HERPETOLOGICAL CONSERVATION AND BIOLOGY

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The Western Slimy Salamander (Plethodon albagula) occurs in southern Missouri, Arkansas, Oklahoma and Texas. It is restricted to woodland habitats and is known to brood its clutch in caves and abandoned mines.

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EDITORIALS AND ANNOUCEMENTS

NON-PEER REVIEW SECTION

DAWNING OF *HERPETOLOGICAL CONSERVATION AND BIOLOGY*: A SPECIAL WELCOME TO YOUR NEW JOURNAL

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Inception of a new journal in herpetology is a rare event. The first discussion of developing a journal with an emphasis on natural history and conservation occurred among a subset of us (McCallum, others), while at the 2005 joint annual meeting of the SSAR/HL/ASIH in Tampa, Florida. Some of the initial questions we posed for a new herpetological journal were as follows: (1) is there a need; (2) audience; and (3) support? If any one of these did not exist, then the concept should be abandoned or modified. We critically examined these questions through discussions with many individuals and informal surveys performed on the Partners in Amphibian and Reptile Conservation (PARC) listserver (parc@listserv.uga.edu) and other forums. Early on, it was obvious to us that there was strong demand for an outlet serving natural history, field ecology and conservation studies, especially descriptive investigations and management case studies that appeared to lack a home in other journals. The road traveled since those discussions has been fast paced, culminating in this 2006 launch of *Herpetological Conservation and Biology* (*HCB*).

By September 2005, we concluded that the herpetological community had several outlets for publishing these kinds of manuscripts, but competition was keen for publication space. While the kernel of a new journal started germinating, we were unconvinced that launching a new printed journal was either possible or necessary. The initial journal committee was composed of Stan Trauth, Bruce Bury and Malcolm McCallum, with Richard Wassersug joining the effort in late September. We discussed the possibility of using traditional publishers for the journal and approached three for information.

By October 2005, six more members joined the advisory board: David Sever, Brian Miller, Raymond Saumure, Joe Mitchell, Jeff Humphries, and Mike Plummer. The founding members (N = 10) provided much of the initial concept formulation for the group and the journal. Two members (B. Miller and M. McCallum) volunteered to act as the fist editorial staff. However, the method of publication remained a roadblock. We knew that financial difficulties hampered several other herpetology journals (e.g., *Herpetological Natural History* was ceasing publication), and overcoming the inherent fiscal problems of publishing required a different tactic.

At this time, R. Wassersug suggested we consider an electronic platform, and he provided an example of a recent publication from *Nature*. We investigated electronic publishing and discovered that there were many high profile electronic journals being developed, and both the new generation of herpetologists and most established scientists were highly receptive to an online publication. A survey to the PARC listserver revealed overwhelming support for an electronic herpetological journal and several suggested that a number of hard (printed) copies should be generated and housed at academic institutions or high-profile museums. Also, it was clear that electronic publishing would provide us with a method of preventing manuscript backlogs, while remaining low cost.

In November, one of us (B. Bury) recommended making the journal open access (i.e., available online and free to authors). In December, we ran a series of surveys to determine if open access or page charges were desirable for funding a journal. Several respondents suggested that an *e*-journal could be inexpensive because the publishing costs are minimal (e.g., costs for data storage are low). Thus, the Advisory Board decided to focus on an open use journal with no costs to authors. We agreed not to request page charges or access fees for the electronic version.

From the outset, we wished to complement the existing printed journals in herpetology and conservation biology, of which we are strong supporters. For example, several of our "senior" editors have been members of *Herpetologica* for 5 decades and the *Journal of Herpetology* since its inception in 1968. Two of our editorial board members authored papers in Journal of Herpetology in its first year (Bury 1968; Stewart 1968). Many of those serving on our editorial board are members, editors or elected officials (now or earlier) of all the major herpetological journals. Our goal is to expand publication of worthy material on natural history, field ecology, conservation and management of amphibians and reptiles. These papers will appear in electronic format and, we trust, will not influence publication in other journals. We

FIGURE 1. Photograph of attendees at the first organizational meeting of *Herpetological Conservation and Biology*, Henderson, NV, on 2-3 June 2006. Left to right: Standing - Stan Trauth, Bruce Bury, Malcolm McCallum, Roger Luckenbach, Phil Medica, and Raymond Saumure; Sitting - Gwen Bury and Dave Germano. Photographed by Stan Trauth.

decided to welcome in-depth scientific articles (no news notes) as well as broader implications of studies on conservation and management issues. We opened the door for critical reviews (**Forum**) and well-thought-out reviews (**HerpSpectives**). These carve a niche somewhat different from other current publications. There is some overlap, but a little competition never hurt anyone. Still, our goals and electronic publication differ from most other outlets.

Further, we also determined that we will publish each issue of the journal as a single print volume at the end of each year. These will be available at or near production cost but our intent is to limit distribution to select university and museum libraries. This allows permanent storage of hard copies.

In December, David Germano and Erin Muths joined as Associate Editors. The journal Advisory Board exploded to 29 members in January 2006. Our email boxes quickly filled as members began actively brainstorming on various operating and logistical issues. We also developed a mock website that was eventually refined into our current site.

