Minnesota State Zoological Board. Zoo-Related Organizations Files.

Copyright Notice:

Version 3
August 20, 2018

Ulysses S. Seal, Ph.D.
Chairman of CONSERVATION BREEDING SPECIALIST GROUP (CBSG)

Charter Zoo Board member, serving from 1969 to 1979 Chair of Zoo Board 1977- 1979

Chairs a specialist group (CBSG) of the World Conservation Union

By professional stature and dedication of his work has brought worldwide attention to and interest in the MN Zoo:

- contributing to its unique design, as a board member
- centering the worldwide ISIS (International Species Information Program) at the Zoo, which he originated and managed from 1972-1978, in MN

  ISIS is a global central database that provides computerized animal management for more than 495 in 54 countries on 6 continents 50 cooperating zoological institutions worldwide
- chairing CBSG, a specialist group of the World Conservation Union, since 1979, headquartering the program at the MN Zoo.

  The *Conservation Breeding Specialist Group is universally agreed to be the most active specialist group of the Species Survival Commission of the World Conservation Union.* The *World Conservation Union is the umbrella organization of the world's conservation groups. (Sierra Club, the Nature Conservancy, etc. are all members of the WCU)* The *WCU has several commissions, the largest of which is the Species Survival Commission, whose 7000 individual members are organized into about 100 groups. Most of these groups focus on orchids, or deer, or similar groups, trying to insure the survival of related life forms.* The *CBSG headquartered here works for species survival in the wild and in captivity under the guidance of U/ie Seal.*

In 1980, Ulie began analyzing the global captive tiger population. In 1981, the AZA formed the Siberian Tiger Species Survival Plan.

From 1982-84, Dr. Seal developed the first model for a Species Survival Plan (SSP) following the International Tiger Symposium in Leipzig. Several participants vividly recall Dr. Seal calculating Siberian tiger inbreeding coefficients by hand during a long journey by bus in what was then East Germany. All subsequent SSPs were modeled after the Siberian tiger program.

Recipient of **AZA Marlin Perkins Award**, the most prestigious conservation award given in North America.

related links
terms of use
paid obituary archives
paid obituaries
deaths elsewhere
in memoriam
tributes to september 11 victims

Obituary: Ulysses Seal III, who helped zoos worldwide participate in animal conservation, dies at 73

Trudi Hahn, Star Tribune

Published March 21, 2003 SEAL21

With a love of animals, a boundless curiosity and commanding charm, Ulysses Seal III helped persuade zoos worldwide to participate in animal conservation.

Seal also helped found the Minnesota Zoo, created "computer dating" for zoo animals to help save endangered species, and spread a conservation organization worldwide starting with only a box of letterhead stationery. He died of cancer Wednesday at home in Bloomington. He was 73.

He carried his childhood love of animals into his own children's lives, said his daughter Pamela Sebesta of Minnesota. When he studied white-tail deer and wolves, he taught the kids to take animal measurements. They also cleaned up messes.

Seal's academic training was in psychology and biochemistry. Though he held adjunct professorships at the University of Minnesota, the bulk of his career was as a scientist researching the human endocrine system and its influence on prostate cancer at what is now the Minneapolis Veterans Medical Center in Minneapolis.

"His grants never got turned down," said Dr. Michael Levitt, director of research at the center.

But his interest in animal research grew. In 1969 he presented papers at a zoo veterinarians' conference, where the vets were lamenting that no one knew what normal blood values were for many exotic animals. Seal volunteered to do the lab work free to establish values if the vets would supply the animals' blood samples, said Lee Simmons, director of Omaha's Henry Doorly Zoo.

From that work, Seal and Dale Makey, a University of Minnesota colleague, developed in 1975 what is now the International Species Information System (ISIS), a computer program that can find matches for mateless animals from around the world. Not only can it help save endangered species, it also can encourage genetic diversity to help any species survive over the long term.

"Genetic variability is the stuff of evolution -- it's what allows all species to try new solutions to problems," Seal said in 1984. He helped create the Species Survival Plan, and he worked extensively with tigers and the black-footed ferret.

The species information system, based at the Minnesota Zoo in Apple Valley, has 600 zoos and aquariums worldwide sharing information about 1.6 million animals, said Nate Flesness, executive director who succeeded Seal at the helm in 1979. Seal was part of the group that

Utilities
Email story
Print t
Make home
Search
News
Find it!
More sear

lobbied the Legislature for a new zoo and created its first board of directors, he said.

Along the way, he came to the attention of what is now called IUCN/the World Conservation Union, a worldwide volunteer network that seeks people who could make a difference in conservation, Flesness said.

In 1979 the group named Seal chairman of what is now the Conservation Breeding Specialist Group. The only support that came with the designation was a box of letterhead stationery for chairman Seal and the encouragement to do what he could.

"Not all these efforts succeed," Flesness said. But Seal's did. The group, based in Apple Valley, became focused on mobilizing zoos and aquariums to participate in conservation.

"It's a world-class center for solving species-management problems," Flesness said. "The problems are usually people."

Seal retired from the veterans' hospital in 1990 to devote more time to the conservation group. His openness, listening abilities and perception of everybody as a potential conservation partner helped create an organization that specializes in bringing differing groups together to understand a problem, agree on a solution and commit to implementing it, said Onnie Byers, a program officer.

The group, with 800 volunteers in 90 countries, has been active in biodiversity-rich countries such as Indonesia, Costa Rica and India, but it recently started working at home with such groups as the U.S. Fish and Wildlife Service, helping formulate plans for wildlife-refuge conservation.

"Worldwide, they're thinking in a different way because of him," Byers said. "Ulie you don't forget."

His wife, Marialice Fluker Seal, who helped create the Minnesota Valley Wildlife Refuge and Recreation Area, died in 1997.

In addition to his daughter, survivors include daughters Saralee Seal of Colorado and Rebecca Soileau and Kathleen Seal-Grayson of Minnesota; son Ulysses S. IV of Minnesota; nine grandchildren; a brother, Robert of Virginia, and a sister, Georgiana Cox of North Carolina.

Services will be held at 11 a.m. Monday at Gill Brothers Funeral Chapel, 9947 Lyndale Av. S. Visitation will be held from 5 to 8 p.m. Sunday and at 10 a.m. Monday.

Trudi Hahn is at thahn@startribune.com.

Return to top

It is with great sadness that I write to let you know that Ulysses S. Seal, Chairman of Conservation Breeding Specialist Group since its inception several decades ago, has succumbed to cancer. Ulie's seemingly boundless energy was drained by the effects of the disease and the treatments, but he continued to provide wise and caring advice up to his last days with us.

Ulie's legacy is so vast that it would be impossible to summarize in a short letter. Through his several careers, he made tremendous contributions to human health, animal health, wildlife conservation, and the development of effective processes for collaboration. Perhaps most importantly, he inspired, challenged, and worked with an amazing network of friends and colleagues (and even with his professional antagonists) to make progress on the problems of conservation about which he felt so passionately. It is a tribute to Ulie, and to his direct personal influence, that the CBSG has more than 1,000 members, has more than 130 organizational and individual sponsors, and has impacted countless more people globally. Appropriately, Ulie has received almost every conservation medal and award that there is.

Staff...

wildlife veterinary services. He holds B.S. degrees in Journalism and Veterinary Science, an M.S. in Biology, and doctorates in Veterinary Medicine and Wildlife Conservation.

Terry lives in the country north of Minneapolis with his wife, Dr. Julie Kreeger, and their son, Andrew. The household is rounded out with three dogs, three cats, two birds, and assorted freshwater fish. The family enjoys hunting, fishing, camping, and working on their wilderness cabin near the Canadian border.

Judi Mikolai, Administrative Officer

Judi Mikolai serves as the Administrative Officer for CBSG. Her primary duties include overseeing the office finances, production and distribution of *CBSG News* (CBSG's quarterly newsletter), and organization of travel arrangements for the CBSG staff (no easy task!). As the staff member with the longest full-time tenure (5 years), she also serves as the unofficial historian for the organization.

Judi spends her free time with her husband, Jon, and her two year-old daughter, Olivia, and nine-month-old son, Isaak. The whole family enjoys the out-of-doors, participating in "silent sports" such as biking, cross-country skiing, and canoeing. When not enjoying the great outdoors, Judi and family enjoy spending "too much time and money" landscaping and renovating their 1925 farmhouse (which is quite old by U.S. standards!).

Phil Miller, Ph.D., Program Officer

Dr. Phil Miller is the newest addition to the CBSG staff, filling the position of PHVA Program Officer in November 1994. Phil is responsible for conducting the VORTEX computer simulation modeling at many of the PHVA (Population and Habitat Viability Assessment) workshops, contributing to the production of PHVA workshop reports, and working towards further refinement of the simulation modeling techniques from a population biology perspective. He received his Ph.D. in Zoology from Arizona State University and is currently working towards completion of post-doctoral research also initiated at Arizona State.

Phil, his wife Ellen, and their two cats live in Minneapolis, Minnesota. They all thoroughly enjoy returning to their native Midwest, having spent nearly three years in the heat of the desert southwest U.S. If he's not listening to his latest music purchase, Phil is usually hiking, birding, or trying to keep the kitchen clean while cooking.

Shelly O'Brien, Secretary

Shelly O'Brien was born and raised in Minnesota and enjoys the change of seasons, even winter. She joined CBSG in December 1992 as a secretary to provide office support. One of her primary functions is to maintain and keep current the 135+ member institutional donor base. Prior to joining CBSG, Shelly worked for a local humane society in an administrative capacity.

Shelly shares her home with two dogs and one cat rescued from animal shelters. She has maintained a vegetarian lifestyle cooking, poetry, horseback riding, and skiing.

Andy Schrah, Program Assistant

Andy started with CBSG in April 1994. He has replaced Lisa Laqua as program assistant. His duties involve handling all of CBSG's publications including printing and distribution. He also assists program officers in organizing and accumulating data for future workshops and publications.

Andy is an avid fly fisherman and sailboarder. When he is not on the water, he is likely to be found mountain biking or hiking through Minnesota's wilderness.

Ulysses S. Seal, Ph.D., Chairman

Combining expertise in physiology, endocrinology, pharmacology, nutrition, genetics, and computer modeling, Ulie Seal has made his life's work the preservation of the planet's biodiversity. A biochemist by training, Ulie has spent the better part of his career as a scientist researching prostate cancer at the Veteran's Administration Medical Center in Minneapolis. During this time, he became intensively involved with endangered species conservation, founding the International Species Information System (ISIS), a global, central database that provides computerized animal management for more than 450 cooperating zoological institutions worldwide. Ulie has served as Chairman of CBSG since 1979.

Ulie lives in Bloomington, Minnesota, with his wife Marialice, who often accompanies him in his CBSG-related travel. The Seals have five children and five grandchildren. During his non-working hours, Ulie enjoys science fiction, classical music, and (what else?) keeping current on the newest computer software.

Dr. Ulysses S. Seal, Chairman of the Conservation Breeding Specialist Group and his wife of 40 years, Marialice Seal.

Conservationist races time to create 'ark' for preserving world's animals

Pulling world together on managing species full-time commitment

DEBRA O'CONNOR STAFF WRITER

From his tiny office at the Minnesota Zoo, Ulysses S. Seal has embarked on an odyssey across the world, creating an "ark" that would preserve the Earth's animals for the future.

Seal, who leads an international band of conservationists called the Captive Breeding Specialist Group, is working feverishly to find ways to identify and save crucial genetic strains in zoos and wildlife preserves, and even as frozen embryos.

"We see ourselves as the conservators of the biodiversity of a segment of the animal population," Seal said.

"To maintain the genetic diversity in the population, you need between 100 and 300 animals, and that number of individuals will be scattered between five and 100 different institutions. This requires first-class, cutting-edge science."

Seal is recognized as a major force in that effort. This month, British Broadcasting Corp. cameras followed him from an Indonesian rhino preserve to a London meeting to the Siberian tiger exhibit at the Minnesota Zoo. The resulting hour-long documentary will be aired next spring in the United States.

BBC director Robert Thirkell and his crew came to Apple Valley to record preparations for a swap of musk ox calves from the Minnesota Zoo for Siberian tigers from the Moscow Zoo. The exchange, which is planned for the next few weeks, would bring new genes into the genetic pool of tigers in North American zoos.

Seal hardly fits the image of the introverted research scientist tinkering away in a musty laboratory. His enthusiasm is apparent, and his ready laugh is infectious.

"When he comes walking into a room, he brings with him a different life force. He has this tremendous energy field around him," Minnesota Zoo director Kathryn Roberts said.

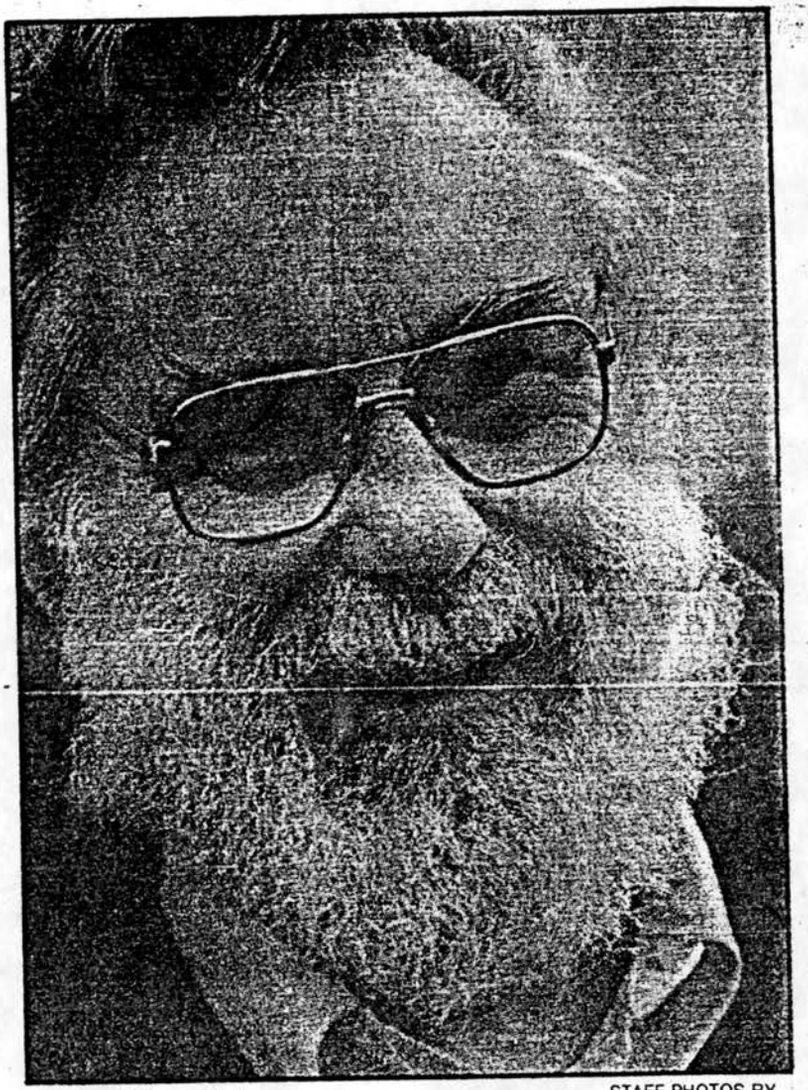
"I think of him as a very creative entrepreneur who has no interest in following organizational order, no interest in being told what the rules or restraints are. His only interest is to get the job done. He's able to take you away from the day-to-day type of thing and remind you of why we're in business."

From his Bloomington home and his rented zoo office, Seal communicates with the world via a plethora of fax machines and computer modems.

In the past 18 months, he has met with conservation leaders in foreign countries including Japan, Indonesia, China, Vietnam, Thailand, Korea, Malaysia, India, Australia, New Zealand, Brazil, England, the Netherlands, Germany, Venezuela, Costa Rica — plus, Seals says tongue-in-cheek, Texas.

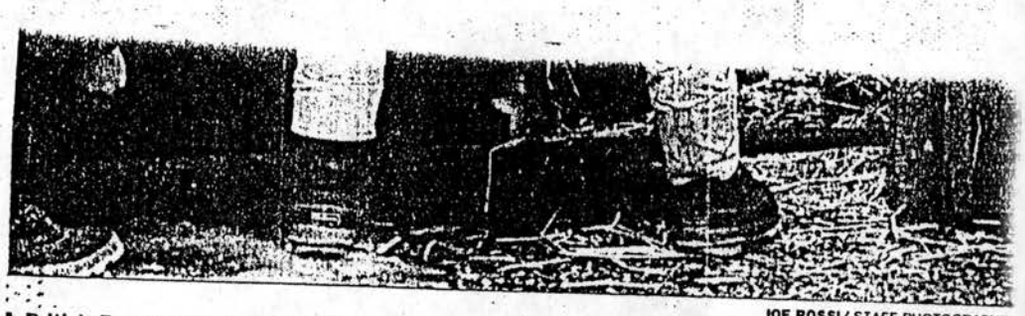
After 35 years as a research biochemist at the Veterans Affairs Medical Center at Fort Snelling, Seal, 61, retired last

SEAL CONTINUED ON 2B ▶



STAFF PHOTOS BY JOE ROSSI

Biochemist Ulysses S. Seal, above, leads an international band of conservationists working to find ways to identify and save crucial genetic strains in zoos and wildlife preserves worldwide. At right, Seal draws a blood sample from a sedated musk ox at the Minnesota Zoo.



