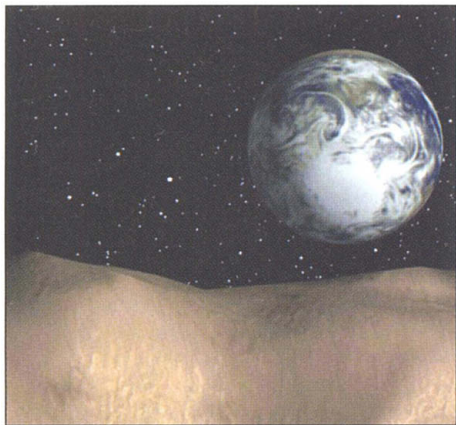


should have a good idea whether there's a sizable asteroid out there with our name on it. Recent estimates of the number of asteroids that can cross Earth's orbit and can therefore hit us—based on measures such as the rate at which such near-Earth asteroids (NEAs) are being discovered—have ranged from 700 to 1200 NEAs 1 kilometer in diameter and larger.



Predictably safe passage. The asteroid Toutatis will pass Earth in 2004.

Those are the ones thought capable of disrupting the environment badly enough to deal civilization a death blow. At the meeting, astronomer Alan Harris of NASA's Jet Propulsion Laboratory in Pasadena, California, reported that the current discovery rate of about nine NEAs per month now supports a range of 1000 to 1200 NEAs that size.

At the behest of Congress, NASA began an NEA search in 1998 with the goal of finding 90% of NEAs 1 kilometer and larger by 2008. So far, 635 of them have been discovered and tracked. Only one looks to have any chance of ever hitting Earth (*Science*, 5 April, p. 27), and that's a slim 1-in-300 chance at most in 2880. "It looks like we're going to be real close to making" the 2008 goal, said Harris, "if not making it."

Many researchers, however, think more needs to be done. Monster 1-kilometer asteroids jolt Earth on average only every few hundred thousand years, but a still-formidable 300-meter body strikes every 60,000 years or so, they point out. As telescopic imaging technology has improved, surveying such 200- or 300-meter "sub-kilometer" objects might soon be practicable. If such an impactor hit within hundreds of kilometers of the U.S. Atlantic coast, it could send a 100-meter tsunami into Boston, New York City, and Charleston, planetary scientist Erik Asphaug of the University of California, Santa Cruz, reminded the meeting attendees.

NASA has just begun looking at how seriously subkilometer asteroids threaten us and what could be done to find the dangerous ones, NASA Solar System Exploration Division Director Colleen Hartman told those at-

tending the meeting. A subkilometer survey would cost considerably more than the \$4 million per year NASA is spending on the current 10-year search. In the past 2 years, the National Research Council has twice recommended that NASA and the National Science Foundation (NSF) jointly fund a survey facility such as the ground-based Large-Aperture Synoptic Survey Telescope (LSST) currently under study by NSF (*Science*, 19 July, p. 317). With something like a \$95 million start-up cost, LSST could find 90% of 300-meter NEAs in 10 years if it did no other scientific work, Harris says.

But even if found, dangerous NEAs present an as-yet-insurmountable problem. Any number of ways of nudging an asteroid off its collision course have been offered, among them blowing it out of the way with a nuclear explosion, attaching a rocket engine of some sort, creating a jet of vaporizing rock by focusing sunlight with a giant solar mirror, and scooping rock off the asteroid and hurling it away. But every method depends to varying degrees on the nature of the particular asteroid. NEAs range from solid chunks of rock or iron-nickel at the small end (less than a few hundred meters) to "rubble piles" of shattered rock covered by a loose layer of pulverized rock. Physicist Keith Holsapple of the University of Washington, Seattle, warned listeners that "whacking" a porous, debris-covered rubble pile out of the way with a nuclear blast would be "like trying to punch a very large marshmallow"—bad news if many near-Earth asteroids fit that description.