In February, several major organizational events defined our new path. Whit Gibbons joined the advisory board, and the total number of members was expanded to 36. He kindly forwarded the journal concept to the PARC Executive Board to encourage their support. We were asked to submit a formal proposal to PARC to cement a close tie of the groups. In March, PARC agreed to a teaming of PARC and *HCB*, which has proven mutually beneficial for both organizations. About this time, Raymond Saumure drafted the 'Instructions for Authors,' for *HCB* and the members provided input leading to the current version. We also began receiving inquiries about publishing in *HCB*, but we were not ready to accept manuscripts.

By April, we had 46 editorial members including Executive, Associate, Assistant and Advisory Editors. The large editorial staff was designed on purpose to minimize workloads on any one editor. Our goal for editorial staff is that the Associate Editors should handle no more than 15 manuscripts per year. As submission rates rise in the future, so will the number of editors.

We also established a new position of Assistant Editor, who we call an editor-in-training. These individuals have little prior editorial experience and are often beginning their professional scientific careers. They are assigned to senior editors who serve as their mentors. Our goal here was to cultivate strong editors for the future that can fill future staff vacancies and ensure the sustained health and growth of *HCB.* In about a year, we intend to reassess this position along with the other ones to ensure each is effective and of value to the journal and its supporters.

On 14 April 2006, we released our first call for papers, including posting on the PARC listserv. In the first 10 days, the website received >1000 visits from over 39 countries. Although most visitors were from the United States, United Kingdom, and Canada, the number of inquiries from foreign countries was surprising. We quickly began receiving manuscripts, and the peer review process proceeded. We also invited submissions from Henry Fitch and Hobart Smith—two icons of herpetology—that we respect, and both accepted our offer. We point out that these two herpetologists were contributors to the first issue of the new journal *Herpetologica* (Smith 1936a, b; Fitch 1939a, b).

We held the first organizational meeting of *HCB* on 2-3 June 2006, at the USGS Field Office in Henderson, Nevada (organized by B. Bury and hosted by Phil Medica). The meeting was highly productive as the collective group (Fig. 1) made many unanimous decisions regarding journal workings and management (Table 1). Some topics were too complex to decide at the time and were tabled (e.g., having elected officials). Several attendees had known each other for decades while others had never met in person, although all the key members had corresponded many times via email. To encourage some comradeship (and interest in field ecology), we also took a late afternoon/evening field trip to the Kelso Dunes and vicinity in the eastern Mojave Desert, California. We enjoyed reminisces and knowledge by Roger Luckenbach, who conducted surveys in the area in the 1970s (e.g.,

Table 1. List of measures, issues and policy decisions at the meeting of *Herpetological Conservation and Biology*, Henderson, NV, on 2-3 June 2006. Votes were by both the SC = Steering Committee present (n = 5) and All = all attending (n = 9). Y = Yes, motion passed; T = Tabled; discuss at the next meeting.

Issue Voted On	SC	All
Policy and Direction		
Accept Rule of Order: each passed measure must receive a majority vote of members present at the meeting (those on Steering Committee, Executive Committee and Associate Editors; n = 5); and record vote of all *HCB* members present (n = 9).	Y	Y
Accept offer by S. Trauth to investigate establishing a non-profit foundation to handle all finances as well as non-profit status for the journal.	Y	Y
Accept offer by S. Trauth to serve as the archivist/historian, and deal with libraries and museums for the archive.	Y	Y
Add name "International" to the definition and scope of *HCB*	Y	Y
Continue discussion to establish a partnership with the World Congress of Herpetology	Y	Y
Change name of the "International Board of Advisors" to the "Editorial Guild".	Y	Y
Accept proposal to develop a new organizational structure with elected officials (e.g., President, Board of Directors, etc.).	T	T
Journal Development and Production		
Publish Journal a minimum of 2 times per calendar year with goal of 4/yr	Y	Y
Inform authors that once there is final acceptance, the paper will be published in the next available issue.	Y	Y
Release first issue when the Steering Committee is satisfied that the contents are sufficient to represent a solid issue.	Y	Y
Develop a "flash list" to announce release of each new issue (online version).	Y	Y

Luckenbach 1975, 1982). All members left the meeting and field foray confident that everyone was on the same page.

After several discussions with Aaron Bauer, President Elect of the World Congress of Herpetology, this group also agreed in late June to partner with *HCB*. Along with ties to PARC, this was another defining moment in our brief history. The involvement of the World Congress provides an opportunity for *HCB* to become the first truly international journal in herpetology. We are currently working with the World Congress to expand the editorial staff to include the entire international community. Although our editorial staff included members from around the world, most are from North America. We hope to change this landscape with a major expansion or reorganization of the editorial staff. To remain abreast with the latest happenings, please visit our webpage: www.herpconbio.org.

Although there are many intricacies in journal operations that continue to bedevil us, in a little more than one year *HCB* evolved from an idea to an operational journal. To us, it is incredible that so many individuals volunteered to develop a common effort. We think this demonstrates the need, audience, and support for a new herpetological journal that is on line.