JOE ROSSI/ STAFF PHOTOGRAPHER

A British Broadcasting Corp. film crew prepares to begin shooting footage of Minnesota Zoo staf loading a musk ox calf into a crate for shipment to the Moscow Zoo.

SEAL

▼ CONTINUED FROM 1B

month to devote his attention to wildlife. One of his immediate aims is to establish an independent non-profit foundation to fund the work of the captive breeding group, which was created by the International Union for the Conservation of Nature.

The breeding group's goal is to manage the entire world population of an animal species as one. Decisions made on breeding Siberian tigers at the Minnesota Zoo, for example, are to be based on the parentage of the remaining 300 wild tigers, as well as each of the 700 in the dozens of zoos across the world. Eventually those decisions will include freezing embryos — cryopreservation.

These measures could ensure safekeeping of animal genes until humans can figure out how to coexist with the Siberian tiger, the Javan rhinoceros, the California condor and other creatures whose survival is threatened by human habits.

It is literally an effort to save the world, at least as it's now known. With one to two dozen animals being added to the endangered species list every year, science is scrambling to hang on until political solutions are found to problems such as the decimation of habitat and explosive population growth. Scientists' major challenge is to avoid inbreeding, which can destroy a species within 20 generations.

To draw international support based on what's best for the animal population as a whole, Seal has had to be a consummate diplomat as well as a respected scientist, conservation officials say.

"There are some fights," Seal said. "A lot of people are concerned about the recommendations we've made. There are people who would rather see a species die with dignity in the wild than come into captivity."

Jim Jackson, a Texas breeder of endangered animals who also serves in the captive breeding group, said Seal is best at getting groups to put aside their individual differences and come to a consensus.

For example, to put the black-footed ferret back into the wild, reluctant government wildlife departments had to be convinced of the need for a thriving prairie dog population, because that's what the ferret eats.

"With 30 people in the room, you're not going to agree on anything, not even on what time to have lunch," Jackson said.

Because Seal has no formal ties to any zoo or wildlife group, he is considered unbiased, which helps. He pays for most of his travel and animal study out of his own pocket, so he's also considered altruistic.

And, Jackson said, Seal is noted for being productive: "I'd be happy if I'd get half as much done as he does, and I'm 20 years younger. He's almost 62 — he'll be eligible for discounts."

Seal and his wife, Marialice, have five grown children. At home is a room of computer equipment that for days at a time runs simulation models of what would happen to a species if this factor or that factor were changed. The models are used to make recommendations for management programs that will keep animal populations stable and healthy.

In 1959, armed with a doctorate in biochemistry from Emory University in Atlanta and postgraduate work at the University of Minnesota, he began a long-term study of prostate cancer as a research chemist at the veterans hospital. He needed to do blood studies on animals whose blood hormones responded in the same way as humans' to a certain test. But he found that the blood of typical laboratory animals, such as rats and chimpanzees, wouldn't work.

What started as a national search through zoos to find a suitable animal ended up as an abiding interest in the welfare of the animals. Along the way, he began the International Species Inventory System, so that for the first time, zoos across the world could keep track of their animals' lineage. He developed new drugs so animals can be immobilized safely and effectively, standard blood analyses of hundreds of animals and a contraceptive implant. He also served on the founding board of the Minnesota Zoo.

His life reflects his passionate concern for the world's animals, Roberts said.

"For Ulie, there is no such thing as a personal life," she said. "For Ulie, there is a life that has to do with species preservation, and it's a 24-hour-a-day commitment."

POLLUTION

CURRICULUM VITAE

SEAL, ULYSSES SAMUEL 28 September 1993

HOME ADDRESS: 9801 Pillsbury Ave. So.
Bloomington, MN 55420 (612-888-7267; Fax 612-888-5550)

OFFICE ADDRESS: Captive Breeding Specialist Group
12101 Johnny Cake Road
Apple Valley, Minnesota 55124
Office Phone 612-431-9325; Fax 612-432-2757

DATE OF BIRTH: June 13, 1929 (Mullens, W. VA)

MARITAL STATUS: Married, five children.

EDUCATION:

Emory Univ., Atlanta, Ga.	Psychology	B.A. 1949
Emory Univ., Atlanta, Ga.	Psychology	M.A. 1950
Emory Univ., Atlanta, Ga.	Biochemistry	Ph.D. 1957
University of Minnesota	Biochemistry	Post Doc. 1957-59

RESEARCH INTERESTS: Small populations and conservation biology.
Risk analysis in conservation. Crisis management.

EMPLOYMENT RECORD:

Career Research Scientist VAMC Minneapolis, MN	1980-90
Research Chemist, VAMC Minneapolis, MN	1959-90
Post-Doctoral, Univ. Minnesota, Minneapolis, MN	1957-59
Professor, Biochemistry, University of Minnesota	1971-
Professor, Fisheries & Wildlife, Univ. of Minnesota	1976-
Professor, Ecology and Animal Behavior, Univ. of Minn.	1986-
Chairman, Captive Breeding Specialist Group	1980-

SCIENTIFIC REVIEW AND ADVISORY GROUPS:

Originator, International Species Inventory System	1972-78
Reviewer, National Institutes of Health	1973-89
Consultant, IUCN, Survival Service Commission	1976-78
VACO Medical Research Advisory Committee	1976-80
Chairman, Research Advisory Committee, VACO	1979-80
Reviewer, National Science Foundation	1976-89
California Condor Advisory Panel	1977-78
Member, R&D Committee VAMC Mpls	1978-83
Chairman, R&D Committee VAMC Mpls	1981-83
VACO Career Research Scientist Promotion Comm.	1982-84
Teacher, World Wildlife Fund, Project Tiger, India	1977,80
Nat. Res. Council, ILAR, Lab. Animal Records Comm.	1977-79
Consultant,NIH,Interagency Task Force on Use & Needs of Chimpanzees	1978-86

Leader, US-USSR Environmental Agreement, Animal Immobilization Project	1978
Chmn, Captive Breeding Specialist Group, IUCN/SSC,	1978-
National Research Council, BARR, Wild Roaming Horse and Burro Committee	1979-82, 1985-88, 1989-90
Research Advisory Committee, VACO	1979-81
Species Coordinator: Tiger SSP of AAZPA	1982-91
Office of Technl. Assessment,Genetic Diversity Animal Resources Wrkg Grp	1984-86
Advisor to Species Survival Plan Programs of AAZPA	1982-
Advisor to Black-footed Ferret Recovery Program	1985-89
VACO Research Service - Planning Council	1988-90
Member Recovery Team, Red Wolf (USFWS)	1988-
Regional Councilor SSC/IUCN	1988-
SSC Steering Committee SSC/IUCN	1988-
Co-Organizer of NSF Workshop on Funding Priorities for Single Species Conservation Biology	1988
Conservation Fellow, New York Zoological Society	1988-
Advisor to Florida Panther Recovery Program	1988-
Member Recovery Team, California Sea Otter	1989-
NAS/NRC Committee on Biodiversity	1989
Fellow AAAS	1990
PHVAs (60) for Bali Starling, Puerto Rican Parrot, Javan Rhinoceros, Lion tamarins, Mexican Wolf, Pink Pigeon	1989-93
Waldrapp Ibis, Whooping crane, Kirtland's warbler, etc	1990-91

MEMBERSHIPS: The Endocrine Society
American Society of Biological Chemists
American Association for the Advancement of Science
The Society for the Study of Reproduction
The Wildlife Disease Association
The Wildlife Society
American Association of Zoological Parks and Aquariums

PUBLICATIONS:

Peer reviewed journal articles = 260
Book chapters and reviews = 70

HONORS:

AAZPA Marlin Perkins Award	1991
Chicago Zoological Society: Presidents Award	1992
Zoological Society of Antwerp: Gold Medal	1993
Emory University: Emory Medal	1993

economists get involved in environmental and conservation negotiations and projects. Only when we can bring the two solitudes into better congruence will we be able to make real progress towards sustainable development.

Looking ahead

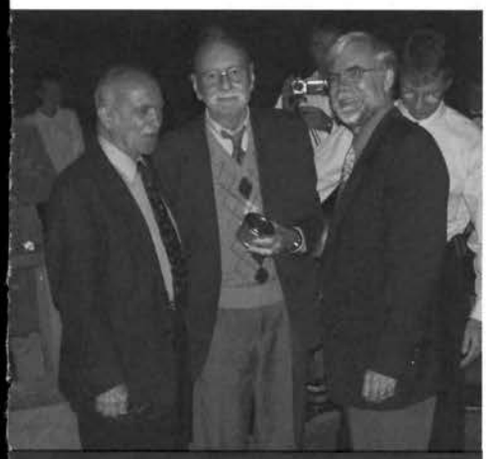
There needs to be a way for the global community to monitor its progress on the commitments made. Right now, with few exceptions, there are few mechanisms for ensuring that a country is living up to its commitments. That imbalance of enforceability leads to an imbalance in implementation. We need to find ways of redressing the implementation balance in a manner that offers positive incentives for conservation, and not just punitive measures.

To do that, we need better information on which to base decisions. I can't help but see that as another argument for the SSC to move ahead aggressively with the Species Information Service, so we can bring the information resources of the SSC network to bear much more effectively.

David Brackett, Chair, IUCN Species Survival Commission

Peter Scott Award for Dr. Ulie Seal

Dr Ulysses (Ulie) Samuel Seal, one of the Commission's leading lights, was recently presented with the Peter Scott Award for Conservation Merit. SSC's current Chair, David Brackett, and former Chair, George Rabb jointly presented this award during an event at the Minnesota Zoo celebrating Ulie's ongoing career as a pioneer of global conservation.



Ulie receives the award from George Rabb and David Brackett

Combining expertise in physiology, endocrinology, pharmacology, nutrition, genetics, and computer modeling, Ulie has made his life's work the preservation of the planet's biodiversity. A biochemist by training, Ulie spent most of his career as a scientist researching prostate cancer at the Veteran's Administration Medical Center in Minneapolis. During this time, he became intensively involved with endangered species conservation, founding the International Species Information System (ISIS), a global, central database that provides computerized animal information management for more than 500 cooperating zoological institutions worldwide. Ulie has served as chairman of the Conservation Breeding Specialist Group (CBSG) since 1979 and is well known throughout the world for his energy, enthusiasm, and commitment to biodiversity conservation. He has published more than 260 peer reviewed journal articles and 70 book chapters and reviews. Ulie has received many honors including the AAZPA Marlin Perkins Award (1991), the Chicago Zoological Society's Presidents Award (1992), the Zoological Society of Antwerp's Gold Medal (1993), and Emory University's Emory Medal (1993).

Team Species

The Booby Cay Iguana Project

Recent extensive fieldwork has revealed just how endangered some of the large iguanas are. Perhaps the most at risk is the genus known as *Cyclura,* the West Indian Rock Iguanas. Of those, the Grand Cayman Blue Iguana *(Cyclura lewisi)* appears to be the worst threatened (see Species 37) and the White Cay Rock Iguana *(Cyclura rileyi cristata)* numbers under 200 individuals. Amongst the many islands east of continental America, is a thin sliver of a cay, no more than 2km long, known as Booby Cay. Here, isolated from any others, is a population of about 700 iguanas that are related to the Turks and Caicos Iguana. Known as *Cyclura carinata bartschi,* this Booby Cay iguana is the subject of many meetings and field trips. Its well-being is discussed and written about, and its image is photographed and drawn. No more or less important than any other species of Iguanid, it has managed to survive on its own in the middle of nowhere and its extraordinary territorial "dance" is indeed a curious sight.

Its existence is threatened by a couple of herds of hungry goats that munch their way around the cay. Some goats are killed for food by fishermen, keeping the population at about 50, but this is too many and an unchecked goat herd can expand rapidly. They are also difficult to find, suggesting there may be more than the estimate, and once found are even more difficult to catch. Our team has been visiting the cay for five years and has tried from the outset to engineer a quick removal of this invasive species. The Iguana Specialist Group and International Iguana Society members have spoken with the authorities many times and have been made promises that have not yet come to fruition. Authorities recognize the goats are a pest but problems continue to set the project back.

Last year a trip was funded by Miami Metro Zoo, and there is good news in the form of a small funding grant from the newly formed International Iguana Foundation. Enough money has been promised to pay for the men needed to do the job of eradicating this invasive species. It is also possible the goats will be rounded up and taken to the mainland in the next excursion. There are no iguanas on the mainland. All that remains to be done now is to coordinate all parties concerned, get to the cay, and do the job. By this time next year, we should be able to report success. It is no good wishing the Booby Cay Iguana luck in its survival as they need more than that. They need our help.

John Bendon, Iguana Specialist Group member.

Rediscovery of the Grass Genus, *Hubbardia*

Hubbardia, a new monotypic grass genus from India, was first described in 1951 by Bor. First collected in 1919 from Jog falls, it was described when Father Santapau placed Sedgwick's grass collections at Bor's disposal. A striking species, *Hubbardia heptaneuron* Bor was only collected on two occasions, clinging to spray-moistened rocks near the famous Gersoppa Falls on the Sharavati River, which formed the boundary between the States of Bombay and Mysore (now Maharashtra and Karnataka respectively). The species disappeared from the region and was reported as probably extinct after dam construction on the Sharavati river and the drying of Jog Falls in the summer.

During our recent field survey on the grasses of Maharashtra, we found *Hubbardia heptaneuron* Bor at the Tillari ghat in Kolhapur district, a new locality for this species. However, careful search between 2000 and 2002 identified the species only at three sites between 400m and 500m altitude. These sites were closely clustered and together occupied an area of only about $3m^2$. It is a rare grass favoring moist rocks in shady places and grows on wet hanging rocks in ghat areas. It closely resembles *Arthraxon jubatus* Hack and exploits the same ecological niche. After collection of the species from Tillari ghat, efforts to locate the species in similar habitats at the Amboli, Fonda and Karul ghats in southwestern Maharashtra proved unsuccessful. It seems the grass is very rare. It is a critically endangered grass species of India's Western Ghats, and needs action taken towards its conservation. The Botany Department of Shivaji University, Kolhapur, India is cultivating this species as a preliminary measure; It is growing well on shaded wet bricks.

G. G. Potdar, C. B. Salunkhe and S. R. Yadav, Indian Subcontinent Plants Specialist Group

Molecular Taxonomy for Conservation

For species threatened by exploitation or protected by international agreements, molecular genetics provides a powerful tool for conservation through the forensic identification of commercial products and verification of trade records. Such products include meat, bones, feathers, shells, dried leaves, and a host of other tissues derived from animal or plants. Although these products may be impossible to classify on the basis of appearance alone, they often contain DNA that can be amplified and compared to sequences from known or 'reference' samples. Methods for molecular biosurveillance are now well established for commercial trade in products such as caviar and whale meat. Less well appreciated is the power of molecular systematic to augment, or even replace, traditional morphology-based techniques for identification of vertebrate species. The recent discovery of a new species of African elephant and a new species of beaked whale are examples resulting from comprehensive molecular surveys of organismal biodiversity.

A rare grass favoring moist, shady places

To address the full range of issues in biosurveillance and biodiversity, components of a molecular taxonomy must encompass both traditional methods and recent advances in bioinformatics. Methods for phylogenetic identification of species must be standardized and comprehensive databases of reference DNA sequences must be established from validated or voucher specimens. These tools must be user-friendly and available over the internet to reach the global community of conservation biologists and agencies responsible for protecting biological resources.

A web-based program, *www.DNA-surveillance*, attempts to bridge the current gap between traditional and molecular taxonomy. The program compares a user-submitted gene sequence of unknown origin against a set of validated reference sequences. Evolutionary distances are used to judge the 'match' and a phylogenetic tree displays their relationship. In its current format, *www.DNA-surveillance* is intended to aid in identification of cetacean specimens and products derived from strandings, fisheries bycatch, regulated exploitation and illegal hunting. The reference gene sequences datasets has proven to be an effective tool for the species identification of test specimens and for differentiating intra- and interspecific relationships among closely related cetacean species. Reference

Ulysses S. Seal, Ph.D.
Chairman of CONSERVATION BREEDING SPECIALIST GROUP (CBSG)

Charter Zoo Board member, serving from 1969 to 1979

Chair of Zoo Board 1977- 1979

Chairs a specialist group (CBSG) of the World Conservation Union

By professional stature and dedication of his work has brought worldwide attention to and interest in the MN Zoo:

- contributing to its unique design, as a board member
- centering the worldwide ISIS (International Species Information Program) at the Zoo, which he originated and managed from 1972-1978, in MN

  ISIS is a global central database that provides computerized animal management for more than 495 in 54 countries on 6 continents 50 cooperating zoological institutions worldwide
- chairing CBSG, a specialist group of the World Conservation Union, since 1979, headquartering the program at the MN Zoo.

