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"Hellbender Hunting in Georgia"

On September 21, 1997 at 6:00 a.m., I set out from Chattanooga with two Tennessee Aquarium herpetologists, Greg George and Tim Schmiedehuisen, in the aquarium's van. We had two large coolers, several bags of ice, various nets, one canoe, wetsuits, scuba masks, snorkels and several six packs (just kidding!). We headed northeast towards Fannin County, Georgia to search for the illustrious hellbender or *Cryptobranchus alleganiensis*. Our group had heard from other Tennessee Aquarium staff members that hellbenders were seen on the Toccoa River, just south of Margaret, Georgia. Luckily, this was the area for which we had received permits from the Fish and Game Department of Georgia allowing the Denver Zoo to collect three specimens. We put the canoe in the water somewhat downstream of the area and paddled slowly upstream until we found waters about two to three feet deep, with lots of large, flat

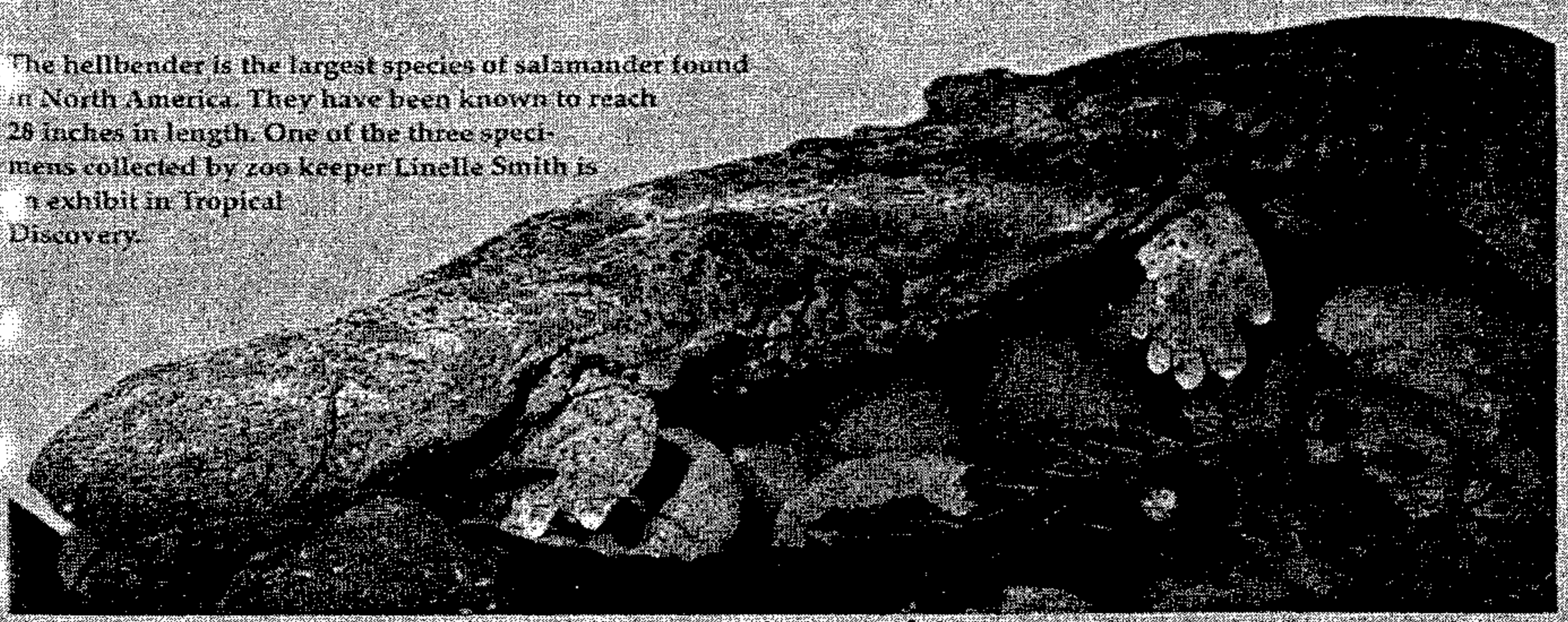
rocks. For close to an hour we flipped these rocks, still moving upstream. At about 1:00 p.m., Greg asked me to check on the water temperature in one of the coolers. Much to my surprise, there was a seven-inch hellbender in there! We began finding many small hellbenders in this area, so we decided to continue moving with hopes of finding larger specimens.

