



HUMAN ETHOLOGY NEWSLETTER

JOAN S. LOCKARD, EDITOR VOLUME 3 UNIVERSITY OF WASHINGTON
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The masthead for our directory issue was drawn by primatologist Carolyn Crockett. She very kindly consented to a few hours from her busy schedule and some magical strokes of her pen before taking off for Venezuela and a revisit to red howler country. Thanks again Carolyn!

ELECTION

The ballot for ISHE Executive Board members election is enclosed. Be sure to submit your ballot by January 31, 1983.

DIRECTORY & DUES

This is our first attempt at updating the directory complete with names, addresses and phone numbers, research interests, etc. If our information regarding your status is incomplete or incorrect, please send us the most recent data as the directory will be printed again in December, 1983. Also, take note of your address label - if it does not read '1983', this is an indication of unpaid dues and you will not receive the next issue until your monies are in. Please use the form at the end of the newsletter to complete current information and enclose \$10.00 for 1983 dues if you have not done so already. Donations above this amount will be gladly received.

ANNUAL MEETING

ISHE is meeting with the Animal Behavior Society June 19-24, 1983 at Bucknell University, Lewisburg, PA. There is a call for papers and the transmittal form is attached to this issue. Your abstract must be submitted no later than March 7, 1983; mail it to Terry Christenson, Dept. of Psychology, Tulane University, New Orleans, LA, 70018. ISHE WILL HOLD ITS BUSINESS MEETING TUESDAY EVENING, JUNE 21st. Highlights of the ABS Program will appear in the next issue of HEN.

WORKSHOP

A workshop on the application of models of life history strategies to human ethology (see "Mini Communications", this issue) is tentatively scheduled for April or May 1983 at UCLA. The workshop will consist of a number of presentations by people working in the areas of models of life history strategies and/or human lifespan development with a discussion of the theoretical and methodological issues involved. Anyone interested in making a presentation should send in an abstract along with an indication of availability of attendance for different dates. Contact (relatively soon) Dr. Ronald Weigel, Human Ethology Laboratory, Neuropsychiatric Institute, UCLA, Los Angeles, CA, 90024; (213) 825-8315.

THE FOUNDATIONS OF ETHOLOGY. By Konrad Lorenz
 Springer-Verlag, New York, 1961

Reviewed by Edward J. Korber
 Queens College, City University of New York

Few individuals come to earn the respect and attention of both lay and professional audiences while consistently contributing to the theoretical underpinnings of a science. Konrad Lorenz is one such individual and in his most recently published book, "The Foundations of Ethology", we are given a perspective of the field by one who has been an important figure in its emergence and development.

Following a brief Forward by Theodore Bullcock, Preface and Personal Outline of ethology's historical development, the bulk of the text is ordered into three major sections: Part I - Methodology (four chapters), Part II - Genetically Programmed Behavior (seven chapters), Part III - Adaptive Modification of Behavior (six chapters) with an Afterward, and an Appendix on *Homo Sapiens*.

Part I, Methodology, is primarily philosophical in nature. Not unlike Taylor (1964) in "The Explanation of Behavior", Lorenz, throughout Chapters 1 and 5, argues for teleonomic inquiry and critically questions the role of reductionism, operationalism and atomism; in his eyes, these have been misapplied to the analysis of behavior. In Chapter 2, a systems-Gestalt approach to the study of behavior is espoused with brief treatment addressing the importance of non-obtrusive studies and deprivation experiments. The last chapter of this section, Chapter 4, introduces the comparative method to the uninitiated. No doubt, as Lorenz readily admits, many a zoologist will find this chapter extremely limited, but it is of some importance in its focus on ethology, as the study of mechanisms of behavior, including phylogeny, an aspect of the science which too often has been more a matter of speculation than the result of a rigorous exercise in systematics (Crowson, 1970).

