How Do You Measure the Lovejoy Effect?

Science *profiles a biologist turned networker—and remarkably effective advocate of the Amazonian rain forest*

IT IS MIDMORNING at the castle of the Smithsonian Institution and biologist Tom Lovejoy, sporting a signature bowtie on a red-striped dress shirt, is seated in his small office. Surrounded by piles of papers covering floor and desk, a gigantic map of Amazonia on the wall behind him, Lovejoy is describing the grand 20-year experiment he initiated in the Amazon. Known as the Minimum Critical Size of Ecosystems (MCSE) Project, the experiment, which has run 10 years so far, is aimed at finding out what conditions are needed to sustain the ecological diversity of a chunk of land—clearly a key question in this era of global warming and worldwide deforestation.

Lovejoy is about to make a point when a secretary walks in. "It's Bob Redford," she says matter-of-factly.

Lovejoy breaks into a wide grin. As he reaches for the phone, his eyes twinkle and he insists, "I did *not* plan this."

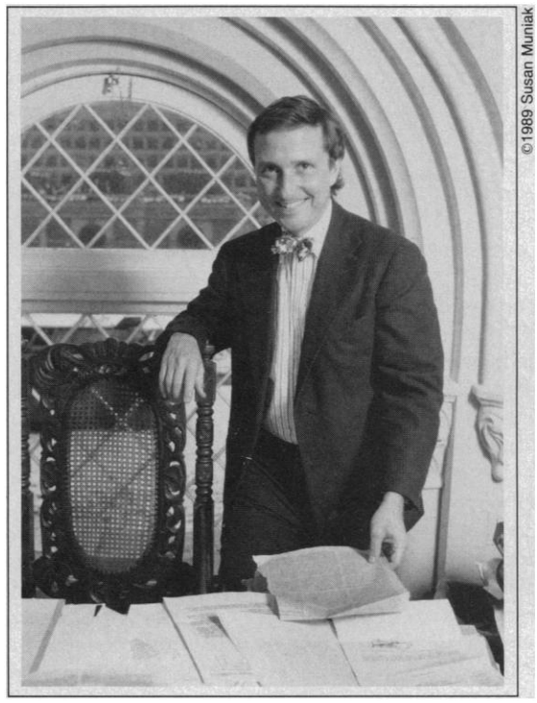
After a brief, casual conversation, Lovejoy hangs up. "Bob is such a nice guy," he says with a grin. "Now, where were we?"

In the space of a minute Thomas Lovejoy's two worlds—science and glamour—have intersected. It's a telling moment, because Lovejoy straddles both those worlds. And that's what makes him unusual among scientists. In addition to impressive scientific accomplishments, there is something that might be called the Lovejoy Effect. The Lovejoy Effect is a unique capacity for engaging others, many of them powerful public figures—politicians, media moguls, and movie stars—in his cause: saving the fragile ecology of the Amazonian rain forest.

What breed of biologist could make the connection between these two worlds? Lovejoy's curriculum vitae—19 closely packed pages of achievements and publications—gives one answer. Yale Ph.D. in biology. Assistant secretary for external affairs at the Smithsonian, a post he's had since 1987. Founder of public television's Emmy Award–winning series "Nature." Member of the board of the Council on Foreign Relations and a myriad of conservation organizations. Member of the President's Council of Science and Technology Advisers.

Another answer—a better one, really—comes from a friend, Senator Timothy Wirth (D–CO), who says, "Tom is a publicist for science. He's the Tom Paine of the rain forest."

Tom Paine. The one who raises the alarm, who rallies his compatriots for what he believes is the crucial, historic struggle. In Lovejoy's case that struggle is saving the fast-disappearing tropical rain forests. He has pioneered a three-pronged attack. One prong is the Minimum Critical Size project. The second is his pioneering concept of "debt-for-nature" swaps, in which developing countries agree to promote conservation in exchange for forgiveness of some foreign debt. And then there is Lovejoy's relentless networking, an activity that led Wirth to call him a "walking Rolladex."



City mouse. *Thomas Lovejoy in his office at the Smithsonian Institution.*

The combination of qualities needed to carry out this complex effort clearly came not only from Lovejoy's training as a scientist but also from his social background. His dedication and self-confidence may have grown out of a sense of noblesse fostered by his childhood. As the bowtie and the red-striped shirt suggest, Thomas E. Lovejoy comes from a background of wealth and establishment taste. Son of a Manhattan family that once held most of the stock of the Manhattan Life Insurance Company, he went to Millbrook boarding school and then to Yale, where he got his B.S. and his doctorate as well.

