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LAW IN SOCIOBIOLOGICAL PERSPECTIVE

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I. INTRODUCTION

This article is intended to acquaint legal scholars with recent findings in the biologically based behavioral sciences which may be relevant to an understanding of legal phenomena. The ideas expressed herein may stimulate further inquiries and research into the interaction of law and behavior and may help bridge the gap between the natural sciences and the empirical studies of law.

Legal research will keep pace more effectively with rapid changes in human society if the findings of the basic sciences are known and accepted by legal scholars. In view of the danger to the very continuation of the human species, due in part to the advancement in the natural sciences, legal research is of the utmost importance. Knowledge is neutral: what we do with it is crucial. Scientific research, with the help of law, could better our social order, but only if law builds on scientific research. Jurists will be able to argue with much greater conviction for meaningful reform or against shortsighted plans for change if they can base their arguments on findings which are accepted as valid in the natural sciences.

II. THE EVOLUTION OF LAW IN SOCIOBIOLOGICAL PERSPECTIVE

The origins of law,1 like the origins of social order, are rooted in the behavior of early man and his primate ancestors. The behavior of the individual and the group in prehistoric times followed rules necessary for the survival of the species. Biologically programmed behavior manifested itself in patterns which in the course of hundreds of thousands of years developed into norms expressed as taboos and

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1. The terms "law," "rules of law," and "legal rules" are used in their broadest sense. For the distinction between "rules of law" and other norms, Bronislaw Malinowski's anthropological definition applies:

The rules of law stand out from the rest in that they are felt and regarded as the obligations of one person and the rightful claims of another. They are sanctioned not by a mere psychological motive, but by a definite social machinery of binding force, based, as we know, upon mutual dependence, and realized in the equivalent arrangement of reciprocal services, as well as in the combination of such claims into strands of multiple relationship. The ceremonial manner in which most transactions are carried out, which entails public control and criticism, adds still more to their binding force.

B. MALINOWSKI, CRIME AND CUSTOM IN SAVAGE SOCIETY 55 (1926).
commandments. With the development of higher levels of culture, spoken or written law—in the present sense of the word—evolved. The evolutionary development of law is evidenced from studies of various animal species and primitive human societies: among their behavior patterns, mechanisms, and systems we can discern rudimentary forms of legal behavior. Ethology, the comparative study of various animal species, may provide insight into the evolution of rules and laws necessary for group living.

The regulation of human society—the life, support, and direction of the group—is the province of those who make and administer the law. For thousands of years philosophers and jurists have endeavored to create, with the help of man-made law, a social order which would facilitate the peaceful coexistence of human groups. These thinkers have used philosophical, religious, and ideological dogmas and hypotheses, or the accepted insights of what then passed for natural science. A variety of theories on the nature and the origins of law sprang out of the systems of thought prevalent in each historical period. These theories continue to influence the contemporary making and administering of the law. But the findings and discoveries in the biological sciences during the last 100 years\(^2\) have not had their deserved impact on legal thought; the social sciences\(^3\) have had more influence on the direction of legal research. Legal thinking has advanced along the expanding frontiers of sociology, absorbing discoveries about man

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2. In 1859 Darwin published *On the Origin of Species*. Today his evolutionary theory is supported by rich and varied evidence gathered in many disciplines. It can rightly be held as "the most important single scientific innovation in the nineteenth century." J. Bronowski, *The Ascent of Man* 308 (1973). The concept of "evolution" in the legal context was used by Sir Henry Sumner Maine independently of Darwin's writings. H. Maine, *Ancient Law* (1885). The evolutionary theory of law, in the traditional sense, implies a natural progression of law from lower to higher states. Maine argued that this progression has been "distinguished by the gradual dissolution of family dependency and the growth of individual obligation in its place." *Id.* at 163. In the scope of this discussion, the term "evolutionary theory" refers to Darwin's theory and not to that of Maine or the other legal and social thinkers of the 19th century.

in his social and, consequently, his legal environment. One need not dwell on the contributions of psychology and psychiatry to criminal law and the law of domestic relations. The results of anthropological research into law and social change in primitive societies are also available; in such societies, the interaction between human behavior and the environment is more readily observed.

As yet legal scholars have not exploited the new and promising research methods used by ethologists. Ethology was developed in the 1930's under the leadership of Karl v. Frisch, Konrad Lorenz, and Niko Tinbergen, who, in 1973, received the Nobel Prize for their discoveries in the science of behavior. Modern ethology combines field and laboratory experiments with observations of animal species in the wild. Through these methods, ethologists seek to identify rules of adaptive behavior vital to the survival of different species in their constantly changing environments.

Ethology is a young science, and its application to human behavior continues to elicit strong criticism. Although ethologists are not all of one mind, they agree that the genetic code of a species determines the things that an individual can learn and when in its development it can best learn them. Some biologists also share this view. An

4. Modern anthropologists have discarded Maine's theory because it rests on assumptions of fact no longer accepted. Malinowski's studies of Trobriand Islanders published in 1926 disproved a notion held by early anthropologists, namely, that primitive law is exclusively penal. B. MALINOWSKI, supra note 1. The concept of "behavior" as central to law, a concept apparent from Malinowski's studies though he did not use the term, has been little explored or developed since his time. Modern anthropologists' interest in primitive law centers on culture, which in their definition includes public attitudes and social values that influence the structure and substance of law.

5. The interdependence of social behavior and social order has been studied for more than a century. Their relationship was analyzed by Épinas in 1878 in his paper, Über die tierischen Sozietäten. The term "ethology" was used as early as 1854 by Isidore Sainte-Hilaire in research which Ernst Haeckel in 1866 described as "ecology." At the turn of the century Louis Dollo, the Belgian paleontologist, used the term "ethology" for his investigations into the adaptivity of behavior to the environment. The Belgian Emile Waxweiller also deserves mention in this short history of ethology. As early as 1906 he proposed interdisciplinary research towards a synthesis of human and nonhuman social ethology. See W. WICKLER, THE BIOLOGY OF THE TEN COMMANDMENTS 54 (trans. David Smith 1972).


7. In many species certain learning processes are limited to a definite period in the individual's life. For example, the infant greylag goose immediately after hatching will follow its mother or any other person (or dummy) supplying certain key stimuli. This process is called imprinting. In some species, such as mallards, a sexually mature individual imprinted at birth to follow another species will likewise direct its sexual responses to that species. K. LORENZ, EVOLUTION AND MODIFICATION OF BEHAVIOR 55 (1967); K. LORENZ, KING SOLOMON'S RING 41 (1952).
animal's genetic code limits the plasticity of its behavior. Its environment, on the other hand, can trigger biologically programmed behavior\(^8\) which might otherwise remain suppressed or develop abnormally under certain conditions. Thus, the view of ethologists contrasts with that of behaviorists who support the theory that human behavioral response is primarily learned behavior and that it can be conditioned and controlled by manipulating the environment and by skillfully applying "behavioral technology."

There is no doubt that human behavior is greatly influenced by the environment, but man is not infinitely plastic; his genetic makeup sets limits to his behavior. It is the task of the natural sciences to discover and define these limits, for the interrelationship of behavior and environment may give important direction to legal research. Yet the major potential of ethology lies in its interpretation of individual behavior as it relates to the group. Individual and group behavior must adapt to continuously changing environments. Man is a part of this process: as the environment changes, so does the behavior of human groups. This adaptation, however, is possible only if the conduct of the individual follows rules or norms which permit the survival of the individual, the group, and the species.