Part II, Genetically Programmed Behavior, covers topics that have been perceived in the past as the major theoretical and empirical concerns of ethology: Centrally Coordinated Movement (Chapter 1), I.R.M. (Chapter 2), Hierarchical Systems (Chapter 5), Taxis and Kinesis (Chapter 6), Mechanisms of Multiple Motivation (Chapters 3, 4, and 7). In these

chapters, topics are addressed and illustrated with the use of a small number of related empirical studies, many of which non-German-speaking students will, unfortunately, not have access. As the reader progresses through this section, it becomes apparent that Lorenz attempted to implicate these behavioral mechanisms and constructs as the basic blocks of what are frequently considered to be more "complex" phenomena (addressed in Section 3).

In Chapters 1 through 4 of Section 3, Lorenz organized those phenomena which typically fall under the rubric of learning into a bioenergetic hierarchy. It is argued that different kinds of "learning" mechanisms have evolved independently of each other in various phyla, thus requiring different accounts of their evolution, a task which is left to the reader. Not surprisingly, Lorenz emphasizes the role of stimulus selection (downplaying that process referred to as response differentiation or selection) as he briefly treats facilitation, sensitization, habituation, and other processes of association (i.e., avoidance, imprinting, conditioned inhibition, operant behavior, etc.) in terms of hypothetical neural mechanisms. It is only in Chapter 6 of this section that the processes of behavioral differentiation or pattern selection are emphasized in the context of short discussions of play, curiosity and exploratory behavior (although these processes are considered again in the Appendix entitled, "Concerning *Homo Sapiens*").

I was admittedly disappointed with this Appendix. Given my own interest and knowledge of the relevant literature, Lorenz's brief speculation with regard to the importance of language and cultural homology was not very novel, profound or informative. He suggested that the homology was proof that "processes are at work that are entirely independent of rational considerations and that, in many respects, are functionally analogous to factors maintaining invariance in genetic inheritance".

Throughout the text, one will occasionally find the relevant work of many a major contemporary figure (e.g., Wilson or McFarland) curiously downplayed and/or ignored. However, on the whole, I think the volume is worth reading, particularly if it is approached not as an up-to-date review or integration of parametric studies in an expanding science, but rather, perhaps as the author had hoped: (a) a useful compilation of the basic constructs of the discipline, (b) a reminder of the truly narrow factual foundation upon which the constructs rest, and (c) the importance of embodying a historical perspective in our theory and research approach.

Taylor, C. The Explanation of Behavior. New York: Humanities Press, Inc., 1964.

Crowson, R.A. Classification and Biology. Chicago: Aldine Publishing Co., 1970.

RECENT LITERATURE

Readers are invited to send literature that they would like included in RECENT LITERATURE to: Robert M. Adams, Dept. of Psychology, 145 Cammack Bldg., Eastern Kentucky University, Richmond, KY 40475.

Articles:

Adams, R.M. & Lockard, J.S. Age and sex composition of family groups in shopping and recreational settings. *Ethology and Sociobiology*, 1982, 3, 131-134.

Calvin, W.H. Did throwing stones shape hominid brain evolution? *Ethology and Sociobiology*, 1982, 3, 124-155.

Dolgin, K.G. & Sabini, J. Experimental manipulation of a human non-verbal display: The tongue-show affects an observer's willingness to interact. *Animal Behaviour*, 1982, 30, 935-936.

Gray, J.P. & Wolfe, L.D. Sociobiology and creationism: Two ethno-sociologies of American culture. *American Anthropologist*, 1982, 84, 580-594.

Green, S.B., McCoy, J.F., Burns, K.P. & Smith, A.C. Accuracy of observational data with whole interval, partial interval, and momentary time-sampling recording techniques. *Journal of Behavioral Assessment*, 1982, 4, 103-118.

Hill, K. Hunting and human evolution. *Journal of Human Evolution*, 1982, 11, 521-544.

Hughes, A.L. Confidence of paternity and wife-sharing in polygynous and polyandrous systems. *Ethology and Sociobiology*, 1984, 4, 125-130.

Kraut, R.E., Lewis, S.H., & Swezey, L.W. Listener responsiveness and the coordination of conversation. *Journal of Personality and Social Psychology*, 1982, 43, 718-732.

Leftler, A., Gillespie, D.L. & Conaty, J.C. The effects of status differentiation on nonverbal behavior. *Social Psychology Quarterly*, 1982, 45, 153-161.

Lumsden, C.J. & Wilson, E.O. Precies of genes, mind, and culture. *The Behavioral and Brain Sciences*, 1982, 5, 1-18.