To understand NEAs well enough to deflect them effectively, space agencies would need to send interplanetary missions for radar and seismic probing, said astronomer Michael Belton of Belton Space Exploration Initiatives LLC in Tucson, Arizona. Belton estimates that such studies would probably take \$1.5 billion and 25 years, not to mention another \$3 billion or so to fashion practical deflection methods for every sort of beast in the asteroid zoo. But given the odds for the next impact, noted planetary scientist Daniel Durda of the Southwest Research Institute in Boulder, Colorado, "Captain Kirk is probably going to be out there before we have to do mitigation" of the asteroid hazard.

—RICHARD A. KERR

BIODIVERSITY

Bid to Save Kamchatka's Wildlife

PETROPAVLOVSK-KAMCHATSKIY, RUSSIA—For decades, the Soviet military cloaked the far-eastern region of Kamchatka from the outside world because of the 1500-kilometer-long peninsula's proximity to Alaska and Japan. That isolation and its unique climate preserved Kamchatka as a haven for thou-

ScienceScope

Insel to Head NIMH A psychiatrist and neurobiologist who began his career at the National Institute of Mental Health (NIMH) has been tapped as its next director. As *Science* went to press, National Institutes of Health director Elias Zerhouni was expected to appoint Thomas Insel (below), now at Emory University in Atlanta, Georgia, to the post.

Insel, 50, spent 15 years at NIMH before leaving to head Emory's Yerkes primate center in 1994. Originally a clinician, he later moved to the lab, studying the neurobiology of attachment. In 1999, he became head of a new National Science Foundation-funded center for behavioral neuroscience (*Science*, 26 July, p. 506).

Insel says one of his top priorities will be to use genomics results to improve patient care, a goal his new boss shares.

But Insel did not ask Zerhouni to let him keep his lab; it was a "tough decision," he says, but NIMH "really deserves a full-time director."

Insel "brings to the table exactly what the institute needs in terms of expertise," says Harvard provost Steven Hyman, who stepped down as NIMH director in December 2001. Colleagues describe Insel as a warm and likable manager, if more low-key than some institute directors. He expects to formally take the reins in mid-November.



Ready to Rumble French scientists are gearing up to fight projected cuts in the nation's research budget. Three researcher unions were expected to hold a war council this week to oppose the cuts, which—according to government documents leaked to the daily *Le Monde*—might take a 1.3% slice out of the \$9 billion civilian R&D budget and ax 50 research posts. A final decision is expected at a 25 September meeting of the Council of Ministers.

The proposed cuts are smaller than the initially rumored 7.6% reduction (*Science*, 16 August, p. 1112). But many scientists say that any cut would break a campaign promise by President Jacques Chirac to boost R&D spending to 3% of gross domestic product by 2010, from its current level of 2.2%. "They say we are lagging behind, and then the first thing they do is cut the budget," says Jacques Fossey, secretary-general of the National Union of Scientific Researchers (SNCS). Government spending needs to rise by 5% to 7% annually to keep Chirac's promise, says SNCS.

Contributors: Jocelyn Kaiser, Michael Balter



Big bird. Steller's sea eagle, the world's largest eagle, makes its home in Kamchatka.

sands of rare animals and plants, from eight unique species of lichen to a subspecies of brown bear. The end of the Cold War saw farmers, poachers, and timber and mining companies rush in to exploit the relatively untouched land, but now the besieged peninsula has found a new protector. A group of international and Russian agencies this week announced a 7-year project to bolster biodiversity conservation and research in four protected areas, with funding of almost \$13 million. "We've been waiting a decade for this," says Olga Selivanova, a marine biologist at the Kamchatka Institute of Ecology and Natural Resources here in the region's capital city.

Soviet taxonomists won international recognition in the 1970s and '80s for their work on Kamchatkan species. Some 10% of the peninsula's 1168 plant species are found only here. The peninsula is home to the world's greatest diversity of salmon, trout, and char, as well as an estimated 15,000 Kamchatka brown bears, the second largest subspecies in the world. And Kamchatka is the breeding grounds for the world's largest eagle, the Steller's sea eagle. But with 59 Kamchatkan fauna on Russia's endangered species list, some experts contend that time is running out to protect what they see as a northern Galápagos.