We hope that all who use this journal for publication, information, learning or recreation, will appreciate the amount of work that was devoted by so many individuals. This is a group effort and it will only be as good as the time we devote to it. We also hope that this journal will become an important resource for all those who work diligently to investigate, conserve, and manage herpetofauna populations around the world. They need our help.

With the support and encouragement of the global herpetological community, there can be no doubt that this journal will flourish due to the readership and sacrifices of time by the Editorial Board. The development into one of the premier herpetological outlets at a later time lies with your continued interest and support. Now that we have launched this e-journal, we wish to hear your comments and suggestions to improve it or the group.

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ECOLOGICAL SUCCESSION ON A NATURAL AREA IN NORTHEASTERN KANSAS FROM 1948 TO 2006

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***Abstract.*—Long-term ecological studies provide important information applicable to the conservation, management and restoration of native ecosystems. These studies allow us to observe changes in habitat and the correlated changes in associated amphibian and reptile communities. Research over the last 58 years at the Fitch Natural History Reservation has indicated biotic responses that would likely have been imperceptible over the short-term. New investigators are encouraged to conduct long-term studies and institutions must devise ways to foster these activities.**

Key Words.—long-term research, ecological succession, herpetology

The University of Kansas Natural History Reservation, where I have spent the last 58 years of my life, exemplifies the benefits of long-term studies and the misconceptions that can result from relatively short-term efforts. The Reservation is a 239-hectare area in northeastern Kansas on the eastern edge of the Deciduous Forest Biome and its Oak-Hickory Association (Shelford 1963). Before my arrival in 1948, the tract had been used for grazing of livestock and cultivation of crops, and there were many fenced (barbed wire and rock wall) subdivisions. About half of the area had been devoted to the pasturing of cattle and horses (and sheep at an earlier stage) and consisted of a grass-weed mixture with little arborescent vegetation. After the area was designated as a Natural History Reservation in 1947, anthropogenic disturbance was largely limited to the lab buildings, residence and surrounding lawn, driveway, and scattered trails that were cleared with a machete (Fig. 1A). Domesticated animals, including grazing livestock, were prohibited. Fire was excluded.

The most obvious change on the Reservation since 1948 has been the widespread intrusion of dense woody vegetation (Fig. 1B; Fitch et al. 2001) a well-documented result of suppression of fire and grazing (Heisler et al. 2003; Knapp et al. 1998). My field work was mostly confined to the Reservation in the early years of sampling. Faunal composition changed as originally open areas acquired trees, and snakes became progressively scarcer. As catches dwindled, my responses typically included a shift to new areas for sampling and/or a change in collecting techniques. Diminishing returns, beginning in the late 1980's, encouraged me to shift my efforts to adjacent experimental areas of the University of Kansas (Fitch 2005, 2006), where grazing, burning, and mowing were regularly implemented. The experimental areas generally were in a stage of succession similar to that of the Reservation several decades earlier.

Most parts of the Reservation have undergone progressive change over the past 58 years, each of the areas expressing divergent rates of ecological succession. Least modified are the hilltops and slopes that already had the climax forest species, Chinquapin Oak (*Quercus muehlenbergii*), Black Oak *(Q. velutina*), Bur Oak (*Q. macrocarpa*), and Shagbark Hickory (*Carya ovata*). Also changing slowly, but less stable than the climax forest, was the mixed forest with some or all of the climax species growing in close association with Black Walnut (*Juglans nigra*), Common Hackberry (*Celtis occidentalis*) and American Elm (*Ulmus americana*). Early seral forest, which consisted mainly of Honey Locust (*Gleditsia triacanthos*) and Osage Orange (*Maclura pomifera*), was subject to relatively rapid change.

In the first year, grazed pastures reverted to a luxuriant grass-weed mixture. The grasses were composed primarily of two exotics, Smooth Brome (*Bromus inermis*) and Kentucky Blue-grass (*Poa pratensis*). Native species of the local tall-grass association, the bluestems, Indian Grass, and switchgrass were scarce. The most abundant weedy species were those that were noxious or otherwise resistant to the grazing of livestock. These included milkweeds (*Asclepias* sp.), Snow-on-the-mountain (*Euphorbia marginata*), Nettle Leaf Noseburn (*Tragia betonicifolia*), thistles (*Cirsium* sp.), Blackberry (*Rubus allegheniensis),* Carolina Horse Nettle (*Solanum carolinense),* Buffalo-bur Nightshade (*Solanum rostratum)*, Prickly Lettuce (*Lactuca serriola*), Cocklebur (*Xanthium strumarium*), and Hoary Vervain (*Verbena stricta*). The grass-weed association changed rapidly from year to year. Weedy species tolerant or resistant to grazing disappeared first, due to competition with grasses. After several years, there remained mainly a stand of Smooth Brome, which in turn was crowded out by thick stands of young trees (mostly elms).