Malatesta, C.Z. & Haviland, J.M. Learning display rules: The socialization of emotion expression in infancy. *Child Development*, 1982, 53, 991-1005.

Martinsen, H. A naturalistic study of young children's explorations away from caregiver. *International Journal of Behavioral Development*, 1982, 5, 217-229.

McHenry, H.M. The pattern of human evolution: Studies on bipedalism, mastication, and encephalization. *Annual Review of Anthropology*, 1982, 11, 151-230.

Plutchik, R. A psychoevolutionary theory of emotions. *Social Science Information*, 1982, 21, 529-554.

Quiatt, D. Further comment on allomothering and adaptation. *Ethology and Sociobiology*, 1982, 3, 135-138.

Reynolds, P.C. Affect and instrumentality: An alternative view on Eibl-Eibesfeldt's human ethology. *The Behavioral and Brain Sciences*, 1982, 5, 267-272.

Richard, A.F. & Schulman, S.R. Sociobiology: Primate field studies. *Annual Review of Anthropology*, 1982, 11, 231.

Rozensky, R.H. & Honor, L.F. Notation systems for coding nonverbal behavior: A review. *Journal of Behavioral Assessment*, 1982, 4, 119-132.

Smith, D.S. Sociobiology and history. *Journal of Interdisciplinary History*, 1982, 13, 301-310.

Smith, N.W. Brain, behavior and evolution. *Psychological Record*, 1982, 32, 483-490.

Smith, P.K. Does play matter? Functional and evolutionary aspects of animal and human play. *The Behavioral and Brain Sciences*, 1982, 5, 139-158.

Sullivan, R.R. Sociobiology and the crisis of public authority. *Philosophy of the Social Sciences*, 1982, 12, 271-285.

Thompson, J.L. The new Social Darwinism: The politics of sociobiology. *Politics*, 1982, 17, 121-128.

Whittaker-Bleuler, S.A. Information transmission of initial vs. later between-point nonverbal behaviors in tennis. *Perceptual and Motor Skills*, 1982, 54, 1135-1138.

Zabel, R.H. & Zabel, M.K. Ethological approaches with autistic and other abnormal populations. *Journal of Autism and Developmental Disorders*, 1982, 12, 71-84.

Books and Book Chapters:

- Demos, V. Facial expressions of infants and toddlers: A descriptive analysis. In T. Field & A. Fogel (Eds.) *Emotion and early interaction*. Hillsdale, N.J.: Erlbaum Associates, 1982.
- Kanner, M. Biological aspects of the mother-infant bond. In R.N. Emde & R.J. Harmon (Eds.), *The Development of Attachment and Affiliative Systems*. New York: Plenum Press, 1982.
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- Malatesta, C.Z. The expression and regulation of emotion: A lifespan perspective. In T. Field & A. Fogel (Eds.) *Emotion and Early Interaction*. Hillsdale, NJ: Erlbaum Associates, 1982.
- Marler, P., Zoloth, S. & Dooling, R. Innate programs for perceptual development: An ethological view. In E.S. Gollin (Ed.), *Developmental Plasticity*. New York: Academic Press, 1981.
- Rosenquist, A.C. Introductory remarks: James M. Sprague Symposium. In A.R. Morrison & P.L. Strick (Eds.) *Changing Concepts of the Nervous System: Proceedings of the First Institute of Neurological Sciences Symposium in Neurobiology*. New York, NY: Academic Press, 1982.
- Adler, L.L. (Ed.) *Cross-Cultural Research at Issue*. New York, NY: Academic Press, 1982.
- Allen, T.F.H. & Starr, T.B. *Hierarchic Perspectives for Ecological Complexity*. Chicago, IL: The University of Chicago Press, 1982.
- Armstrong, E. & Falk, D. (Eds.) *Primate Brain Evolution: Methods and Concepts*. New York, NY: Plenum Press, 1982.
- Aschoff, J., Daan, S. & Groos, G. (Eds.) *Vertebrate Circadian Systems: Structure and Physiology*. New York, NY: Springer-Verlag, 1982.
- Bates, P.B. & Brim, O.G. (Eds.) *Life-Span Development and Behavior*. (Vol 4). New York, NY: Academic Press, 1982.
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- Budyko, M.I. *The Earth's Climate: Past and Future*. New York, NY: Academic Press, 1982.
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- Fassnacht, G. *Theory and Practice of Observing Behavior*. New York, NY: Academic Press, 1982.
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- King's College Sociobiology Group, *Current Problems in Sociobiology*. Cambridge University Press: New York, 1982.
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- Lamb, M.E. & Sagi, A. (Eds.) *Fatherhood and Family Policy*. Hillsdale, NJ: Lawrence Erlbaum Associates, Winter 1985.
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- Tsukada, Y. (Ed.) *Genetic Approach to Developmental Neurobiology*. New York, NY: Springer-Verlag, 1982.
- Wilson, G. *The Collidge Effect: An Evolutionary Account of Human Sexuality*. New York: William Morrow, 1982.