By comparative studies of nonhuman primates and other group-living species, ethologists have perceived patterns of behavior that stimulate social interaction and preserve group cohesiveness. The development of these patterns follows certain rules and is influenced by mechanisms regulated by hormonal processes.\(^b\) In man, behavior patterns such as pair formation, pair bonding, and child rearing\(^10\) predate the time when man's ancestors separated from the common primate family tree. These patterns are part of a biological heritage shared with other primates.\(^11\)

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8. The terms "biologically programmed behavior" and "innate behavior" are used interchangeably in this paper. I am aware that ethologists' jargon, like that of other disciplines, follows trends, and that terms are periodically discarded if they become too freighted with controversy. Within the scope of this paper, however, I will accept Lorenz's thesis that innate (or what we formerly called instinctive) behavior is not individually learned, i.e., ontogenetic, but rather acquired by the species through phylogenetic development. K. LORENZ, EVOLUTION AND MODIFICATION OF BEHAVIOR 3-5 (1965).

9. During the last ten years, biologists and other scientists engaged in behavioral research have intensively studied nonhuman primates. In the United States, a number of primate research centers have been established where the correlation between behavior and the simultaneous physiological processes is investigated. The Stanford Outdoor Primate Facility is one such facility.

10. The terms "broodtending" (used originally for birds) and "child rearing" or "care of the offspring" are used interchangeably in this article.

11. Recent findings by molecular biologists document a close link in the genetic endowment of apes and man. Three laboratory techniques are used to measure the evolutionary distance between the different species. One method involves the genetic
Certainly the mechanisms which serve group cohesiveness and direct group behavior are part of this biological heritage. It can reasonably be assumed that at some time during modern man's evolution, his ancestors learned to articulate the implicit rules of group life. With the development of his ability to speak, to imagine, and to plan, these rules were formalized. Over a period of hundreds of thousands of years the implicit rules of group life evolved into formal legal rules. During this time the rules governing group life decreed behavior which, in part due to hereditary factors partly learned and transmitted from one generation to the next, served to adapt man to his environment. Once behavior was expressed in legal norms, the norms could be effective only if the individual members of the group willingly obeyed the rules or could be forced to obey them. In sum, the effectiveness of legal norms depended on the legal behavior of the individual.\(^{12}\)

Let us assume that all human behavior, whether in response to law or other stimuli, is determined by two factors: learning or the genetic code. In most cases, behavior is determined by a combination of the two. Let us also assume that biologically programmed behavior (innate drives)\(^{14}\) is more resistant to change or regulation. From this it would follow that deviance will be particularly high where legal norms require behavior that works at cross purposes with the demands of biologically programmed behavior, particularly if such behavior has survival value for the species. On the other hand, if legal norms and the behavior prescribed by these norms complement biologically programmed behavior, compliance will tend to be high. Thus, human

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material DNA. The two strands (double helix) of DNA can be separated and a single strand each of man and ape combined with each other. The chemical links between the two strands will reestablish themselves except at the points where the links are chemically different. The relationship between man and ape is then determined by the number of chemical links that fail to reestablish themselves. The differences in the DNA structure make one creature a man and the other an ape. A second method determines evolutionary distance by comparing protein molecules. In man and chimpanzee the amino acid sequence of hemoglobin is identical, whereas the sequences of man and of horse differ at about forty-three points. The third approach for measuring the distance between the species follows the immunology method which compares antibody reactions with protein. All three methods place the chimpanzee, followed by the gorilla, closest to man in evolutionary terms. M. Edey, The Missing Link, 132-33 (1972).

12. Rules understood by the members of a group and without which the group could not function, but which are not (to the human observer's perception) clearly expressed, are "implicit" for our purposes, as contrasted with "explicit" rules which are (to the human observer's perception) clearly expressed.

13. For present purposes legal behavior can be termed the behavioral response to rules or norms, whether the response is obedience (compliance), evasion, or disobedience (deviance).

14. See note 8 supra.
legal behavior is helped or hindered by the biological program which man inherits and shares with other primates.

However, the laws which man has to obey are uniquely human. Man-made laws embody values, whether they are the indigenous law of primitive societies or the norms contained in the sophisticated legal systems of technically advanced nations. When members of a group make value judgments about acceptable behavior, even those based solely on expediency or survival, these judgments coalesce into rudimentary concepts of right or wrong—concepts of justice. It is probable that as man evolved he came to need some mechanism to guide obedience; man had to develop an individual sense of justice—a dynamic cerebral mechanism to complement biologically programmed behavior. This mechanism, which guides individual behavior within the group, has developed concurrently with the ability to create and adhere to legal rules. It can be activated by sensory inputs, and, given the continuous change of human environments, must have always included the capacity for adaptation and change.

The development of control mechanisms in individuals has been the subject of varied speculation. C. H. Waddington suggests that human evolution has depended on authority-bearing systems that help prepare the infant to accept transmitted information and to become a creature who "'goes in for'" having the beliefs of the tone we call ethical. Albert Ehrenzweig, influenced by Freud, regards the development of ethics (the precursor of a sense of justice) as inborn. The child's experiences within his family reinforce the innate trait.

The child, at some time and somehow, learns to obey and disobey orders in what we may call his first ethics. The rules and standards which he thus derives from his father's or mother's or siblings' reactions, respond to an inborn, or develop an inbred, sense of justice.

It does not matter ... where we draw the line between this vague feeling and a conscious recognition of valid legal rules. At one point in his development the child will begin to accept his father's orders as part of a general pattern of authority. And at one point in its history, a primitive community will cease mechanically

15. Prohibition and drug laws are examples of laws that are predicated on the prevailing judgments of the power groups responsible for legislation and adjudication. Established behavior patterns (drinking) or changing behavior patterns (drug use) of a large or growing number of people whose values do not correspond to those of legislators or judges can force a redefinition of the ethical standards on which laws are based. They can also lead to stronger enforcement measures, functional obsolescence of existing laws, or the adoption of new laws.

to follow established customs and begin to relate a duty to obey a prevailing rule of "law." Anthropology has supplied us with a wealth of facts and speculations regarding the origin and growth of such pre-legal and legal orders.\textsuperscript{17}

Konrad Lorenz, however, holds that man’s “instinctive drives and the culturally conditioned, responsible control over them [which is dependent on culture and which requires individual responsibility] form one system in which the functions of both subsystems are exactly in tune.”\textsuperscript{18} This ethological analysis suggests that the human behavioral response to law results from the interaction between innate drives and the individual sense of justice which is shaped by the individual’s experiences within the group. As a system-controlling behavior, this cerebral mechanism—the sense of justice—is limited in its efficacy by the drives which it attempts to regulate. This control mechanism, like law itself, can succeed only within the limits set by innate drives.

Regulatory laws, such as traffic rules, enable modern societies to function. They support the theory that man evolved as a law-abiding species with an affinity to make and adhere to rules. Laws prescribed or based on reason rather than morals or values are obeyed or disobeyed on rational grounds. The effectiveness of a law which changes the speed limit is not contingent upon moral values or biologically programmed behavior. However, many laws regulate behavior rather than conduct. Man’s behavior is part of his evolutionary biological and cultural makeup; it has taken differing forms under varying environments and has withstood the impact of differing values. Here, certainly, biological insights can serve as aids to broaden the scope of the social sciences in general and the sociology of law in particular.\textsuperscript{19} In certain fields, evidence is already available that should assist in monitoring proposed reforms in the legal system. This is particularly true in the field of family law.