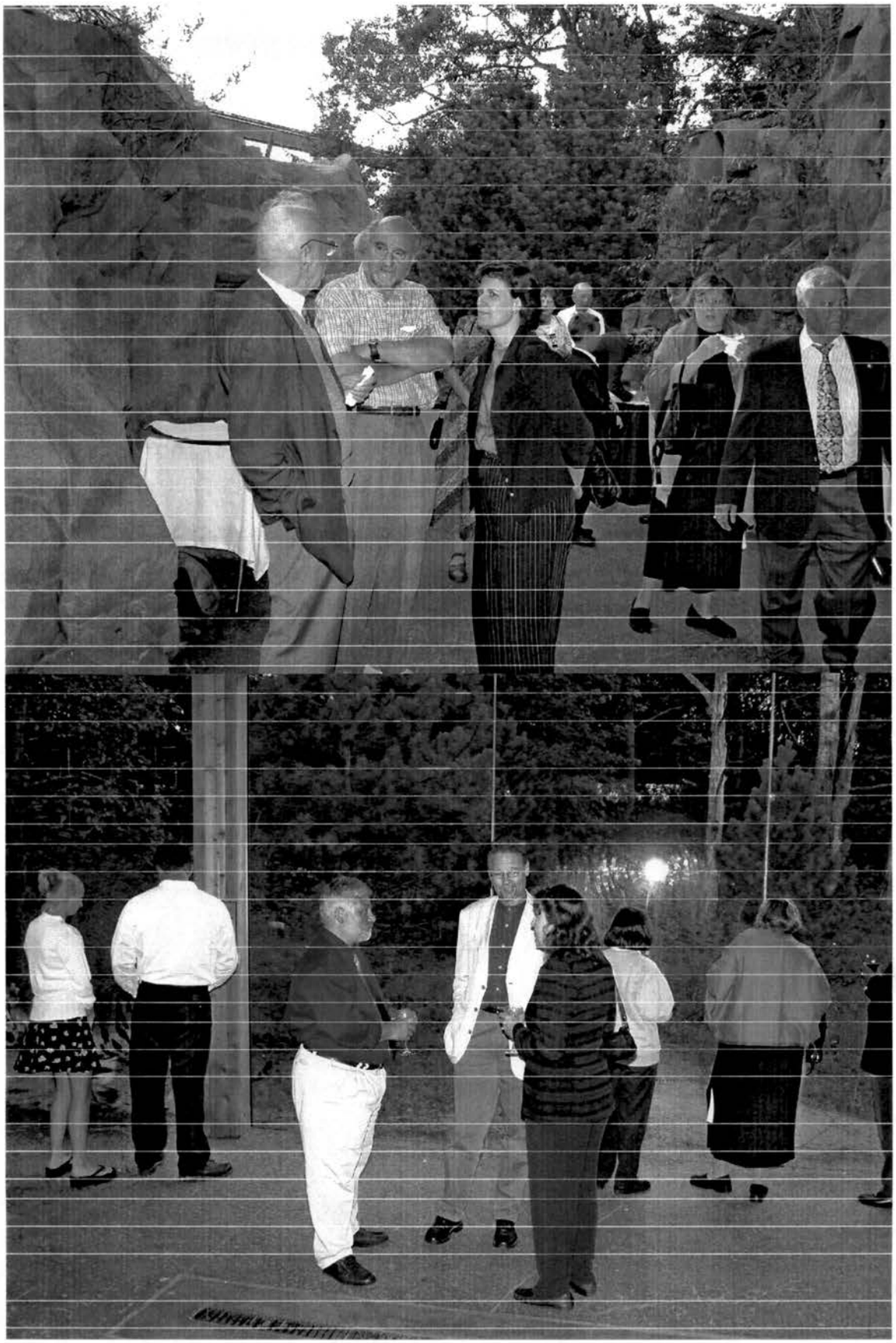
  The *Conservation Breeding Specialist Group is universally agreed to be the most active specialist group of the Species Survival Commission of the World Conservation Union.* The *World Conservation Union is the umbrella organization of the world's conservation groups. (Sierra Club, the Nature Conservancy, etc. are all members of the WCU)* The *WCU has several commissions, the largest of which is the Species Survival Commission, whose 7000 individual members are organized into about 100 groups. Most of these groups focus on orchids, or deer, or similar groups, trying to insure the survival of related life forms.* The *CBSG headquartered here works for species survival in the wild and in captivity under the guidance of U/ie Seal.*

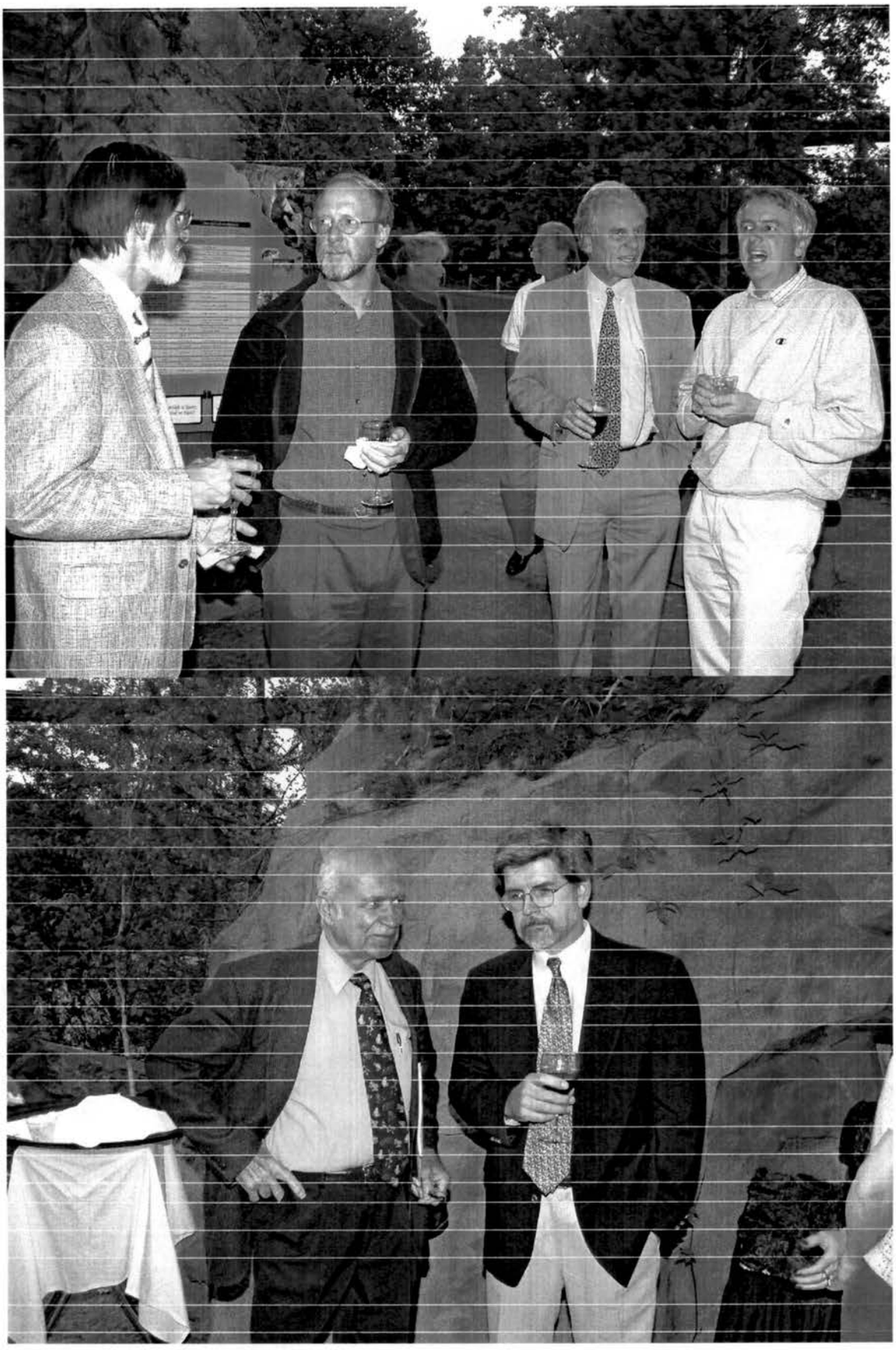
In 1980, Ulie began analyzing the global captive tiger population. In 1981, the AZA formed the Siberian Tiger Species Survival Plan.

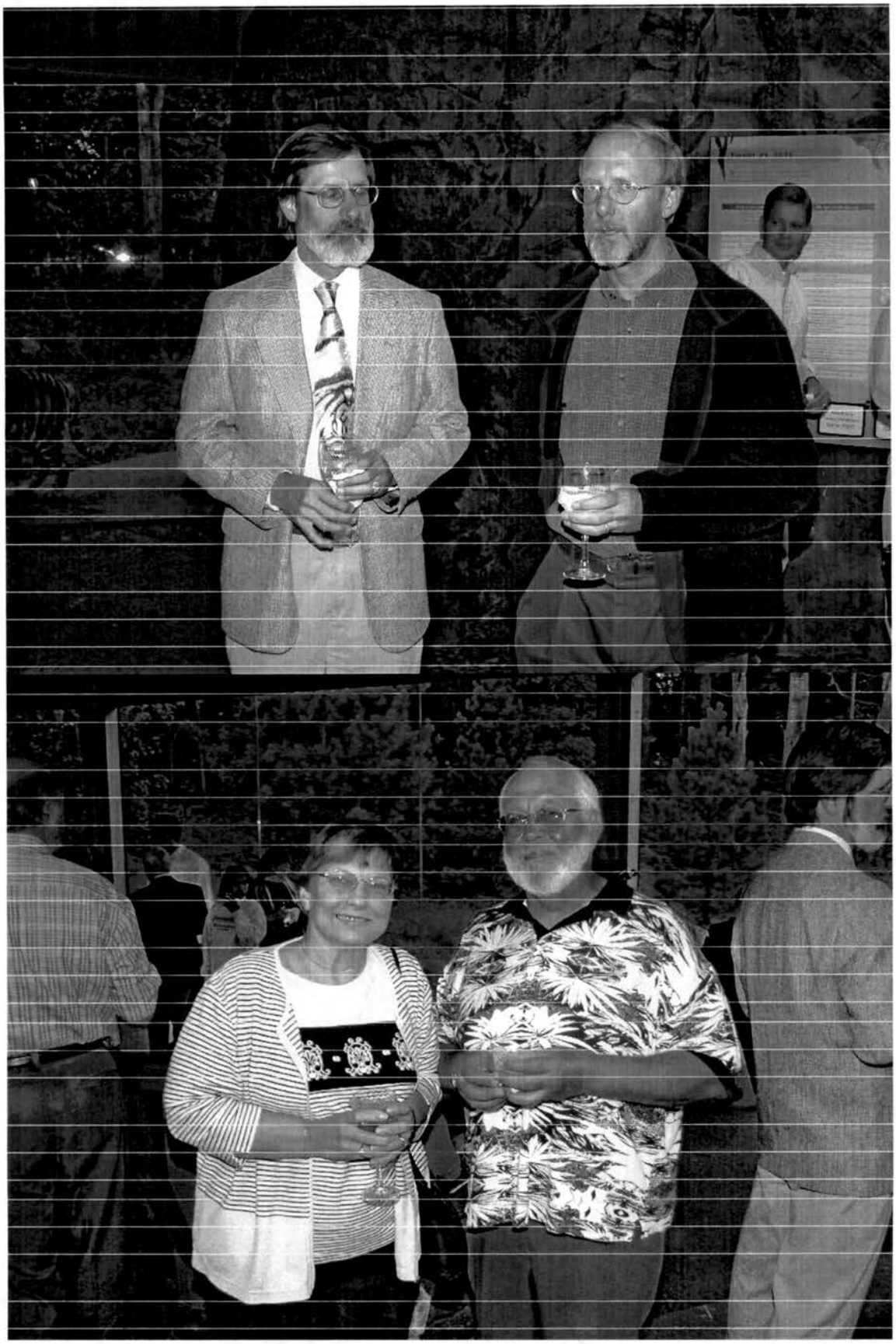
From 1982-84, Dr. Seal developed the first model for a Species Survival Plan (SSP) following the International Tiger Symposium in Leipzig. Several participants vividly recall Dr. Seal calculating Siberian tiger inbreeding coefficients by hand during a long journey by bus in what was then East Germany. All subsequent SSPs were modeled after the Siberian tiger program.

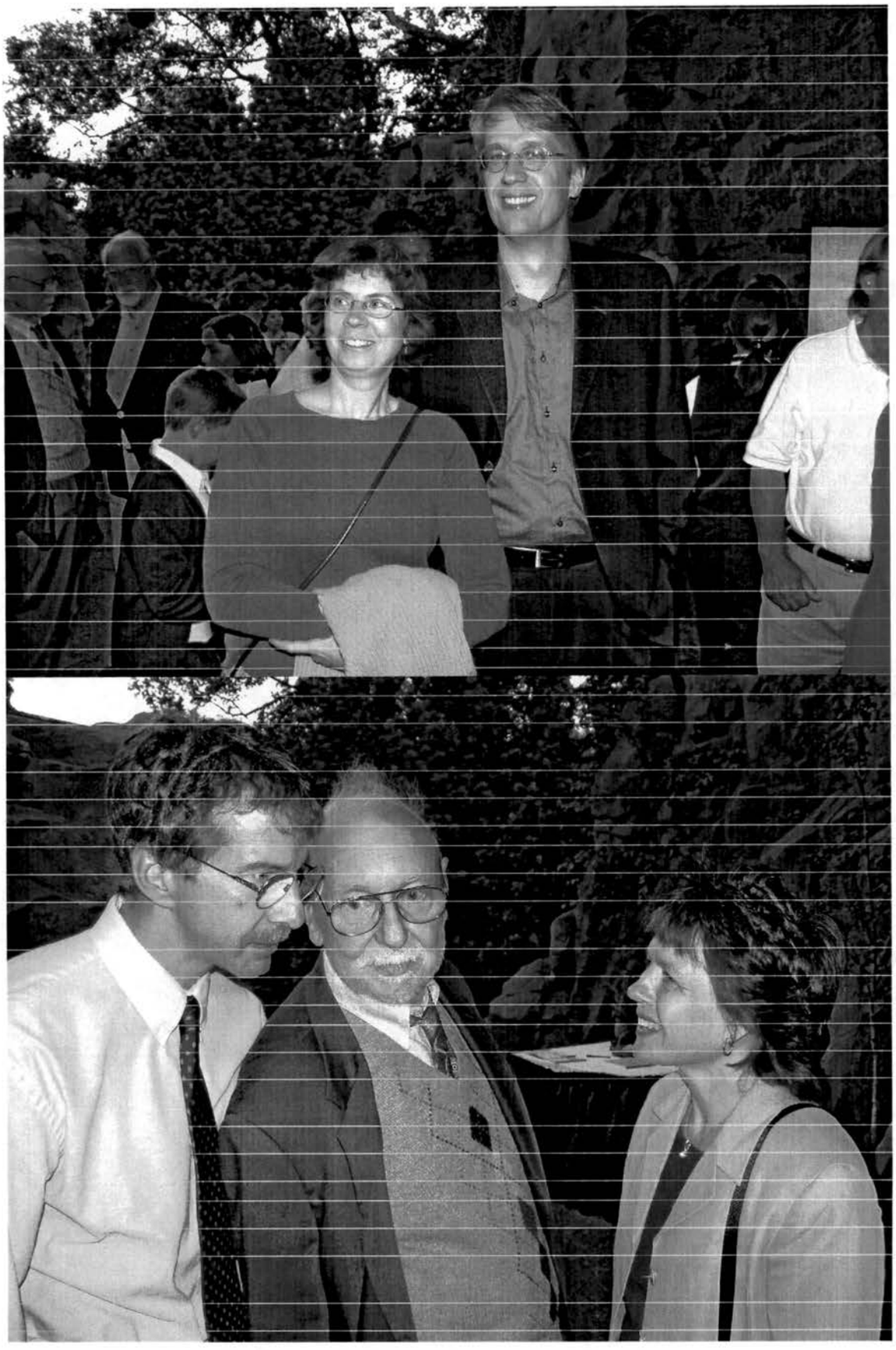
Recipient of **AZA Marlin Perkins Award**, the most prestigious conservation award given in North America.

