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Editor's Note: James Murphy was the first Section Editor for Herpetological Husbandry, beginning in 1972, and much later (2002) he established the Zoo View column.

Launching SSAR into the Herpetocultural World

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“REPTILE KEEPING HAS DEVELOPED INTO A SCIENCE DURING THE PAST TWO DECADES, AND THE ADVANCEMENTS, ESPECIALLY IN THE FIELDS OF MEDICATION AND CAPTIVE BREEDING, ARE LITTLE SHORT OF PHENOMENAL. COMPARED WITH THE SOPHISTICATED TECHNIQUES THAT ARE NOW AVAILABLE, OUR EFFORTS OF HALF A CENTURY AGO SEEM CRUDE IN THE EXTREME. IN THOSE DAYS WE OFTEN CONSIDERED OURSELVES LUCKY IF A MAJORITY OF OUR ANIMALS LIVED A YEAR OR TWO, AND WHAT LITTLE CAPTIVE BREEDING OCCURRED WAS FORTUITOUS, NOT PLANNED.”

—ROGER CONANT (1980)

INTRODUCTION

In the 1960s and 1970s at the annual meetings of the American Society of Ichthyologists and Herpetologists (ASIH), The Herpetologists' League (HL), and the Society for the Study of Amphibians and Reptiles (SSAR), there were virtually no zoo and aquarium representatives in attendance, due in large part to the fact that they felt unwelcome. Editors and reviewers of peer-reviewed herpetological and biological journals often rejected theoretical and applied papers on amphibians and reptiles from zoo workers, believing that observations made on captive herps were not representative of the biology of their wild counterparts. Feeling isolated, zoo workers gravitated toward settings and venues that were more comfortable. When the *International Zoo Yearbook* appeared in 1960 and its editors encouraged studies on captive herpetofauna, zoo workers responded with enthusiasm, leading to the dissemination of important information. The International Herpetological Symposium on Captive Propagation and Husbandry (IHS) was formed and started publishing annual proceedings beginning in 1979. Zoo professionals and serious amateur herpetoculturists were attracted to these meetings. Three years later, the journal *Zoo Biology* was created, and papers on captive herpetofauna appeared. In fact, in 1996 when an issue—edited by David Chiszar and Clay Garrett—was devoted exclusively to advances in zoo herpetology, a positive feature was that many papers were jointly written by zoo people and specialists outside the zoo field. These important changes led to greater cooperation and interaction between zoo and aquarium personnel.

SSAR began encouraging zoo participation by sponsoring symposia on captive management in 1978, 1991, and 2001, creating a Zoo Liaison committee, including a Zoo View column and Herpetological Husbandry section in each issue of *Herpetological*

Review (HR), and having a zoo representative on the board of directors. As the curator of herps at the Dallas Zoo when I attended my first SSAR meeting at the University of New Mexico in 1971, I had been stunned that only one other zoo worker was present. Furthermore, I knew very few academic or museum herpetologists personally. I had read many of their publications but they were known to me only by name. It was apparent that many of them viewed zoo herpetologists as a bunch of “snake wavers” and not serious researchers. One obstacle was the belief by some that studies on captive animals were flawed. It became clear that zoo herpetology was not taken seriously by academic researchers; we experienced open antagonism or indifference, which was bizarre given that both sides were fascinated with the same group of organisms. At that point, we in the zoo world felt that our somewhat parochial approach had to change so that zoo herpetology could start being viewed by our academic and museum colleagues as an important subset of herpetology. We began to forge professional ties with other herpetologists by making our collections accessible and developing mutual research projects. I argued that comparisons can be made to determine differences between captives and wild counterparts, especially if propagules were destined later for reintroduction. Many published behavioral studies would be downright impossible in the field.

When The Herpetologists' League held its annual meeting many years ago in downtown Dallas, I arranged with the president, the late Wilmer Tanner, to have a wine-and-cheese social at the Dallas Zoo (DZ) for attendees in the evening. We were proud of our efforts in opening our new building and assembling a nice collection, and we wanted to show colleagues what we had accomplished. But not a single person attended! I was deeply disappointed and realized that zoo personnel needed to greatly expand their horizons to be viewed as serious herpetologists. After that I made it a point to attend as many conferences as possible—encouraging zoo people to join me—and at each I made a concentrated effort to meet and greet as many non-zoo workers as possible. As a result, I count many as personal friends and valued colleagues today.