Formerly cultivated fields developed a mixed stand of Giant Ragweed (*Ambrosia trifida*) and Sunflower (*Helianthus annuus*). Over a period of several years, a mixed weed association dominated by Goldenrod (*Solidago* sp.) flourished in these areas. As in the former pastures, this weed association was gradually replaced by young trees (*Ulmus* etc.).

All vertebrate species were drastically affected by these successional changes. In the first season after removal of grazing livestock, a population explosion occurred in the Prairie Vole (*Microtus ochrogaster*), which attained a density of hundreds per hectare. Its bird, mammal, and reptile predators thrived and increased. Reptiles were especially monitored to clarify their relationship to the changes that occurred. Live-traps were constructed of 6 mm wire "hardware cloth" shaped into cylinders 15.2 cm in diameter with an entrance funnel at one or both ends. Later, 1.2 x 0.6 m shelters of metal (corrugated roofing "tins") or wood were used. These shelters were advantageous over the wire traps in that mortality of reptiles was never a factor. Also, reptiles using them for hiding places were much more likely to have food in their stomachs than their trap-caught counterparts.

Collecting effort for animals varied somewhat from year to

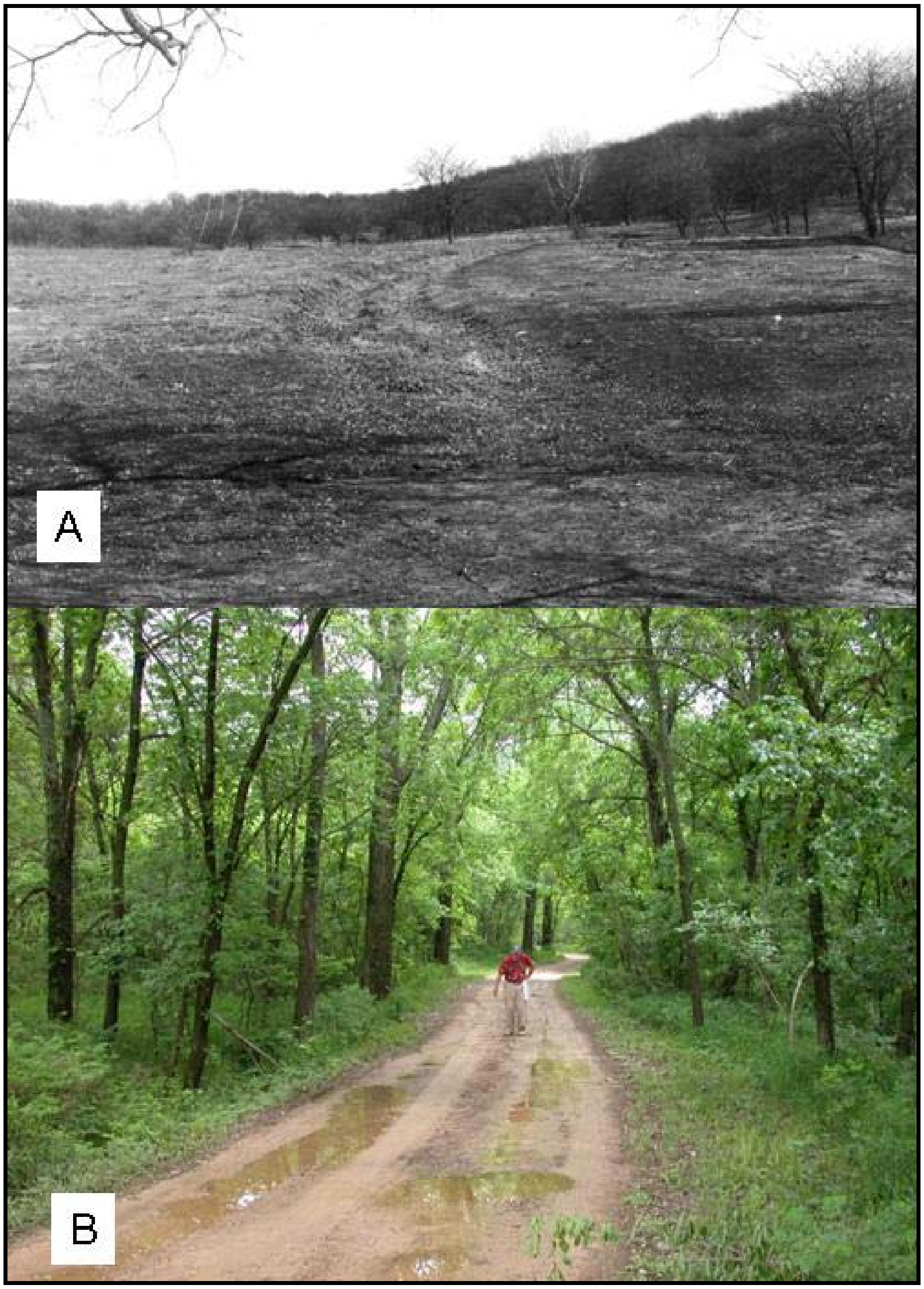

FIGURE 1. Entrance to Fitch Natural History Reservation in 1948 (A, photographed by W. Dean Kettle) and 2004 (B, photographed by Alice Echelle). The striking successional changes in vegetation were accompanied by equally remarkable modifications in the composition of the herpetofauna.

year and from decade to decade. During the first few years, the catch generally increased as more traps became available and as snake abundances increased under favorable conditions of food and cover. In the 1957 season, funnel traps with drift fences were added to the open areas comprising the snakes' summer habitat; whereas, in earlier years trapping had been limited to hilltop outcrops where the snakes came to hibernate in the fall months (Fitch 1965).