About half a mile upstream we hit a very populated area where we collected four more "benders" of six to eight inch size. The river bottom is extremely silty, so the three of us often had a difficult time seeing the large amphibians once we flipped over rocks. Along with hellbenders, we were also seeing a large number of darters and crayfish inhabiting areas beneath the flat rocks. We did collect eight crayfish for the aquarium and placed them in the coolers with the hellbenders, however, the little crustaceans had been eaten by the time we got back to

Chattanooga! I took water samples and temperatures along our journey to find a pH of neutral (7.0), and an average temperature of 59-63 degrees Fahrenheit. The ice bags we carried along were slowly added to the coolers to keep the hellbenders' water temperature at 50-52 degrees Fahrenheit. The cooler water slows the amphibians down and prevents them from releasing too much slime-coating due to stress during transport.

At 4:00 p.m., we were satisfied that we had five nice specimens for Denver and for Tennessee. As we were heading back to the van, we spotted a very large hellbender in an area four feet deep with very large, flat boulders set along the river edges. Thanks to Greg's ability to dive out of a canoe quickly, we got our sixth amphibian, a large male. The fall is the best season for collecting hellbenders since the males swell in the cloacal region making sex determination slightly easier. The males reach sexual maturity at five years and 12 inches in body length; females mature at six years. The males actively defend their territories and only allow gravid females

The hellbender is the largest species of salamander found in North America. They have been known to reach 28 inches in length. One of the three specimens collected by zoo keeper Linelle Smith is on exhibit in Tropical Discovery.



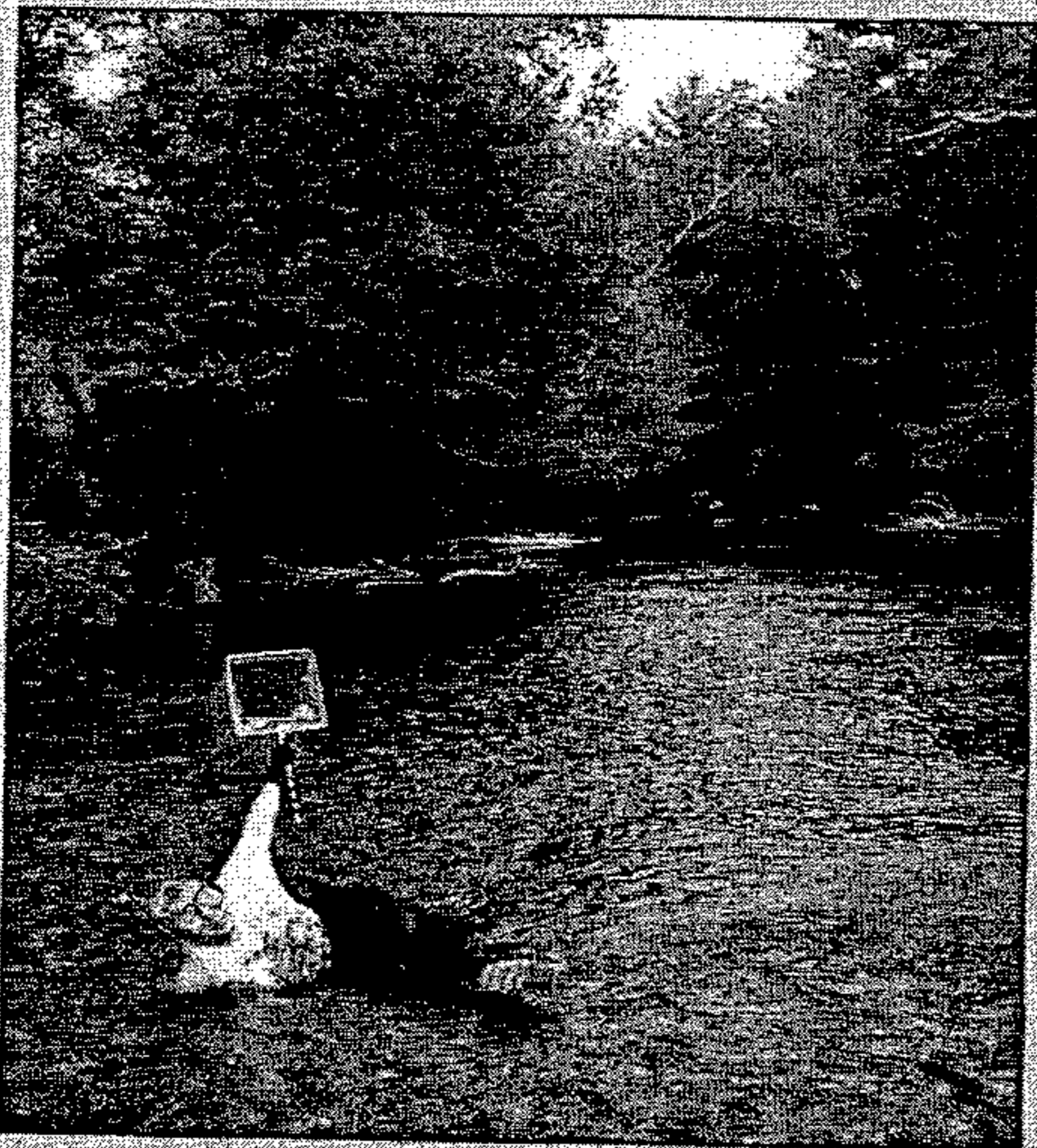
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into their established areas. Males will defend nest sites once eggs are deposited and then fertilized. Nest sites usually are made beneath flat stones, with