III. SOCIOBIOLOGICAL FINDINGS AND THEORIES

When comparing the behavior of man with that of animals, one must remember that the leap from the world of non-human primates to the human species as it exists today is long both in evolutionary terms and in time. Even the most primitive societies living today are highly advanced when compared to nonhuman primates. The chimpanzee is the animal most closely related to man, but millions

\begin{footnotes}
\item[18] K. Lorenz, Civilized Man’s Eight Deadly Sins 48 (1974).
\end{footnotes}
of years have passed since the two species separated from a common ancestral tree. Both have evolved independently through genetic mutation and selection.

Therefore, any comparisons between the behavior patterns observed in humans and in other species are somewhat speculative. But some similarities are striking. The examples which follow have not been selected as proof of a particular theory, nor are they exhaustive. They are used only to represent the ethological point of view.

During the last ten years, research on nonhuman primates has gained momentum. A number of primate research centers in the United States, as well as in other countries, are studying the correlation between observable behavior and simultaneously occurring physiological processes that determine behavior. All behavior, whether genetic or learned, is controlled by cerebral processes; it has been shown that the genes which determine behavior are also responsible for the ontogenetic development of the brain.

Through the study of cerebral processes scientists are becoming increasingly aware that these processes are very complex and that many different integrated mechanisms act as control systems to check and balance behavior. Behavior is the sum of many components; complex systems control its various elements. The purpose of these systems is to achieve a balance which will insure the health and survival of the species.

In human societies, maintaining this balance is the essential function of the law and legal system. Traditionally, law has been used in

20. Sarich and Wilson of the University of California at Berkeley have assembled a great amount of molecular-biological evidence to determine the rate of evolution in time. Their findings place the hominid-chimp split on the primate family tree at less than four million years ago. This is not in accord with the views held by paleontologists, who place the man-ape split closer to fifty million years ago. M. Edey, supra note 11, at 135-36.

21. Comparisons between man and other animals are often made in popular modern writings on social problems. Frequently animal behavior which has been observed only once or during a few experiments is used as the basis for comparison. As a result, the goals and methods of ethology often become distorted, regardless of whether the writer has a positive or negative attitude in regard to this field of science. Observations of rarely occurring behavior taken out of context can never be the basis for generalization, especially if the experiment concerns a captive animal. Incarceration or externally imposed limitations on choice always change the behavior of both animals and humans.

22. Benzer, From the Gene to Behavior, 218 J.A.M.A. 1015 (1971). Using mutant fruit flies (Drosophila) in his experiment, Benzer traced the origin of several behavioral traits, such as mating behavior and circadian rhythm, to the genes responsible for the development of the head. The fly's nervous system differs vastly from the human's, but it is similar in that it works via neurons, synapses, and transmitter molecules. The fly has developed the senses of sight, hearing, taste, smell, gravity, and time, making it useful in experiments which analyze components of behavior relevant to man.
efforts to maintain harmony, settle disputes, and resolve conflicts. Furthermore, lawmakers have sought to give individuals the means to predict what societal reactions will follow certain actions. Many other animal species have mechanisms which serve the same purpose. The resulting behavior patterns are potentially convertible; if they are successful in one context, they can be used in others. For example, behavior derived from child rearing or reproductive acts can be used to stabilize the sexual relationship between two or more individuals or to unite members of a larger group. Sometimes these behavior elements are also used to inhibit aggression. Chimpanzees assume a crouching posture otherwise used by the female during copulation as a gesture of submission. The expected and usual reaction is that the potential aggressor desists from attack. Such patterns are of great adaptive value when behavior is met by specific predictable responses. Actions become reciprocal, obligations and rightful claims coinciding.

Animals can exhibit behavior which from the human perspective resembles altruism. Lorenz calls this behavior "moral analogous behavior in social animals. Wickler explains it in these terms: helping one's kin can insure the survival of one's own genetic material. In striving for reproductive success, the individual exerts himself not only for his own survival but also for the survival of the material carried in his genes. The proportions of this genetic material in related individuals vary depending on the degree of kinship. Robert Trivers reduced these proportions to mathematical formulae and, on this basis, developed a theory explaining human altruism in terms of Darwinian natural selection. Trivers sees family attachments (mother-child bonds and attachments between siblings) as essential factors in the development of the ability to act altruistically. Family bonds, like dominance, are vital factors in the maintenance of group order, and
group order cannot exist without reciprocity of action and aid between various members of the group.

IV. LEGAL BEHAVIOR AND GROUP ORDER

Legal behavior can take various forms: strict obedience, evasion, and disregard or disobedience of rules, norms, and laws. Therefore, the comparison of behavioral responses to rules under different environmental conditions and in different species is of interest. Group-living animals have a group structure—an ordered group life. They have and respond to rules. In the human species the response to rules depends, at least in part, on a sense of justice, which itself has a biological basis.

Early man lived in small groups. At least some type of family organization existed, since a newborn infant was completely dependent on the help and care of his mother. During an infant's period of social maturation the mother typically bore more children. A mother and one or more offspring constituted the smallest possible social unit. If we assume that for early man, social interaction within the group followed certain rules and that behavior was adaptive and varied with the environment; and if we further assume that man's ancestor in the early stages of his evolution communicated with sounds, gestures, and postures; then it follows that as language and abstraction—the ability to foresee, imagine, explain, and plan—developed, concurrently the implicit rules evolved into primitive law.

Furthermore, man's creative imagination, which enabled him to survive in more habitats than all other primates combined, engendered belief in the supernatural. Belief is closely related to feelings of worship, awe, and fear. The emotional need to live on good terms with supernatural forces and to accept these immutable forces may be closely related to a willingness to respect authority and power. Imagination, therefore, would serve to embellish primitive laws with conviction and persuasive power.

The ability to formulate legal rules, like other regularities that characterize successful species, must have had significance in the evolution of the species. The formulation of rules is a uniquely human characteristic and is central to the creation of social cultures rich in symbolic content. These rules result in complex social traditions transmitted nongenetically to successive generations. Group survival depends on the quality of choice among alternative modes of cultural behavior and the social mechanisms for formulating rules and en-

28. See notes 64–67 and accompanying text infra for a detailed discussion of the structure and organization of the human family during this period of time.
forcing prescribed behavior. In this sense, legal behavior is inherent in cultural behavior and law is inherent in culture. Early human groups undoubtedly were structured in dominance patterns: those most able to verbalize rules and thereby formulate laws may have enjoyed relatively high status, which in turn permitted them to give sanction to the law.

Observations of animals in their natural habitats suggest that one of the prerequisites of cultural behavior, the readiness to accept non-genetically transmitted information, also exists in non-human animals. Mammals, especially primates, are less dependent than many other animals on rigid innate behavior trends. In one instance, an island troop of macaques at a Japanese feeding station adopted a new eating habit within six years after it was initiated by one young member of the group.