Although the Russian government has approved modest expansions of some of the peninsula's parks, setting aside an additional 16,000 hectares over the past decade, cash-hungry bureaucrats and businesses threaten many biodiversity preserves, says Paul Grigoriev, a conservation biologist working for the United Nations Development Programme.

The Kamchatka project—the richest conservation effort yet in the Russian Federation—suggests that "the situation is improving," says Grigoriev, who's leading the effort. The project, backed by the Global Environment Facility, the Canadian International Development Agency, and the United Nations, will seek to bolster the legal status

of protected sites and improve monitoring and management of almost 30,000 square kilometers, covering habitats ranging from temperate deciduous forest to arctic tundra and volcanic wastelands. The project will also fund scientific research and ensure that local people benefit by promoting tourism and integrating aboriginal hunting and fishing into site management.

The scientific program, with a budget of \$550,000 over 7 years, will tackle the classification of existing specimens collected over the years.

Selivanova, who crafted the project's scientific program, says that some 45,000 samples collected during Soviet times remain unclassified. She and others also hope to get back out into the field, as collecting trips were mostly abandoned after the Soviet collapse. "We want to get back to doing it now," she says.

—PAUL WEBSTER

Paul Webster is a writer in Moscow.

NUTRITION RESEARCH

IOM Panel Weighs In on Diet and Health

Consumers trying to make sense of divergent diet-book claims aren't likely to find easy answers in a new, 1000-page tome on diet and health issued by the Institute of Medicine (IOM). But they will find a review of the risks and benefits of consuming the disputed "macronutrients": carbohydrates, fats, and proteins. Although the report makes specific recommendations, it also laments gaps and contradictions in nutrition research, suggesting that even the experts are struggling to sort out the information.

After nearly 3 years of spirited debate, the 21 scientists on the IOM panel agreed on a bottom line: 20% to 35% of one's calories should come from fat, 45% to 65% from carbohydrates,

and 10% to 35% from protein. A similar panel in 1989 suggested hard numbers within these ranges: no more than 30% from fat, no less than 50% from carbohydrates, and the rest from protein.

The flexible 2002 standards might reflect a newfound humility. "Twenty-five years ago, guidelines were presented with absolute certainty, [for example,] 'Thou shalt not eat eggs,'" says Walter Willett, an epidemiologist at Harvard's School of Public Health in Boston, who was not on the panel. "I think [this report] is a healthy acknowledgment that we don't know absolute truths."

The panel set out to determine the impact of macronutrients on chronic diseases such as diabetes. The assignment proved enormously complex. Fat, for example, is an umbrella that covers the omega-3 fatty acids and monounsaturated fat, which are considered healthy; the *trans*-fatty acids, which are considered unhealthy; and the saturated fats, about which there is no consensus.

The report also comes during a raging public debate on diet. To remain neutral, the panel members "put on blinders" to the policy implications of their work, according to panel chair Joanne Lupton, professor of nutrition at Texas A&M University in College Station. Popular diets, such as the heavily criticized Atkins diet, advocate nearly eliminating carbohydrates and relying on fat and protein. At the same time, the evidence favoring a low-fat diet has been questioned (*Science*, 30 March 2001, p. 2536).

IOM panelists tried to limit the scope of their review by focusing on diets for healthy individuals, not those seeking to lose weight. But the duel over fat and carbohydrates edged its way into discussions anyway, as the panelists examined scientific studies dating back to the 1930s. "It's a very, very difficult decision as to whether high carb ... and lower fat is better," says Sheila Innis, a panel member and expert in pediatric nutrition at the University of British Columbia in Vancouver. On the one hand, Innis notes, "there are populations that do very well with high-fat diets," such as the Greeks. Their so-called Mediterranean diet, though, is composed largely of the healthy fats found in fish and olive oil—not the kind consumed by most Canadians and Americans, the report's intended audience. In the end, says Innis, the panel leaned toward carbohydrates because, in the context of a North American diet, they were deemed safer.

Although the IOM report aims to stay out of the big battle, it is one of the first government-funded efforts to parse out the underlying science. And it stakes out

Smorgasbord. The public has been offered a bewildering array of recommendations on healthy diets.

