subject out of its typological straitjacket and revitalize it. Chirki, although a limited site, already has demonstrated the contemporaneity of side-flake tools, core tools (picks and handaxes), and pebble tools (choppers and the like). Kalibangan, on the other hand, has gone a long way toward elucidating the organization of a Harappan settlement, filling in data missing from or incomplete at older excavated sites. Especially interesting is the division of the site into a town area and a citadel area divided into two parts. Equally important is the documentation of an earlier "pre-Harappan" level including the remains of a ploughed field. The latter documents for the first time the use of the plough in Bronze Age agriculture in the area. L. S. Leshnik in a paper that combines archeological questions with ethnographic answers picks up the subject of Harappan agricultural practice and presents a stimulating discussion of possibilities. Two other papers also deal with technological questions: M. Piperno discusses methods of microdrilling as revealed by wear patterns on flint drill bits from Bronze Age Shahr-i Sokhta in Iranian Seistan, and J. Stargardt includes the results of thermometric testing of Kedah Red Wares in her review of Indian influence in Malaysia in the 13th century A.D.

Other papers deal with the results of distributional studies of a more traditional type and cover such diverse topics as Upper Paleolithic blade cultures in western India (B. Allchin), comparisons of ceramics in the Quetta area based on surface surveys (J. F. Enault and J. F. Jarrige), shared design elements in the painted pottery of Iranian Seistan and Turkmenia in the third millennium (R. Biscione), and possible typological and cultural links between the late second millennium "Gandhara Complex" of burials and northern Iran and Europe (G. Stacul). An especially ambitious paper by I. C. Glover deals with the relative distribution of Hoabinhian and Flake Tool traditions throughout Southeast Asia. Other typological and stylistic analyses deal with problems having a strong chronological aspect: Kushan coinage (D. W. MacDowall), Late Kushan–Early Gupta sculpture (J. C. Harle), Chinese trade wares (9 through 11th centuries A.D.) at Persian Gulf Siraf (D. Whitehouse), and Bengal temple terra-cotta of the 16th through 19th centuries (D. McCutchion).

Fundamental as a background to all of the papers dealing with Bronze Age problems is the systematic review by G. F. Dales of the absolute chronology of the Indus and adjacent areas based on radiocarbon dating. With current correction factors proposed by MASCA (the University of Pennsylvania Museum Applied Science Center for Archaeology) calculated from samples of known age, the radiocarbon chronology now appears much closer to the relative chronology based on the comparative typology of Indus materials and Mesopotamian sequences and historical dating. Dales and others struggle with the problem of terminology in the Indus area emerging as the result of increasing evidence for levels of occupation which underlie the "mature" Harappan but show a wide diversity of content. Neither "pre-Harappan" nor "early Harappan" satisfies the experts. One suggestion is to call all of these assemblages simply "Early Indus Cultures." The argument over terminology itself pinpoints one of the research frontiers of the immediate future in the Indus area. The 21 papers in this small volume indicate many others and illustrate the continuing vitality of South Asian field research as a whole.

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The Ovary

Comparative Morphology of the Mammalian Ovary. HARLAND W. MOSSMAN and KENNETH L. DUKE. University of Wisconsin Press, Madison, 1973. xxviii, 462 pp., illus. $25.

Books summarizing a life's work generally have a heightened interest and value, and this monograph is no exception; the senior author's distinguished contribution to knowledge of ovarian morphology has earned respect over many years. His co-author is a worthy younger colleague, and there is no doubt that the appearance of their joint treatise will be greatly appreciated by reproductive biologists.

The book sets out in detail the histological features of the ovary in an extensive range of mammals, showing precision and accuracy in identification and description. After dealing with gross anatomy, general microscopic structure, and the development of the ovary, the authors pass on to describe and discuss comparative matters, with particular reference to the human ovary, and then point up special problems for research and debate. Many of the data have never previously been published. The treatment throughout is clear, direct, and succinct, and the numerous illustrations are well chosen and most are of excellent quality.

The formal text as thus far considered accounts for only about two-thirds of the book. The balance contains "synoptic tables" in which distinctive features of ovaries in representatives in all mammalian orders are set out and "supplementary notes" which provide additional minutiae of comparative morphology. This material is impressively comprehensive: its main appeal is rather restrictedly for the systematist, but the collation does provide a source of information that otherwise would be difficult to come by. There is also a useful glossary, the usual list of cited literature, and a well-prepared index.

The book is intended to be of use to teachers and researchers in zoology, morphology, embryology, physiology, and endocrinology, and also to medical specialists in obstetrics and gynecology. This goal is very likely to be achieved; equally, the book may well "bore most people who are not of a scientific turn of mind," as the authors remark in the preface, for it is dedicated to the unvarnished fact. Indeed it deserves a warm recommendation to the scientifically minded.

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Prenatal Activity

Behavioral Embryology. GILBERT GOTTLIEB, Ed. Academic Press, New York, 1973. xviii, 370 pp., illus. $22.50. Studies on the Development of Behavior and the Nervous System, vol. 1.

In the introductory chapter of this volume Gilbert Gottlieb, editor of the series, provides an overview of the main problems and issues pertaining to the prenatal development of behavior and the nervous system, traced historically and through a review of the current research. The volume is devoted mainly to the behavioral embryology of the chick, although it includes important contributions, which I will describe later, on other animals.