29. Sociologists of law today emphasize culture's impact on law. See Friedman, Legal Culture and Social Development, 4 Law & Soc'y Rev. 29 (1969). Friedman compares situations where culture influences the effectiveness of law:

Americans . . . seem willing to pay their taxes; they evade, but within acceptable limits. . . . On the other hand, any attempt to use law to eliminate adultery in the United States creates entirely different problems of enforcement. No one obeys adultery laws simply because they are laws. . . . [S]tate intervention in private sexual behavior is culturally disapproved.

Id. at 42.

30. Kummer, Primate Societies, Worlds Of Man Studies In Cultural Ecology 88–89 (W. Goldschmidt ed. 1971). While not all social roles among primates are necessarily correlated with dominance, studies of macaques, baboons, and chimps indicate that primates which live in groups rely on leadership to find daily and seasonal routes to food sources. The leadership position is not held permanently and not always by a single individual, but troop decisions are always made by individuals who enjoy a high status.


The cow herd in which the young grow up serves as a repository of traditional knowledge vital for survival: the routes to water holes and feeding grounds, the seasonal movements to new ranges. It is possible to build and transmit such a repository because the elephant's large brain [three times the size of man's brain] enables it to learn by imitation—and to remember. Also, since the elephant is potentially a long-lived animal and matures slowly, several generations can exist in the same herd, increasing the young's opportunity for learning.


Since 1952 an island troop of macaques has been provisioned with sweet potatoes . . . at a feeding station on the beach. One day Imo, a 1½-year-old female, was seen washing the sand off a sweet potato. This new tradition was first imitated by one of Imo's playmates, then by Imo's mother. The potato-washing behavior continued to spread, generally from youngsters to mothers and from younger brothers and sisters to older ones. . . . Four years later the only adult animals that had learned to wash potatoes were mothers of potato-washing youngsters. . . . [W]hen [youngsters] became mothers, they waded into the sea to wash potatoes with their young clinging
The degree to which man transmits information and uses value judgments in accepting or rejecting traditional behavior is unique to him, however, because his brain is capable of producing symbols and abstract thoughts. The brain grew to its present size and complexity because of its adaptive capability. Fossil discoveries, like those made by the Leakeys in the Olduvai Gorge, together with new scientific dating methods, have produced evidence of the brain's evolutionary development. Furthermore, tools and weapons found with hominid fossils help illustrate the behavior and way of life of the creatures who used them.

The human ancestor, who lived approximately two million years ago and whose brain was not larger than that of today's gorilla, had already tried to make primitive tools and weapons. Such tasks are part of cultural development. After man started to make tools and use them to his advantage, his brain grew in size and complexity. Another evolutionary change—upright posture—also proved helpful when tool making became important for survival. Those hominid creatures who could sit and walk upright were able to use arms and hands to manipulate the tools and thus become more skillful. A

The offspring imitated their mothers as if monkeys had always washed sweet potatoes.

The macaques also eat wheat that is scattered on the beach and becomes mixed with sand. The members of Imo's troop laboriously scoured the wet sand for single grains of wheat. Then Imo, at age 4, was seen to pick up a handful of sand and wheat, toss it into the sea, and scoop up the floating wheat after the sand had sunk. In the next six years most monkeys started wheat-sifting when they were 2, 3, or 4 years old. Adult males of the troop, including those of the highest rank in the dominance hierarchy, usually do not enter the sea—even after their favorite food, peanuts. Here we see the other side of the story: Animals bound by tradition resist the development of new behavioral patterns.

See also Kummer, supra note 30, at 117–24.

34. M. Edey, supra note 11, at 44, 49.
35. "[F]ossil evidence [is] accumulating at an extremely rapid rate (more fossils were collected in 1970 than in all previous years put together)." L. Fuchs, Family Matters 6 (1972).
36. Bones and tools found in Olduvai Gorge by the Leakeys are 1.65 to 1.75 million years old, "as dated by the radioactive potassium-argon method . . . ." These tools were fashioned from quartz pebbles. "There is nothing in a quartz pebble or flint concretion that suggests the functions of the knife, axe or scraper that it may become. The fashioning of a useful tool from such a pebble can be the product only of both accidental observation and purposeful experiment." C. Hurlbut, Minerals and Man 29 (1968).
37. J. Van Lawick-Goodall, In the Shadow of Man 35–37 (1971). Chimpanzees remove leaves and bark from thin twigs to make them into tools for catching termites. Similarly, they chew leaves to make them more absorbent and then use them as sponges to soak up water which they cannot reach with their lips. Both are examples of the modification of objects to serve a specific purpose—the definition of tool-making.
larger brain and upright posture together led to behavior which proved adaptive for the human species.

At some point in human evolution cooperative hunting developed. Members of the group would not only hunt together, but they would share the spoils according to implicit or explicit rules. Division of labor, cooperation, and planning became a necessity. Cooperation in the hunting group required an advanced form of communication. There was a premium on creatures who were capable of learning quickly and who were competent to change the environment if changes in behavior were unfeasible or undesirable.

Living in groups as man did, changes in behavior or attempts to change the environment were possible only if the group acted together according to rules. Members of the group had to learn to obey commands. Groups whose members were inclined to obey rules, who felt guilt about breaking them, and who learned to control their actions within the rules of group life were favored: legal behavior had a selective advantage. Tasks that are crucial for the survival of the species tend to be pleasurable; they are easy to learn and the wish to perform them is hard to extinguish. Furthermore, people derive a certain satisfaction or pleasure from obeying rules. It is conceivable that individual gratification or reward from obedience to the rules of group life stimulated the emergence of new rules in new situations. The propensity to devise rules for games and sports may support this view.

The quality and adaptiveness of the value judgments inherent in the rules of group life grew in importance as group life and the rules that regulated it became more complex. Unsound ideas and mal-adaptive value judgments were short-lived, dying with the group or individual who adopted them. Natural selection favored those ideas that were at least tolerable if not adaptive; only those lasted long enough to develop into cultural traditions. It is important to remember, however, that evolutionary changes take thousands, if not millions, of years. Values cherished today may well have outlived the purposes for which they originally proved adaptive.

V. FAMILY STRUCTURE IN THE ANIMAL WORLD

The formulation of laws is species-specific in man. Although man alone writes laws to control social and family organization, he shares with other species behavioral mechanisms which lead to family formation and group interaction. The behavior of nonhuman primates is,

These and similar observations made by Goodall in Gombe refute the previously accepted assumption that only man is capable of making tools.
not unexpectedly, the most relevant for our purposes. Like man, non-human primates exhibit wide diversities of family structure. Monogamy prevails among the gibbons of Sumatra, whereas among the hamadryas baboons, one adult male can be bonded to several females in a polygamous union. The chimpanzee family unit consists of the mother and her offspring.

Research into the behavior of a number of animal species suggests that environmental conditions, particularly “economic” ones relative to food supply or climate, influence the type of family within the species. This view is also held by some anthropologists. They postulate that economic factors were decisive in shaping legal structures in primitive societies, much as trends toward “open marriage” in the modern West appear in social strata where economic conditions either force women to support their children without male assistance (e.g., extreme poverty) or make family support no longer necessary (e.g., affluence).

Among the different species of baboons exist a variety of family structures. A study of these structures is particularly rewarding because both man and the baboon evolved from tree-living, forest ancestors. Both found new ecological niches in the open where they had to develop ways to find food and defend themselves against predators. However, among all the varied family structures that developed in the course of evolution, one common factor persisted: the long period of dependency of primate young demanded a close mother-infant bond. Other individuals congregated around this mother-infant unit for shorter or longer periods of time, depending upon their roles within the group and upon environmental demands.

