Society for Chaos Theory
In Psychology and the Life Sciences
P.O. Box 7226 • Alhambra, CA • 91802

Dec. 1993-Feb. 1994 NEWSLETTER **Volume 2, Issue 1**

DUES AND SUBSCRIPTION

If there is a '94' in the corner of the address label on this newsletter then you are paid up through 1994. If there is a '93' we believe your subscription expires with this issue. Please use the form on the back of the newsletter to forward dues and information changes to the Society offices in Alhambra. Thanks.

ELECTION RESULTS

Congratulations to our new President-elect, Dr. Jeffrey Goldstein of Adelphi University. Thanks also to our membership who returned a remarkable number of ballots. Jeff will take office in June at the annual meeting.

1994 CONFERENCE

The 1994 Conference will be held June 24-27 at Johns Hopkins University just north of Baltimore and about 45 minutes from Washington, DC. Lodging is remarkably reasonable at $29.75/person double and $37 single occupancy and approximately $19/day for meals. The conference fee will be $75 regular, $35 for students. Like Geneva Park lodging, meals and meeting rooms are all located in the same building which at Hopkins is a newly renovated Georgian mansion. If you are staying on-site payment must be received by **April 22**, so make your plans soon. Send registration and lodging payment and requests for information to the Society offices using the form on the back of the newsletter.

CALL FOR PAPERS

Send abstracts for papers, posters and session proposals for the annual meeting to Dr. Jeffrey Goldstein, 29 Hayes Rd., Amityville, NY 11701; email: goldstein@adlibv.adelphi.edu. Abstracts should be 800 words or less and must be received by **Mar. 15**. We strongly encourage you to organize sessions with other individuals in your topic areas. As a result of the success of last year's format, the program committee will arrange such groups if sessions are not organized in advance.

PROGRESS REPORT

Publicity is booming thanks to our new Publicity Committee Chair, Holly Arrow. Holly, supported by Steve Guastello has posted notices of the Society's meeting and workshops to electronic bulletin boards wherever possible. We have also sent out flyers about the Society to the heads of psychology departments in the 1000 largest schools in the country. We've already had responses from as far away as Japan. Congratulations to Holly and thanks to her and the committee.

An Online Reference Database is being organized by Tom Lasley – many thanks Tom! The database will be located on **chaopsyc** but you should send references to Tom electronically at clasley@unca.edu.

APA Continuing Education Approval is being sought through the efforts of our newly formed Education Committee headed by Dr. Keith Clayton of Vanderbilt and assisted by Alan Combs of UNC Asheville. The paperwork is awesome but, if we become an accredited provider, workshops will become much more available because of advertising support and the lure of CE credits. Let us wish Keith and Alan well.

CONTENTS

The Society's Winter Meeting

The Society's east coast winter meeting will be held in New Haven, Connecticut **Feb. 4-6, 1994** at the Quality Inn Conference Center across from Southern Connecticut State University. Cost will be $85 which includes room (double occupancy), meals and fees for the whole stay (Friday night through Sunday morning). Single occupancy rooms are available for an additional $24/night. Pools, Jacuzzis and vans for transportation to local sites should make this a luxurious affair. To sign-up contact Dr. Carlos Torre, 2765 Yale Station, New Haven, CT 06520 (Phone: 203-498-7070, evenings and M-Tu-F-Sa-Su during the day). Checks should be made out to The Quality Inn Conference Center. Act promptly so Carlos can reserve rooms in advance.

Many thanks to Carlos Torre, Angela Vicenzi, Fred Abraham and Derek Paar who are organizing this event.

Articles: Starting this issue we will be publishing short articles provided by our readership. If you would like to contribute a piece, contact Dr. Sally Goerner, 374 Wesley Ct., Chapel Hill, NC 27516; email: goerner@gibbs.oit.unc.edu. The following piece by our new President-elect is a synopsis of his talk on language at the annual conference. The other two pieces by Iona Miller and Burt Webb were taken from chaopsyc bulletin board exchanges.

