Book Reviews

The Natural Laws of Behavior

The Sexual Code. The Social Behavior of Animals and Men. Translated from the German edition (Munich, 1969). WOLFGANG WICKLER. Doubleday, Garden City, N.Y., 1972. xxxiv, 302 pp., illus. $7.95.

The facts of human biology constrain the forms of human society. The uniquely human attribute of investing social forms and relations with symbolic values places further constraints on conscious efforts to modify the forms of society or the characteristics of the interpersonal relations within it. There is not yet universal agreement, however, on what are the facts of human biology and what they imply for human moral values.

In 1798 Malthus argued in "An Essay on the Principle of Population" that population increased faster than food supply, and would eventually be controlled either deliberately or by catastrophe. Much later, but still antedating the current public and official awareness of the problem, Carr-Saunders showed in *The Population Problem: A Study in Human Evolution* (1922) that primitive societies in fact made use of a variety of means, including infanticide, to ensure that population did not exceed food supply. Although high prenatal and postnatal mortality rates commonly function to limit rates of increase among animal populations, commonly accepted moral values among modern civilized societies prohibit this means of population control, at least when applied to the postnatal stage of the life cycle.

In modern times, however, there is confusion as to the appropriate source of moral law or ethical principle, which were once explicated in the myths of a culture and reified in religious practice and ceremony. Although scientific thought and practice have by no means replaced the religious or mythopoetic base of moral value even in the materialistic industrial societies, some scientists have wondered whether it might be possible to derive ethical laws from, or at least find their justification in, natural laws as determined by scientific practice. For instance, the third part of George Gaylord Simpson's well-known book *The Meaning of Evolution* is an attempt to show that the value Western societies place on the life of the individual is justified biologically by the trend in vertebrate (and especially primate) evolution for the fewer offspring that are produced to receive more parental attention, so that each one represents a greater evolutionary investment in biological energy. Simultaneously individuality, the distinctness and importance of the individual in the population, increases. Both trends reach their culmination among humans. Simpson is at pains to criticize the mystical views of the Jesuit paleontologist Teilhard de Chardin, although Chardin also based his views on a careful examination of the evolutionary record. Theologians who are not also scientists, perhaps responding to the increasing influence science is having on contemporary thought, have also attempted to show that moral practices or ethical principles can be based on natural law, which in turn is considered to be an expression of divine law. Among these attempts is the controversial papal encyclical *Humanae vitae*, which proscribes most forms of contraception, declaring that human interpersonal behavior must be subordinate to the purposes of nature, and that the natural purpose of copulation is procreation.

But by what method were the laws of nature in regard to reproduction and interpersonal behavior determined? Wickler, a prolific comparative ethologist of the Lorenzian school, examines the question in the current book, a translation from the German of his *Sind wir Sünder?* (Are we sinners?). Wickler uses the methods and findings of comparative ethology specifically to discover if the laws of nature as implied in *Humanae vitae* correspond to what can be determined from the direct observation of nature. He is less concerned with the question of whether moral laws can in fact be derived from natural laws, but he insists that if one attempts to do so the natural laws must be well understood and correctly stated.

The result of his examination is one of the most interesting of the many books which have appeared in recent years to expound on the subject of man's animal nature. Although intended for nonbiologists and nonscientists it is a careful, logical, and scientific work. It deserves and requires careful reading and study by anyone interested in the biological basis of human society, as well as by persons in positions of political and moral authority who wish to justify their legislation of rules of human conduct based upon assumptions about man's basic nature. The implications of the work go beyond its relevance for the understanding of reproductive behavior.

The topics that are emphasized are the relations between mating behavior, procreation, pair-bonding (especially monogamy), and brood-tending or parental behavior. The 34 short chapters are grouped into four parts.

The first part covers the methods which reveal natural laws of behavior. Comparative ethology uses the principles of analogy and homology, which have proved so successful in comparative morphology. If one wishes to discover what components of structures or behavior patterns are necessary to fulfill a function, the function must be studied in a wide variety of unrelated species, so that the similarities can be assumed to be due to functional requirements rather than to common descent. If, on the other hand, one wishes to discover the evolutionary origin of a particular structure or behavior pattern, then the feature must be studied in as many closely related forms as possible to determine the homologies of the components. Then it may be possible to infer the primitive structure or behavior pattern from which the one in question was derived. Wickler applies both methods.

Wickler is careful to insist that findings on one species cannot be transferred directly to a second species without restudying the problem in the second species. However, if a principle is found by direct study to apply in a number of species it can be transferred as a hypothesis to be tested by direct study on additional species, and is likely to have high predictive value if they are closely related. It is important that readers take careful note of this point and thereby save themselves irrelevant criticism of the later chapters in which the human species is discussed.