When baboons left the protection of the forest, they could propagate only if they lived in troops cohesive enough to ensure survival. The average baboon troop is comprised of approximately forty animals, about seven of which are adult males. They protect the troop and are admirably suited for the job. Males weigh approximately twice as much as females, have dagger-like teeth, and show aggressive behavior from

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38. "Polygamy" and "polygamous" are used in this article to describe an established relationship between one male and several female animals.
40. Family structure influences the social structure of tribal communities and their legal order. See E. HOEBEL, THE LAW OF PRIMITIVE MAN (1954) and M. GLUCKMAN, POLITICS, LAW AND RITUAL IN TRIBAL SOCIETY (1965). See also Wahl, "Influences Climatiques sur l'Evolution du Droit en Orient en Occident," REVUE INTERNATIONAL DE DROIT COMPARÉ (1973), in which the author traces the development of different concepts of property rights in the East and West to climatic differences which have shaped "the image of man."
early infancy. "[A]ny three . . . can [successfully defend the troop against] all predators except a pride of lions." ⁴¹

It is believed that early man lived in groups of varying numbers, generally no more than fifty. Undoubtedly humans also developed behavior mechanisms for assuring group cohesiveness. These mechanisms contributed to the mother-infant relationship, the pair bond, and similar relationships which underlie primate family structure and ultimately group structure as well.

The main tasks of the family as a unit, regardless of its structure or composition, are firmly rooted in two basic needs: procreation, and care of the young until they reach social maturity. Comparative studies of two baboon species, the hamadryas and the anubis, illustrate how these goals are achieved. The anubis live in "multi-male" groups, the most common arrangement among nonhuman primates. ⁴² Mating is random, with pair formation and very brief bonding during the female's estrus. In contrast, the hamadryas live in polygamous one-male family units, where strong pair bonding ⁴³ exists between one male and several females.

This one-male unit, extensively studied in the field by Hans Kummer, ⁴⁴ is the optimal foraging unit for the hamadryas. It is large enough to include one male protector for several females and their offspring, yet small enough to assure sufficient food for all. Every hamadryas female is associated permanently with a particular male, unlike baboon females of most other species. And since infants and small juveniles are bonded to their mothers, the band is divided into subgroups with only a few adult and juvenile males excluded. To strengthen the hamadryas' pair bond, a special behavior mechanism called the "herding technique" developed. (A similar technique is used by baboon mothers to control their infants.) The males' large size makes it easy for them to dominate more than one female; thus, hamadryas social life is dominance-oriented.

The hamadryas male's possessiveness toward females in every reproductive stage may be biologically programmed, for herding in one-male units has been found in all wild hamadryas troops observed to date. The intensity of male possessiveness, however, may vary. ⁴⁵

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⁴² M. EDEY, supra note 11, at 92, 97.
⁴³ Although the term "pair" normally includes only two individuals, "pair bonding" is also used here to discuss the bond between one male and several female animals.
⁴⁴ Kummer, supra note 30, at 33.
⁴⁵ After several generations in captivity, however, the males in the hamadryas colony at the Russian research station of Sukhumi still show herding behavior. "Ap-
Curiously, the males' inclination to herd may be effective in creating family bonds only because of the females' learned response when approached by a threatening male. In like situations, most other primate females, including anubis, take flight.\(^4\)

In a series of field experiments adult anubis females were transferred to hamadryas troops. The anubis females learned within an average of one hour to follow the one hamadryas male who threatened them and to interact with no other male. In reverse experiments, hamadryas females readily adapted to the independent life of an anubis group. "[T]hey groomed several males in succession and ceased to follow any particular male."\(^4\)\(^7\)

The one-male family system among the hamadryas has created aggressive males who have become highly possessive of females.\(^4\)\(^8\) Field experiments suggest that in the wild the "pair Gestalt"—the pair perceived as a phenomenon different from its elements, the individuals—inhibits the male's aggression.\(^4\)\(^9\) When a pair bond is established other males respect it. Respect is a stabilizing response that protects the pair bond and the existing family structure. In evolving a system of one-male units, hamadryas baboons also evolved a mechanism for coping with the problems of highly possessive males: possessiveness was complemented by respect for possession. Is it possible that respect for possession in man also has a comparable genetic base?\(^5\)\(^0\)

\(^{46}\) Female chimps seem to learn during adolescence to respond appropriately to male displays that can constitute either threatening or courtship behavior. Interview with Jane Goodall, at Stanford University, Palo Alto, California (October 1973).

\(^{47}\) Kummer, supra note 30, at 100.

\(^{48}\) Id. at 100-01:
When 30 new females were introduced to a colony of about 100 hamadryas baboons in the London Zoo, all the old males tried to secure females and, within one month, killed 15 of them in competitive fights over their possession. This event, though provoked by an unnatural manipulation, points out the risk in evolving possessive males. . . . [A]round 50 adult baboon females [were released] into strange hamadryas troops . . . . There never was a general rush of the troop males for the new female. Regularly, only one male of the troop came forward and appropriated the female. A few times two males would approach simultaneously at the first sight of the female, but within seconds, one of them would withdraw. Only once did a short fight between two males break out . . . . Whenever a male is trapped and temporarily removed, his females are taken over by other males of his troop. After only a few hours, the new possessor will not release the acquired female without a fight, even if the former leader is returned. The outcome of the fight will then determine whether the female remains with her original possessor or with the new one.

\(^{49}\) Id. at 105.

\(^{50}\) Respect for possession may have evolved from respect for exclusive access between individuals linked by strong family bonds.
Observations of nonhuman primates suggest that the perception of a mother and an infant (or any adult and infant) in close bodily contact (seemingly a unit) can also inhibit aggression.\(^1\) Low-ranking young male baboons will occasionally snatch up infants and hold them close to gain greater freedom within the group. Similarly, the perception of such relationships as hunter-weapon or craftsman-tool may have inhibited attempts to take objects away from the "rightful" owner. Other observations reveal that among baboons a dominant male will attempt to enforce the rules of the group, even interfering with mother-infant relationships where the mother's behavior results in cries and whimpering by the infant.\(^2\) This type of intrusion into inter-individual relationships may be based on precursors of the cerebral mechanisms that today regulate legal behavior and foster a "sense of justice."

The baboon's predisposition seems to be phylogenetic.\(^3\) When two different species of baboons come into contact in a new environment, they readily change such behavior as sleeping habits but do not alter their family structures.\(^4\) Similarly, the human species adjusts to new

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51. Some recently observed incidents have demonstrated exceptions to this generally held belief. Wilson, supra note 19, at 85.

52. A sequence of slides taken at the Gombe Research Center by Dr. David A. Hamburg show the attempts of a dominant male to enforce the implicit rules of group life among a troop of baboons. In this sequence an adult female could not keep up with the progress of the troop on the daily march because her infant was too sick to cling to her. This led to a conflict between two very powerful drives in the animal: proper care of the infant and staying with the troop on the march. This conflict influenced not only the conduct of the baboon mother but also that of the troop leader. When the mother tried to carry the infant in her hand, she was not able to follow the troop without hurting the infant—which was pushed to the ground with each step. The whimper of the infant immediately caught the attention of the dominant animal, who approached the mother and threatened her. The mother picked up the infant and again tried to follow, but the infant's cries brought the same results. After several attempts the mother solved her conflict by abandoning the dying infant. Slides by David A. Hamburg, Stanford University Lecture Series (Oct. 1973).