BULLETIN BOARD

The Fifth Annual Field Work in Animal Behavior for Summer 1983 will consist of 4 weeks of travel and study within the national parks and wildlife reserves of Kenya, East Africa. The course begins in July with only 16 students allowed. Early applications are advised so contact Dr. Terry L. Maple, School of Psychology, Georgia Institute of Technology, Atlanta, GA, 30332.

The Beth Israel Hospital of the Harvard Medical School is offering a course in Behavioral Medicine March 8-11, 1983. This course will cover the therapeutic efficacy of the placebo effect and alternative healing practices along with the usefulness of eliciting the relaxation response in the prevention and therapy of illnesses, i.e., cancer, pain, and hypertension. Registration applications accepted until February 8, 1983. Tuition fees are \$400 (U.S.) Residents/Fellows/non-physicians \$200. Contact the Harvard Medical School, Dept. of Continuing Education, Boston, MA, 02115 (617)732-1525.

Recently published in the October 1982 issue of *Comparative Psychology* is Clara Jones' review of *Ethology: The Mechanisms and Evolution of Behavior* by James L. Gould.

The Center for Intercultural Communication is an interdisciplinary network of researchers throughout the world who are interested in global communication on an interpersonal level. The Center connects scholars with similar interests from all world regions who wish to participate in team research projects. The network is currently expanding and publishing a directory of cross-cultural researchers. Those interested should contact Dr. Robert Shuter at Marquette University, Milwaukee, Wisconsin/53233; (414) 224-3492.

The Primate Foundation of Arizona is presenting pre-doctoral fellowships for the study of chimpanzee behavior. Fellowships begin in January and August 1983 with \$6,000 awarded for 12 months. Contact Jo Filtz, Executive Secretary, Primate Foundation of Arizona, P.O. Box 86, Tempe, AZ, 85281 for more information.

In the October 1982 issue of HEN we noted that Jerry Hirsch will begin his six-year editorship of the *Journal of Comparative Psychology* in March of 1983. He wants to encourage "literature in the study of social structure in the animal species... that goes beyond sexual and reproductive behavior to family and group life." Two other new editors of

APA journals are Sam Glucksberg who will begin a six-year term in 1984 of *Journal of Experimental Psychology: General* and Robert Helmreich who will edit the *Interpersonal Relations* and *Group Processes* section of the *Journal of Personality and Social Psychology* also commencing in 1984.

New Journals: *Zoo Biology* is published quarterly and is concerned with aspects of the exhibition and maintenance of wild animals in captive settings. For submitting manuscripts, contact Editor Terry E. Maple, School of Psychology, Georgia Institute of Technology, Atlanta, GA, 30332. *Animal Behavior*, to be edited by Jeram Brown, will deal with any facet of animal behavior or behavioral ecology. Inquiries regarding manuscripts should be submitted to Susan D. Suarez, Ph.D., the Editor of SUNY Press, State University Plaza, Albany, NY, 12246.

R.W. Oppenheim and W.G. Hall edit *Developmental Psychobiology: The Official Journal of the International Society for Developmental Psychobiology*. It is a publication of research reports focusing on behavioral development in the embryo, fetus, neonate or juvenile animal with emphasis on neurobiological processes. For Volume 15, 1982, contact Wiley & Sons, New York, NY.