Along the way two mentors encouraged his interest in organisms in their natural habitat. At Millbrook, Frank Trevor, founder of the school's zoo, inspired the teenager to study field biology, birds in particular. "I was swept away in a matter of weeks," Lovejoy says. At Yale he studied under the eminent ecologist G. Evelyn Hutchinson, who exposed him to more of the complexities of field biology, complexities that Lovejoy mastered in the rain forest.

Long before the Amazon became a chi-chi cause, Lovejoy was carrying out the region's first bird-banding studies in pursuit of his Ph.D., living in Belem for 2 years. In 1973, a couple of years after he finished his doctorate, he found a niche at the World Wildlife Fund where he could merge his interests in science and conservation. Though he intended to spend only a couple of years there, he ended up staying 14 years, eventually becoming executive vice president of the international organization.

It was at the WWF that the scope of Lovejoy's vision first became apparent. In 1976, not long after joining the WWF staff, Lovejoy hatched the Minimum Critical Size project, a proposal that seemed audacious even to the dean of biodiversity studies. According to Edward O. Wilson of Harvard University, the MCSE is "one of the boldest scientific experiments and one of the most original in the field of biodiversity."

What has especially impressed Wilson was that Lovejoy saw a practical way of resolving a raging debate that seemed virtually impossible to resolve through field experimentation. In the early 1970s, biologists were embroiled in a debate over biodiversity, heatedly arguing the biological characteristics of ecological "islands," not only islands like Madagascar that are surrounded by water, but also acreage defined by park boundaries, for example. What was the best strategy for conserving biological diversity? One big piece of land or a number of smaller plots?

Advocates of the "single large" approach argued that bigger is better. Proponents of small patches contended their approach was "a way to spread your bets. If a particular species goes extinct in one plot, it might recolonize another," Wilson explains.

Some scientists were examining coral reefs as a model, but no one had attempted a rigorous field experiment. Such a study would be massive in scale, take decades to complete, and need a continuous, substantial flow of money—a tough combination for attracting academic scientists. Not only that, who knew where such a study could be carried out?

In December 1976, Lovejoy and other scientists met for a brainstorming session at the National Science Foundation. Lovejoy knew that at that moment Brazil was beginning to encourage economic development of the Amazon basin near Manaus through tax incentives. Under Brazilian law developers could clear 50% of the rain forest, but they were required to leave intact the remaining half.

The patchwork of large and small plots created by that kind of development would provide a good test for the abstract ecological controversy in the discipline, Lovejoy realized. "We were sitting in the NSF meeting and it dawned on me" that the "small versus large" controversy could be put to the test in Brazil, he says.

Lovejoy spent the next couple of years getting the project off the ground. He convinced the NSF to buy him a ticket to Manaus so he could persuade scientists at the Institute for Amazonian Research that the project was a good idea. He coaxed WWF to kick in $500 a month to hire Rob Birregaard, a postdoc fresh from the University of Pennsylvania, to be project director—a post Birregaard still holds.

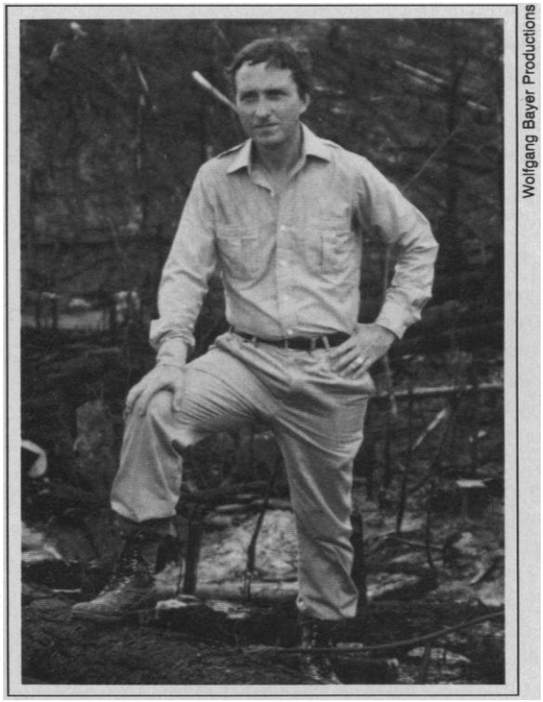
Next the irrepressible Lovejoy drummed up $30,000 in seed money and took a group of noted biologists, including George Woodwell, director of the Woods Hole Research Center, to the project site. They returned home and talked it up. Money began to flow from WWF and from foundations. Today, the MCSE has a half-million dollar annual budget. Until this year the funding was provided mainly by WWF; now it is run by the Smithsonian.