53. The term "phylogeny" is used by biologists to describe adaptive processes in the evolving genotype. It refers to the gene pool and the information stored in the genes. Changes in the stored or coded information occur very slowly through mutation and selection. Geneticists rate the likelihood of a mutation's being adaptive at about 10\(^{-8}\). K. Lorenz, supra note 8, at 11-12. In contrast, "[o]ntogeny is the process by which a fertilized egg cell, endowed with a set of genes, develops into a mature . . . adult." It refers to individual development under the impact of environment. In biological terminology, ontogenetic adaptation is "modification." Kummer, supra note 30, at 10.

54. This was observed in 1968 at the Awash National Park in Ethiopia. The park was inhabited by both hamadryas baboons, whose social organization consists of one-male family units, and anubis baboons, who form multi-male family units without pair bonding.

There was an ecological transition at Awash. Anubis groups, which roosted in the forest every night and made daily foraging trips into the thornbush, inhabited an area upstream which consisted in the main of a gallery forest with trees up to sixty feet.
housing or to the conveniences of technology, but resists attempts to change the organization of the pair bond or of mother-infant relationships. Legal efforts to induce such changes have usually resulted in failure.\textsuperscript{55} There appears to be a phylogenetic predisposition to learn the specific form of family structure early in one's development. The bonds that assure cohesiveness are so essential to survival that the individual learns at a very early age that his particular family composition is the "right way."

VI. EVOLUTION OF THE HUMAN FAMILY STRUCTURE

Nowhere in legal thinking are value judgments more deeply embedded than in laws relating to the family.\textsuperscript{56} Family structure and each member's rights and duties within it have been regulated and defined by ancient taboos and religious commandments as well as by

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\textsuperscript{56} A "family" is "[a] collective body of persons who form one household under one head and one domestic government and who have reciprocal natural and moral duties to support and care for one another." Black's Law Dictionary 728 (4th ed. 1968) (citations omitted).
modern laws. Family matters, which are the basis of group life, occupy a place of importance in all existing legal systems. They are the most frequent basis for judicial action in primitive societies and are a major subject of legislation in technologically advanced societies.

Modern societies are alarmed by increasing family disintegration, which results in the neglect of children and the weak. Recent laws and commission reports on divorce emphasize the importance of family stability; however, modern divorce laws seem to foster family instability. One must not lose sight of how changes in laws regulating family relationships reflect changes in the behavior of people under the impact of the environment. As the environment changes, so ultimately must laws reflecting human behavior within it.

Breakdowns in basic family ties such as the pair bond or the parent-child relationship are at the root of family instability. The results are the constantly growing caseload of juvenile courts, the increase in violent crime, child abuse, mental disorders, the neglect of the old, and other social ills. Therefore it is hardly surprising that there are enormous pressures for reform of domestic relations law. Recently, legislatures have been particularly active in revising family laws, and the United States Supreme Court is attempting to reinterpret existing laws to accommodate these often conflicting new demands.

Because the family occupies so central a position in human society, we may begin to explore an ethological explanation of legal behavior by examining behavior within the family structure. This examination begins with the most obvious difference in human families: the

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57. Opposition to easy divorce has been motivated primarily by the belief that this would inevitably lead to the destruction of the institutions of marriage, family, and society. M. Rheinstein, Marriage Stability, Divorce, and the Law 29 (1972).

58. The California Governor's Commission on the Family, Report 9-11 (1966) suggests that parties petitioning for divorce should submit to counseling in order to attempt reconciliation.

In the Soviet Union new legislation in 1944 sharply reduced the divorce rate (1.1 per 1,000 population in 1940 to 0.6 in 1945). When it rose to 1.34 for the years 1960 to 1964, new reforms were initiated. Rheinstein, supra note 57, at 241 (1972).

59. In Griswold v. Connecticut, 381 U.S. 479, 486 (1965), the United States Supreme Court based its decision granting married couples the right to use contraceptives not on the fourteenth amendment, but on a "right to privacy older than the Bill of Rights . . . ." See Bender, Privacies of Life, Harper's, March, 1974, at 63. In Eisenstadt v. Baird, 405 U.S. 438 (1972), the Court granted single persons the right to use contraceptives; and in Roe v. Wade, 410 U.S. 113 (1973), the Court granted a broad right to obtain abortions. In its last term the Court decided that a married woman could not be required to obtain the consent of her husband for an abortion during the first stage of pregnancy, and "the State may not impose a blanket provision . . . requiring the consent of a parent or person in loco parentis as a condition for abortion of an unmarried minor during the first 12 weeks of her pregnancy." Planned Parenthood of Missouri v. Danforth, 428 U.S. 52, 74 (1976). See also Bellotti v. Baird, 428 U.S. 192, motion to vacate order denied, 97 S. Ct. 251 (1976).
monogamous family units of the West and the polygamous family units predominant throughout Asia and Africa. Religion has influenced marital and family law, but the cause of this difference is not entirely religious. Man and his hominid ancestor lived in cohesive groups and formed family units long before modern religions began. The mother-infant relationship was ubiquitous and perceived as a unit. It led to the same value judgments regardless of environment. Pair bonding probably existed among some groups of early men and, depending upon environmental factors, may have been either polygamous or monogamous.

Modern man is shaping his environment through technology. His efforts are successful only because he can adjust some of his behavior, including family structure, to changes he himself sets in motion. Groups adapting to different environments form different value judgments about family structure because of differing early impressions. Consequently, the human species has had examples of monogamy, polygamy, and occasionally polyandry.

The family structure of our hominid ancestor who lived as a gatherer probably showed familial varieties similar to baboon troops. The mother-infant unit certainly existed. Adult males probably were not occupied with direct parental tasks but functioned within the group as protectors of the females and offspring and as procreators of the next generation. As long as each individual could gather all the food needed for his survival, approximately seven adult males, as in the anubis baboon group of forty, would have been adequate for

60. "Cross-cultural studies reveal that 84 per cent of 185 societies (Ford & Beach, 1951) or 75 per cent of 554 societies (Murdock, 1957) practice legalized polygamy." R. JOHNSON, AGGRESSION IN MAN AND ANIMALS 95 (1972).

61. See notes 38 and 43 and accompanying text supra.

62. According to Wickler and other ethnologists, behavior is the most malleable aspect of all animals. The plasticity of behavior is necessary for ecological survival under varying environmental conditions. It is hoped that new biological findings will help predict which group structures are most favorable in certain environmental conditions. Interview with Wolfgang Wickler, Professor at Max-Planck-Institute, in Seewiesen, Germany (May 1975).

63. A system of fraternal polyandry, with several brothers sharing a wife, is found in Tibet. R. FOX, KINSHIP AND MARRIAGE (1971). See also I. EIBL-EIBESFELDT, LIEBE UND HAS 186 (1971). According to Eibl-Eibesfeldt, the scarcity of food supplies and territory prompted the development of this family structure. Population control was required and accomplished by limiting the number of childbearing women and by providing for the sexual availability of each female to a greater number of males.