A PLACE FOR HERPETOLOGICAL HUSBANDRY IN SSAR AND HR

The *Newsletter of The Ohio Herpetological Society* started in 1958 and the last issue was published on 26 November 1966. HR was first published in 1967. In 1973, publications of the *Herpetological Information Search Service* (HISS) were substituted for HR; HR was restarted the next year. In 1973, I asked HISS Editor Herndon Dowling to include a regular column on herpetological husbandry, in part to attract zoo workers to submit their findings and encourage participation in SSAR activities. Dowling had been herpetological curator at Bronx Zoo (now Wildlife



FIG. 1. This spectacular drawing is from the paper by Osbert Salvin (On the Reptiles of Guatemala) of a Yellow-blotched Palm Pit Viper (*Thamnocentris aurifer*, now *Bothriechis aurifer*) feeding on Morelet's Leaf Frog (*Hyla holochlora*, now *Agalychnis moreletii*), published in the *Proceedings of the Zoological Society of London* in 1860. Shown is the dramatic difference between a black-and-white image (left) and the full-color original (right), the latter used in the redesigned *Herpetological Review* since 2011.

Conservation Society) so he was receptive to the idea. I was asked to be section editor so I started soliciting manuscripts from zoo colleagues and publishing my five-part series on chelonian medical management. In addition to this request, I asked SSAR President James R. Dixon to create a regular slot on the board for zoo people and regional herpetological representatives to strengthen diversity; I served SSAR as Board Member (1977–1979) and President in 1981.

In 1978, a symposium entitled “Reproductive Biology of Reptiles” was held at Arizona State University, Tempe, followed by a SSAR volume called *Reproductive Biology and Diseases of Captive Reptiles*, including papers by 37 leading specialists, two years later (Murphy and Collins 1980). This was the inaugural book in the *SSAR Contributions to Herpetology* series. At the ASIH meeting in 1980 in Fort Worth, organized by Texas Christian University professor Gary Ferguson, a busload of attendees came to the Dallas Zoo where they were hosted for a social in the reptile house. What was gratifying were the comments by many that they understood for the first time why zoos and aquariums were contributing to the overall understanding of the biology and conservation of amphibians and reptiles.

In 1994, Joseph T. Collins, Kraig Adler, and I edited Volume 11 in the *Contributions in Herpetology* series called *Captive Management and Conservation of Amphibians and Reptiles*, which included chapters by 70 leading specialists (Murphy et al. 1994). This book was the result of a Society-sponsored

symposium three years earlier honoring Roger Conant and held at Pennsylvania State University. Conant (1909–2003) was an incredibly productive herpetologist who was held in great esteem by both zoo persons and academics. He was curator of reptiles at Toledo Zoo, curator of herpetology and director at Philadelphia Zoo, a longtime research associate with the American Museum of Natural History in New York, and an adjunct professor at the University of New Mexico. He was one of my treasured mentors for many years. He was active until the end—publishing a major paper on Mexican gartersnakes in the last year of his life (Conant 2003).

In 2007, Lucian Heichler and I obtained a Smithsonian Atherton Seidell grant to publish a translation of “Aufgaben und Probleme der Tiergärtnerei bei der Erforschung der Lebensäusserungen der Niederen Amnioten (Reptilien)” [Tasks and Problems Encountered by Zoo Keepers in Research Concerning the Vital Manifestations of the Lower Amniotic Animals (Reptiles)] by Hans-Günter Petzold. *SSAR Contributions to Herpetology*. [volume 22]. New title: *The Lives of Captive Reptiles* by Hans-Günter Petzold. Petzold had written his book in 1984, demonstrating the utility of captive and scientific studies.

Seventeen years ago, *HR* editor Bob Hansen and SSAR co-founder Kraig Adler asked if I would be willing to act as a section editor, soon to be a permanent *HR* fixture, for a *Zoo View* column. Being retired and worried about my brain becoming addled, I jumped at the chance since quarterly deadlines loomed

and those two friends would hound me forever if I missed even one. I determined that quotations and analyses from prominent herpetologists should be added in the beginning in most of my columns when appropriate.