Linguistic Ambiguity in Nonlinear Dynamics

by Jeffrey Goldstein, Ph.D.,
Adelphi University, Garden City, NY 11530

A creative aspect of a new theory is the great profusion of new terms. But there's a problem when what one person means by a new term is not exactly the same as what another person means, yet both assume they mean the same thing. Is there unanimous agreement on the specific meanings of "bifurcation," "attractor," "chaos," "complexity," "far-from-equilibrium," and so on? Lingusitic ambiguity can have several sources. First, people hail from different theoretical schools: Prigogine's work; nonlinear dynamical systems theory; complex adaptive systems research; and so on. Each school has different research agendas, different questions and different ways of answering these questions, and different meanings for terms. Second, there is the popular meaning of the terms–e.g., "chaos" has traditionally connoted turmoil, turbulence, the primordial abyss, and the Biblical references to Tohu and Bohu. Third, these terms have accrued new meanings as a result of the popularization of the new sciences. Nowadays, "chaos" is used to refer to all sorts of turbulent, unstable, or unpredictable behavior. Is all this supposed "chaos" depicted in a chaotic attractor? Fourth, such linguistic confoundedness is amplified when the new terms are used in a metaphoric sense, an inevitable element in science like "electric current," "spin," or the "charm" of a "quark."

"Chaos" is a good example of the problematic meaning of a new term. Ambiguity about it goes back to its first usages. Ruelle (1991) notes that "chaos" in Yorke's and Li's (1975) first article referred to how for a large class of maps of a line interval into itself, the existence of a periodic point of period 3 implies the existence of periodic points of every other period. Ruelle points out that a temporal evolution with many periodic orbits often does not have to show sensitive dependence on initial condition, yet what we now mean by "chaos" includes sensitive dependence on initial conditions. Or, how about the different magnitudes of "chaos?" For example, the "weak chaos" of Per Bak's theory of self-organized criticality (Bak and Chen, 1991) operates according to a power law, not an exponential law, and, therefore, "weakly chaotic" systems have more long-term predictability. Recently, Ditto and Pecora (1993) have written about "mildly chaotic" phenomena, e.g., the Rossler signal used to coax two out-of-phase nonchaotic systems to operate in phase. Then, there are the phrases "edge of chaos" (Lewin, 1992) or "border of chaos" (Bak and Chen, 1991). When we are using the term "chaos" are we referring to "weak chaos," "mildly chaotic," "strong chaos," the "edge of chaos," or "chaos" as merely a metaphor?

"Equilibrium" and "Far-from-equilibrium" are two more examples. "Equilibrium" has referred to everything from Archimedes' balance of weights on a lever, to the psychologist's Herbart's (Goldstein, 1992) notion of the tendency of mental contents to sink or rise in consciousness, to the final goal of all systems according to the 2nd Law of thermodynamics, to Talcott Parson's (Russet, 1966) ideas on social system stability, to Kurt Lewin's views on the status quo of a social system (Lewin, 1951). And, what exactly are we to make of "far-from-equilibrium"? Is it simply a synonym for the

critical values of parameters whereby bifurcation occurs (Nicolis, 1989)? Must it have some thermodynamic connotation? And what is the exact connection of "equilibrium" and "far-from-equilibrium" to stability and instability?

Perhaps we need to spend some time to agree or agree to disagree about what we are meaning by the terms we are bandying about and not simply take-it-for-granted we are all speaking the same language.

References:

Bak, P. and Chen, K. (1991). Self-organized Criticality. Scientific American, January: 46-53.

Ditto, W. and Pecora, L. (1993). Mastering Chaos. Scientific American, August: 78-84.

Goldstein, J. (1992). Unbalancing Psychoanalytic Theory: Moving Beyond the Equilibrium Model of Freud's Thought. Society of Chaos Theory in Psychology: 2nd Annual Conference.

