time "to take an orderly, logical approach."

Nathanson is advocating a large-scale, standardized comparison of dozens of vaccines in monkey tests. "We'd like to bracket the [candidates] from the very effective to the ineffective," says Nathanson, who is gambling that the monkey model will reflect what happens in humans. Human versions of the most promising vaccines then would move forward. Primate researcher Norman Letvin of Harvard Medical School is helping to organize these studies. "I am very excited," says Letvin. But he adds that "to do this is moving mountains because everyone sitting around the table has their own interests."

In parallel with the increased emphasis on monkey studies, NIH is more aggressively pursuing human trials. NIAID's new Integrated Preclinical/Clinical Program awards grants to academic researchers who promise to move candidate AIDS vaccines into human trials, and Nathanson says NCI has a plant in Frederick, Maryland, that academics could ask to manufacture vaccines for human studies. "In the past, NIH almost exclusively relied on companies to bring products into clinical trials," explains Johnston.

The drive to learn more from human studies even led NIH last week to announce that it would take part in tests of one of the vaccines it rejected 4 years ago. The vaccine—a preparation made from HIV's envelope protein, called gp120—is made by VaxGen of South San Francisco, which during the past few years raised private money to stage efficacy trials. The trials, the first of their kind, began in the United States this June. NIH will conduct laboratory studies of the immune mechanisms behind the vaccine's successes or failures. "Potentially valuable science will be captured because VaxGen itself will do limited studies with licensure as the goal, not scientific understanding," says Baltimore, who, interestingly, is one of the vaccine's many critics (*Science*, 30 January, p. 650).

Nathanson, who has been a prime player in the backroom negotiations with VaxGen, has worked hard to spread this pragmatic point of view. "Obviously, the VaxGen trial can make important contributions in a variety of different ways to developing a vaccine," he says. "That's all I really care about."

–JON COHEN

Jon Cohen is on leave from *Science*, writing a book about AIDS vaccines.

BIODIVERSITY TREATY

Botanical Gardens Cope With Bioprospecting Loophole

Experts will draft guidelines ensuring that indigenous peoples profit from specimens collected from their countries years ago

With thousands of species from around the world collected under one roof, a botanical garden may seem like a mother lode for drug companies and scientists interested in probing exotic plants or fungi for novel biochemicals and genes. Not only do botanical gardens and seed banks house up to a third of the world's vascular plant species, but the majority of an average garden's holdings may come with an economic bonus: Because they were collected before the biodiversity treaty was signed by 160 countries in Rio de Janeiro 5 years ago, they don't come under its protection. Thus, any company that struck botanical gold in a collection may not be obliged under the treaty to pay a cent to the country in which the specimen originated.

Alarmed by this prospect, watchdog groups and scientists worldwide are stepping up efforts to craft regulations to ensure that source countries are compensated for products derived from specimens gathered by botanical gardens. And representatives of gardens and arboreta themselves are also confronting the issue. They will meet in Kirstenbosch, South Africa, in September to hammer out a consistent, nonbinding policy that they hope to finalize within a year.

Although garden officials back such efforts, they argue that they are policing themselves effectively. "If we collect anything in a foreign country as a herbarium specimen or for cultivation, it's available for sampling [only with] permission from the country where we got it," says Peter Raven, director of the Missouri Botanical Garden in St. Louis, who says this policy is common at other botanical gardens. But some activists argue that general rules are needed to back up those assurances.

PORTER LOWRY/MISSOURI BOTANICAL GARDEN

Botanical gold. Guidelines could spell out who profits from garden holdings, such as this Gentianaceae *Exacum* from Madagascar.

Agreements between gardens and drug companies "are being put together in a very ad hoc way," asserts Edward Hammond, a program officer at the advocacy group Rural Advancement Foundation International in Winnipeg, Canada. Hammond points to an arrangement between the New York Botanical Garden (NYBG), the drug company Pfizer Central Research, and several Hawaiian botanical gardens, in which Pfizer pays an undisclosed sum for plant research in exchange for the right to license promising compounds. After investigating the agreement in 1995, Hammond claims it was "very clear" to him that the proposal "had nothing to do with compensating countries of origin or [the] people from whom these collections came."

Not so, say NYBG officials. The garden forges agreements only with those groups—including Pfizer—that pledge to return a fixed portion of future royalties from plant products to the source country, says Hans Beck, an NYBG botanist. Each specimen "has careful records that will allow us to identify, inform, and compensate the original collaborators, decades from now when a product might be developed," adds Michael Balick, director of NYBG's Institute of Economic Botany. The garden's official policy says that compensation would amount to half of all net royalties from any discovery.

The gardens' own efforts to craft fair guidelines at the Kirstenbosch meeting will be difficult, however—partly because it's often unclear where a plant came from. "How far back in time do you go in terms of how long people have lived in an area, and where do different genes originate?" asks Allan Stoner of the U.S. Department of Agriculture's National Germ Plasm Research Laboratory. Seed banks are already having problems working up guidelines compatible with the biodiversity treaty, Stoner says, because the United Nations Food and Agriculture Organization favors free exchange of agriculturally useful plants. "Many countries are still trying to figure this whole thing out."

Balick and others agree, however, that the time is ripe to tackle thorny ownership questions. Although, he says, "I don't know of any commercial drug that has come from a botanical garden collection," the gardens should be players in this debate. "If companies are interested in natural products such as plants," says Balick, "they come to where the botanists are—which is gardens."

–ALAN DOVE

Alan Dove is a writer based in New York City.