Increasingly, pictures became part of the Zoo View column. I knew that in a time of increasing digitization of historical images and the emergence of the Biodiversity Heritage Library, colored images were becoming more available, but the strikingly rich colors of the original plates could not be duplicated. For years, *HR* was published in a black-and-white format so my color figures had to be converted to this style (Fig. 1). In 2011, *HR* turned to the use of full color and was totally redesigned so these images could be appreciated in their original magnificence. Smithsonian and Harvard librarians have been critical in scanning images and providing information—Daria Wingreen-Mason and Leslie Overstreet from the Joseph F. Cullman 3rd Rare Book Library and Kristen Bullard and Polly Lasker from Smithsonian Institution Natural History Library. Bianca Crowley, Biodiversity Heritage Library Digital Collections Manager, Smithsonian Libraries and Kendra Hurt, Instructional Design Intern, Biodiversity Heritage Library, and Smithsonian Libraries were very helpful in preparing high-quality images. Special collections librarian Dana Fisher from the Harvard Museum of Comparative Zoology's Ernst Mayr Library searched for appropriate illustrations. Based on comments sent to me by many readers, the new, greatly improved presentation has become *the* favorite publication in our community and editor Bob Hansen is revered as the one who made this journal what it is today! Several recent SSAR presidents have said privately (and in jest, of course) that they would leap off a cliff should he choose to retire.

In my opinion, two seminal papers that appeared under the Zoo View banner deserve special mention for thoughtful explanations of amphibian subjects at risk. In 2011, Joseph Mendelson discussed the changing role of conservation biologists in an era of declines and extinctions (Mendelson 2011). [I refer readers to four companion essays from Kraig Adler, Harry Greene, Michael Lannoo, and Larry David Wilson in the following issue (2011)]. Earlier, Donald Nichols (2003) provided a fascinating perspective on the discovery of the chytrid fungus, including the role that he played. Much has changed since the Zoo View section began in 2000. Many authors of both scholarly and popular works now emphasize the role of *in situ* and *ex situ* conservation initiatives because so many herp taxa are at risk of extinction. The Anthropocene, an epoch proposed to cover the period since human activities have had a significant impact on Earth's geology and ecosystems, has become broadly recognized in the scientific community.

Three members of our zoo community have been elected as SSAR President: James Murphy from Dallas Zoo, Hugh Quinn from Houston Zoo, and Joseph Mendelson from Zoo Atlanta. Members of the Zoo Liaison Committee (Relations with Herpetologists at Zoological Parks) during the period of 1978–2006 included: J. Murphy, B. W. Tryon, J. D. Groves, P. J. Tolson, R. A. Sajdak, D. M. Boyer, R. R. Goellner, J. Ettl, C. Wright, R. Hartdegen, and C. Garrett. Zoo-affiliated members of the SSAR Board during the period of 1977–2017 have included R. Conant, H. Quinn, J. Behler, B. Tryon, A. Mitchell, S. Hammack, K. Lovich, and J. Mendelson.

In 1971, J. P. Bacon of the San Diego Zoo presented the symposium “Captive Amphibian and Reptile Management.” The next year, conveners B. W. Tryon and J. W. Lang created a

symposium called “Reproductive Biology and Conservation of Crocodilians.” J. D. Groves and H. R. Quinn arranged a symposium at the 2001 SSAR meeting in Indianapolis called “Herpetological Research in Zoos: The Academic Connection.”

Zoo personnel have published in the SSAR *Herpetological Circulars* series, covering such topics as treatments for diseases of captive reptiles (Murphy 1975), longevity of reptiles and amphibians in North American zoo collections (Bowler 1977; Snider and Bowler 1992), standard names lists (Collins, Conant, Rundquist et al. 1982), safety protocols for handling venomous reptiles (Altimari 1998), history of zoo herpetologists in the United States (Card and Murphy 2000), and husbandry of chameleons (Murphy 2005).