Lewin, K. (1951). Field Theory in Social Science. NY: Harper & Row.

Lewin, R. (1992). Complexity. NY: Macmillan Publishing Company.

Li, T. and Yorke, J. (1975). Period three implies chaos. American Mathematics Monthly, 82: 985-92.

Nicolis, G. (1989). Physics of far-from-equilibrium systems and self-organization. In P. Davies (Ed.). The New Physics, pp. 316-347. Cambridge: Cambridge University Press.

Ruelle, D. (1991). Chance and Chaos. Princeton: Princeton University Press.

Russett, C. 1966. The Concept of Equilibrium in American Social Thought. New Haven: Yale University Press.

AWARDS AND THANKS

Engraved pewter tankards were awarded to Larry Vandervert and Carlos Torre at last year's annual conference. Larry Vandervert was honored (in absentia) for co-founding the Society and serving as the first President. He also received a lifetime membership and (oh, yes) a new elegant concord-jade turquoise shirt with the Society logo. Carlos Torre was a recipient of a humanitarian award for the application of his unique triadic-chaos theory of learning to programs for adjustment of students of culturally diverse backgrounds to university life, a great boon to the development of human potential and the respect and preservation of cultural and personal differences.

Awards of the shirts also went to David Peat, Keynote speaker, and to Dorothy Gample, retiring treasurer.

Chaos, Neural Nets and Psychology

by Burt Webb

The purpose of the brain is to learn, recognize, manipulate and generate patterns relevant to survival. The brain is basically a pattern processor. These patterns can be in the spatial domain (vision, touch), frequency domain (hearing and speech), molecular domain (taste and smell), etc. Different artificial neural nets can learn new patterns, recognize known patterns, generate a whole pattern from a fragment, generate the remainder of a sequence from when fed a fragment, sort patterns into categories, etc. What is the connection between thoughts, concepts, learning, reasoning, motivation, behavior, etc. and neural net processes? If psychological processes can be linked to the behavior of neural nets, then it may be possible to link chaotic behavior in neural nets to psychological processes.

A recent theory suggests that personality is a simulation of a digital style symbolic processor running on the underlying neural net architecture of the human brain. When you run a simulation, certain 'strange' behaviors may appear which turn out to be caused by the nature of the underlying system running the simulation. How could the unique capabilities of a neural net simulator influence the behavior of a simulated discrete logic system? If the logical mind is a simulation running on a neural net, can it appeal to lower level processes which are not "logical" but which can carry out functions whose results are entered back into logical processes? There are terms which seem to hint at this such as 'intuition', 'gut-feeling', 'inspiration', etc.

> Phase-space trajectories of a dissipative chaotic system separate exponentially over time and yet remain on a bounded fractal subset of the phase space, called a chaotic or strange attractor, within which are embedded an infinite number of unstable periodic orbits.....The basic theme used by the few groups pursuing research in this area (the active use of chaos in control system design) involves a linearized control scheme and reliance on the denseness of strange attractors and of the unstable periodic orbits within them to achieve control. (Bradley & Zhao, 1993, p. 39)

If the proper signal is fed into a chaotic system, one of the "potential' periodic attractors can be "locked in" and govern the behavior of the system as long as the external signal is being fed in. As soon as the

signal stops, the chaotic attractor reasserts itself. Work on the olfactory lobe of the rabbit suggests that the lobe starts from a chaotic pattern, a strange attractor. Then when a few molecules of scent enter the nose, the system is pulled into an attractor basin and the smell is recognized. After the scent vanishes, the system returns to a chaotic state.

This could connect to a possible "resonance mode locking" in the brain during recognition and concentration. In such a situation, the brain would move into a complex periodicity for a time interval and then move back into a chaotic mode in order to be prepared for the next resonance mode. Terms like "self- stabilizing", "recursive loop", "standing wave", "self-resonant" could be used in reference to this phenomena. If a small cyclic input to a chaotic system can momentarily draw the system into a cyclic behavior and one of the results of that cyclic behavior is to output a small cyclic signal which can be reintroduced into the system, then such a pattern could stabilize itself and endure for an extended period, until overridden by a different input or swamped out by the noise in the system.