The keynote is sounded by V. Hamburger in his chapter on embryonic motility, which is followed by chapters

written by two of his students, R. W. Oppenheim (with R. F. Foelix) and R. R. Provine, on synaptogenesis and electrophysiology of the developing chick spinal cord, respectively. Embryonic motility was rediscovered by Hamburger and his students only 10 years ago; they have since established that both the development and the elicitation of rhythmicity and movement patterns are independent of sensory stimulation. Provine describes the techniques he developed for recording neural activity in the embryonic spinal cord and his findings that indicate a close correlation between the rhythmicity and spread of motility and the bursts of neural activity at corresponding levels of the spinal cord. Foelix and Oppenheim describe their electron-microscopic search for the earliest appearance of synapses in the embryo's spinal cord. The search was successful and yielded results that, for the most part, closely correspond to predictions based upon developmental changes in motility. Their discovery of inhibitory synapses raises problems with respect to the relationship between observed behavior and underlying neurogenesis —the one appears to be the product of spreading excitation while studies of the other indicate that excitation even at the beginning of spinal cord functioning may be shaped by inhibition in ways that are not evident in overt motility. Hamburger poses the problem, in passages that attain esthetic beauty, as the "fundamental difficulty inherent in every reductionist effort to 'explain' phenomena at one level in terms of events occurring at lower levels."

Hatching is perhaps the most complex activity of the avian embryo. The available knowledge for the chick and other species is reviewed by Oppenheim, who himself has done some of the most analytical research on hatching. His chapter, through its excellent descriptions and illustrations, makes the subject unusually clear. The chapter by Corner, Bakhuis, and van Wingerden views the rhythmicity of embryonic motility as the expression of a basic neural rhythmicity which may be continuous in development with the rhythmic alternation of sleep and wakefulness during the early life of the chicken. These authors contribute additional evidence that hatching is controlled by cerebral mechanisms (already indicated in Oppenheim's studies) through their experimental analysis of EEG activity during hatching.

The remaining four articles do not simply tag along but make substantial contributions of their own. Two of these articles approach the study of behavioral embryology from a behavioral and functional point of view (and use different avian species, namely bobwhite and Japanese quail and laughing gull). Hatching and posthatching behavior observed in their natural setting are taken as starting points for the investigation of prenatal behavioral development. Key questions from this point of view are "the extent to which this [embryonic development and activity] is dependent on, or controlled by, the environment, either via sensory processes or by other means" (M. Vince) and "the possible role of the natural (species-typical) environment in structuring the embryo's behavior and perception" (M. Impekoven and P. S. Gold). These chapters present findings of interest to developmental ethologists: auditory stimuli accelerate and retard hatching among quail and other species, leading to synchronized hatching of the clutch (Vince), and specific parental calls have prenatal activating or inhibiting effects on gull embryos which persist in the hatchling (Impekoven and Gold). The study of embryonic behavior in Crustacea is presented in the chapter by M. Berrill. Research on this subject is at its beginning, but spontaneous motility is evident in several but not all species, reflex activity can be elicited somewhat later, and hatching, as in the chick and other animal classes reviewed by Oppenheim, requires special behavioral mechanisms.

Gottlieb's introductory chapter leads one to conclude that the old nature-nurture controversy is still present in behavioral embryology. It takes the form of a theoretical division between preformistic and probabilistic epigeneticists and often divides neuroembryologists and developmental ethologists or psychologists. There is hope, though, that this is not the case in the following statement made by Hamburger in concluding his chapter: "The notion that neurogenesis fully 'explains' or 'determines' embryonic behavior development is not valid as a generalization . . . even the most detailed knowledge of neural organization, including all significant synapses, in chick or rat embryos at a given stage would permit no prediction of the actual . . . movements performed at that stage. . . . All one can say is that the *state of differentiation of the nervous system at a given stage delimits the range of behavioral potentialities.*" This volume, then, admirably presents the state of the science, lacking only a fuller report of Gottlieb's research on the prenatal development of species-specific auditory preference among ducks.

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History of a Disease

A Plague of Corn. The Social History of Pellagra. DAPHNE A. ROE. Cornell University Press, Ithaca, N.Y., 1973. xvi, 218 pp., illus. $11.50.

Daphne A. Roe has written an informative and impassioned social history of the dietary deficiency disease pellagra. Her own research in basic and applied nutrition may well have compelled her to examine the complex circumstances which give rise to disease; her investigation has yielded a fascinating account of the ways in which scientific observation and explanation of disease are shaped by the social circumstances of the victims. Pellagrins have suffered combinations of hostility, abuse, and disregard from the time the dermatologic, metabolic, and behavioral symptoms associated with the disease were first observed in poor Spanish peasants during the 18th century. Even in 1937, after effective prophylaxis and therapy were known, ravages of pellagra among sharecroppers in the southern United States could be vividly documented, as in the pictorial commentaries of Margaret Bourke-White and Erskine Caldwell.

Ever since the earliest identification of pellagra contrasting assumptions have formed the idiom of investigation: there were "those who believed that pellagra was a man-made disease, the result of the inhuman practice of restricting the poor to a diet that cannot support health in a dog; and those who thought that it was the fault of the afflicted." Roe suggests, somewhat too simply, that those who have been responsible for successful research into the linkage between poverty and diet have been dedicated "to the credo that freedom from want is an integral human right."

The irony of this disease of malnutrition is that it first appeared at the time when agricultural technology made possible not only the growth of sufficient staple crops to prevent outright starvation but also the development of