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I dedicate this article to all of the editors of *Herpetological Review* (and its precursor, the *Newsletter of The Ohio Herpetological Society*) since 1958: Kraig Adler, Corson Jay Hirschfeld, Joseph T. Collins, Herndon Dowling, Max A. Nickerson, George R. Pisani, Martin J. Rosenberg, and Robert W. Hansen.

The herpetological community owes all of these persons a debt of gratitude—without their combined efforts, this journal would not be the stellar publication that it is today.

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Editor's Note: Deanna Olson established the Diseases section in HR beginning in 2007 and has continued as the coordinating Associate Editor ever since.

A Decade of Herpetological Disease Papers: Puzzle Pieces of a Bigger Picture

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The Amphibian and Reptile Diseases section of *Herpetological Review* (*HR*) has experienced 10 years of tremendous participation and expansion since its initiation in the December issue of 2007. Through December 2017 there have been 185 disease articles by 594 authors, including reports on seven disease-causing agents and a geographic scope spanning 42 countries and 35 US states (Fig. 1). Considering the service contributed by local experts providing logistical support for field work, the laboratories that have analyzed samples, the organizations that funded the studies, an extensive international cadre of reviewers, and the addition of several Associate Editors to help with submission processing, this section represents a world community that has rallied to advance our understanding of infections that may threaten herpetofauna.

The inception of this section is tied to a larger strategic effort to accelerate the pace of science and its communication regarding potential threats of emerging infectious disease. In November 2007, an international amphibian chytrid fungus (*Batrachochytrium dendrobatidis*, or *Bd*) conference convened in Tempe, Arizona, USA. In preparation for the meeting, I initiated the Global *Bd* Mapping Project months earlier to compile existing knowledge of world *Bd* distribution to provide context at the conference and as possible, inform follow-up work. As national and regional data coordinators (the *Bd* Mapping Group: Olson et al. 2013) submitted their reports for synthesis, an astonishing number of unpublished sampling efforts were revealed. The science of *Bd* was rapidly expanding at that time (e.g., Berger et al. 2005; Lips et al. 2006; Rachowicz et al. 2006; Skerratt et al. 2007; Woodhams et al. 2007) and although descriptive reports of *Bd* prevalence in a species or location were being published, the number of unpublished reports highlighted a need for incentives for authors to pursue peer-reviewed products. In particular, an outlet facilitating dissemination of *Bd* prevalence studies was

needed.

HR met this challenge by initiating the Diseases section. By asking reviewers for a 2-week turn-around on papers, an accelerated process unfolded. A truncated Introduction section has streamlined contributions, as almost all papers could begin by a general statement about the role of disease in population declines. Authors now take that as a given and get more directly to the gist of studies. By publishing reports that both detect and do not detect disease agents, data can be aggregated and larger patterns examined, with appropriate caveats about *ad hoc* sampling and different methods used in study designs and analyses. The publication of the no-detection data has been a particularly important contribution of *HR*. Continuing such aggregation of findings among studies after the 2007 *Bd* conference was anticipated from the inception of the *HR* Disease section, and led to inclusion of study details to facilitate later compilation across studies. In some ways, this has fostered use of standardized methodologies and terminologies as well. For example, at this time, due to concerns with false-positive or -negative findings from laboratory diagnostic tests, the use of the terms “detection or no-detection” of pathogens in samples tested is being favored, and methods sections are detailing how approaches have differed from previously published protocols.

After a decade, most (84%) *HR* Disease articles have addressed *Bd*. *Bd* sampling of amphibians, fish, birds, and water has been reported. These data as well as published accounts in other journals have been further compiled (largely through literature reviews by my office: data manager K. Ronnenberg, US Forest Service) into the world *Bd* data portal. This portal is currently in transition from the original repository at Bd-maps.net (D. Aanesen and M. Fisher; Imperial College, London, UK; Olson et al. 2013) that will soon be discontinued to an updated database at AmphibiaWeb (<https://amphibiandisease.org>; Michelle Koo, Museum of Vertebrate Zoology, University of California, Berkeley, CA, USA). The new portal has more nimble search and analysis options, and more efficient import and export capability (Bsal Task Force 2016). As part of an accessible world database, data from *HR* Disease contributions have been included in other