Perhaps a normal personality has some sort of underlying chaotic attractor similar to the "single regime" Rossler attractor which keeps it moving through the phase space of possible conscious states. Compulsive/obsessive disorders could be cyclic patterns which do not move back to chaos. Attention deficit and learning disorders could be related to the inability to drop out of chaos and lock into a particular mode. Attractors with identifiable multiple discreet regimes such as the Lorentz could provide a model for multiple personalities which switch between different patterns. A small perturbation at the right point of the trajectory of such a system can flip it from one regime to another. Exploration the mechanisms of mode locking, mode reset, and "sensitive regions" where systems shift regimes could have therapeutic implications.

Bradley, E. & Zhao, F. (1993). Phase-space Control Systems Design. *IEEE Control Systems*, April 1993, p. 39.

HAVE YOU BEEN TO THE PARADOX?:

Chaos Theory and Fuzzy Philosophy

by Iona Miller, 1993

married to Richard Alan Miller

> Whence will come the Chameleon of our Chaos, in which all secrets are hid in their potential state." — Alchemical text

As a postmodern "chaos culture," we are in the position of having to take ritual fictions (including scientific theories) seriously, while recognizing their status as state-of-the-art models at the same time. Chaos Theory may be "read" metaphorically as an invitation to that age-old process of recycling consciousness–Know Thyself. According to James Hillman, "Know Thyself is revelatory, non-linear, discontinuous." This dictum echoes through the eons, urging us to turn our consciousness back on itself, assessing and experiencing the relative "truth" of what we find within. We know ourselves through our guiding myths, our guiding fictions.

In logic things can be 100% true or false; in nature they seldom are. To the extent science has measured facts and interpreted them in all or nothing terms, it has failed to describe experiential reality. "Truth" doesn't always match the facts. In the context of non-interpretive experiential psychotherapy (a healing

Opportunities

The editors of **Complexity International,** a new electronic journal, are looking for previously unpublished work in the field of complex systems. Distribution is worldwide, publication is rapid, and subscriptions are free. For further information contact the editorial board at: ci-editor@life.anu.edu.au

The editors of the **New Oxford Journal of High Integrity Systems** may be interested in publishing conference papers from the Society's 1994 conference. If you wish to be considered for such publication get your abstracts in (see Call for Papers on page 1) and also contact Dr. Sally Goerner, 374 Wesley Court, Chapel Hill, NC 27516; email: goerner@gibbs.oit.unc.edu.

Dr. Philip Kronenberg at Virginia Tech is compiling a list of scholars who are using chaos/nonlinear systems, evolutionary metaphors and complexity theory (among others) to work in public policy development, planning, and the strategic management of national institutions. For information or to be put on the list contact him at: philk@vtvm1.cc.vt.edu or Philip S Kronenberg, Professor of Public Policy, Virginia Tech, Northern Virginia Graduate Center, Falls Church, VA 22042-1287.

fiction), healing is a journey through fear and pain into the chaotic heart of emergent creativity. In this virtual reality of the imagination the surety of fact melds into dynamic psychic reality. Mythic consciousness requires a telos to create momentum – the dynamics of consciousness. The new myth is not one of polarity, but plurality – openness to many relative forms of validity.

Traditionally logic and chaos have held sway in opposite camps. Where they interface, the creative edge, there is a melding where the irreconcilable become indistinguishable from one another. This is strongly reminiscent of the alchemical/Jungian notion of "holding the tension of the opposites" (coincidentia oppositorum), distinct but conjoined, as expressed by C.G. Jung, James Hillman, and Marion Woodman.