The *International Journal of Theoretical Population Biology* edited by Alan Templeton and K. Dietz, involves papers on the theoretical aspects of ecology, genetics, demography, and epidemiology with the main emphasis on theory. For Volumes 23-24, 1983, write to Academic Press, New York, NY.

Jay Rosenblatt edits *Advances in the Study of Behavior*. Volume 12, 1982, is a collection of reviews of research in animal behavior including a multidisciplinary approach to behavioral problems.

Glendon Schubert and Albert Somit, with a foreword by Thomas Wiegale, have edited *The Biology of Primate Sociopolitical Behavior*. This is a publication of "occasional papers in politics and the life sciences" printed by the Center for Biopolitical Research, Northern Illinois University, Dekalb, IL, 60115, 1982.

Funding from the National Science Foundation for various animal behavior programs is discussed in depth in the November issue of the *Animal Behavior Society Newsletter*, Volume 27, #4. Fred Stolnitz of NSF writes extensively with regards to three proposals - "The Psychobiology Program", "The Population Biology and Physiological Ecology Program", and "Grants for Scientific and Engineering Research." For more details concerning this informative article, contact Fred Stolnitz at (202) 357-7949.

Since the Spring 1982 forum question did not elicit a single reaction (after nearly nine months of patience), as to whether bonding in courtship and in parent-offspring relations is a unitary process (see relevant HEN issue for a more complete statement of the question), I am taking the prerogative as editor to present some VERY preliminary data that attempts to address this idea:

Bonding Process: En Face in Parent-Infant and Courtship Pairs

Joan S. Lockard, Nona K. Phillips and Jean D. Heestand

In research that detailed a courtship ethogram of mixed-sex dyads in public (Lockard and Adams, 1980), contact behaviors were implicated as a means of emotionally bonding couples together. Contact has been found to be essential in mother-infant relations as well (Klaus and Kennell, 1976). Mothers of newborns also give a very specific facial gaze called an en face to their infant in which the mother rotates her head to align her face in the same plane as that of the infant's face and looks at the infant for extended periods of time. This behavior correlates with certain hormonal changes and is thought to facilitate the bond between the mother and infant. Time spent in this position increases with exposure to the newborn.

Perhaps adult females in courtship exhibit an en face to their mates in solidifying their relationship with them. Couples "in love" have been shown to engage in longer periods of mutual gaze more than those who are not (Rubin, 1976). In addition, females look more at persons with whom they are interacting than do males (see review by Argyle and Cook, 1976). These findings may be compared with the prolonged periods of gaze (en face) in which mothers and their infants engage, beginning in the first days (Robson, 1967) or even hours of the infant's life (Trevathan, 1982).

The present pilot study attempted to compare courtship and parent-offspring gaze displays in public. When the en face was initiated by an adult in mixed-sex couples or by a parent towards an infant, these occurrences were tabulated. The characteristics of this facial gaze are distinctive enough such that detection of its occurrences was reliable. Its most salient features are the aligning plane of the two faces involved, the distance between the two faces, and the duration of the eye contact of the initiator.

Dyads (mixed-sex adult pairs or single parent-single child units) were observed in public recreational areas as the observers passed stationary groupings. All occurrences of the en face (i.e., a gaze > 2 sec with less than 18 inches between the faces), the initiator and direction of the gaze (i.e., head tilt left, right, or forward to align the faces in the same plane), and whether it was unidirectional or mutual were detailed on a checksheet and the age and sex of the subjects recorded by trained observers.

The gazes of some 67 courtship dyads and 99 parent-offspring pairs were recorded. The data with respect to left, right, or forward head tilt indicated that both parent and offspring, regardless of sex, tilted their heads predominantly forward (50-73%) during the en face, while members of courtship pairs during a gaze tilted their head primarily to one side, females to the left (63.6%) and males to either side (48.2% left, 44.8% right). However, it is intriguing to note that in the parent-offspring pairs, exhibiting a side head tilt, both female adults (25.0%) and female infants (26.9%) tilted their heads more to the left than to the right whereas male infants showed a right side tendency (30.4%) and male adults manifested no clear side preference.