Every species of the local herpetofauna was drastically affected, with each species changing according to its own pattern (Fitch 2005). Table 1 shows species-specific catches of snakes (excluding recaptures) on the Reservation. It does not include those taken on the adjacent experimental areas. The table is included only to convey a rough approximation of general trends because the numbers are affected by unavoidable variables. Partial decades of collecting should not be considered as comparable to full decades. My efforts became more focused on the experimental areas as the herpetofauna declined on the Reservation, perhaps accentuating the impression of decreasing numbers on the Reservation. Also, numbers were affected by the previously mentioned shifts in trapping methods. In the 2001-2006 intervals, inevitable effects of aging curtailed my collecting intensity.

Responses of the various species to ecological succession can be broadly classified into several groups. Some of the species were early seral, and required bare soil, sand, rock or short grass.

TABLE 1. Numbers of snakes of each of 12 species processed per decade, from the 1940s into the 21st century on the Fitch Natural History Reservation. Recaptures are not included.

Species	1948-1949	1950s	1960s	1970s	1980s	1990s	2001-2006	Totals
Agkistrodon contortrix	44	773	436	455	534	37	6	2285
Carphophis vermis	7	169	161	33	9	23	0	402
Coluber constrictor	52	635	212	235	284	21	10	1449
Crotalus horridus	2	62	16	2	3	4	0	89
Diadophis punctatus	11	1430	1735	4090	4260	2195	193	13914
Lampropeltis calligaster	1	37	55	36	30	6	2	167
Lampropeltis triangulum	0	13	22	15	24	11	0	85
Nerodia sipedon	2	30	92	46	26	52	6	254
Pantherophis obsoletus	15	231	85	65	108	38	8	550
Pituophis catenifer	10	76	25	1	8	0	0	120
Storeria dekayi	0	23	164	32	23	15	0	257
Thamnophis sirtalis	25	313	788	359	447	448	98	2478
Totals	169	3792	3791	5369	5756	2850	323	22050

Among the first to disappear, members of this group were less useful in tracking succession than those that persisted longer. Most of the lizard species and also several amphibians were in this group, thus they are not represented in Table 1. This general category includes the Great Plains Skink (*Plestiodon obsoletus*), Five-lined Skink (*Plestiodon fasciatus*; still persists in 2006 around the residence and lab buildings), Six-lined Racerunner (*Aspidoscelis sexlineatus*), Ornate Box Turtle (*Terrapene ornata*), Woodhouse's Toad (*Bufo woodhousii*), Great Plains Narrowmouth Toad (*Gastrohryne olivacea*), Plains Spadefoot (*Spea bombifrons*), Prairie Skink (*Plestiodon septentrionalis*), and Flat-headed Snake (*Tantilla gracilis*). The last three species, never common and never occupying more than a small part of the area, were among the first to disappear. The other species of this group were initially at least moderately abundant, but most dwindled rapidly after cattle were removed.

The largest group comprised species that declined after livestock removal but then persisted for many years. Some of these are apparently no longer present on the area (Fitch 2006), including the Western Chorus Frog (*Pseudacris triseriata*), the Timber Rattlesnake (*Crotalus horridus*), and the Bullsnake (*Pituophis catenifer*). The two latter species were both fairly common in the beginning, but dwindled during the 1960s, and the few individuals found in later years were most likely vagrant. The last resident Timber Rattlesnakes were found in the 1960s at prominent limestone outcrops; the spread of deciduous trees in thick stands apparently eliminated critical basking places along the ledges.

Species that declined markedly but that still occur on the area include the Prairie Kingsnake (*Lampropeltis calligaster*), Little Brown Skink (*Scincella lateralis*), Slender Glass Lizard (*Ophisaurus attenuatus*), Prairie Ring-necked Snake (*Diadophis punctatus*), Eastern Yellow-bellied Racer (*Coluber constrictor*), and Osage Copperhead (*Agkistrodon contortrix*). The Prairie Kingsnake grew progressively scarcer, but is probably still present. *Scincella* occupied the grass-weed pastures on the Reservation rather than its usual leaf litter woodland habitat. It dwindled slowly but was still present in 2006. Although *Ophisaurus* was rare when the Reservation was created, it thrived after grazing livestock were removed, increasing from an initial nucleus of a few individuals to high abundance in the former pastures where tall grass had come to predominate. In the 17th year, it was so common that more than 70 were taken in a single day. By then, tree saplings had become established and were beginning to shade out the grasses. From the early 1960s, this species steadily lost ground, and by 2006, it was scarce although still present. *Diadophis punctatus*, at peak abundance, outnumbered all other reptile species combined. It has dwindled gradually but is still present in 2006 (Fitch and Echelle 2006). The Yellow-bellied Racer is a good example of a generalized snake. Unlike some of the other species, it is not dependent on one kind of prey; first-year young take orthopteran insects, and adults take mouse-sized rodents, common lizards or small snakes. However, *Coluber constrictor* dwindled gradually, and those found in recent years have been hatchlings, perhaps wanderers from other habitats. The copperhead increased for several years in response to increased cover and the abundance of the prairie vole, its favorite prey, but from the early 1950s, as voles began to decline, it underwent a downward trend that has lasted more than 50 years. Without the vole as food, snake litters are smaller and non-breeding is more common.