As polarities chaos and logic represent our classically conditioned duality, which is also expressed as the interplay of feminine (moon) and masculine (sun) energies. Both chaos theory, in exploring the blending of chaos and order, and fuzzy logic seek a mythical sort of "sacred marriage" through not only a scientific revolution, but a new way of experiencing the nature of reality–e.g. Hillman's so-called "illumined lunacy," diffuse awareness. To "fuzzy consciousness" (Kosco, 1993) nothing is absolute - everything is a matter of degree, free of the gravity of literalism. It is openness to many forms of validity, freedom from choosing identification with some polarities over others. The essence of fuzzy logic describes the whole in the part. Multivalence, rather than bivalence, more accurately reflects the complex dynamics of consciousness.

We find this reflected in experiential psychotherapy when we initiate potentially infinite regress: associating "backward and downward," exploring ourselves through epistemological metaphors, "how we know what we know" about ourselves - the fractal reiterations of what our nature and experience is like. Dynamic recycling of consciousness creates/reveals the dynamic flux of holistic feedback patterns. It establishes a patterning matrix–a strange attractor–reflective of the organism's relationship to the whole, through a unique relationship of chaos and order. This holistic approach to existence is both-and chaotic and logical–logically chaotic, chaotically logical–a dynamic tension between the rational and natural mind.

Process-oriented therapy is sufficiently context dependent that it is unpredictable, iterating, self-referencing. We never know just where the experiential process will go next–what imaginable expression awareness will flow into and identify with. But we trust the process to "liquefy" consciousness, as it de-structures (dissolves) rigid patterns within the psychobiological, behavioral, emotional, mental, and belief systems of the participants. Fundamental identity is then repatterned holistically by the emergent creativity of the transformational process–a chaotic trajectory. Thus, the alchemical prima materia, primal identity is identical with the re-patterned ultima materia, self-actualizing potential.

As Jung noted, "The psyche is an equation that cannot be "solved" without the factor of the unconscious; it is a totality which includes both the empirical ego and its transconscious foundation."

lm00@lehigh.edu

EMAIL NEWS FRED

Chaopsyc is being reorganized by our beloved Past-president and new online communications committee chair, Dr. Fred Abraham. The new chaopsyc is being moved to listproc@moose.uvm.edu.. To subscribe send a message to this listproc saying: SUBSCRIBE your_name.

If you are not yet on email we recommend MCImail which is a short distance call from most places in the US and costs only $35 a year plus a small charge for messages sent. To join call 1-800-444-MAIL. If you need further help, call the Society's contact person: Bill Long, 25873 Line Road, Denton, MD 21629. Phone: 410-479-2631 or 221-2451. His email address is: 0005939365@mcimail.com.

If you are having problems with MCImail, you might consider a Windows package called MailRoom. MailRoom will automatically take care of calling MCI, re-dialing if necessary, logging in with your password, downloading any messages that have arrived, uploading new messages, and keeping address books. It can also be used to send faxes via MCI, provides a simple full-page editor for composing messages, and saves deleted messages for a week - just in case. MailRoom costs less than $100 and is available from Sierra Solutions, 2016 Kelton Ave., Los Angeles, CA, email: MCI-Mail # 545-0183. Thanks to Robin Robertson for submitting this suggestion.

Interest Area Contacts

The following is an updated list of contact people in various interest areas. You can use these people to begin networking with others in your area. If your area is not listed and you are willing to be a contact person, please send your name to Dr. Sally Goerner, 374 Wesley Court, Chapel Hill, NC 27516 (919-932-5547), email: goerner@gibbs.oit.unc.edu.

Changes from last issue are indicated in italics.