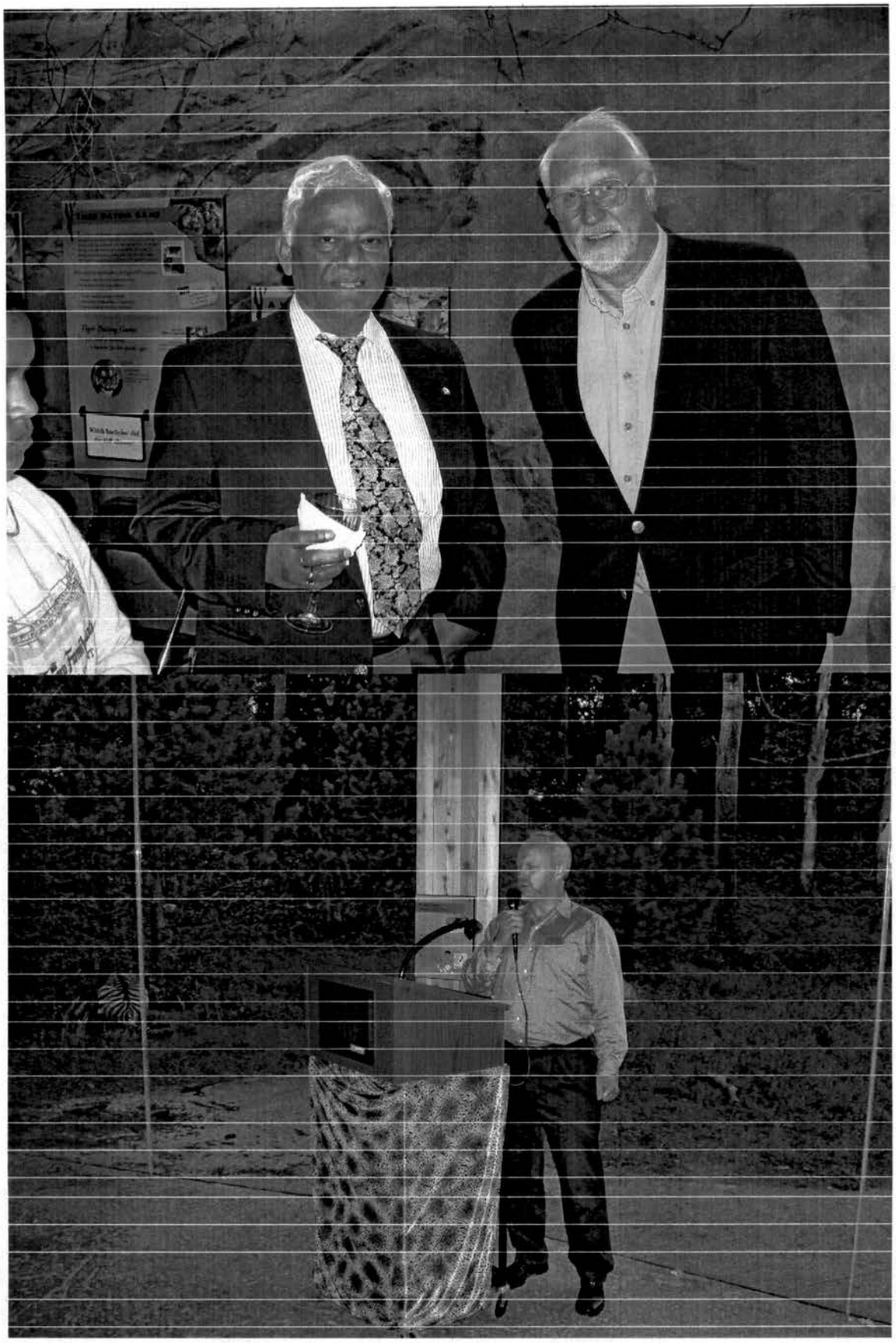
9/15/02 Julie Seal
CBS6 farewell

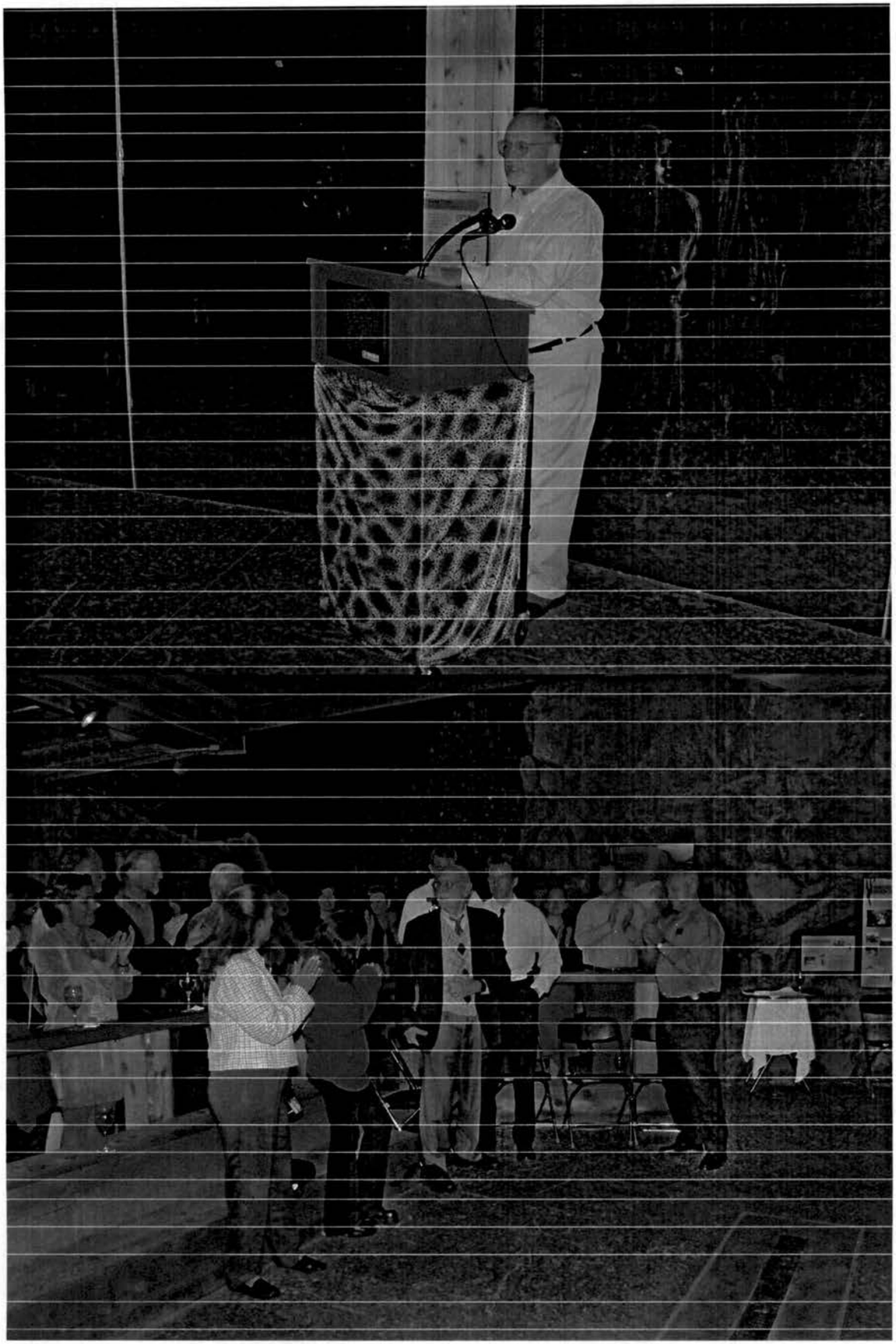


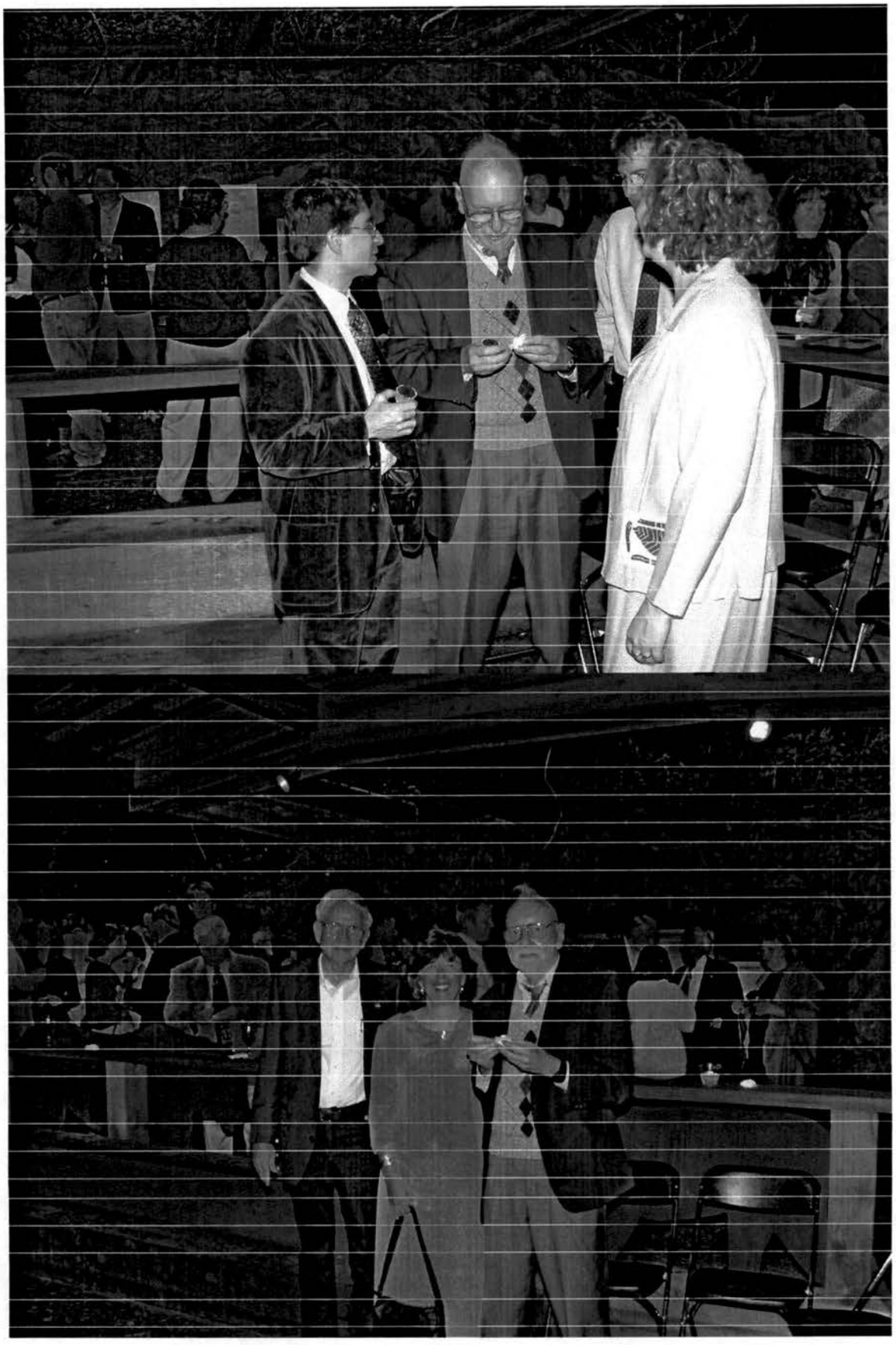


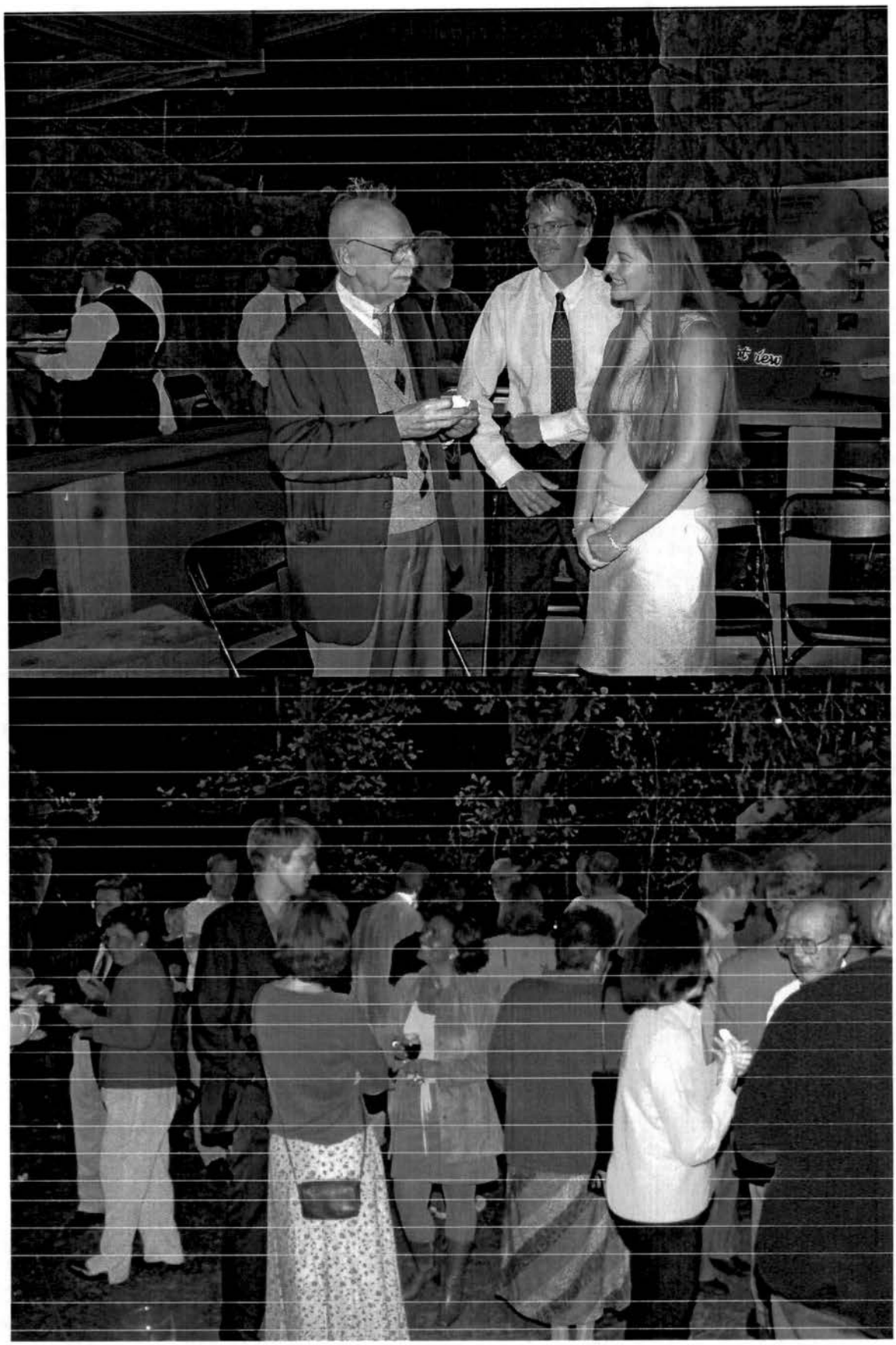


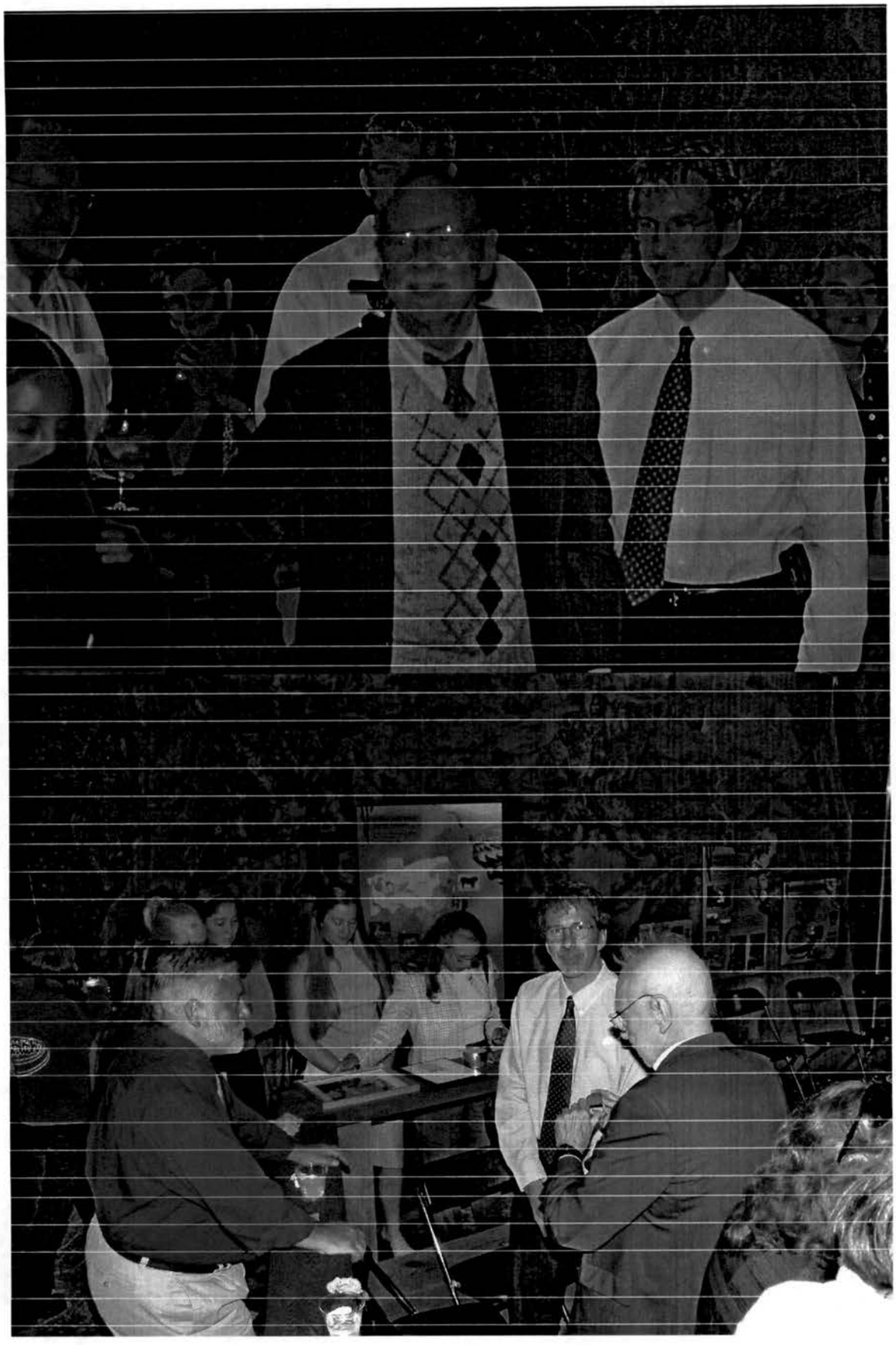


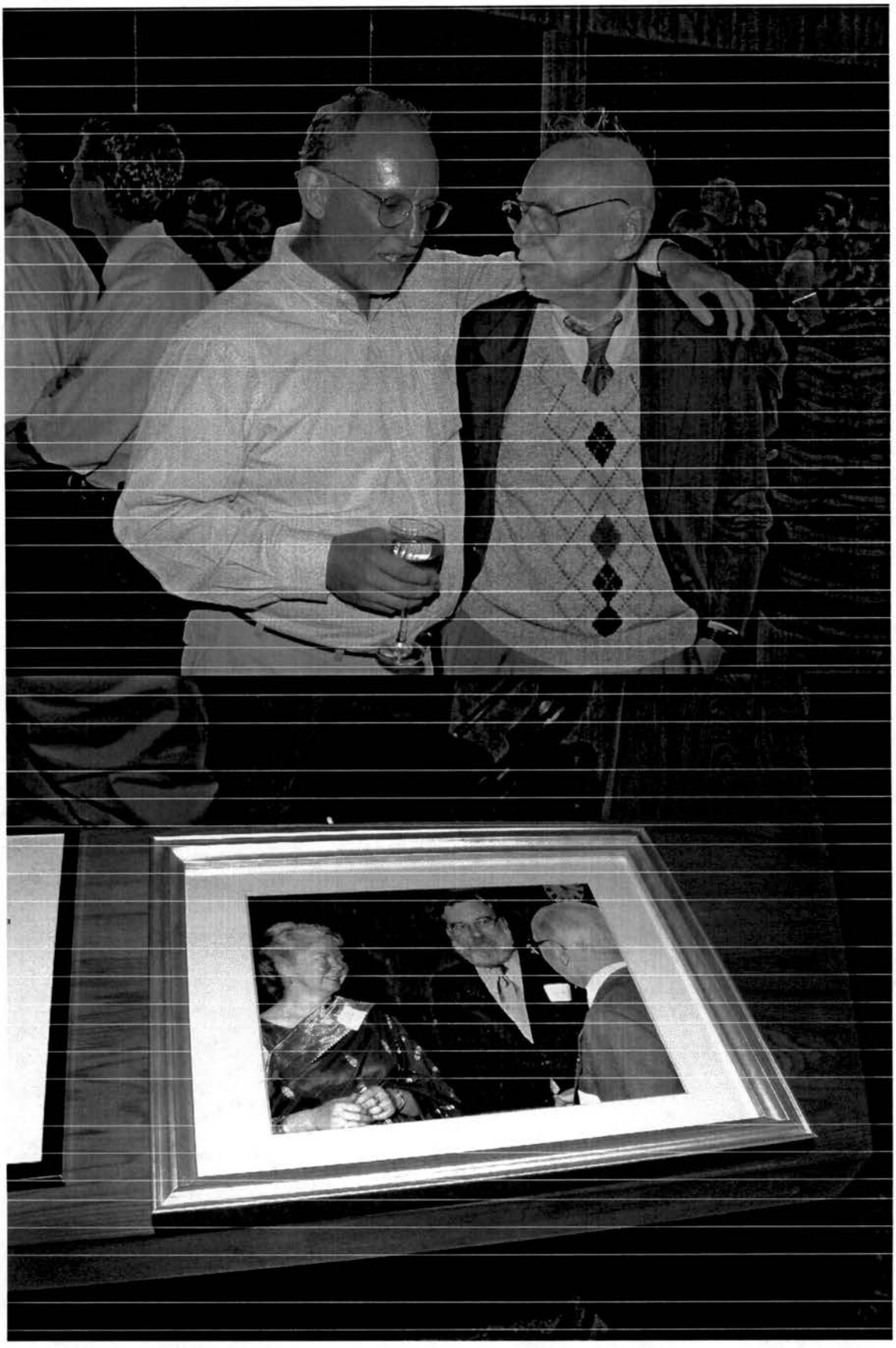


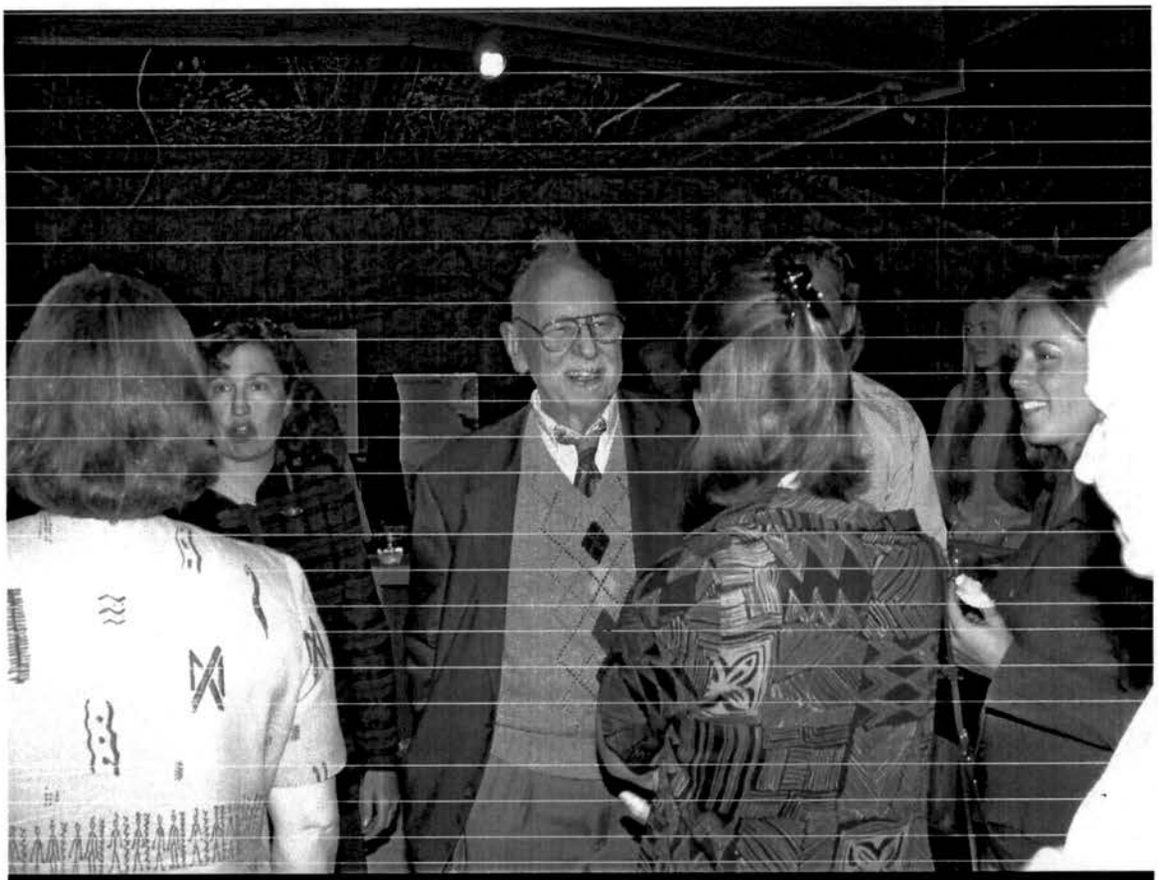


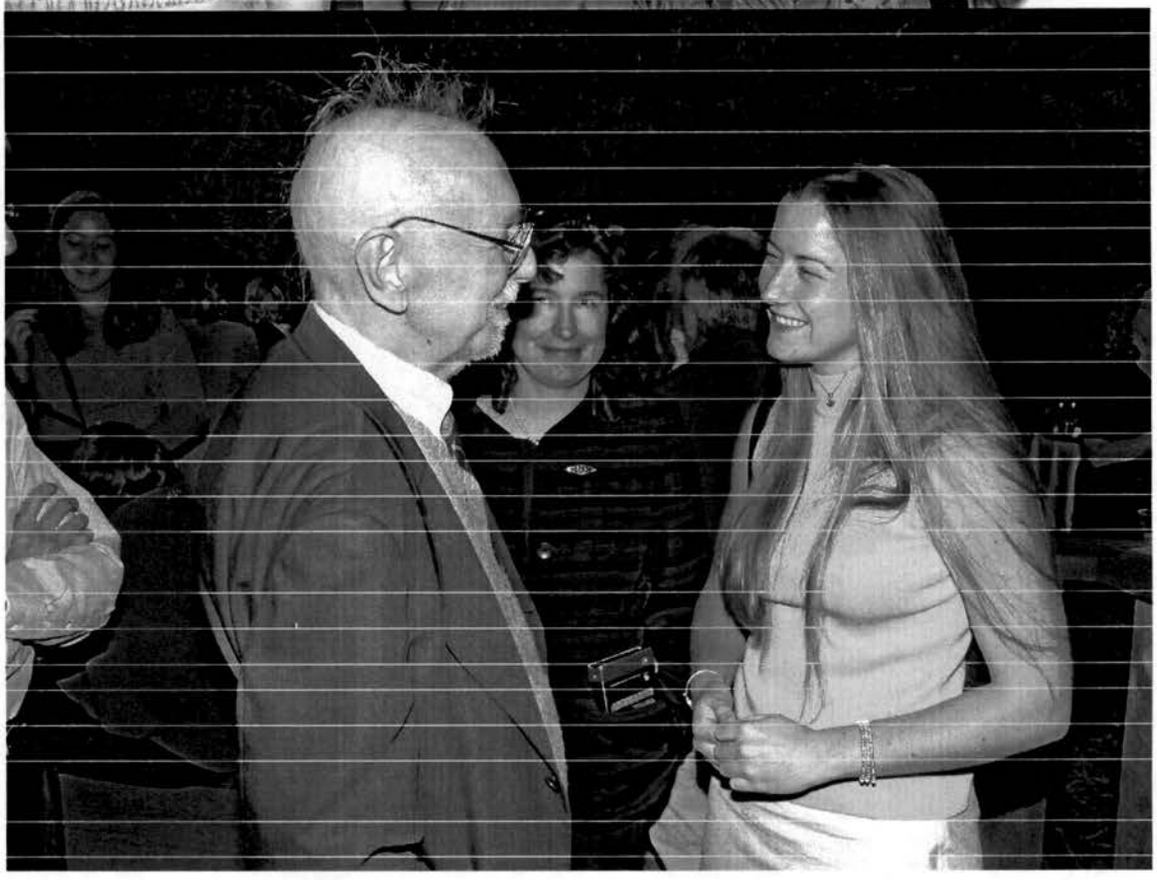


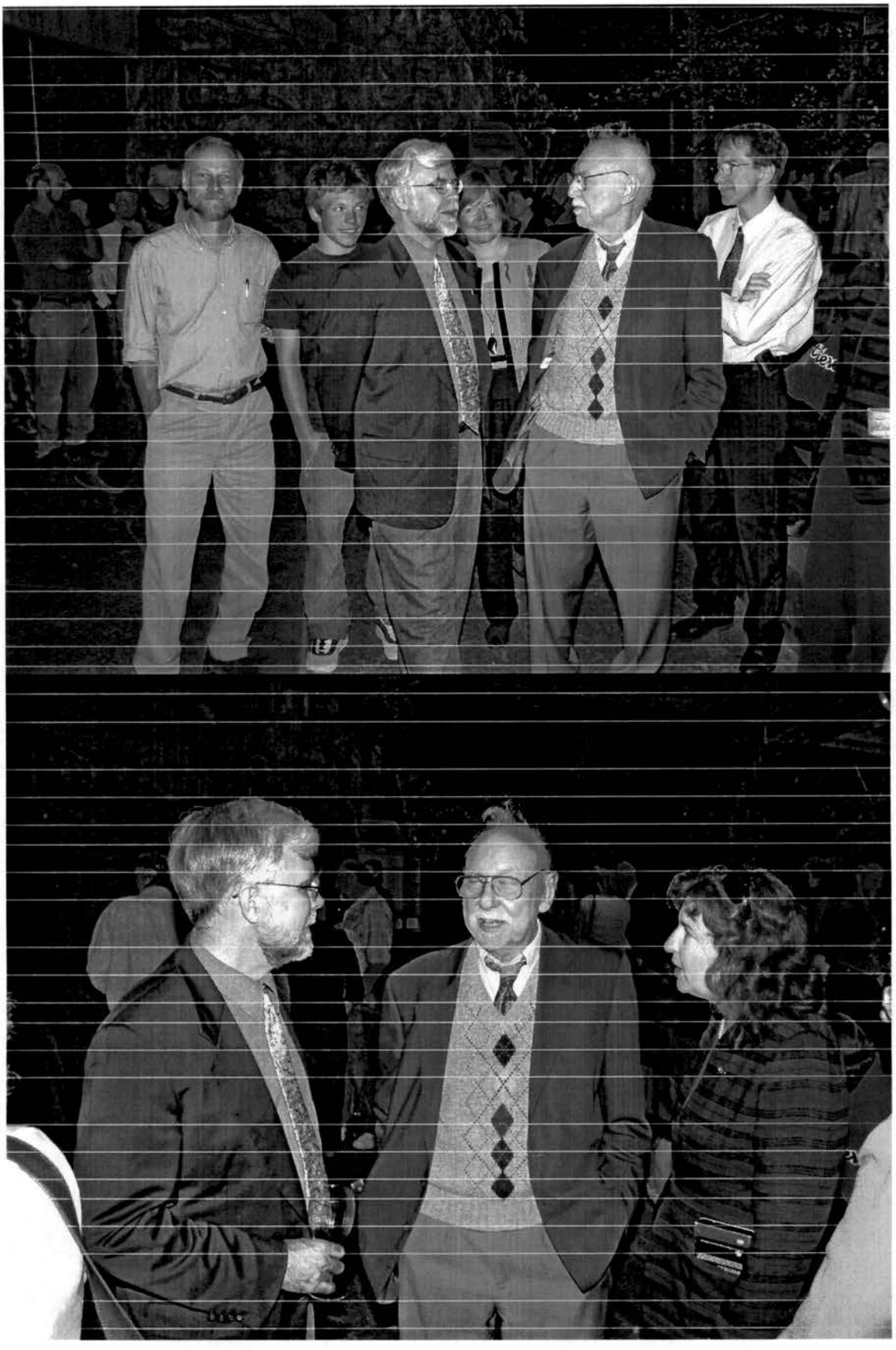












FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan
FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan	FY03 Annual Spending Plan

G1

Gimy:
I agreed w/ annie that the Zoo would cover $500, and the CBSG and Lee Simmons would pick up the rest.
Pleaz follow up.
Thanks

LANCER

CATERING

MN Zoo VIP Event
(Account #2581)

Catering Invoice

Event in Tiger Lair/DBay if Rain on Sunday, September 15, 2002

1	Fresh Vegetable Roll-ups with Jade Sauce (50 pieces) @95.00	95.00
1	Mini Yukon Gold Potatoes filled with Nicoise Vegetables (50 pieces) @95.00	95.00
1	Sausage Stuffed Mushroom Caps (50 pieces) @95.00	95.00
1	Sun-Dried Tomato and Feta Cheese Pillows (50 pieces) @95.00	95.00
2	Sesame Chicken Satay, Spicy Plum Sauce (50 pieces) @100.00	200.00
2	Asian Spring Rolls with Ground Turkey, Soy Ginger Dipping Sauce (per 50 pieces) @95.00	190.00