Several species are not easily classified in any of the above groups. One of these is the Red-sided Garter Snake (*Thamnophis sirtalis*). It increased rapidly and became abundant in the early years and is still thriving in 2006. The Northern Watersnake (*Nerodia sipedon*) was present at the pond throughout the years and seemed to be little affected by the changes in terrestrial habitats. The abrupt reduction in number of Black Ratsnakes (*Pantherophis obsoletus*) from the 1950s to the 1960s is due largely to the fact that, by the 1960s, a substantial proportion of those on the Reservation had been caught and marked; reduced captures in the 1990s can probably be explained by the shift of trapping effort to nearby experimental areas. The Brown Snake (*Storeria dekayi*) was most common during the 1960s and dwindled in later decades.

Superimposed on the changes precipitated by ecological succession, every species responded differently to environmental factors confronting it, and every year was unique in weather sequence. For example, environmental moisture was a critical factor for first-year young of the Red-sided Garter Snake. These depend almost entirely on earthworms for food. In drought years the availability of the worms is much reduced, depending on the severity of drought, and survival of young snakes is drastically affected. In a "bad year" only a small percentage may survive, and in these, sexual maturity may be postponed beyond the normal age.

As mentioned in Fitch (2006), it is ironic that on this area dedicated to preserving native flora and fauna and protected from anthropogenic disturbance for more than half a century, a large portion of the herpetofauna has been reduced by natural succession. However, perhaps it should not be surprising. The Reservation occupies the ecotone between eastern deciduous forest and tall-grass prairie. In this area, prairie is maintained as a fire or fire and grazing subclimax, and the balance can easily swing toward brush and forest when fire is suppressed. When the Reservation was created in 1947, it possessed a spectrum of habitat subdivisions and each was near, or adjoined, others of contrasting communities. Reptile/amphibian species thus had a choice of many habitats, all of them changing at different rates. Now, after 58 years of succession, the area as a whole is much different from what it was at the outset. The prospect is that over a sufficiently long time the fauna will become less diverse, different subdivisions will become more similar, and a climax community will eventually prevail. Some species, e.g., *Coluber constrictor*, which had shown marked decline on the Reservation, remained abundant on the experimental areas (Fitch et al. 2003). These areas thus provided perspective to the successional changes on the Reservation and demonstrated responses of the local ecosystem to management regimes such as mowing, fire, and grazing. To date, there are few published studies that have directly addressed the effects of brush management on native herpetofauna in the central United States (but see Jones et al. 2000). Effects of brush management have been more thoroughly studied for avian communities (e.g., Reinking 2005), and in some of these studies, reptilian responses are mentioned more or less incidentally (Shocat et al. 2005; Misenhelter and Rotenberry 2000).

In summary, observations of long-term changes in habitat and herpetofauna provide important information applicable to the conservation, management and restoration of native ecosystems. Without such observations, it would be difficult to surmise how these communities have changed or might change in the future. I have been fortunate to have the opportunity to conduct such studies. However, in the current atmosphere that fosters fast-return research supported by large grant money, long-term, detailed studies of natural history are generally not encouraged by academic institutions. This type of information is no longer solely pedagogical. Now, more than ever, we need a solid database to deal with the effects of human population growth and attendant problems of environmental alteration. Institutions need to promote detailed natural history research if only because the data can ultimately contribute to the management and conservation of biodiversity.

Acknowledgments.—I am indebted to many colleagues and students and also to family members for data included here. Although it is not practical to list all of the colleagues and students, major contributors included Donald R. Clark, Robert R. Fleet, Robert W. Henderson, Richard B. Loomis, Richard A. Seigel, and Donald H. Troyer. I am particularly grateful to my wife, Virginia R. Fitch, for support and help in many aspects of my work over the years. Alice F. Echelle typed the manuscript, and she and Anthony A. Echelle, and four anonymous reviewers read the manuscript and made helpful suggestions. Finally, I thank Stanley E. Trauth for honoring me with the invitation to contribute an essay to this promising new journal.