Anthropology and Sociology:
Patrick Baker
Department of Sociology and Anthropology
Mt. Allison University
Sackville, N.B. EOA 3CO, Canada
506-364-2202 (w) 506-536-1474 (H)
Email: pbaker@mta.ca

Art/Art History:
Tobi Zausner
137 East 38th St, 6J
New York, NY 10016
212-686-5272 (Fax 212-686-1396)

Clinical Theory/Practice:
Ray Hawkins
Austin Mental Health
1600 W. 38th St. Suite 404
Austin, TX 78731
512-459-4101 (w) 512-477-7877 (H)

Clinical Research:
Gary Burlingame
Comprehensive Clinic
Brigham Young University
Provo, Utah 84602
801-378-7759 or 4050 (W)
Email: burlinga@tlrb.byu.edu

Consciousness Studies
Dr. Allan Combs
Department of Psychology
#1 University Heights
University of North Carolina at Asheville
Asheville, NC 28804-3299
PHONE:704-251-6423
Email:combs@unca.edu

Economics:
Stephen Guastello
P.O. Box 92305
Milwaukee, WI 53233
414-288-7218 (H)
Email:
6155guastell@vms.csd.mu.edu

Family Systems
Bill McCown
Nathan Kline Institute, Building 37
140 Old Orangeburg Road
Orangeburg, NY 10962-2210
914-365-2000 (w) 215-885-4666 (H)
Email: mccown@nki.bitnet

History/Philosophy:
Lillien Greeley
4 University Rd.
Cambridge, MA 02138
617-576-2034 (H)

Jungian Psychology
Robin Robertson
P.O. Box 7226
Alhambra, CA 91802
818-281-3601 (H)
Email: 0005699249@mcimail.com

Learning Theory and Research:
John Cooney
Educational Psychology
University of Northern Colorado
Greeley, CO 80639
303-351-1642 (W)
303-351-2312 (Fax)
Email:
jcooney@dijkstra.univnorthco.edu

Language and Literature:
Bob Kahn
Center for Graduate Studies in Higher Order Literacy
P.O.Box 090603
University of Missouri at Kansas City
Kansas City, MO 64109
816-471-7123 (H) 816-235-2477 (w)
Email: rkahn@vax1.umkc.edu

Memory and Perception:
Keith Clayton
315 Wilson Hall
Vanderbilt University
Nashville, TN 37240
Email:
claytokn@ctrvax.vanderbilt.edu

Neural Nets:
Bill Sulis
Department of Psychiatry and Psychology
McMaster University
Hamilton, Ontario
Canada
416-772-7212 (H)
Email: psych@mcmaster.ca

Nursing:
Angela E. Vicenzi
Department of Nursing
501 Crescent Street
Southern Connecticut State University
New Haven, CT 06515
203-397-4156 (Ans. Machine)

Organizational Psychology:
Jeff Goldstein
Adelphi University
29 Hayes Rd.
Amity Harbor, NY 11701
516-789-4145
Email:
Goldstein@adlibv.adelphi.edu

Physiology/Neurophysiology:
Wally Pritchard
RJR Tobacco Company
BGTC 611 R&D
Winston-Salem, NC 27102
Phone/fax: 919-741-4682
Email: wally@rjrt.com

Psychiatry
Hector Sabelli
2400 North Lakeview Avenue
#2802
Chicago, IL 60614
312-942-0118 (w) 312-348-5679 (H)

Workshop on Methods

To help answer the need for EDUCATION we will provide a two-day workshop on nonlinear methods after the annual meeting in Washington DC **June 28-29**. The workshop will have introductory and advanced segments as described below: (Note: you can take either one or both segments.)

Introductory Segment: Chaos, Attractors and Fractal Dimension Analysis
Dr. Allan Combs and Dr. Tom Gentry — Two three-hour morning sessions (9am-12pm).

Basic concepts (for example, phase space, fractals, Lyapunov exponents)
Attractor Construction and Reconstruction Techniques
Distinguishing Chaos from Noise
Calculation and Applications of Fractal Dimension Analysis

June 28-29

Advanced Segment: Complex Systems Theory and Methods
Dr. William Sulis — Two three-hour afternoon sessions (1:30pm-4:30pm).

Introduction to Complex Systems including complexity, edge of chaos, adaptation, evolution, and emergence.
Complex Systems Methods including cellular automata, Boolean automata, artificial life, and genetic algorithms
Introduction to Ergodic Theory and Statistical Mechanics and their applications to human science research including critical exponents, scaling, spectra, order parameters, phase transitions, entropy, ergodicity.