There are 24 island reserves under study, in assorted sizes of 1, 10, 100, and 200 hectares, and one 10,000-hectare control area. About 20 to 30 researchers at any one time are working at the site. Research projects now under way include the study of seedling dynamics, microclimate changes at the edge of a reserve, monkey behavior, and changes in the rain forest soil.

Halfway through its life-span the MCSE project has already begun to yield some intriguing findings, according to Wilson and Russell Mittermier, president of Conservation International in Washington and a former colleague of Lovejoy's at WWF. Lovejoy and his team discovered, for example, that fragments of rain forest undergo significant changes at their perimeter, which they dubbed the "edge effect." Trees at the perimeter die off quickly, and bird and butterfly populations decline. These changes amount to a shrinkage of the reserve and mean that the acreage needed to conserve an area's natural biodiversity may be bigger than some had thought.

At this point Lovejoy has an avuncular, rather than paternal, relationship with the MCSE. "I can call people now and suggest research and it gets done. I don't have to do it myself and I don't mind that," he says.

Indeed, one pattern in Lovejoy's life is that he creates a grand idea, then lets others flesh out the details. And, as his career has progressed, he has moved further toward generating ideas and away from the mechanics of implementing them.



Wolfgang Bayer Productions

Country mouse. *Lovejoy in a strip of recently logged Brazilian rain forest.*

That trend is clearly visible in the concept of debt-for-nature swaps. With the Amazon project well on its way, Lovejoy was on Capitol Hill, taking part in hearings that explored the relationship between bad debt and environmental damage in developing countries. A pattern emerged from the discussion that troubled him deeply: To reduce their foreign-exchange imbalance, poor countries must spend much of their revenue paying off foreign debt, leaving little to improve the economy or preserve the environment. "As I sat there," Lovejoy says, "I thought surely there is a way to help solve the debt crisis and help the environment at the same time."

As is appropriate for a contemporary Tom Paine, the scheme was first made public in the *New York Times*. The concept, as outlined on the *Times* op-ed page 5 years ago, is simple: Developing nations willing to protect their natural resources should be eligible for discounts or credits against their outstanding foreign-exchange debt. Private creditor banks would receive "appropriate tax considerations."

But the idea wasn't charity, Lovejoy explains: "This would be more than a disinterested handout to a mendicant. Left untouched, the environmental problems of the Third World will touch our lives by generating social and political unrest."

Having presented the idea to the world, Lovejoy left it to the staff of the WWF, tax lawyers, and legislators to fine-tune the notion and put it to work. And it has worked—to some extent. To date, almost $100 million of foreign debt has been canceled through debt-for-nature swaps in countries including Costa Rica, Bolivia, Ecuador, the Philippines, Madagascar, and Zambia.

The money raised through these transactions has gone toward the promotion of indigenous training and education in conservation and expansion of park reserves. Brokered by WWF and other environmental groups, debt-for-nature exchanges are widely regarded as an important mechanism for promoting conservation in developing countries.

U.S. banks and others in the domestic private sector have participated in several transactions, but the U.S. government had never done so—until last fall. With WWF acting as the broker, the U.S. government participated for the first time in a debt-for-nature swap (with Madagascar). Lovejoy hopes developed nations will seize the opportunity to engage in many debt-for-nature exchanges as they restructure loans to poor countries that are rich in species diversity.

While environmental groups, including Conservation International, say the debt-for-nature concept is a promising tool, they acknowledge that it is by no means a cure-all. The amounts involved are minor compared to the hundreds of billions of develop-

ing-country debt and the devastation being wreaked on habitat. And much to Lovejoy's frustration, Brazil, an ecological jewel that has $110 billion in foreign debt, has not yet swapped any of it for nature.

One obstacle has been Jose Sarney, past president of Brazil, who regarded pressure by industrialized nations to alter his country's development plans as an infringement on sovereignty. "You are not going to make us a green Persian Gulf," Sarney defiantly told a visiting American delegation last year. But with a new Brazilian president (conservative Fernando Collor de Mello) in office, Lovejoy and others hope that the climate for conservation may improve in Brazil.

Whether or not that comes to pass, Lovejoy's vision has already gone far beyond the debt-for-nature swaps. At the Smithsonian he has taken on his most ambitious project: firing up the world to save itself from environmental catastrophe. Lovejoy was lured to the Smithsonian in part because the institution is not regarded as an advocacy group—which was perhaps a limitation of the World Wildlife Fund. "I can say the same thing at the Smithsonian as at WWF and it has more credibility," he says.

Exploiting the Smithsonian platform for all it's worth, he's redoubled his efforts to save the rain forest and broadened his outreach, propelled by the rapid acceleration of tropical deforestation, the loss of biodiversity, and the increase in carbon dioxide emissions into the atmosphere.