Linelle Smith collecting hellbenders on the Toccoa River, Georgia.



G. George

females occasionally sharing an oviposition site. Nest protection lasts for 68-84 days, with the male also aerating the 450 eggs per clutch which are laid annually. The eggs take about 76 days to develop into larvae, and the larvae about 1,750 days to develop into sub-adults.

Upon arriving back at the Tennessee Aquarium, the hellbenders were placed in chilled 30 gallon tanks to await being shipped via overnight mail to Denver. I returned to Tropical Discovery to put the final touches on the designated hellbender exhibit

tank. These interesting creatures arrived unharmed and seem to be doing quite well in their new surroundings. The largest one (affectionately called "Louie") is on display alone since it is possible he could ingest the smaller two hellbenders. Zoo visitors have to look very closely to find the animal on exhibit due to his lack of movement and camouflage capabilities. Occasionally a rocking motion can be detected from the hellbender. This is done to increase oxygenation across its folded skin. The other two hellbenders are in a chilled holding tank behind the scenes in Tropical Discovery. The hellbender tanks are kept at a temperature of 58-65 degrees, and the animals are fed a weekly diet of earthworms and shrimp. So, if you are ever in the neighborhood, please stop in and try to find these interesting amphibians called hellbenders!

Linelle Smith
Zoo Keeper

Zoological Horticulture - European Style *continued.*

Artis Zoo in Amsterdam. Founded in 1838 and situated in the middle of the city of Amsterdam, Artis is the oldest zoo in the Netherlands, exhibiting over 900 species of animals. Its strong science program has resulted, over the years, in bringing together a unique combination of zoo, botanical garden, zoological museum, geological museum and planetarium, making Artis a complete "Museum of Life". While many of the animal exhibits here were rather out-dated by current-day standards, plans had been drawn up to begin renovating older exhibits. A recent renovation of the Aquarium re-

turned this 1882 structure to its former architectural glory while greatly improving the management of the collection of some 500 fish, marine invertebrates and, in the basement level, amphibians. Many of the gardens within the zoo combined colorful plantings of annuals and roses, setting off a very impressive collection of sculpture.

As our trip came to an end, I could not help but reflect upon the impact this tour had on me. The opportunity not only to visit these unique and impressive European zoos but to be led through their animal and botanical collections by the Directors

and knowledgeable horticulture and botanical staff was a rare and memorable experience. I am most appreciative to have had the opportunity to lead this tour and to learn much of value from our professional colleagues in Germany and Holland.



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