3	Assorted Mini Cheesecakes (per 50 pieces) @60.00	180.00
8	Oxford Landing - House Chardonnay (per bottle) @20.95	167.60
9	Oxford Landing - House Merlot (per bottle) @20.95	188.55
4	Oxford Landing - House Cabernet/Shiraz (per bottle) @20.95	83.80
3	Lemonade (per gallon) SELF-SERVE IN PUNCH BOWL @15.95	47.85
	Discount Given	(287.56)
	Subtotal	1,150.24
	Tax	97.02
18%	Surcharge	207.04
	Total	1,454.30
	Paid	0.00
	Balance	1,454.30

Please remit the total balance due upon receipt. If account balance is still unpaid 30 days after the event date, finance charges will be applied.
Please send all correspondence to Stacy Rundquist, Catering Sales Representative, at the address below.
Thank you for this opportunity to serve you.

13000 Zoo Boulevard, Apple Valley MN 55124 - t: (952) 953-6886 f: (952) 953-0669

Department Head Expenses

MAPS Expenditure Information

Agency Name MZB

Date of Expense	Explanation of Expense	Amount	Individual (s) Present	Official Capacity
9/15/02	Top Store of Wine Seal	500	60 individuals	
	hosted event		connected w/CBSG.	
	(invoice attached			

Total → 500

Pay Lanier Catering reference "Seal event on 9/15 in Tiger Lair."
(Balance to be paid by CBSG)

PI Coding Block-Accounting Component

See MAPS Operations Manual for instructions.

