 0.1 ppb, 16% to 20% of the animals developed up to six gonads, including both testes and ovaries. In male adult frogs exposed to 25 ppb of atrazine, testosterone levels dropped 10-fold, to levels found in females.

"This study is ground-breaking," says Val Beasley, an ecotoxicologist at the University of Illinois, Urbana-Champaign. It may well "give us an important piece of the puzzle of amphibian declines," adds James Collins of Arizona State University in Tempe.

Atrazine concentrations used in the study are frequently encountered in the wild, affirms U.S. Geological Survey hydrologist William Battaglin. Atrazine is routinely present in streams, rivers, and reservoirs in the central portion of the United States at levels of 1 to 10 ppb in spring; peaks of 100 to 200 ppb have been recorded. Airborne atrazine is brought to earth in rainfall, sometimes at concentrations above 1 ppb. Because the herbicide is most often applied in the spring, its runoff peaks just as frogs are breeding and tadpoles developing—often in ditches and pools near agricultural fields.

Because Hayes and colleagues found no effects on mortality, growth rate, or external appearance, they argue that endocrine abnormalities might easily occur in the wild unnoticed. But critics point out that the current study doesn't reveal whether the abnormalities affect reproductive ability. It's also not clear whether atrazine-induced damage would lead to decreases in amphibian numbers. EPA biologist William Rabert adds that wildlife studies must demonstrate negative effects on populations before the agency will consider regulatory action.

As useful as *Xenopus* is in the lab, conservationists aren't trying to protect it, so Hayes and his group have been studying wild frogs in North America. Their unpublished data suggest that in northern leopard frogs the effects of atrazine are "even more dramatic than what we see in *Xenopus*," Hayes says. Lab work with this species has shown similar gonadal effects, and field collections across the United States reveal that frogs in areas of high atrazine use show more endocrine damage than those in areas devoid of the chemical, he says.

Hayes and colleagues suggest that atrazine disrupts the endocrine system in a different way from compounds known to mimic hormones. They propose that atrazine activates the enzyme aromatase, which converts androgens to estrogen. "The testes have been coopted by atrazine to make the wrong thing," Hayes explains. Reproductive biologist Louis Guillette of the University of Florida, Gainesville, and his students first demonstrated this mechanism in atrazine-exposed alligators, whose testes produced hormones as ovaries do, and it has since been shown or suggested in several other vertebrates.

The new report, published in the 16 April issue of the *Proceedings of the National Academy of Sciences*, appeared the same week that EPA was to release its revised risk assessment for atrazine, a key step in its years-long process of reviewing the chemical's effects on humans, wildlife, and the environment. Although EPA officials refused to comment on the risk assessment before *Science* went to press, they confirmed that Hayes's results were forwarded to them before publication and were considered in the assessment.

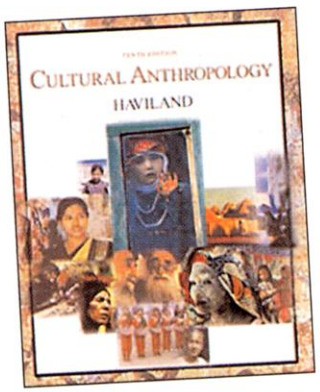
–JAY WITHGOTT

Jay Withgott writes from San Francisco.

SCIENTIFIC MISCONDUCT

Beijing U. Issues First-Ever Rules

BEIJING—China's most prestigious university has adopted the country's first explicit policy to root out research misconduct. The new policy, announced late last month, is distinctive for its sweeping range of offenses—and for having teeth.



Textbook misconduct. A Beijing University anthropologist used material from this popular U.S. text in his own book.

For years the government here has tried to combat what is seen as a rising tide of questionable behavior in the scientific community (*Science*, 18 October 1996, p. 337; 5 March 1999, p. 1427). In keeping with that campaign, the new policy at Beijing University (also called Beida) goes beyond the universally accepted sins of plagiarism, fabrication, and falsification of research data to include much broader misuses of scientific information. Its definition includes "intentionally exaggerating the academic value and economic and social results of a research finding; publishing results without appraisals from school authorities or other academic organizations, … and disclosing research findings that should be kept confidential according to the country's laws and regulations."

The rules, 3 years in the making, flesh out well-meaning but bland statements on ethical conduct that were issued recently by the Chinese Academy of Sciences and the Ministry of Education. "Our regulations are more practical compared with similar regulations published earlier," says Zhou Yueming, who heads the university's department of human resources and who helped draft the document. In addition to the definition, the policy describes procedures for investigating allegations of misconduct and lays out a range of penalties for those found guilty.

Even before the policy was officially adopted, Beida officials had already applied it to a faculty member found to have plagiarized large amounts of material from a leading U.S. textbook on cultural anthropology. A university investigation found that Wang Mingming, a 38-year-old anthropologist, had used the material in his 1998 book *Imaginary Alien Nation*. Late last year, the university removed Wang from his post as director of the folklore study center, as well as from the sociology department's academic board and its anthropology teaching and research section. Wang is not allowed to recruit new doctoral students for 2 years, although he may continue advising those currently under his supervision.

Wang has declined to comment, but last fall he wrote about his situation to William Haviland, a retired University of Vermont anthropologist and author of the popular college text, *Cultural Anthropology*. "He said he'd done a terrible thing and asked for my forgiveness," says Haviland. "In other words, he 'fessed up. I told him that it was wrong and that he shouldn't have done it. But I forgave him."

Ironically, Haviland says that he gave Wang permission to translate the third edition of his textbook, which appeared in Chinese in 1987, and that Wang wrote him last fall asking for permission to translate the 10th edition, which had just appeared. "I was told that my text was the first Western anthropology textbook allowed in China in the post-Mao era," Haviland says. "And although plagiarism is a serious offense, it is also the sincerest form of flattery."

University officials say that media coverage of Wang's case this winter influenced the timing of the announcement. Three other Beida employees have been disciplined in recent years for misconduct involving improper crediting of research material. One teacher was moved out of the classroom, and two others were made ineligible for promotions.

Senior faculty members, some of whom were consulted on the policy, say they are pleased with the new rules. "I am a strong supporter of those regulations," says Chen Dayue, deputy director of the college of mathematics science. "Research ethics have been passed on from teachers to students over generations at our university. But now a

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