These preliminary observations tentatively suggest that in both courtship and parent-offspring pairs, females exhibit a left-side head-tilt preference whereas males do not, and that this difference is masked in parent-offspring pairs in public because the infants tend to be older (i.e., weigh more than newborns) and, thus, to be held with both arms during an en face which usually places them at the midline of the parent's body. This placement would dictate a head-tilt forward during an en face more often than to either side. If, with additional data, these speculations are supported, they may indicate similarities in the bonding process of courtship and parent-offspring pairs as well as being consistent with the left-side infant carrying data of adult females (Lockard et al., 1979) and the left-side post-birth infant holding preference of mothers (Trevathan, 1982).

Argyle, M. and Cook, M. Gaze and Mutual Gaze. Cambridge: Cambridge University Press, 1976.

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Lockard, J.S., Daley, P.C. and Gunderson, V.M. Maternal and paternal differences in infant carry: U.S. and African data. The American Naturalist, 113:235-246, 1979.

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Robson, K.S. The role of eye-to-eye contact in maternal-infant attachment. Journal of Child Psychology and Psychiatry, 8:13-25, 1967.

Rubin, A. Measurement of romantic love. Journal of Personality and Social Psychology, 16:265-273, 1970.

Trevathan, W.R. Delineating an ethogram of human maternal behavior in the first hour after birth. International Journal of Primatology, 3:342, 1982.

MINI COMMUNICATION

Ron Weigel has submitted the following discourse to serve as the Forum for the next issue of HEN in preparation for the Workshop to be held in mid-spring at UCLA. Please submit your reactions, comments, suggestions or intended contributions for the Workshop to the author (address given in Directory).

The Application of Models of Life History Strategies to the Study of Human Lifespan Development

Ronald M. Weigel
University of California at Los Angeles

Lifespan developmental psychology is most often only an enumeration of the various "stages" of psychological development, with their associated characteristics. If "adaptation" is ever discussed, it is usually in terms of an individual's ability to deal with the problems generated by being at a particular stage of social and biological development. Rarely are the characteristics of the developmental stages viewed as part of a "life plan" for maximizing fitness. In contrast, biologists have recently given considerable attention to the study of adaptive "life history strategies" (e.g., Gadgil & Bossert, 1970; Pianka & Parker, 1975; Stearns, 1976; Horn, 1978). Theoretical models of life history strategies assume that the phenotypic manifestation of genotypic potential at any age represents a compromise between the maximum reproductive output that can be obtained at that age and the cost incurred by such reproductive effort. This cost is measured in terms of decreased future reproductive output, and is due in part to a decreased probability of survival. Thus, an adaptive life history strategy requires varying the allocation of resources in different "developmental pathways" as a function of age, in such a way as to maximize fitness.

The model of life history strategies of Gadgil and Bossert (1970) provides us with an outline for identifying distinct areas that compete for resource allocations during development. The Gadgil and Bossert model identifies three allocation areas: (1) maintenance (= survival), (2) growth, and (3) reproduction. The ultimate measure of success for a life history strategy is reproductive success, and survival and growth are only important as determinants of reproductive success. However, the interactions among these three main factors (and their constituent variables) can become very complex. Nevertheless, one apparent simple relationship is

that increased reproductive effort at age 'X' siphons off resources that could have been allocated to maintenance and growth, thereby decreasing the probability of survival to age X+1, and the size of the individual at that age. If one assumes that size is positively correlated with reproductive success, then the expected reproductive success at age X+1 is reduced relative to its expected value if energy had not been allocated to reproductive effort at age X. The developmental decision of primary adaptive significance to the individual is the optimal allocation of resources among maintenance, growth, and reproductive effort so as to maximize the rate of propagation of one's genes.

The application of the general models of life history strategies from population biology to the study of human ontogeny requires some modifications and some elaboration. Consider the three parameters of the Gadgil and Bossert model. The assumption that allocation of resources to growth enhances future reproductive success may not be tenable for humans. It is apparent that the growth parameter of this model represents some factor independent of direct reproductive effort, or the opportunity to reproduce by just being alive, that contributes to increased reproductive success. In humans, it is likely that accumulated material resources (Hartung, 1976) and social prestige (Barkow, 1975) show a higher positive correlation with reproductive success than does body size. Therefore, it is suggested that in life history models of human development, the growth parameter should be replaced by parameters indicating investments made toward resource acquisition and maintenance, and the attainment of social prestige.