1. Date of Record / / 2. Accounting period / 3. Budget FY
4. ○ New 5. Mod ○
6. Vendor code 7. Document total
8. Name
9. Line #
10. Fund 15. Object/Sub 2M70 18. Amount
11. Agency
12. Org/Sub 16. Rept category 19. Partial/Final
13. Appropriation 17. Job number 20. Occur date /
14. Activity 21. Prompt pay date / /

I hereby certify that the goods or materials covered by this claim have been inspected and received or the services have been performed and are in accordance with specifications and are in proper form, kind, amount and quality, and payment therefore is hereby recommended.

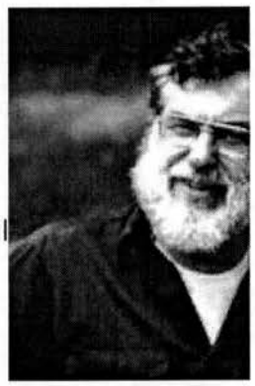
Document ID# Dept. Authorized Signature

Form FI-00543-01 (7/95)

About Us : History

Conservation Breeding Specialist Group
Species Survival Commission,
World Conservation Union
U.S. Seal, CBSG Chairman

12101 Johnny Cake Ridge Rd
Apple Valley, MN
55124-1851 USA
PHONE: 1-952-997-9800
FAX: 1-952-432-2757
EMAIL: office@cbsg.org



CBSG, originally known as the Captive Breeding Specialist Group, was formed to meet the need for interface between the academic or field conservation community, as traditionally represented by the SSC taxon-based Specialist Groups, and the captive breeding community. CBSG had several chairmen before Dr. U.S. Seal was appointed to its chairmanship by Sir Peter Scott in 1979. The IUCN developed Terms of Reference for CBSG at that time, which clearly defined IUCN's expectations and goals for what became its most rapidly evolving interdisciplinary Specialist Group

From 1982-84, Dr. Seal developed the first model for a Species S (SSP) following the International Tiger Symposium in Leipzig. Sev participants vividly recall Dr. Seal calculating Siberian tiger inbree coefficients by hand during a long journey by bus in what was the Germany. All subsequent SSPs were modeled after the Siberian ti program. The 1984 CBSG Annual Meeting began an active IUCN r studbooks and was attended by most of the CBSG membership - delegates met in a living room at St. Catherine's Island.

A major turning point came in 1985, when CB became involved with the development of the program for the critically-endangered black-fo ferret. This effort laid the foundation for the P and Habitat Viability Assessment (PHVA) prog incorporated a computer-simulation modeling to become VORTEX. Central to the developme subsequent effective recovery of the black-fo were experts on breeding viverrids and muste were included as advisors to develop the capt breeding program on which the success of th subsequently hinged.

In 1986, the first Global Captive Action Plan for Parrots was devel distributed. The IUCN Policy Statement on Captive Breeding, deve input from CBSG, was drafted at the 1986 CBSG Annual Meeting, approved in 1987. By 1988, CBSG membership had grown to 50 i and a CBSG office was established at the Minnesota Zoo.

At the 1989 Annual CBSG and IUDZG (now World Association of Z Aquaria) meetings in San Antonio, pledges for donations to provid support for the CBSG office were solicited from attending zoo dire all, 57 institutions pledged $228,500, ranging from $500 to $10,0 annually. The CBSG Steering Committee was officially formed at t meeting.

As CBSG grew, in addition to the captive breeding community, wil managers, non-governmental organizations, governments, and th sector became more integrally involved in CBSG's activities. The network became widespread and highly effective, providing an interdisciplinary vehicle for communication and collaboration betw individuals from each of the sectors mentioned above. The expans network prompted the publication of CBSG News. The premiere is CBSG News was sent to 3,000 individuals and institutions in Marc

One of CBSG's primary strengths is that it has brought a scientific to defining problems and determining management strategies for conservation activities, both in captivity and in the wild. Dr. Rober development of the VORTEX program was pivotal in moving CBSG forward. This user-friendly small population biology tool was imm integrated into CBSG's workshops, further expanding the PHVA pr Combining field and captive data and expertise, PHVAs continue t unique forum in which wildlife managers, academics, and captive experts can work together in species management and recovery p

The first Conservation Assessment and Management Plan (CAMP) (for primates) was held in Minnesota in March 1991. Following a C waterfowl in August, a CAMP workshop for Asian hornbills was hel conjunction with the CBSG Annual Meeting in Singapore. At this Genome Resource Banking guidelines were developed and subseq published. The CBSG's first network office, CBSG India, also was i 1991.

By 1993, the institutional donor base increased to $331,500 from institutions. In February 1993, CBSG held a Futures Search Works Jamaica to plot its direction and strategy for the next decade. By t March, the 20th CAMP workshop had been conducted and PHVAs for 50 species. There were 562 members of CBSG and CBSG New circulation of 6,250.

CBSG's eventual integration of risk assessment and conservation management planning workshop processes for ex situ and in situ populations, with an emphasis on maintenance or restoration of w populations, led to the change in name from 'Captive' to 'Conserv Breeding Specialist Group in 1994.

CBSG's Future Search Conference held i August, 2000, represented the third suc in ten years. The reports of the four Fut working groups reflect both a shared co and distinctive, program related visions

future. They all shared a common vision of CBSG as a catalytic en conservation at a global level, as a source of innovation, profound committed to local and grass roots empowerment as well as to inc as a focus for cutting edge conservation science and processes. T commitments have remained constant over the last ten years. In the spirit of innovation that is core to the CBSG philosophy, are e proposals for expanding possibilities in: 1) in situ conservation; 2) technology transfer and training; 3) community empowerment an expanded stakeholder inclusion through joint venture partnership experimentation with new tools and tool sets such as GIS to stim interdisciplinary collaboration in the transformation of information knowledge and knowledge to action.

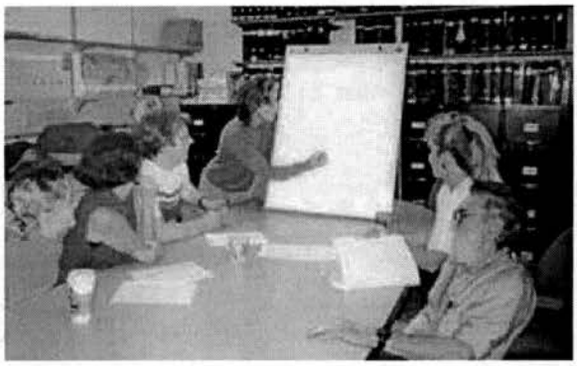
By the end of 2001, CBSG had conducted over 80CAMP workshops PHVA workshops, along with numerousDisease Risk Assessment workshop Conservation Planning workshops and Facilitation Training workshops.

Currently, CBSG has a membership of 941 individuals from 92 co CBSG is supported by 147 donor institutions, organizations and in Contributions range from $25 to $25,000 per year for a total ann funding base of $384,178. CBSG's core staff of two program offic three support staff rely on an extended network of volunteer asso members and regional network convenors to initiate, develop and CBSG products and processes. One of the keys of CBSG's enormo effectiveness and resilience is the capacity of its network to work independently but in concert to achieve short and long term conse objectives.

CBSG's Future

As the world changes around us, CBSG remains focused on its cor competencies and remains committed to assisting with complex, conservation issues using our participatory, interactive, science-b workshop process while, at the same time striving to improve our capabilities through innovation and partnership. The CBSG staff re brainstormed terms that reflect the essence of CBSG. The resultin statement reflects more than the mission of CBSG but its vitality, and soul.

CBSG cares about saving endangered species and habitat. It base mission and activities on the development and implementation of scientifically sound processes. CBSG takes a position in the conser community based on cross-cultural, interdisciplinary and intersect partnerships. It champions openness, inclusiveness, ethics, and ri CBSG constantly evolves in response to the needs of those concer conserving the planet's biodiversity. It depends on the support, ac and vitality of its extended community.



CBSG/Minnesota Zoo/ISIS Exhibit Overview

April 17, 2001

Mission (1st Level Information):

As the human population continues to grow across the globe, biodiversity is being lost at a rapid rate. Three organizations housed at the Minnesota Zoo are working to conserve the biodiversity at risk. The primary goal of the exhibit is to inform zoo visitors and potential donors about the broad scope of local, national and international conservation initiatives that stem from the Minnesota Zoo.

Initiatives (2nd Level Information):

The conservation initiatives mentioned in the mission are carried out by three organizations headquartered at the Minnesota Zoo; the Conservation Breeding Specialist Group (CBSG), the International Species Information System (ISIS) and many departments of the Minnesota Zoo. All three organizations have extensive networks across the globe through which two-way communication regularly occurs for the active conservation of endangered plant and animal species. Not surprisingly, many of the strongest networks have been developed in the most heavily populated regions where biodiversity is at the highest risk.

Sections (3rd Level Information):

In order to graphically depict the fact that human population growth is adversely affecting biodiversity, the exhibit will have three sections centered around the concrete column at the top of the entrance ramp to the MN Zoo Tropics trail in the following sequence:

Section 1: THE PROBLEM

Components:

- **Heading sign:** The human population is growing, resulting in the loss and eventual extinction of many plant and animal species across the globe.
- **Population growth ticker/Biodiversity loss ticker**
- **Volunteer booth:**
  - Computer screen with current updates on all three organizations. (Touchable or non, only in operation when booth is staffed.)
  - Automatic slide carousel with screen
  - Other artifacts or materials
- **Photos of species already extinct in the wild or highly endangered**
- **Fact sheet about the effects of human population growth and consumption.**

Section 2: THE SOLUTION

Components:

- **Heading sign:** What we're doing about it.
- **CBSG/MN Zoo/ISIS fiber optic sign:** See detailed description of sign on page 3 of this document.

Section 3: THE RESULTS

Components:

- **Heading sign:** We're making a difference.
- **CBSG workshop report covers, signed moratoriums, etc.**
- **MN Zoo studbook covers, conservation awards, etc.**
- **ISIS Awards, baby animal photos, etc.**
- **How YOU (the zoo visitor) can make a difference: brochures on conservation.**
- **Money well.**
- **Web site information for CBSG, ISIS and the MN Zoo.**

Section 3, THE RESULTS:

We're making a difference, and you can too!

$

Brochure Stand

Section 2, THE SOLUTION:

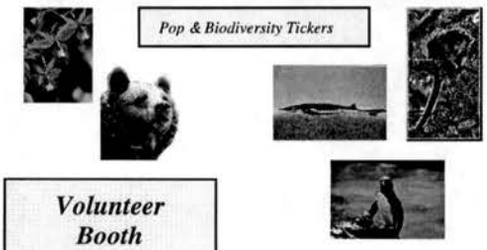
Two international conservation organizations housed here at the zoo are doing something about it.

Concrete Column

Entrance to Tropics

Section 1, THE PROBLEM:

The human population is growing, resulting in the loss and eventual extinction of many plant and animal species across the globe.



Pop & Biodiversity Tickers

Volunteer Booth

Top of Ramp from Main Zoo Entrance

The CBSG/MN Zoo/ISIS Fiber Optic Sign (In Section 2)
CBSG, the Minnesota Zoo and ISIS all contribute to the conservation of plant and animal species in very different ways:

1. **Conservation Breeding Specialist Group (CBSG) IUCN/SSC** *(Information provided by Jenny Shillcox and Ulie Seal)*:
    - CBSG provides its networks and membership of over 1000 volunteers across the globe with scientifically developed tools and processes to use for conservation in their countries.
      (Photos of members representing different cultures around the world. Lines leading from Minnesota connect with the networks and branch out from there.)

    - CBSG brings experts and people from different governments, cultures and disciplines together in workshops to develop practical conservation action plans for endangered species.
      (Photos of working groups using flipcharts, computers and involved in a high level of interaction. Possibly some examples of report covers.)

    - CBSG has conducted workshops to save over 6000 plant and animal species in over 50 countries.
      (Photos of some of the plant and animal species CBSG has worked with. Lights will lead to the countries in which workshops have been held.)

2. **Minnesota Zoo** *(Information provided by Ron Tilson, Kevin Willis and Jim Streater)*:
    - Local conservation: Restoration: The Minnesota Zoo is one of the leading contributors of Trumpeter swans cygnets used by the DNR to restore this species in the wild.
      (Photo of Trumpeter swan adults and cygnets or a montage of several photos of this species. Lights show where released birds have been tracked.)

    - National conservation: Ex situ conservation: Staff of the Minnesota Zoo actively participate in xx programs (SSP, TAG, SMAG, CAP, Studbooks, etc.) of the American Zoo and Aquarium Association (AZA) for endangered species management.
      (Photo of tiger mother and cubs or montage of several species. Lights show where these endangered species call home and which zoos in North America we partner with in our jointly coordinated programs.)

    - International conservation: In situ conservation: The Minnesota Zoo created the Adopt-a-Park Program that protects the only Indonesian national park left in the world where Javan rhinos survive, and is a leader in tiger conservation efforts across parts of Southeast Asia.
      (Photos of park guards on patrol in Ujung Kulon, the Minnesota boat, a ranger station. Lights show where these projects are.)

3. **International Species Information System (ISIS)** *(Information provided by Nate Flesness)*:
    - ISIS offers pooled specimen information on 300,000 live zoo specimens of 4,000 species, from 576 ISIS-member zoos, aquariums, and breeding centers in 56 countries. ISIS also has information on 1,200,000 ancestors of today's live zoo animals. This unique information base improves animal management. It helps zoos monitor population sizes, find unrelated animals for breeding, and provides normal veterinary medicine values for exotic animal species.
      (Photos of animals, studbook examples and veterinary labs. Lights will lead from Minnesota to the member zoos across the globe.)

    - ISIS develops zoological software for quality animal records-keeping and collection management. ISIS software is the world zoo standard.
      (Photos of the software and/or programmers working on their computers.)

- In addition to headquarters here at Minnesota, ISIS has branch offices in Amsterdam and Sydney, in cooperation with regional zoo associations there.
  (Photos of the branch offices. Lights will connect the Minnesota office to the branch offices.)

Note: This outline is for concept only; the phrases and supporting graphics need further refinement by each organization and by the designer.

Location and Design

Discussions among sign committee members pertaining to the location and design of the sign have resulted in the following recommendations:

Location: The sign will be located at the top of the entrance ramp to the Tropics Area. It will be mounted on the curved wall facing the entrance.

Size: The sign should be as large as possible to attract visitors. Size will depend largely on the cost.

Materials & Mechanics: The sign face should be made of a semi-transparent plastic material (Ex: hard plexi-glass). The sign, when first approached, will be dark black except for the illuminated title, map and three color-coded buttons, one each for CBSG, ISIS and the Minnesota Zoo. Light boxes behind the title, map and buttons will be necessary for this purpose. When the buttons are pressed, two things will happen:

1. A network of color-coded fiber optic cables will light up and stem out from the Twin Cities area on the map for each organization. The cables will be mounted behind the semi-transparent map and each will have it's own illuminator and color wheel for movement.

2. Three "blurbs" of color-coded text accompanied by graphics will light up for each organization. Light boxes will be needed for this.

With the design components in mind, it is anticipated that the three levels of information outlined above will be conveyed as follows:

- The mission (1st level) is the general message the sign should convey at first glance. The illuminated title, large map, three buttons for CBSG, ISIS and the Minnesota Zoo and possibly the addition of plant and animal photos will serve this purpose.

- The initiatives (2nd level) will be illustrated when the buttons for each organization are pressed and color-coded fiber optic cables stemming from Minnesota to other countries across the globe will become illuminated on the map. End-point fiber optics can be used in addition to the cable to better illustrate specific countries or sites of conservation activity. Heavily populated areas can be color-coded somehow on the map to show the correlation between conservation activities and densely populated areas.

- Examples (3rd level) will be conveyed by the three bullets of information with illustrative photos for each organization that will light up on the black areas of the sign.

Please refer to the attached sign with all three levels of CBSG information shown as an example.

Conservationist races time to create 'ark' for preserving world's animals

■ Pulling world together on managing species full-time commitment

DEBRA O'CONNOR STAFF WRITER

From his tiny office at the Minnesota Zoo, Ulysses S. Seal has embarked on an odyssey across the world, creating an "ark" that would preserve the Earth's animals for the future.

Seal, who leads an international band of conservationists called the Captive Breeding Specialist Group, is working feverishly to find ways to identify and save crucial genetic strains in zoos and wildlife preserves, and even as frozen embryos.

"We see ourselves as the conservators of the biodiversity of a segment of the animal population," Seal said.

"To maintain the genetic diversity in the population, you need between 100 and 300 animals, and that number of individuals will be scattered between five and 100 different institutions. This requires first-class, cutting-edge science."