According to Senator H. John Heinz III (R–PA), who is one of Lovejoy's powerful connections, "To Tom, losing the Amazon is a metaphor for losing the planet."

And to avoid losing the Amazon Lovejoy has been taking bands of bigwigs such as Heinz to the Amazon—and bringing them back as converts. About a year ago Lovejoy took a band of "campers," including Ben Bradlee, executive editor of the *Washington Post*, on one of his guided tours to witness the splendor and destruction of the rain forest. Bradlee returned a true believer.

Last September, Bradlee told an audience of scientists and fellow journalists that the *Post* was "late in covering environmental issues. Our editors didn't know about environmental issues. We didn't understand how a guy in a New York apartment spraying underarm deodorant could create a hole in the ozone—never mind the flatulent cow." Many readers think the *Post* has stepped up its coverage of global warming and biodiversity in recent months.

Heinz, another convert, says: "The Good Lord hasn't made someone like him in a long time. He took an obdurate skeptic and made a believer out of me."

The clout of people like Ben Bradlee and John Heinz is obvious and directly political. But Lovejoy also appears on television talk shows with media figures like pop singer Sting, a vocal champion of protecting the rain forest. Lovejoy provides scientific legitimacy to the powerful and glamorous who otherwise might be viewed as environmental novitiates, if not dilettantes.

It is clear that Lovejoy's charm and style, his capacity to make others feel at ease and to feel at ease himself in many circumstances, is a big part of his success. A trim man with rumpled brown hair, a long nose, and a ready smile, he bounces from one appointment to another, looking comfortable and confident.

Although Lovejoy has hosts of celebrants, he also has his critics. Indeed, there are those who feel his approach is more style than substance. Last fall Lovejoy organized a conference on global warming for scientists and the media that was hosted by the Smithsonian. Subsequently, *Wall Street Journal* editorialist David Brooks panned the meeting in the newspaper's 5 October 1989 edition, contending that the conference presented a lop-sided alarmist view that the world is headed for environmental disaster.

Brooks said of the conference that "enlightenment was beside the point. The scientists were limited to 10 minutes, enough time to cite a few familiar facts and sum up with a grandiloquent plea of action (if you can't stand purple prose, don't go to an environmental conference)."

While Lovejoy "eloquently encouraged the idea that we are in a planetary crisis," Brooks said, "the conference offered no constructive prescriptions. Not too many politicians are going to go before their constituents and renounce economic growth."

Clearly, reaction to Thomas Lovejoy depends on what one thinks about the state of the global environment. If one believes the environment is on the verge of crisis, he is a crucial figure. If, like David Brooks, one believes the threat is overstated, Lovejoy might conceivably appear somewhat self-indulgent.

Whatever one feels about him, Lovejoy is certainly an intriguing figure, partly because he is one of the few people capable of making the leap from science to impassioned advocacy. "I wish there were ten more of him," says Wilson. "We desperately need more people who can bridge the gap between science and the public."

■ MARJORIE SUN

NIH Seeks a Chief, Desperately

An active search for a director for the National Institutes of Health is being renewed after several months during which a special advisory panel has been trying to define ways to make the position more attractive. The problem: those who are most qualified to do the job are accustomed to more lavish perks than the NIH directorship offers and may be put off by its relatively low pay and bureaucratic limits.

At an advisory panel meeting last week, Assistant Secretary for Health James O. Mason, who chairs the search committee, called for nominations by the end of March, even though the advisory panel will not have fully completed its work by then.

Search committee members include Upjohn chairman Theodore Cooper, James F. Dickson of Boston University, and James R. Gavin of the University of Oklahoma. All three also serve on the advisory panel.

The panel was convened by Health and Human Services Secretary Louis W. Sullivan last summer after it became apparent that because of limits on the NIH director's authority, and the now infamous (and no longer applicable) litmus test on abortion, many qualified candidates would not take the job.

The advisory panel so far has offered a variety of recommendations that, taken together, would add luster and power to the directorship. At its most recent meeting, for instance, the panel formally called for a special pay schedule for top NIH scientists that would make their salaries competitive with those in medical schools.

The panel also urged the secretary to delegate to the director substantial authority for hiring NIH scientists and appointing advisory committees. It also suggested that the NIH head be designated the secretary's chief adviser on science and research, and given a seat on important federal science policy groups. This suggestion is an effort to make the NIH chief equivalent to the National Science Foundation director, who currently enjoys greater independence and a higher federal rank.

Regardless of which recommendations are enacted, it already seems clear that the crisis in finding an NIH head and the very existence of the new advisory panel has raised the NIH's profile within HHS and has given acting NIH director William Raub more direct, "one-on-one" access to the secretary than NIH heads have had in recent years.

■ BARBARA J. CULLITON