The specific natural laws of reproduction are discussed in the second part. Examples are given from across

the entire animal kingdom, beginning with Protozoa and invertebrates. The author shows that among these animals copulation and procreation are sometimes not mutually obligatory, that is, one can occur without the other. Even the presence of genitalia among organisms where copulation does occur does not mean that the sole function of the genitalia is copulation. The reviewer finds one example in particular very challenging to conventional evolutionary thought: Among flat bugs the genitalia, although retained, are not used for copulation or procreation at all. Rather, a method of extragenital mating has evolved whereby the male perforates the female's back and deposits the sperm into the wound, whereupon they enter the body cavity and eventually reach the ova. Among other organisms the genitalia, especially of the male, have taken on other functions in addition to copulation. Among mammals, including many primates, the genitalia are used for depositing scents which serve a variety of individual or social functions, such as indicating travel routes or marking territories. Among several Old World monkeys, where visual displays play an important role in social life, the genitalia have become brightly colored and may be conspicuously displayed, particularly in threat or in indicating group boundaries. Wickler draws upon the ethnological literature to argue that the widespread use of phallic designs and symbols among humans also serves the function of aggressive threat or territorial defense, often against anthropomorphic demons and spirits. Undoubtedly, experts on the various species or human groups may wish to debate the specific functions which Wickler imputes to these displays in his examples, yet his main conclusion seems secure, that the genitalia can serve functions in social life other than copulation. Since the genitalia have evolved modifications to serve their secondarily acquired functions for display Wickler can state another important principle: Changes in behavior can result in evolutionary changes in structure, and therefore norms for behavior patterns cannot be deduced from structure alone, particularly in regard to future behavior.

Many examples are given which show how behavior patterns derived from mating behavior come to be used to alleviate social stress, especially on the part of subordinate animals. These examples illustrate the principle of emancipation, which is shown to apply in animal groups as distantly related as primitive insects (termites) and higher primates (chimpanzees).

In the third part, pair-bonding in the context of reproduction is considered. Because the author is leading to a discussion of man, most of his examples now are derived from studies of vertebrates. He demonstrates that the behavior patterns used to maintain the bond within mated pairs of vertebrates often are derived from three sources: brood-tending behavior, redirected aggression, and mating behavior. Therefore, if we find an unstudied species of vertebrate, and we find that mated pairs occur within its social groupings, our working hypothesis will be that the behaviors which maintain these mated pairs will also be derived from those sources.

The fourth and final part of the book therefore is an examination of the nature of the pair bond among mated humans. Examples of mother-child behavior from the ethnological literature as well as commonly known examples from European peoples precede examples which show that many of the elements of behavior directed toward the human child also occur in emancipated form in the behavior between adult men and women. He finds that, as among the other higher primates, copulation itself has been emancipated from its procreative function and along with emancipated brood-tending behavior serves to maintain the bond within the mated pair. This, of course, is the climax of the book, and it contradicts the statements on the natural laws of procreation found in *Humanae vitae*. Wickler does not attempt to derive a moral code himself, but ends with restrained criticisms of theological assertions about natural laws which are contrary to the facts discovered by direct observation of nature.

Many of the conclusions and some of the facts in this book will be familiar to readers of popular ethology, but Wickler's work is far more restrained, far more ordered into a well-reasoned argument, and above all far better documented than any of the other books that have covered the same ground. Only the popular works of Konrad Lorenz are of comparable stature. It is likely, however, that Wickler's work will not become as widely popular as Lorenz's *On Aggression*, for instance, for Wickler is more difficult to read and each chapter requires careful study. Those who expect a flowing literary style and witty personal anecdotes will not find them. Yet some, like the reviewer, may prefer Wickler's craftsmanship that informs and fascinates with each sentence and paragraph and that, without polemic and with no attempt to titillate or even to amuse for amusement's sake, nevertheless charms the reader with each careful addition of detail to a work of high quality.

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Microevolution

Ecological Genetics and Evolution. Essays in Honour of E. B. Ford. ROBERT CREED, Ed. Blackwell, Oxford, and Appleton-Century-Crofts, New York, 1971. xxii, 392 pp. + plates. $24.50.

Edmund Brisco Ford is emeritus professor at the University of Oxford. These 19 essays have been dedicated to him by 24 of his friends and associates. Almost without exception, they reflect Ford's characteristic approach to biology, the integration of Darwinism and Mendelism at the intraspecific level. The topics dealt with are his favorites: polymorphism, mimicry, and melanism in natural populations of a variety of organisms, especially Lepidoptera. The editor has succeeded in the difficult task of producing a volume complementary to Ford's own *Ecological Genetics*, which has just appeared in its third edition (1971). There is little overlap between the books. Most of the contributors to the present volume have provided detailed expansions of topics briefly reviewed in the former. For example, B. Clarke and J. J. Murray have confined themselves to data on variation in one subspecies of the snail *Partula suturalis*. A. J. Cain, writing on the snail *Cepea*, explores in detail variation found in subfossil samples. Even papers on the Lepidoptera successfully avoid redundancy; it is pleasing, for example, to see two papers on the remarkable but little-studied mimicry in heliconid butterflies. J. R. G. Turner's paper is enhanced by a sumptuous colored figure, one of several in the book. Only one paper reports on data obtained by the currently fashionable electrophoretic techniques. The influence of Ford's ideas on human genetics and polymorphism is acknowledged through the presence of four