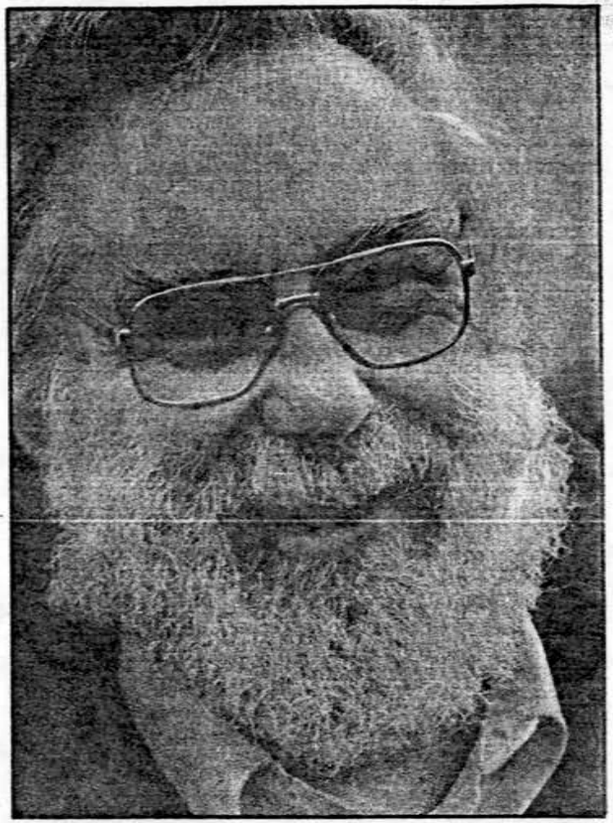
Seal is recognized as a major force in that effort. This month, British Broadcasting Corp. cameras followed him from an Indonesian rhino preserve to a London meeting to the Siberian tiger exhibit at the Minnesota Zoo. The resulting hour-long documentary will be aired next spring in the United States.

BBC director Robert Thirkell and his crew came to Apple Valley to record preparations for a swap of musk ox calves from the Minnesota Zoo for Siberian tigers from the Moscow Zoo. The exchange, which is planned for the next few weeks, would bring new genes into the genetic pool of tigers in North American zoos.

Seal hardly fits the image of the introverted research scientist tinkering away in a musty laboratory. His enthusiasm is apparent, and his ready laugh is infectious.

"When he comes walking into a room, he brings with him a different life force. He has this tremendous energy field around him," Minnesota Zoo director Kathryn Roberts said.

"I think of him as a very creative entrepreneur who has no interest in following organizational order, no interest in being told what the rules or restraints are. His only interest is to get the job done. He's able to take you away from the day-to-day type of thing and remind you of why we're in business."



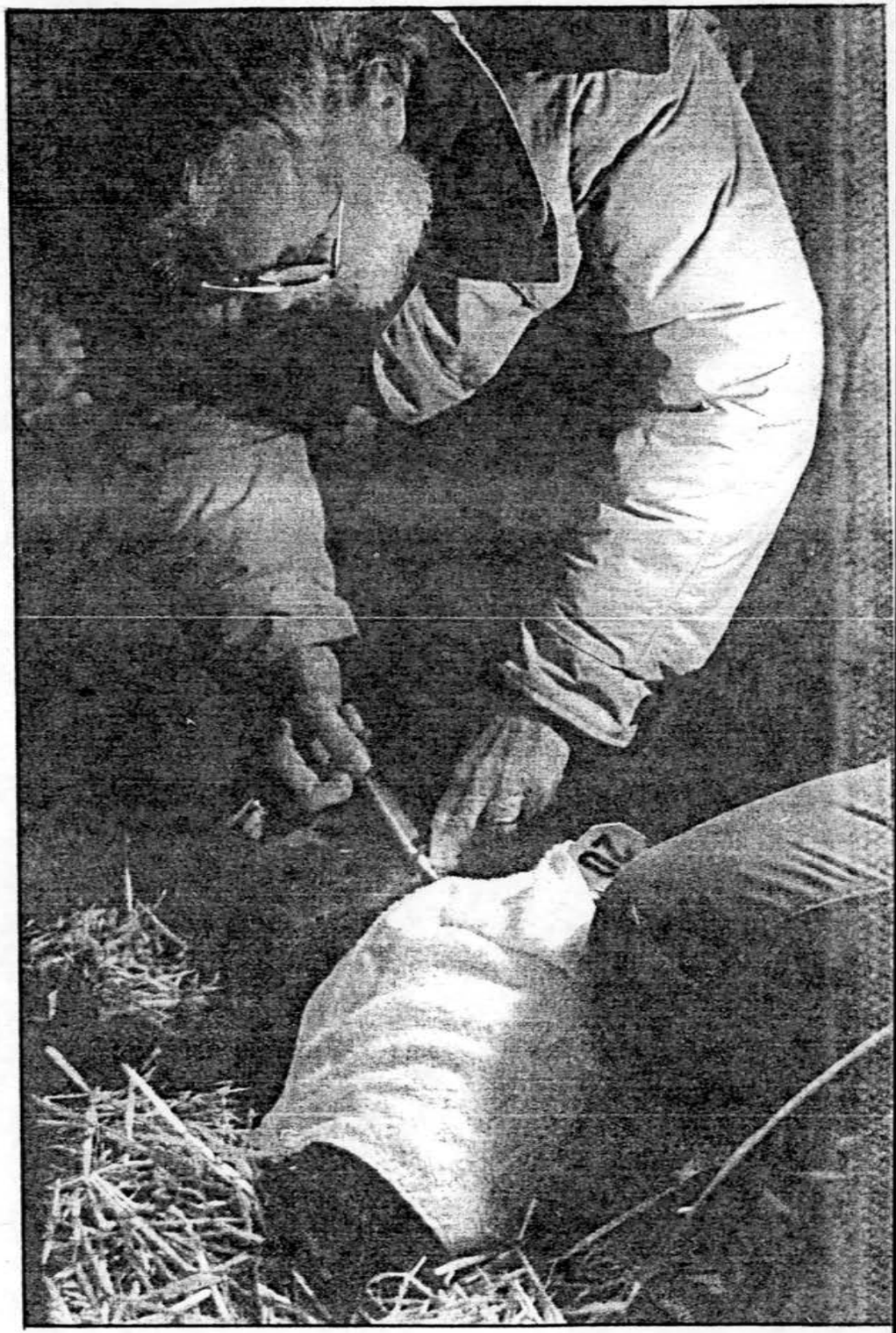
STAFF PHOTOS BY JOE ROSSI

From his Bloomington home and his rented zoo office, Seal communicates with the world via a plethora of fax machines and computer modems.

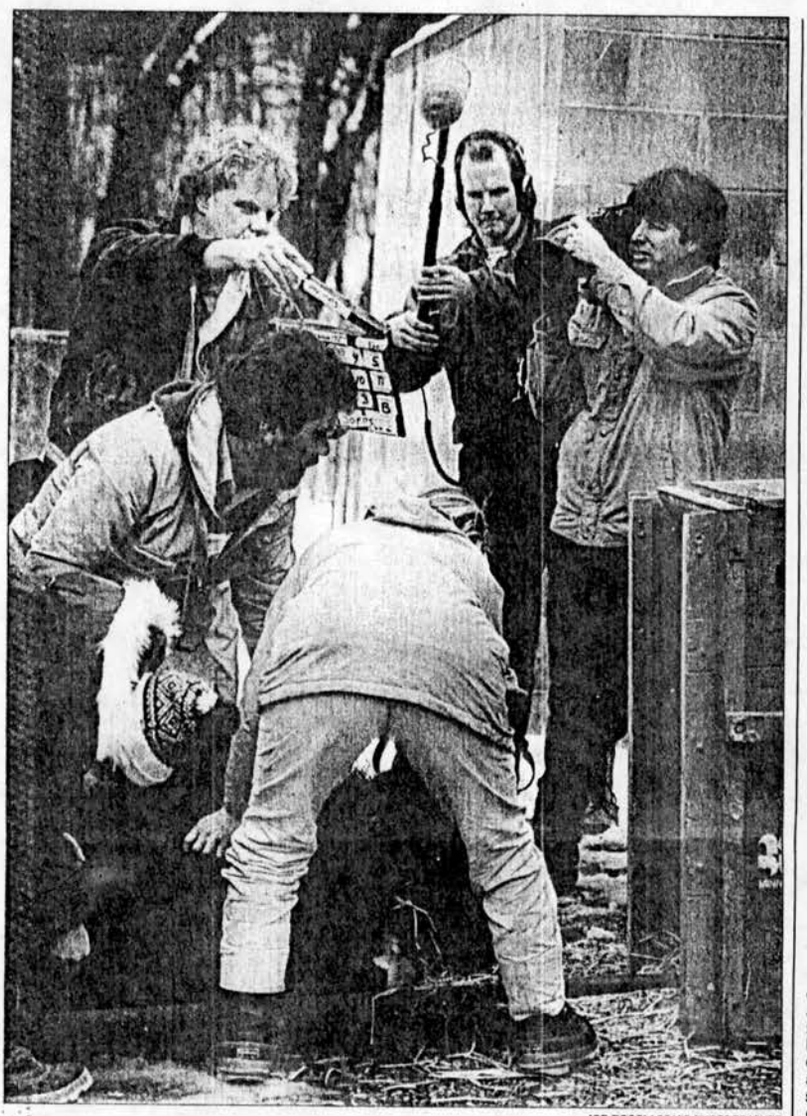
In the past 18 months, he has met with conservation leaders in foreign countries including Japan, Indonesia, China, Vietnam, Thailand, Korea, Malaysia, India, Australia, New Zealand, Brazil, England, the Netherlands, Germany, Venezuela, Costa Rica — plus, Seals says tongue-in-cheek, Texas.

After 35 years as a research biochemist at the Veterans Affairs Medical Center at Fort Snelling, Seal, 61, retired last

SEAL CONTINUED ON 2B ▶



Biochemist Ulysses S. Seal, above, leads an international band of conservationists working to find ways to identify and save crucial genetic strains in zoos and wildlife preserves worldwide. At right, Seal draws a blood sample from a sedated musk ox at the Minnesota Zoo.



JOE ROSSI/ STAFF PHOTOGRAPHER

A British Broadcasting Corp. film crew prepares to begin shooting footage of Minnesota Zoo staff loading a musk ox calf into a crate for shipment to the Moscow Zoo.

SEAL

▼ CONTINUED FROM 1B

month to devote his attention to wildlife. One of his immediate aims is to establish an independent non-profit foundation to fund the work of the captive breeding group, which was created by the International Union for the Conservation of Nature.

The breeding group's goal is to manage the entire world population of an animal species as one. Decisions made on breeding Siberian tigers at the Minnesota Zoo, for example, are to be based on the parentage of the remaining 300 wild tigers, as well as each of the 700 in the dozens of zoos across the world. Eventually those decisions will include freezing embryos — cryopreservation.

These measures could ensure safekeeping of animal genes until humans can figure out how to coexist with the Siberian tiger, the Javan rhinoceros, the California condor and other creatures whose survival is threatened by human habits.

It is literally an effort to save the world, at least as it's now known. With one to two dozen animals being added to the endangered species list every year, science is scrambling to hang on until political solutions are found to problems such as the decimation of habitat and explosive population growth. Scientists' major challenge is to avoid inbreeding, which can destroy a species within 20 generations.

To draw international support based on what's best for the animal population as a whole, Seal has had to be a consummate diplomat as well as a respected scientist, conservation officials say.

"There are some fights," Seal said. "A lot of people are concerned about the recommendations we've made. There are people who would rather see a species die with dignity in the wild than come into captivity."

Jim Jackson, a Texas breeder of endangered animals who also serves in the captive breeding group, said Seal is best at getting groups to put aside their individual differences and come to a consensus.

For example, to put the black-footed ferret back into the wild, reluctant government wildlife departments had to be convinced of the need for a thriving prairie dog population, because that's what the ferret eats.

"With 30 people in the room, you're not going to agree on anything, not even on what time to have lunch," Jackson said.

Because Seal has no formal ties to any zoo or wildlife group, he is considered unbiased, which helps. He pays for most of his travel and animal study out of his own pocket, so he's also considered altruistic.

And, Jackson said, Seal is noted for being productive: "I'd be happy if I'd get half as much done as he does, and I'm 20 years younger. He's almost 62 — he'll be eligible for discounts."

Seal and his wife, Marialice, have five grown children. At home is a room of computer equipment that for days at a time runs simulation models of what would happen to a species if this factor or that factor were changed. The models are used to make recommendations for management programs that will keep animal populations stable and healthy.

In 1959, armed with a doctorate in biochemistry from Emory University in Atlanta and postgraduate work at the University of Minnesota, he began a long-term study of prostate cancer as a research chemist at the veterans hospital. He needed to do blood studies on animals whose blood hormones responded in the same way as humans' to a certain test. But he found that the blood of typical laboratory animals, such as rats and chimpanzees, wouldn't work.

What started as a national search through zoos to find a suitable animal ended up as an abiding interest in the welfare of the animals. Along the way, he began the International Species Inventory System, so that for the first time, zoos across the world could keep track of their animals' lineage. He developed new drugs so animals can be immobilized safely and effectively, standard blood analyses of hundreds of animals and a contraceptive implant. He also served on the founding board of the Minnesota Zoo.

His life reflects his passionate concern for the world's animals, Roberts said.

"For Ulie, there is no such thing as a personal life," she said. "For Ulie, there is a life that has to do with species preservation, and it's a 24-hour-a-day commitment."

JAPAN

▼ CONTINUED FROM 1B

venture with a Japanese community.

Schultz, who came to Winona State from Arlington Heights, Ill., is happy with the Japanese program. She has a boyfriend among the 250 Japanese students studying on the campus, and she is planning to stay in Japan for at least one more quarter after the current academic year.

Administrators also say the campus in Akita, 225 miles north of Tokyo, has met their expectations in most respects. But they are having a hard time recruiting American students for the next session, which begins in mid-April.

Last year at this time, 35 students had applied for what was supposed to be a class of 60 Americans. This year, only 16 students have applied for a class that administrators had hoped would number 80 to 90.

Like last year, a Dec. 1 deadline for applications has been extended to Jan. 31.

"Our experience last year was kids didn't make commitments until they had gone home over Christmas and hashed this out with Mom and Dad," said Robert Carothers, chancellor of the Minnesota State University System.

"One of the things we're considering doing," said Charles Graham, the assistant chancellor in charge of the Japanese program, "is recruiting a group to go in September when it may be more natural for our students to go. We haven't announced that or made a final decision, but we're certainly considering it."

Another change will allow students to study in Japan for as little as one academic quarter instead of a full year.

There have been some problems with the campus. One of the early complaints from students was about a Japanese cook who served fried chicken and french fries for breakfast. On a more serious level, there have been some disciplinary problems among the Japanese students, and some American students have complained that the limited curriculum available during the first year may delay their graduation.

Carothers said the disciplinary problems, which included a fight over a young woman, were typical of freshmen away from home for the first time.

The school offers American students a one-year program of Japanese language and culture classes

With only ... up for a cl... projected ... 90, the en... deadline h... extended t... 31.

and a few ge... courses.

It also offers a ... gram for Japanes... begins with a ye... English instructi... three years, the J... will be eligible to ... of the State Univ... seven Minnesota ... earn bachelor's de... more years.

POLLUTION

New York Times 1/2/90 (Science Times, p. 19)

Research Offers Hope for Threatened Species

By JON R. LUOMA

APPLE VALLEY, Minn.

lmost weekly for nearly 10 years, Ulysses S. l has raised a long plastic pipe to his mouth blown a tranquilizer dart into the flank of a ed Siberian tiger.

linutes later, in a flurry of activity, Dr. Seal, iochemist, and his assistants work on the ne and anesthetized tiger as part of a long- m study on the complexities of large-cat roduction.

he research here at the Minnesota Zoologi- Gardens in a suburb of Minneapolis could lead to techniques that will increase biologists' options for breeding Siberian tigers, which are considered highly endangered in the wild. It is part of a much broader effort being conducted by Dr. Seal and a growing group of researchers convinced that the survival of many endangered species will depend on the ability of humans to breed them successfully in captivity.

These scientists point to a series of successes or partial successes, including work with red wolves, black-footed ferrets and the California condor in the United States, small monkeys called golden lion tamarins in Brazil, and the Arabian oryx, an antelope that lives in the Arabian desert.

The New York Times/Steve Wolt

ranquilized Siberian tiger at the Minnesota zoo.

But captive breeding is not embraced with universal enthusiasm. Many biologists and environmentalists say its potential is sharply restricted by limitations in available space, by relatively high costs and by humans' limited ability to reintroduce zoo-reared animals to wild habitats.

Whitney Tilt, project director for the National Fish and Wildlife Foundation, a conservation organization, said: "The problem is if you look at captive breeding as an alternative to habitat protection, you might as well shut off the lights right now. The time you can call captive breeding a success is not when you get your first baby born, but when you can get animals back into the wild."

Dr. Seal, chairman of the Captive Breeding Specialist Group of the International Union for the Conservation of Nature, a scientific and environmental organization, said he agreed that preserving wild habitats was a far more effective means of preserving endangered species. But he added, "Some animals are now in such deep trouble that we're going to have to have captive breeding programs for them if they're going to have any reasonable hope of surviving."

In their work with Siberian tigers, the largest of the world's cats, the researchers here typically take blood samples from an anesthetized animal weighing 300 pounds or more. If the tiger is a male, semen may be extracted. If it is a female, eggs may be flushed.

Usually, researchers working with the tigers analyze sperm cells under a microscope to gauge their abundance and vigor, often mechanically separating seminal fluid in a centrifuge and replacing natural fluids with chemicals and nutrients known to improve sperm survival. Often sperm or fertilized eggs are frozen in tanks of liquid nitrogen for storage.