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Henry Sheldon Fitch was born 25 December 1909 in Utica, New York. Within a year after his birth, his family moved to the Rogue River Valley of southwestern Oregon where his parents had purchased a pear/apple orchard in the foothills of the Siskiyou Mountains. He received his B.A. from University of Oregon in 1930, and both the M.A. and Ph.D. degrees from University of California, Berkeley, in 1933 and 1937, respectively. He worked as a biologist for the U.S. Bureau of Biological Survey (U.S. Fish and Wildlife Service) at the San Joaquin Experimental Range in central California from 1938-1941 until he was drafted by the U.S. Army. After his release from the Army in 1945, he returned to his former job at the San Joaquin Range, but was transferred from California to Leesville, Louisiana in 1947. In 1948, the University of Kansas offered him a professorship position. His duties also included being resident naturalist and steward of the newly created University of Kansas Natural History Reservation, a 239-acre tract of land about seven miles northeast of Lawrence, Kansas. He still resides in this place that has been his home and living laboratory for the last 58 years. (Photographed by Vada Snider).

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DILEMMA OF NAME-RECOGNITION: WHY AND WHEN TO USE NEW COMBINATIONS OF SCIENTIFIC NAMES

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***Abstract.*—Recent changes in many scientific names have caused confusion for many non-systematists. We suggest wider use of the category of subgenus as a compromise between the simultaneous needs that exist at the present time: nomenclatural stability for the vast variety of users of scientific names, and phylogenetic correctness for systematists and others concerned.**

Key Words.—taxonomic changes; nomenclatural stability; subgenera; name usage

Recently, several long-accepted scientific names of numerous genera with world-wide or hemispheric distribution were split into two or more genera. Although most of these better represent the intricate relationships among groups of species within a genus in the broad sense (*sensu lato*), many biologists (especially those lacking taxonomic training) become confused by new taxonomic changes and are now uncertain how or what nomenclature is acceptable. An insurgence of new names has appeared with the increasing role of molecular genetic techniques and their inherent role in expressing phylogenetic relationships through genus-group names.

Examples of recent changes in nomenclature include revisions of *Eumeces* (Griffith et al. 2000; Schmitz et al. 2004), *Cnemidophorus* (Reeder et al. 2002), *Elaphe* (Utiger et al. 2002), and several changes in amphibian genera including *Bufo*, *Eleutherodactylus* and *Rana* (Frost et al. 2006). Each of these examples demonstrates one or more occasions where a long-known generic name perforce was restricted to the populations of a relatively small area including the range of the type species. The generic names of remaining new taxonomic subdivisions were either given new original names or provided resurrected ones from previous synonyms.

Frost et al. (2006) is an excellent example and includes a number of nomenclatural changes among North American anurans (Table 1). They split *Bufo* (*sensu lato*) into three genera, substitute *Craugastor* for *Eleutherodactylus* and *Lithobates* for some *Rana*, and revive *Syrrhophus.* Among these genera, *Bufo* and *Rana* have been previously accepted, well-known, and regularly used for over two centuries. During that time, zoologists produced an enormous literature-base referenced via these previously stable designations.

TABLE 1. Examples of prior and new names for North American anurans as proposed by Frost et al. (2006).

Earlier Name	New Combination
Eleutherodactylidae	
Eleutherodactylus augusti	*Craugastor augusti*
Eleutherodactylus guttilatus	*Syrrhopus guttilatus*
Bufonidae - true toads	
Bufo americanus	*Anaxyrus americanus*
Bufo boreas	*Anaxyrus boreas*
Bufo marinus	*Chaunus marinus*
Bufo alvarius	*Cranopsis alvaria*
Ranidae - true frog	
Rana catesbeiana	*Lithobates catesbeianus*
Rana chiricahuensis	*Lithobates chiricahuensis*
Rana aurora	*Rana aurora* [no change]
Rana boylii	*Rana boylii* [no change]

Concomitantly, nomenclatural changes have sometimes been widely disturbing to biologists, and perhaps this consternation is not necessary. More importantly, many fields of biology (e.g., physiology, medicine) have been accustomed to use of those names. Now must they, as well as field biologists, change all these names, especially when the change may have minor or nil importance to their fields? Here we offer an alternative.

Taxonomic nomenclature serves the primary function of name recognition and a secondary function of phylogenetic relationship. Taxonomic specialists are most concerned with the secondary function whereas other biologists are more concerned with the primary function of these designations. Splitting generic names in these cases serves only the *secondary* function of zoological nomenclature: to reveal relationships of species at a finer level than which biologists have been long accustomed. It does not serve the *primary* function of zoological nomenclature: name recognition.

Those two functions (relationship, name recognition) are inherent in the official "binominal" classification system (actually binary) in the fourth edition of the International Code of Zoological Nomenclature (Ride et al. 1999), hereinafter "the Code". The specific epithet (e.g., *pipiens* in the species name *Rana pipiens*) is attached permanently to its taxonomic category and remains valid barring problems for priority, as well as uncertainty of application to a given species. One name cannot be universally sufficient for name-recognition. A minimum of one other word is necessary to group species by binominal nomenclature into manageable units. The generic name serves that fundamental function, but it lends additional meaning in assembling species according to their phylogeny.