64. M. EDEY, supra note 11, at 97:
Just as baboons have differing life styles, surely hominids did too, depending on where they lived and on how severe the seasonal food- and water-getting problems were. Where such problems were at their worst, extra male hominids may be considered to have been just as expendable as surplus male baboons, and one-male family units may have resulted.
procreation and protection. When hunting became part of the human way of life, food sharing became a necessity. Once sharing was established, the family in its various forms became the only viable economic unit.

Bonding between male and female in the human species is not based on a rigid mechanism like the hamadryas' herding technique; however, like the hamadryas, the human pair bond is not limited to the female's time of estrus. The human female's continuous ability or desire to participate in sexual activity was a factor which helped establish and preserve the stable pair bond necessary to assure food and protection for the mother and her offspring. To survive the human infant required constant, close maternal contact for a significant period of time, and it is likely that the human mother needed the male's help even in relatively favorable environments. The father's presence in the family became even more important when specialized skills had to be taught to assure survival of the progeny.

Although the human female's constant sexual receptivity attracted the male and strengthened the pair bond, her continuous sexuality could endanger the infant's life if early intercourse after childbirth led to new pregnancy. Pregnancy would terminate lactation, and she could no longer provide the food on which the infant's life depended. In primitive societies, even where the causal connection between intercourse and pregnancy is not clearly understood, strong taboos regulate sexual intercourse before and after childbirth. The taboos are strictly observed in polygamous family structures. For this reason, polygamous structures may have been adaptive when food sources lacked sufficient proteins for infants to survive without their mother's milk.


Hunting in itself is an insecure economic base. Recent studies of living hunter-gatherers, such as the Bushmen of the Kalahari Desert, reveal that men can go hunting only because they can rely on significant food contributions by the women who gather . . . 50 to 80 percent of the Bushmen's daily diet. This might vary under different ecological conditions; however, it indicates that hunting could not become a principal feature of human social evolution until males and females shared food and food-gathering.

66. Other primates do not show food-sharing behavior, with two exceptions: the sharing between mother and infant, and the meat sharing among chimps which follows certain rules unique to this one particular situation. It is assumed that without the reinforcing behavior pattern of sharing, division of labor could not have developed. Studies of living hunter-gatherers indicate that a home base is of great advantage for division of labor. Woman and children gather food nearby while men go hunting, and the family reunites at the home base to share the results of their labors. Address by Jane Goodall, Stanford University Lecture Series, in Palo Alto, California (Oct. 1973).

According to present findings, modern man learned to domesticate plants and animals and to produce and store food supplies approximately 10,000 years ago. Excavations place the development of agriculture in the area of the Cresent Valley in the Middle East, where the first domesticated plant and animal fossils have been found. From this area the agricultural revolution spread to other parts of Asia and to Africa and Europe. The family unit during this period was probably an extended family comprised of several generations including one or more adult males and several females, infants, and adolescents. It seems likely that the units grew smaller as young male adults set out to start new home bases with as many females as custom or marital law permitted.

Slightly more males than females are born in the human species. In some groups, however, many adolescent or young adult males probably died while hunting for food or fighting against predators, while adolescent females led a more sheltered life. In other groups, early childbirth and lack of postpartum sexual taboos might have led to a high death rate among young females. Depending on the ratio of young adult males to females, pair bonding could have been polygamous, monogamous, or even polyandrous.

Between 10,000 and 5,000 B.C., agriculture and husbandry became permanent parts of man's economic environment. They influenced family structure. The social order necessary to assure procreation and to raise the young to adulthood was channeled and regulated by taboos, commandments, and rules. For thousands of years man's imagination had created myths and strong beliefs in the supernatural. The balance between incentives and inhibitions was molded by experience and the authority vested in leaders—men of the highest status and dominance. The family structure received the sanction of law and religion.

69. Kummer, supra note 30, at 34:

Although a primate has access to all members of his group, he usually shows marked preferences for some members while hardly ever interacting with others. Such subgroup formation is partly based on unexplained individual affinities and partly on kinship and age-group preferences.

Nonhuman primates recognize only matrilineral kinship. The subgroup of a mother and her children shapes [their] social relationships . . .

70. W. ZIEGENFUSS, HANDBUCH DER SOZIOLOGIE 433 (1956).
71. "Were it not for female infanticide . . . there would be approximately one-and-a-half times as many females in the average Eskimo local group as there are food-producing males." This disparity would be a consequence of hunting accidents and killing among the men. E. HOEBEL, THE LAW OF PRIMITIVE MAN 76 (1954).
72. Status behavior in chimps can also be transferred to a certain degree. Infants of females who enjoy a higher status usually develop behavior which assures them higher
The agricultural economy relied on the labor of women, adolescents, and young adults to grow food. The adult males may have spent time away hunting, but we can assume they did not stray far. They were needed to defend the land against predators and nomadic bands. Defense needs limited the size of the territory, and this in turn limited the amount of food available and the number of people who could be fed. Under these conditions an extended family, possibly monogamous but more likely polygamous, was most adaptive. Adult males who were bonded to their females spent more time close to the young, and stronger paternal bonds were formed. The father taught his sons the tasks men had to perform. His tolerant and protective attitude towards the young, also a part of the primate heritage, was probably reinforced by the dawning realization of biological fatherhood. The extended family structure, polygamous or not, was adaptive for a social structure and a family style not too distant from that which still prevails in large parts of Africa and Asia.

A new influential economic factor developed around the year 5,000 B.C. Large communities with urban characteristics developed in the fertile crescent around Mesopotamia. This decisive cultural and
social change was made possible by an agricultural economy efficient enough to produce surpluses. By 3,000 B.C., several important cities in lower Mesopotamia included more than 250 acres within their fortifications. The city of Uruk extended over 1,100 acres and may have contained 50,000 people. Thus, in 5,000 to 8,000 years, the life of man had changed more radically than in all the preceding millions. He had learned to produce and store food instead of merely gathering or hunting it. This change released human energy for specialization and a whole spectrum of new activities.

When cities reached the size of Uruk, crowding and increased contact with strangers may have affected hormonal processes which influence aggressive and sexual behavior.\textsuperscript{77} Cult and ceremony, as well as a strong belief in the supernatural, provided outlets for repressed emotions and helped to redirect aggression and strengthen latent inhibitions.

In addition, urban living conditions prompted a class system in which it was economically advantageous to have a limited number of dependents. Monogamy became so attractive that religious leaders\textsuperscript{78} eventually proclaimed it the only acceptable family structure. The monogamous family, whether arising by design or accident, proved adaptive. Strengthened by religious command, monogamy was the marital system which spread with Christianity to the entire Western world. The care of the old and the sick and of widows and their

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the village-farming community had fully matured in southwestern Asia. As a way of life it then stabilized internally for 1,500 years or more . . . .

Then came a sharp increase in tempo. In the next 1,000 years some of the small agricultural communities on the alluvial plain between the Tigris and Euphrates rivers not only increased greatly in size, but changed decisively in structure. They culminated in the Sumerian city-state with tens of thousands of inhabitants, elaborate religious, political and military establishments, . . . and widely extended trading contacts . . . .

\textit{Id.} at 154.

