thermoregulation, especially as related to conservation of water. In another chapter Casas-Andreu and Gurrola-Hidalgo compare two extremely similar syntopic bisexual species in a semi-arid region in Jalisco; it is remarkable that, contrary to what is seen in the United States, there is only one daily activity period.

Garland presents an experimental study of the correlates of endurance in C. *tigris* without reaching a definite conclusion. Also inconclusive is a report by Wit and Sellers on thyroid activity related to hibernation in C. *sexlineatus* in Alabama and Georgia.

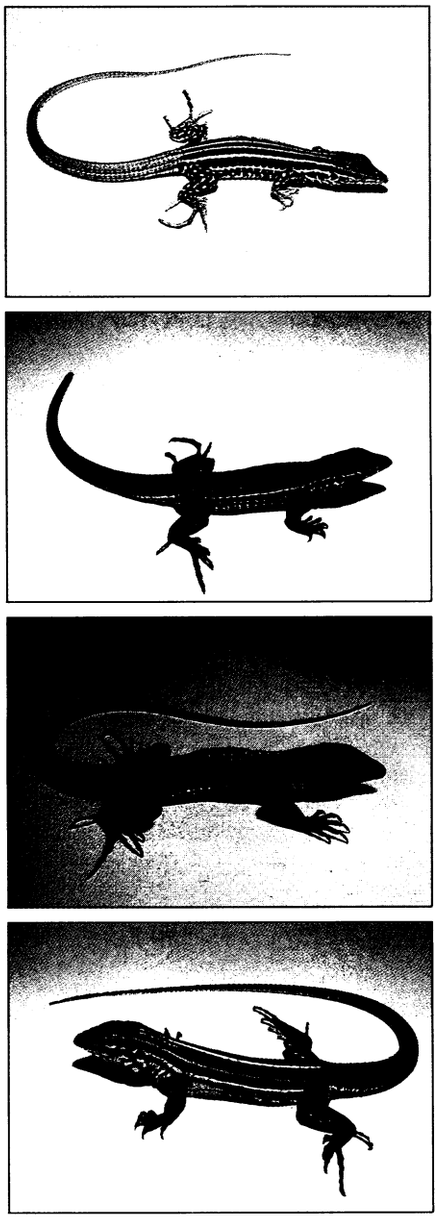
Vitt and Breitenbach study the correlates between foraging mode and a large array of life-history (including demographic) traits. From a statistical study of 52 local samples of numerous species they reach no conclusion, but suggest topics for further research.

Crews and Moore write on pseudocopulatory behavior in all-female species. Their experimental study leads them to the conclusion that post-ovulatory females (or castrated females having received progesterone) will assume male roles, being accepted by pre-ovulatory (or estradiol-treated) females. Individuals will assume both roles during the ovarian cycle. As to the function of the behavior, Crews and Moore stress that it may facilitate ovulation, with considerable demographic consequences.

Schall uses a set of five species, two of them parthenogenetic, to test Wright and Lowe's 1968 "weed" hypothesis—that parthenogenesis would become established because the high heterozygosity of hybrid females would give them an advantage in the exploitation of ecotonal and disturbed environments. His data fail to support the conjecture.

Chapters by Cuellar and by Price, LaPointe, and Atmar deal with resource partitioning among sympatric species, focusing on competitive interactions and on patterns of reproduction and including removal experiments. Cuellar finds out that his two species (C. *uniparens* and C. *tigris*) use adjacent but dissimilar habitats; where they compete, unisexual C. *uniparens* performs better than bisexual C. *tigris* and has a wider ecological valence. The study by Price *et al.* consists of a removal experiment involving two ecologically "twin" species, parthenogenetic C. *tesselatus* and its maternal parent, C. *tigris marmoratus*. Contrary to expectations, the bisexual species actually behaved more like a "weed" than the unisexual one.

An original and interesting chapter by Leuck deals with kin recognition, using diploid and triploid C. *tesselatus*. Both agonistic and benign interactions were studied. The results clearly show that the lizards recognize ploidy levels, but the mechanism remains obscure (Leuck herself favors olfaction).



Representative members of the *Cnemidophorus depii* species group. "As presently constituted the group consists of five species with 12 subspecies . . . distributed from Costa Rica to California in dry tropical, subtropical and temperate habitats." [From J. W. Wright's chapter in *Biology of Whiptail Lizards*]

Another interesting chapter is an analysis by Trauth and Fagerberg of the fine structure of the eggshell of C. *laredoensis* and its parent species C. *sexlineatus*. There is still no application for this type of data, but it is an elegant line of research.

This is a valuable book for the primary information it contains and for some of the literature reviews, but it offers no synthesis—nothing in fact that would justify the erection of "cnemidophorology" as a science. Some omissions are noteworthy, especially the lack of a well-organized treatment of systematics, a summary of parthenogenesis, and comparisons with the parallel parthenogenetic genus *Lacerta*.

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Climate Chronologies

El Niño. Historical and Paleoclimatic Aspects of the Southern Oscillation. HENRY F. DIAZ and VERA MARKGRAF, Eds. Cambridge University Press, New York, 1993. xiv, 476 pp., illus. $69.95 or £40. Based on a workshop, Boulder, CO, May 1990.