Advanced reproductive technologies, particularly insemination using frozen and thawed sperm, have been successfully practiced on cattle and other livestock for years. Although they would be a boon to captive breeders, solving the problem of shipping tigers or rhinos for mating, the technologies are now available for only a few wildlife species, largely because of the difficulties of understanding each species' hormonal

Continued on Page 23

ie. Test-
tamarins has occurred.
ore than 100 animal species are
part of formal breeding pro-
ns conducted by associations of
in North America, Europe and
ralia. These include the black
ceros, the snow leopard, orang-
, Asian elephant, Bali myna, go-
, Sumatran rhino and Puerto Ri-
toad. Dr. Seal said the captive
ding group was developing more
100 other programs and hoped to
1,000 programs for vertebrates,
ding mammals, birds and rep-
, by the end of the 1990's.

ryos for Animals in Wild

We still feel that's less than half of
vertebrate species that will need
ive propagation if they're going

Hope for Threatened Species Seen

Continued From Page 19

and reproductive system. Last July, with the help of Dr. Seal's research, scientists at the National Zoo in Washington succeeded for the first time in a "test tube" fertilization of Siberian tiger ova. Although the embryos did not develop to term, the researchers said they had overcome a major hurdle in the attempt to perfect embryo tranplantation techniques for the cats.

Proponents of captive breeding point to other species where they have had success.

With the help of consultants from the captive breeding group, state biologists in Wyoming have increased a captive population of black-footed ferrets from 17 in 1987 to 118. The ferrets, none of which are known to survive in the wild, now are split between breeding sites in Wyoming, Nebraska and Virginia, and program managers expect that the number will double in the next year. Plans are being made to reintroduce ferrets into the wild in 1991.

In 1988, Federal officials began reintroducing small numbers of red wolves into national wildlife refuge lands in North Carolina, South Carolina and Louisiana. The red wolf had become extinct in the wild, and survived only in a few zoo collections. By the end of 1989, there were about 25 red wolves on refuges in the wild, about half of them wild-born pups, said Warren Parker, the Federal red wolf recovery coordinator. As scientists expected, however, at least 12 have died from a variety of causes.

In the late 1970's, biologists working in Oman began reintroducing the Arabian oryx, a cream colored antelope that had vanished from its Arabian desert habitat but was preserved in breeding programs at the Phoenix and San Diego zoos. Today some 80 oryx survive in Oman, and another 90 in Jordan.

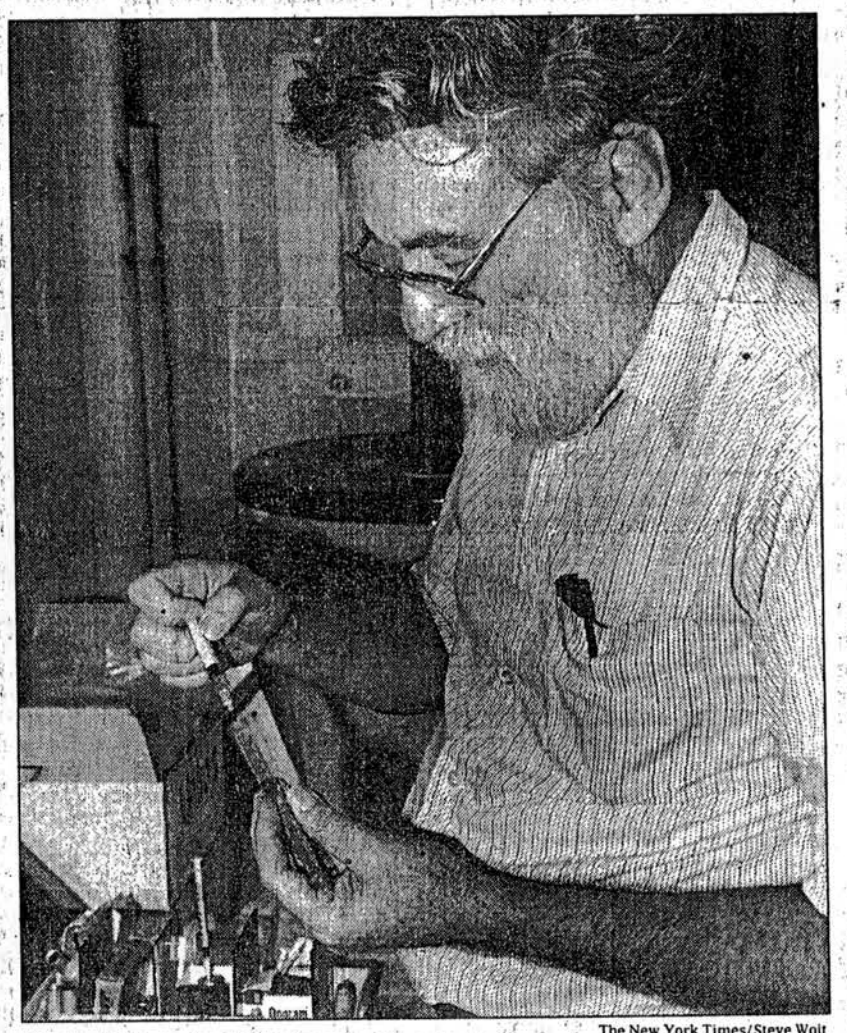
In 1984, officials of the National Zoo and the World Wildlife Fund, a conservation group, began reintroducing golden lion tamarins into the Atlantic coast rain forest of Brazil, where only a few hundred of these brilliantly golden, squirrel-size monkeys survived. To date, more than 60 captive-bred tamarins have been introduced to the reserve. Some breeding with wild tamarins has occurred.

More than 100 animal species are now part of formal breeding programs conducted by associations of zoos in North America, Europe and Australia. These include the black rhinoceros, the snow leopard, orangutan, Asian elephant, Bali myna, gorilla, Sumatran rhino and Puerto Rican toad. Dr. Seal said the captive breeding group was developing more than 100 other programs and hoped to have 1,000 programs for vertebrates, including mammals, birds and reptiles, by the end of the 1990's.

Embryos for Animals in Wild

"We still feel that's less than half of the vertebrate species that will need captive propagation if they're going to survive," he said.

As with Dr. Seal's efforts with the Siberian tiger, some researchers are working to develop such reproductive technologies as artificial insemination and embryo transfer. Among other benefits, such techniques could allow biologists to transfer embryos from a zoo female into a womb of a wild female. That, in turn, could help expand a small and shrinking population on an isolated reserve or enlarge a tiny gene pool in the wild.



The New York Times/Steve Wolt

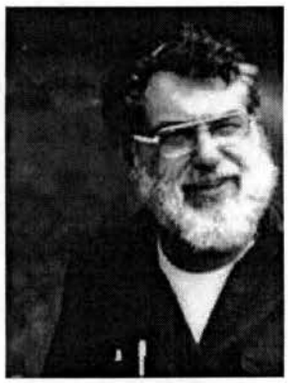
Dr. Ulysses S. Seal, head of an international captive breeding effort, preparing a tranquilizer dart at the Minnesota zoo near Minneapolis.

The New York Times/Steve Wolt

esota zoo.

Advanced reproductive technologies, par larly insemination using frozen and tha sperm, have been successfully practiced on tle and other livestock for years. Although would be a boon to captive breeders, solving problem of shipping tigers or rhinos for ma the technologies are now available for only a wildlife species, largely because of the diff ties of understanding each species' horm

Continued on Page 23



- B.A., Psychology, Emory University, 1949
- M.A., Psychology, Emory University, 1950
- Ph.D., Biochemistry, Emory University, 1957
- Post Doc., Biochemistry, University of Minnesota, 1957-59

Combining expertise in physiology, endocrinology, pharmacology, nutrition, genetics, and computer modeling, Ulie Seal has made his life's w preservation of the planet's biodiversity. A biochemist by training spent the better part of his career as a scientist researching prost cancer at the Veteran's Ad ministration Medical Center in Minnea During this time, he became intensively involved with endangere conservation, founding the International Species Information Sys (ISIS), a global, central database that provides computerized ani management for more than 500 cooperating zoological institution worldwide. Ulie has served as chairman of the Conservation Bree Specialist Group (CBSG) since 1979. (CBSG is one of about 125 s groups, all belonging to the Species Survival Commission, one of commissions of the IUCN - The World Conservation Union, known informally as the United Nations of the World of Nature) He has p more than 260 peer reviewed journal articles; and 70 book chapt reviews. Ulie has received many honors including the AAZPA Marl Perkins Award (1991), the Chicago Zoological Society's President (1992), the Zoological Society of Antwerp's Gold Medal (1993), E University's Emory Medal (1993), the U.S. Fish and Wildlife Servi Lakes-Big Rivers Region Silver Eagle Award (199 4), the first Hei Hediger award of the IUDZG (1996) and the American Associatio Veterinarians award (2001).

Well-known throughout the world, Ulie has conducted more than CBSG workshops in 60+ countries involving more than 6 ,000 participants and met with their conservation leaders. In 2000, Uli traveled more than 150,000 miles.

Home | About Us | News | CBSG Toolkit | Reports | Regional Networks | Global Zoo Directory | Sitemap | Search

New York Times 1/2/90 (Science Times, p. 19)

Research Offers Hope for Threatened Species

By JON R. LUOMA

APPLE VALLEY, Minn.

Almost weekly for nearly 10 years, Ulysses S. Seal has raised a long plastic pipe to his mouth and blown a tranquilizer dart into the flank of a caged Siberian tiger.

Minutes later, in a flurry of activity, Dr. Seal, a biochemist, and his assistants work on the prone and anesthetized tiger as part of a long-term study on the complexities of large-cat reproduction.

The research here at the Minnesota Zoological Gardens in a suburb of Minneapolis could lead to techniques that will increase biologists' options for breeding Siberian tigers, which are considered highly endangered in the wild. It is part of a much broader effort being conducted by Dr. Seal and a growing group of researchers convinced that the survival of many endangered species will depend on the ability of humans to breed them successfully in captivity.

These scientists point to a series of successes or partial successes, including work with red wolves, black-footed ferrets and the California condor in the United States, small monkeys called golden lion tamarins in Brazil, and the Arabian oryx, an antelope that lives in the Arabian desert.

The New York Times/Steve Wolt

A tranquilized Siberian tiger at the Minnesota zoo.

But captive breeding is not embraced with universal enthusiasm. Many biologists and environmentalists say its potential is sharply restricted by limitations in available space, by relatively high costs and by humans' limited ability to reintroduce zoo-reared animals to wild habitats.

Whitney Tilt, project director for the National Fish and Wildlife Foundation, a conservation organization, said: "The problem is if you look at captive breeding as an alternative to habitat protection, you might as well shut off the lights right now. The time you can call captive breeding a success is not when you get your first baby born, but when you can get animals back into the wild."

Dr. Seal, chairman of the Captive Breeding Specialist Group of the International Union for the Conservation of Nature, a scientific and environmental organization, said he agreed that preserving wild habitats was a far more effective means of preserving endangered species. But he added, "Some animals are now in such deep trouble that we're going to have to have captive breeding programs for them if they're going to have any reasonable hope of surviving."

In their work with Siberian tigers, the largest of the world's cats, the researchers here typically take blood samples from an anesthetized animal weighing 300 pounds or more. If the tiger is a male, semen may be extracted. If it is a female, eggs may be flushed.

Usually, researchers working with the tigers analyze sperm cells under a microscope to gauge their abundance and vigor, often mechanically separating seminal fluid in a centrifuge and replacing natural fluids with chemicals and nutrients known to improve sperm survival. Often sperm or fertilized eggs are frozen in tanks of liquid nitrogen for storage.

Advanced reproductive technologies, particularly insemination using frozen and thawed sperm, have been successfully practiced on cattle and other livestock for years. Although they would be a boon to captive breeders, solving the problem of shipping tigers or rhinos for mating, the technologies are now available for only a few wildlife species, largely because of the difficulties of understanding each species' hormonal

Continued on Page 23

Hope for Threatened Species Seen

Continued From Page 19

and reproductive system. Last July, with the help of Dr. Seal's research, scientists at the National Zoo in Washington succeeded for the first time in a "test tube" fertilization of Siberian tiger ova. Although the embryos did not develop to term, the researchers said they had overcome a major hurdle in the attempt to perfect embryo tranplantation techniques for the cats.

Proponents of captive breeding point to other species where they have had success.

With the help of consultants from the captive breeding group, state biologists in Wyoming have increased a captive population of black-footed ferrets from 17 in 1987 to 118. The ferrets, none of which are known to survive in the wild, now are split between breeding sites in Wyoming, Nebraska and Virginia, and program managers expect that the number will double in the next year. Plans are being made to reintroduce ferrets into the wild in 1991.

In 1988, Federal officials began reintroducing small numbers of red wolves into national wildlife refuge lands in North Carolina, South Carolina and Louisiana. The red wolf had become extinct in the wild, and survived only in a few zoo collections. By the end of 1989, there were about 25 red wolves on refuges in the wild, about half of them wild-born pups, said Warren Parker, the Federal red wolf recovery coordinator. As scientists expected, however, at least 12 have died from a variety of causes.

In the late 1970's, biologists working in Oman began reintroducing the Arabian oryx, a cream colored antelope that had vanished from its Arabian desert habitat but was preserved in breeding programs at the Phoenix and San Diego zoos. Today some 80 oryx survive in Oman, and another 90 in Jordan.

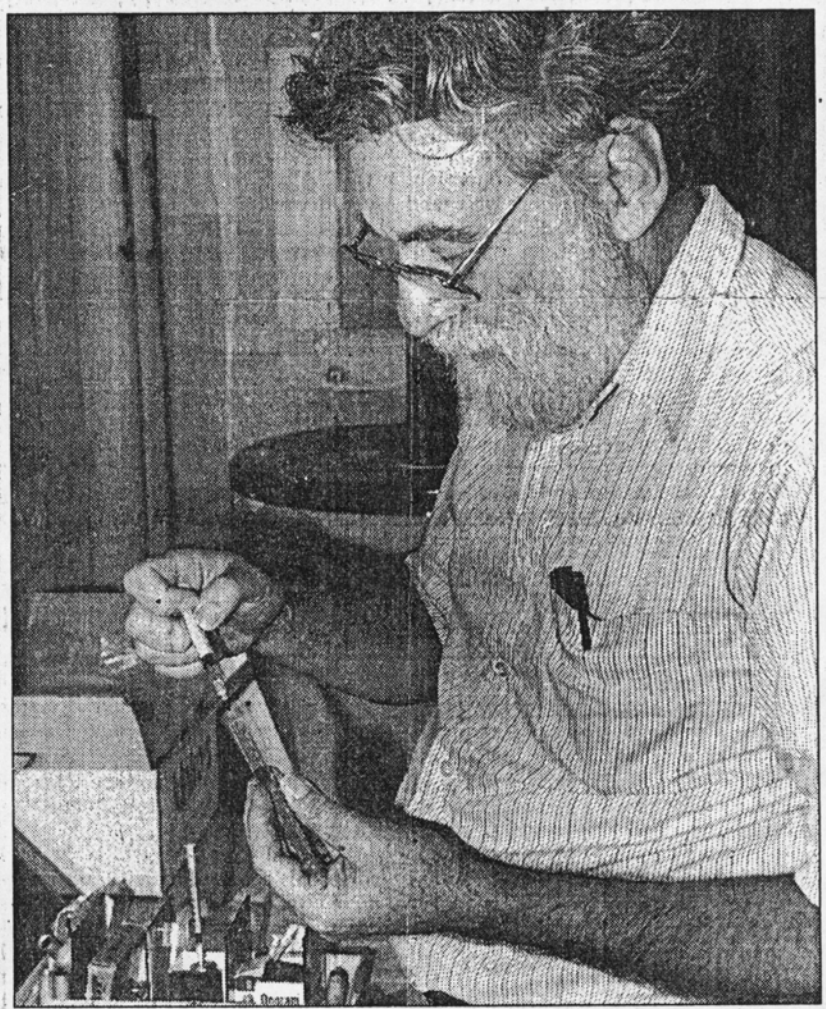
In 1984, officials of the National Zoo and the World Wildlife Fund, a conservation group, began reintroducing golden lion tamarins into the Atlantic coast rain forest of Brazil, where only a few hundred of these brilliantly golden, squirrel-size monkeys survived. To date, more than 60 captive-bred tamarins have been introduced to the reserve. Some breeding with wild tamarins has occurred.

More than 100 animal species are now part of formal breeding programs conducted by associations of zoos in North America, Europe and Australia. These include the black rhinoceros, the snow leopard, orangutan, Asian elephant, Bali myna, gorilla, Sumatran rhino and Puerto Rican toad. Dr. Seal said the captive breeding group was developing more than 100 other programs and hoped to have 1,000 programs for vertebrates, including mammals, birds and reptiles, by the end of the 1990's.

Embryos for Animals in Wild

"We still feel that's less than half of the vertebrate species that will need captive propagation if they're going to survive," he said.

As with Dr. Seal's efforts with the Siberian tiger, some researchers are working to develop such reproductive technologies as artificial insemination and embryo transfer. Among other benefits, such techniques could allow biologists to transfer embryos from a zoo female into a womb of a wild female. That, in turn, could help expand a small and shrinking population on an isolated reserve or enlarge a tiny gene pool in the wild.



The New York Times/Steve Wolt

Dr. Ulysses S. Seal, head of an international captive breeding effort, preparing a tranquilizer dart at the Minnesota zoo near Minneapolis.