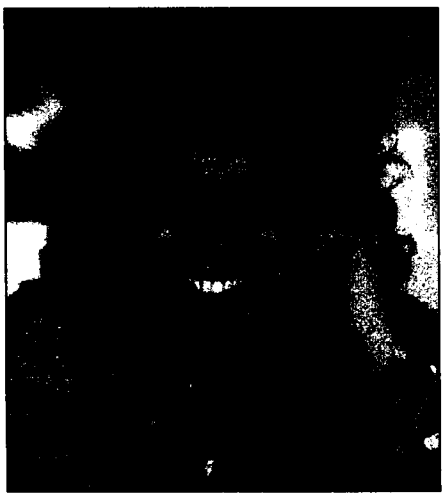

Bio bias. Steven Pinker worries that the new institute lacks focus on human cognition.

centers complement that, he adds, by providing insight into specific issues—such as molecular and cellular mechanisms for learning and memory in the case of the Picower, and possibly systems-level work on vision and movement systems in the case of the McGovern. Center researchers have joint appointments with the department. "We want multiple approaches," Sur adds. The Martino Imaging Center, which develops imaging techniques, will also be part of the complex.

But whereas Tonegawa, Sur, and the Martino Center will build on their existing efforts and reputation, Sharp must build from the ground up. And although he wants the McGovern to do for brain and behavior what the Whitehead Institute has done for molecular biology in the last decade, he faces constraints that Whitehead founders, including David Baltimore, did not. "The Whitehead is off-campus and fantastically endowed," acknowledges Sharp. By contrast, the McGovern must depend on MIT for its building allotment, and it will receive only a restricted annual sum from its donor for the first 2 decades. Sharp anticipates that the McGovern will begin to pull in more money and resources as it matures, providing additional autonomy.

Building up the institute's endowment, as well as its credibility, will take several years, Sharp and McGovern point out. And the current criticism is to be expected, says McGovern, as it reflects the usual cycle of raised expectations and disappointment that follows the start of any project of this magnitude: "This [institute] had a lot of publicity, and everyone thought it would boom immediately. But things are going pretty much according to the original plan."

Many academics agree that it's too early to judge, given the inevitable inertia when large sums of money, a major university, and prominent researchers are involved. "There are concerns in the neuroscience community," says Tonegawa, "but I want to be patient. Adds Newsome: "It's much more important that this be done well rather than quickly."

Still, the community will be watching closely to see if MIT and the McGovern Institute can pull off a program that founders hope will be a model for 21st century neuroscience. **–ANDREW LAWLER**

DNA FORENSICS

Laying Ghosts to Rest In Bosnia

Scientists are embarking on a major effort to identify the remains of as many as 30,000 missing persons

TUZLA, BOSNIA-HERZEGOVINA—Exactly 4419 white nylon bags are stacked on bare metal shelves, row after row, in a chilly, dimly lit room. Inside the duffel-sized bags are the remains of anonymous victims of the worst massacre in Europe since World War II: Bosnian Muslims slaughtered when Serb forces overran Srebrenica in 1995.

This month, the biggest project ever to use DNA testing to identify human remains shifts into high gear here in Bosnia. Using techniques pioneered by the Armed Forces DNA Identification Laboratory in Rockville, Maryland, scientists plan to compare DNA from victims and survivors to try to bring closure to thousands of grieving relatives. "This is the first time this has been done on a scale this large," says the project's leader, Ed Huffine, former head of the mitochondrial DNA (mtDNA) program at the Armed Forces lab.

The plan is to sequence nuclear and mtDNA to identify an estimated 30,000 people missing since the Dayton peace accord brought Bosnia's three-and-a-half-year war to an end in 1995. About 10% to 20% of the victims are expected to be Serbs and Croats. So far, the International Commission on Missing Persons in the former Yugoslavia (ICMP), created at the G-7 summit in France in 1996, has carried out limited DNA testing on war victims, shipping samples to labs in the United States and Poland where costs run up to $5000 per sample. Operating two Bosnian labs—joined by a third later this year at Banja Luka in the Republika Srpska, the Serb-controlled portion of Bosnia—will lower the cost to $300 to $350 per body. That savings, along with donated equipment, free rent, and lower salaries in the war-ravaged country, is expected to hold the overall price tag to no more than $25 million.

Despite the grisly nature of the work, Bosnia offers advantages over other war-torn regions. For example, in Rwanda, where more than half a million people were killed during 3 months of civil war in 1994, the warm, moist climate and widely scattered remains would make such an effort impossible. That doesn't mean the Bosnian project will be easy: Technicians must work meticulously to ensure that the bone samples, in particular, aren't contaminated with other DNA. "If I was asked to do it, I think it would be close to my vision of a nightmare," says the father of DNA fingerprinting, Alec Jeffreys of the University of Leicester, U.K. Nonetheless, he says, "there are plenty of precedents in terms of this type of analysis for mass disasters. [The technique] does work."

Traditional forensics can't begin to tack-

Bone-chilling. Researchers may soon be able to put names to remains of Srebrenica's victims.