In the last decade the El Niño–Southern Oscillation (ENSO) has become recognized as perhaps the dominant mode of interannual oceanographic and climatic variability in the tropical Pacific and Indian oceans. It has also been found to contribute to global climatic anomalies both within and outside the tropics by affecting such diverse components of the climate system as sea surface temperature, tropical atmospheric convection, cloud cover, and precipitation. Climatic manifestations of the ENSO system can dramatically alter crop yields and fish harvests and bring about catastrophic monsoon rains. The ENSO system involves the pronounced east-west "seesaw" of tropical convection and atmospheric pressure (known as the Southern Oscillation) whereby a large region of convecting air over the western Pacific and Indian oceans is linked by high-altitude winds to a descending limb in the eastern Pacific. In 1966 Bjerknes named this the Walker Circulation, after Sir Gilbert Walker, who first identified it in the 1920s. ENSO has two extreme phases—El Niño (the warm phase) and Anti-El Niño (the cold phase)—and a mean period ranging from 2 to 10 years. Although its behavior during the last 50 to 60 years is well established, little is known about its prior variations. However, the pace of research aimed at reconstructing the history of the phenomenon has been increasing owing to the recognition of its wide-ranging implications for the environment and human life and the value of being able to predict its future behavior. This book brings together some of the most innovative recent

Vignettes: Matter and Energy

Abstract
The authors attempted to achieve tabletop fusion at room temperature (23°C). They succeeded.

Materials
(a) Two (2) tabletops, each composed of pasteboard and measuring I m × 2 m × 10 cm.
(b) A paste mixture composed of flour, water, and palladium grounds.
(c) Tritium, in trace amounts.

Method
The authors sprayed atomized paste between the two tabletops (Figure 1). The tabletops were brought into close contact. Pressure was then applied to their outer (noncontact) surfaces. The tritium was stored at a separate storage facility and was observed continuously during the course of the experiment.

Results
Tabletop fusion occurred (Figure 2). Trace amounts of tritium were observed at the storage facility.

—*Ponz Fleischedicher* and *Joseph Morton*, in *Sex as a Heap of Malfunctioning Rubble (and Further Improbabilities): More of the Best of the Journal of Irreproducible Results* (Marc Abrahams, Ed.; Workman)

You can create life in the bathtub, easy. Mix twelve dozen cartons of Jell-O in your bathtub, run 220 volts of electricity through it, and there you are. Science even has a hunch that this is probably how all life itself began. . . . Psychologists might waste their time and ours by wondering why anyone in his right mind would want to electrocute a gelatinous blob, but it is only by saying no to the rules and yes to the impulse that real beginnings are made.

—*Dr. Science* (with Dan Coffey and Merle Kessler), in *Dr. Science's Book of Shocking Domestic Revelations* (Morrow)

work on the historical and paleoclimatic reconstruction of ENSO.

Clues to the past behavior of ENSO come from a variety of sources. Ship and meteorological records have yielded information about El Niño–related events off South America dating back to the 1500s. In East Africa, documentation of Nile River levels and flooding extending back to A.D. 622 provides an even longer record. Historical records of eastern Pacific fish catches provide important information about ecological consequences of past El Niño–related events. Streamflow is highly sensitive to rainfall at time scales ranging from seasons to days, and studies of streamflow in the western United States over the past several decades have provided information about rainfall patterns during both phases of ENSO.

Paleoclimatic recorders of ENSO must offer absolute dating at annual resolution coupled with long and continuous records. Biological and physical systems meeting these requirements include trees, tropical ice cores, massive hermatypic corals, and varved (annually laminated) lake or marine sediments. Each of these systems is discussed in the book, with comparisons made between different types of records.

Time-series records of variations in tree-ring width contain information about the hydrologic balance of an area. In the Northern Hemisphere, tree rings have proved useful for tracking rainfall anomalies at different sites, primarily in North America. Several contributions to the book document periods of drought over the last thousand years and discuss the use of spectral analysis techniques to examine and quantify variance and regional coherence. The strongest correlations with ENSO are found in the southwestern United States, where there is a long-term relationship between ENSO variability and rainfall amount. Trees also contain fire scars that serve as indicators of the prevalence of wildfires and ENSO-related precipitation in Arizona and New Mexico.

In the marine realm, long-lived hermatypic corals from the Pacific and Indian oceans yield information about past ENSO variability over the last several centuries. Many corals contain annual growth density bands; when these occur in living corals with known collection dates, they can be used for absolute dating. Coral skeletons incorporate several independent chemical tracers of tropical oceanic and atmospheric phenomena related to ENSO. Studies have shown that isotopic, fluorescent, and trace-element chemistry of accreting coral skeletons can accurately record seasonal and interannual changes in sea surface temperature, salinity, rainfall, nutrient availability, and river input. Coral records from the Galápagos (eastern Pacific), Tarawa Atoll (central Pacific), and Bali (western Pacific) have been shown to accurately monitor different components of ENSO, pointing to the need for additional collection sites.

Tropical and subtropical ice cores provide unique information concerning the chemical and physical character of the atmosphere. Annual variations in the amount of precipitation accumulating in ice caps produce annual laminations that allow precise dating. The thickness of annual layers reflects net accumulation, while the abundance of dust, stable oxygen isotopes ($\delta^{18}O$), and ions conveys information about local atmospheric conditions. Tropical ice cores, by virtue of their great length, also provide information about "natural" climatic variation over the last several thousand years. Analysis of ice cores from the Dunda (China) and Quelccaya (Peru) ice caps reveal that except for the annual cycle, the dominant variation in the global climate system at time scales of months to several years is due to ENSO.

One section in the book explores the low-resolution paleoclimatic reconstruction of ENSO using intermittently varved marine sediments and terrestrial indicators. Lower-resolution changes in vegetation assemblages, fire histories, bioproductivity, and sedimentary records can be evaluated in the context of larger variations in the ENSO system. The possibility of a connection between variations in net solar irradiation reaching the Earth and ENSO is also explored.

As the editors of this volume point out, the study of past ENSO variability is still maturing. This book should spur new interest in the field. Additional paleoclimatic data are required if we are to develop a comprehensive understanding of the dynamics of the ENSO system and establish its relationship to the other components of the tropical and subtropical climate engine.

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