There is also a marked contrast with most other organisms in the numerical values associated with the survival and fertility parameters of life history models. Both mortality and fertility are low, as are the variances in age of death and the total number of offspring produced per lifetime. Considering these factors, it is likely that the factor contributing most to fitness is the age of first reproduction; i.e., a strategy that promotes early genetic replication will, if (genetically or culturally) heritable, yield offspring that reproduce early, and so on, so that the multigenerational effect is an increase in that strategy (and its genetic correlates), relative to other strategies (and their genetic correlates) (Cox & Weigel, in preparation).

A central empirical focus in the application of models of life history strategies to human development would be an assessment of the relative adaptiveness of different life history strategies under varying environmental conditions. This would begin by studying the relationships among three sets of variables: (1) outcome measures related to fitness (e.g., fertility, offspring survivorship, longevity); (2) the environmental factors (essentially) not under the control of the individual, and (3) behavioral responses to environmental conditions. Testing a model of life history strategies would

involve estimating the maximum fitness associated with a particular set of environmental conditions, and then assessing how effective various behavioral strategies of resource acquisition, prestige attainment, and reproductive behavior were in achieving this maximum. There is a wealth of human demographic data that can be used for this purpose, and the field of human ethology is growing. What is needed is more detailed study of behavior with respect to ecological precursors and reproductive outcomes.

The direct focus upon reproductive strategies is an obvious component of any model of life history strategies. The next stage is examining reproductive strategies within a developmental perspective. The purpose here is to identify some possible issues for research. One immediately apparent issue is the study of factors affecting the age of first reproduction, and the relationship between the onset of puberty (first possible reproduction) and the onset of actual reproduction. Extending the application of models of human life history strategies back into the prepubertal ages is more difficult, but there are a number of apparent empirical issues. Does the behavior of children, with regard to the acquisition of social status in peer groups, reflect the skills necessary to achieve reproductive success within the ecological context projected for that child as an adult? The first part of this would study involve determining the relationship between child status and adult status, and the relationship between adult status and reproductive success. But the second part would incorporate the ecological context, recognizing that there are different optimal strategies for different individuals, based upon ecological factors. Therefore, considering a model of life history strategies, one would predict that as life expectancy, resource acquisition potential, and expected offspring survivorship decreased, the age of first reproduction would decrease, and the number of offspring produced increase. This is a strategy associated with poverty which could provide a useful interpretation of the pattern. Therefore, under impoverished conditions, behaviors correlated with reproductive success (e.g., courtship, social status acquisition, rapid resource acquisition, parental-type behaviors) would appear at earlier ages. The pattern under conditions of wealth would be the opposite.

This discussion only scratches the surface of a very important area of potential study. Life-span human development could evolve from the descriptive stage to become a predictive science with a unifying theory. It is a challenge for theoretical population biologists, developmental psychologists, and human biologists to exchange ideas and build the foundations for this new research approach.

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UPCOMING MEETINGS

The 2nd Annual International Conference on Non-Verbal Behaviour: An Interdisciplinary Perspective will be held May 16-18, 1983 in Toronto (at DISE), Ontario. Activities include workshops and papers on the role of non-verbal behavior concerning teaching, therapy, research approaches, vocal communication, children's expression, assessing anxiety and depression, and ethnic and inter-gender body politics. To register contact Irene Lepp at the Ontario Institute for Studies in Education, 252 Bloor Street W., Toronto, Ontario/ M5S 1V6; (416) 923-6641, ext. 391. Late registration is considered after March 14, 1983.

The 2nd International Conference on Social Psychology and Language is scheduled at the University of Bristol, England between the 19th and 22nd of July, 1983. Papers are invited for presentation and appropriate topics should include developmental psychology, sociology, cognition and personality.

East Lansing, MI is the location for the August 7-10, 1983 meeting of the American Society of Pciimatologists and interested persons should contact W. Richard Dukelow, Local Arrangements Chairman, Endocrine Research Unit, Michigan State University.