CREDITS: (TOP TO BOTTOM) DONNA COVENEY/MIT; EILEEN KOVCHOK

le the task of identifying the remains of the victims, many of them Muslim men and boys slain during the fall of Srebrenica, a United Nations "safe haven" that Western peacekeepers notoriously failed to protect. Many survivors of the rampage fled to Tuzla, the nearest city under Muslim control. And they've stayed here, loath to move back to Srebrenica, now part of the Republika Srpska. Thus it made sense to ship the victims' remains, unearthed from pits or collected from fields, to the Podrinje Identification Project's morgue here in Tuzla.

The ICMP project got going last year, when it began dispatching teams to collect blood from relatives of the missing persons. So far the ICMP has amassed more than 12,000 samples, with some relatives coming here from as far away as Australia. On average, it requires 2.5 donors to identify a body, says Huffine. The ICMP has 100,000 blood kits in hand, enough in principle to identify 40,000 bodies. "Once we have 100,000 samples, then we can expect that almost every body we find can be identified," says Amor Masovic, director of the Bosnian Muslims' missing persons commission.

The blood samples are shipped to a newly outfitted lab at the Tuzla Clinical Center, where key DNA regions are sequenced. The ICMP will open a second DNA lab in Sarajevo to sequence DNA from the bone. The researchers use the polymerase chain reaction to churn out millions of copies of the target DNA regions. The DNA is tagged with fluorescent dyes; different colors bind to each of DNA's four repeating nucleotides. A laser reads the colors to sequence the DNA.

Nuclear DNA is the material of choice for samples in which it has been preserved. Because roughly half is inherited from each parent, it offers "a unique profile for every individual, just like fingerprints," says molecular biologist Rijad Konjhodzic, ICMP's DNA lab coordinator. In Bosnia, where tens of thousands have been killed—many from large families—telling brothers apart or son from father would be virtually impossible without nuclear DNA. The lab also uses nuclear DNA to sequence telltale markers on the Y chromosome, which can reveal a male victim's paternal lineage.

A second procedure involves screening the mtDNA, which is "better preserved than nuclear DNA and will stay [intact] longer in a corpse," Konjhodzic says. As mtDNA is inherited only from the mother, an individual will share virtually identical sequences with all maternal relatives. Because most of the survivors—and blood donors, therefore—are women, the odds of determining the families of at least the male victims are higher than they might have been through random screening of a gender-balanced population.

Clean room. DNA testing will be carried out in three new Bosnian labs, including this one in Tuzla.

CREDIT: EILEEN KOVCHOK

"There are a lot of maternal relatives [of the victims], so we will have a lot of matching DNA," says Konjhodzic. Often, no single test will identify remains. But combining the results from the nuclear DNA and mtDNA tests, he says, "can give us an answer."

If successful, the DNA work could soon expand to the rest of the former Yugoslavia. The ICMP recently signed an agreement to collect blood and bone samples in Kosovo, and it hopes that a new office in Belgrade will oversee the collection of blood from those who fled Bosnia and Croatia to avoid the fighting. There is also a preliminary agreement to incorporate DNA samples from a state-funded organization in Croatia into the ICMP database. Such international agreements, says Huffine, helped overcome "a certain degree of mistrust between parties" when surviving relatives live outside the country in which the victims' remains were recovered.

Before DNA testing from blood samples became automated about 5 years ago, Huffine says, the effort in Bosnia could not have been done. But for every victim that the latest DNA science helps the ICMP team to identify, that's one less ghost to haunt this troubled land. **–SUSAN LADIKA**

Susan Ladika is a freelance writer in Vienna.

ASTRONOMY

India Seeks Partners for 'Himalayan Space Telescope'

Ground-based astronomers lust after sites that are cold, dry, high, and dark. India's new Hanle observatory fits the description—and fills a geographic gap

HANLE, LADAKH, INDIA—It's a 9-hour Jeep ride from the nearest airport, over rugged terrain. And local officials recommend a 2-day layover before setting out, to get used to the Himalayan altitude. But the cloudless skies and cold, dry climate at Mount Saraswati make this remote, 4517-meter-high site ideal for optical, infrared, submillimeter-, and millimeter-wavelength astronomy. Next week Indian officials will dedicate a new 2-meter optical/infrared telescope here with the goal of turning the world's highest observatory into one of the world's most productive scientific locales.

Ground-based astronomers are forever trying to escape the limits that Earth places on their profession. That search has led them to higher and more remote regions of the planet. The Indian Astronomical Observatory at Hanle, operated by the Indian Institute of Astrophysics (IIA) in Bangalore, is perched some 200 meters higher than the Meyer-Womble Observatory operated by the University of Denver in the Rocky Mountains and at a similar altitude to the proposed Atacama Large Millimeter Array in the Andes Mountains of northern Chile. With several observatories already in operation, the Atacama desert region may be Hanle's chief competition for new astronomy facilities.

"It's a dream site," says Yash Pal, an astrophysicist and former chair of the University Grants Commission, who has dubbed the facility the "Himalayan space telescope." Other scientists add that Hanle's location also makes it an excellent site for research in several other disciplines, including geophysics, atmospheric science, climatology, and conservation biology.