Cost will be $100 per segment. Please let us know of your interest early so we can plan. Contact: Dr. Sally Goerner, 374 Wesley Court, Chapel Hill, NC 27516, 919-932-5587, email: goerner@gibbs.oit.unc.edu

Software

Physics Academic Software Box 8202, NC State University, Raleigh, NC 27695-8202; 1-800-955-tas1 or 919-515-7447 or fax 919-515-2482 offers the following packages: Dynamic Analyzer (IBM PC $75 US); Chaos Data Analyzer (IBM PC $100 US); Chaotic Dynamics Workbench (IBM PC $70 US)

Chaos Data Analyzer is also available from Media Magic, P.O. Box 598, Nicasio, CA 94946; 1-800-882-8284.

The journal *Computers in Physics* also contains ads for similar packages.

Calendar

Jan 29	*Washington Evolutionary Systems Society's Second Annual Conference on Interdisciplinary Systems,* Washington DC, Jerry Chandler, chandler@casa.ninds.nih.gov, or 301-496-1846
Feb 4-7	*Society for Chaos Theory in Psychology and the Life Sciences, Winter Meeting*. See page 2.
Feb 10-12	*Pan Pacific Conference on Brain Electric Topography*, Sydney Australia, Fax +61-2-635-7734, Tel. +61-2-633-6688, pan@brain.physics.swin.oz.au
Mar. 18-20	*Symposium on Nonlinear Econometrics* in Boson. Abstracts due Jan. 15. Contact by the Eastern Economics Association 401-232-6470, fax 401-232-6720.
Apr 24-28	*First World Congress on Computational Medicine, Public Health, and Biotechnology*, Austin TX. Proposals due in Oct. Information at 512-471-2472; email compmed94@chpc.utexas.edu.
June 8-10	Session on *Supercomputer Applications and Economics* at the IFAC Workshop on Computing in Economics in Amsterdam, The Netherlands. Contact Paul Beaumont, Dept. Econ., Florida State University, Tallahassee, FL 32306; beaumont@scri.fsu.edu; fax 904-644-0098.
June 24-27	*Annual Meeting of the Society for Chaos Theory in Psychology and the Life Sciences,* See notice on page 1.
June 28-29	Workshop on Methods, see notice below.
July 7-8	*Experimental Psychology Society* meeting in Exeter, England is looking for submissions on the topic of Chaos Theory in psychology. Contact J.R.Eiser@Eiser@exeter.ac.uk; fax 44-392-264623.
Sept. 26-28th	*Australian National Conference on Complex Systems*, theme "Mechanisms of Adaptation in Natural, Man-made, and Mathematical Systems. Contact: complex@ucq.edu.au; fax: 61-79-309729.

Dues and/or Conference Registration

You can use this form to register for the 1994 conference or to pay annual dues. Enclosed is (check box):
☐ Annual Dues ☐ Conference Fee ☐ Lodging and meals

Costs for conference registration and/or lodging and meals are given on Page 1. Indicate your lodging requirements below. Dues are $25 (regular) $10 (student, limited income).

Enter your name and any changes to your address information below:
(Please include your email address and interest area if we do not have them).

Name_____
Address_____
_____
Phone (Work)_____(Home)_____
Email_____Interest Area_____

Conference information: Please indicate single or double occupancy; number in party and dates you will need accomodations.

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_____
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Send form and checks to: Katherine Robertson, Secretary-Treasurer, The Society for Chaos Theory in Psychology and the Life Sciences, P.O. Box 7226, Alhambra, CA 91802. If check is not from a US bank please use money order or make payment out to Dr. Robin Robertson instead of to the Society for Chaos Theory.

The Society for Chaos Theory
In Psychology and the Life Sciences
P.O. Box 7226
Alhambra, CA 91802
USA

first class