The degree to which phylogeny is reflected in generic names is subjective. The Code says nothing about evolutionary origin because that is a zoological, not nomenclatural, decision. Any of several generic names could be used in conjunction with a given specific epithet, without changing the latter's role as the ultimate recognition name; only the grouping name has changed. Obviously the name that functions to group related species should be kept as stable as possible, so that name recognition is minimally disrupted. As arbiters of nomenclature, taxonomists bear the responsibility of serving the needs for efficient name constancy of their fellow biologists and the needs of phylogeneticists to show evolutionary relationships of species to a reasonable degree.

We recommend a compromise to serve the needs of both of these important groups. The Code does provide for such a compromise, whereby the impact on stability of species names that result from the partitioning of any given genus can be greatly minimized by the optional subgenus category. As stated in the Code, names of subgenera, when used, follow in parentheses the generic name, providing the combination such as: the Marine Toad, *Bufo (Chaunus) marinus*. This option provides flexibility of the genus-group category without upsetting constancy of the species name.

The proposal of names at the subgeneric level is optional for the partitions of genera *sensu lato*, and the subsequent use of them. Thus one may use the name *Bufo marinus* without challenging the validity of the subgenus *Chaunus*. Although the partitions of *Bufo* and *Rana* in Frost et al. (2006) were proposed at the generic level, that does not prevent future workers from regarding them as subgenera. Thus the options exist, under the Code, to cite the names newly revived or created for the subdivisions of these two genera as genera or subgenera, and if the latter to use them only in circumstances where phylogeny is of concern, not necessarily in others.

This is a long-needed compromise between nomenclature's primary (name recognition) and secondary (phylogeny) roles. A century or more has passed without need for this compromise because most biologists were taxonomists. Today only a fraction of biologists are trained in systematics and even fewer conduct research in this area. When most users of names are taxonomists, name-recognition is not a major concern. When the primary users are non-taxonomists, as in modern times, name stability increases in importance.

Unofficially, custom plays an important role in what is acceptable or not acceptable. Customs stabilize, but also stultify. Subgenera have not been popular in the past, but changing times suggest that they could be an important component providing both phylogenetic correctness and name stability in modern systematics.

Those workers who prefer to retain current generic names in their broad sense are completely within their rights to do so, under the Code, and certainly no confusion is caused thereby. However, approval by others of these individual rights is ultimately vital. The compromise here suggested is fully justified, in our opinion, but it is operative only if accepted by those most concerned with phylogeny and the most recent scientific discoveries, as well as by those most concerned with stability. Individual rights need general acceptance.

A broad-based survey of preference by all users of the names under consideration would undoubtedly strongly favor stability. Taxonomic specialists have been slow to accept their responsibility to such users equally as well as to their responsibility to convey new knowledge of phylogeny. Acceptance of subgenera as a concession to all users is their part in the suggested compromise.

We appeal to the compilers of checklists that serve as name standards to recognize the need for the suggested compromise and incorporate subgeneric names in their listings, thereby validating the option of use of them, or not, by writers of every variety.

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Hobart Muir Smith (long sleeve plaid shirt) was born Frederick William Stouffer in Stanwood, IA on 26 September 1912, the sixth child of Harry and Blanche Stouffer, farmers who soon moved to Ohio. After Harry was killed in WWI, the children were orphaned and young Frederick was adopted by Charles and Frances Muir Smith, postal worker and teacher, respectively, who changed the boy's name to Hobart and took him to Oklahoma (Shawnee and Okmulgie) and later to Bentonville, Arkansas, where Hobart went to high school. He was sent to Kansas State University in 1928, where he majored in entomology, graduating with that major in 1932. During this time, Hobart met an older student, Howard Gloyd, and accompanied him on several summer field trips, discovering a new fascination with herps as well as a new intellectual orientation which included Gloyd telling HMS to look up a young professor, Edward Taylor, at the University of Kansas. The rest of Hobart's career from his Ph.D. in 1935 is generally well known, as is his hyperscrivenous reputation, with 1602 titles on his vita and some ten more in press, including two books with Julio Lemos-Espiñal. Asked to identify his most important publications, he quickly pointed to the Handbook of Lizards (1946) and the three checklists to Mexican herps (1943, 1948, 1950). With a smile and a raised eyebrow he also mentioned that the Golden Nature Guide has sold over a million copies. (Contributed by David Chiszar).

David Alfred Chiszar (short sleeve shirt) was born at a military base in Sergeant's Bluff, IA, 21 October 1944, to Alfred and Florence Chiszar, but the birth was officially recorded in Sioux City. He was moved to the family home in Perth Amboy, NJ, when Alfred was shipped to Europe as an Army Air Corps aviator. After WWII, Alfred worked for General Motors Corp. and later operated a Gulf filling station and mechanic shop, while Florence operated a confectionary store. The family continued these businesses for many years, but moved to Woodbridge, NJ, where David went to high school. Degrees in psychology came from Rutgers (BA 1966, Ph.D. 1970) and it was in 1970 that he met Hobart at the University of Colorado. Collaborative field and laboratory work followed, continuing to the present. Experiments on strike-induced chemosensory searching in rattlesnakes occupied much of their time, but they managed to make numerous field-collections trips within Colorado, surrounding states, and Mexico.