77. Studies of nonhuman primates show that aggressive behavior is closely related to sexual behavior. This is also confirmed by recent endocrinal data. "[T]he principal male sex hormone testosterone is significant for aggression . . . [M]otivational-emotional patterns essential to survival and reproductive success in mammals find their main structural base in the [phylogenetically] older parts of the brain, particularly in hypothalamus and limbic system." Washburn and Hamburg, \textit{Aggressive Behavior in Old World Monkeys and Apes}, PRIMATE PATTERNS 276, 282 (P. Dolhinow ed. 1972).

78. Religious leaders had emerged as a powerful class under the stratified social-class system of the Sumerian city-states. They are believed to have been "the first persons released from direct subsistence labor." They supervised "a multitude of economic as well as ritual activities," and their power and influence was manifested in the temples, which were the largest and most complex institutions that existed in those early communities. This privileged group of religious leaders had undisputed authority in decisions concerning what today is called marital law. Secular law became effective in this realm only several thousand years later. Adams, \textit{supra} note 76, at 160-61.
dependent children remained a part of the family function well into the 19th century. As technology, mobility, and modern urbanization again brought drastic and rapid changes in man’s way of life, the family structure, especially in highly developed countries, shifted toward the “nuclear family.” Industrialization and exploitation of resources in the new world may have been helped by the Western emphasis on monogamy, a family structure capable of greater mobility than the polygamous one. Industrialization may have begun and progressed more rapidly in the Protestant states which emphasized man’s duty to work and prosper on earth in order to be rewarded in heaven. It may also have been in Protestant countries that the nuclear family achieved its most notable dominance.

It seems obvious today, however, that the nuclear family has serious failings. It does not adequately provide for the maturation and emotional support of the individual family members. Moreover, rapid social change causes continuous conflict in sexual and family relationships; demands for individual rights appear among individuals and social groups without the assumption of reciprocal obligations. Whether the nuclear family will prove adaptive may depend on the values expressed in family legislation. In addition, new group structures are being proposed to replace older family organizations and to fulfill their functions. These forms may or may not prove adaptive.

VII. FAMILY LAW AND THE FUNCTIONS OF SEXUALITY

The stability of all family structures, whether polygamous or monogamous, extended or nuclear, depends heavily on the strength and duration of the pair bond. The pair bond, as the term is used here, unites a male and a female. In many species, courtship behavior leads to pair bonding. Other behavior can also initiate, regulate, and maintain the bond. These complex behavior patterns are triggered

79. Wickler calls pair bonding “remarkable biological processes” which “include certain ceremonies that each individual performs only with its mate or with a closely related member of the family, but not with unknown members of the species.” Examples are the “duet songs, which are typical of monogamous birds whose sex cannot be distinguished externally.” In some species both partners sing the same notes or phrases, either echoing each other or singing in unison. In other species the partners utter different phrases or parts of phrases, combining them in various ways. Duet songs also occur in the siamang (Hylobates syndactylus), a monogamous large gibbon from Sumatra. W. WICKLER, supra note 39, at 116, 118. Some species show pair-bonding behavior before they reach sexual maturity. Kummer reports that adolescent hamadryas males acquire females before they are sexually mature, and that these bonds are lasting and respected by the much stronger adult hamadryas. Kummer, supra note 30, at 35. Konrad Lorenz describes pair-bonding of sexually immature gray geese. K. LORENZ, ON AGGRESSION 184-85 (1966).
by hormonal processes. In addition to sexual behavior, the pair bond also encompasses some nonsexual functions. These include child rearing, social interaction, and mutual protection. These behavior patterns can become advantageous in numerous contexts and thus can become "freely convertible." Behavior which evolved in broodtending or which stimulated sexual practices could also serve to unite pairs over a longer period of time or to strengthen group cohesiveness. It is very adaptive for a species to have the ability to use specific behavior for a variety of purposes and for an individual to know that a certain action will evoke a predictable reaction. This leads to reciprocal interaction within the group and a balance between claims and obligations. Actions become ritualized (or routinized) and elicit a standard reaction or interaction.

The display behavior of chimpanzees is an example. It is used

80. F. Beach, Sex and Behavior (1965). Sexual behavior in nonhuman species has been studied by observation of actions, but it has also been thoroughly investigated in its interrelationship with the nervous system, hormones, and individual experience. See also Washburn and Hamburg, supra note 69, at 279. According to Washburn and Hamburg, when animals are closely related, it is more likely that the internal biological mechanisms on which their actions are based will be similar.

81. See note 23 and accompanying text supra.

82. According to Wickler, the function of sexual behavior can change, and pair-bonding mechanisms can be used to redirect aggression. W. Wickler, supra note 39, at 193. Konrad Lorenz described this pattern in cichlids and greylag geese. K. Lorenz, Das Sogenannte Böse (1963); K. Lorenz, On Aggression (1966).

83. There are several contexts in which display behavior is used. Goodall reports from her 15-year study of approximately 40 wild chimpanzees in the Gombe Research Center, Tanzania, that male chimpanzees practice display behavior at a very early age, and that it is sometimes difficult to distinguish between play and aggression while the animals are still very young. During puberty the frequency of this behavior increases. While there are always aggressive elements in the behavior—the chimps wave their arms, shake branches, and throw stones—display does not always lead to a fight. It is often meant only as a threat. Severe injuries have rarely been observed, and even more rarely have such injuries led to the death of an animal. Display behavior is primarily an expression of excitement or the release of tension. Often it leads to redirected aggression, such as the attacking of objects or other (usually weaker) animals. There seems to be an inhibition which prevents fights between animals who could inflict very severe or fatal injuries on each other. J. van Lawick-Goodall, supra note 37, at 112-17.

Other behavior definitely serves a function within the dominance or hierarchical order. The young male gains a position in the adult order with his displays. Displays are also used by those adult males who attempt to gain a higher status, and their attempts to reach it stretch over a period of several months. An example is the chimpanzee "Mike" who, within a period of 3-4 months, climbed from a very low status to that of Alpha male, the highest status; he then was able to retain this status for five years. He achieved this by using empty cans which he found at the camp site—in addition to the conventional objects like stones or branches—in his displays. Id.

Dominance does not consist of constant threats and attacks by the stronger animals. On the contrary, dominant animals rarely engage in actual fighting. Generally, the attitude of less dominant animals towards the dominant ones shows the ranking within
in aggressive encounters and also to initiate courtship and sexual relationship. The male chimpanzee will shake branches and assume a threatening posture, his hair and penis erect. As a courtship display, the adult male chimpanzee will perform only towards estrous females. Once started, there is a sequence of reciprocal interactions; the claims of one partner become the obligations of the other. Each partner is expected to perform by using specific gestures and postures. The female responds to the male’s courtship behavior by adopting a crouching position and permitting the male to mount her. Male and female chimpanzees alike use the crouching posture as a submissive gesture during aggressive encounters. It is the specific reaction used if the individual accepts the dominance of the other and wants to avoid a fight. And when a threatened chimpanzee demonstrates his intentions by adopting the submissive posture he expects a specific reaction from the other, namely, an end to the aggression.

Pair formation, the pair bond, and the different functions of sexual behavior in humans have been regulated by marital law for many centuries. On an evolutionary time scale the legal institution of marriage is a very recent phenomenon. However, ceremonial marriage is present in all modern societies, and anthropological studies of primitive societies suggest that it existed in prehistoric times.

Many laws today deal with marriage and marriage breakdown. They include the solemnization of marriage, the rights and duties of the marital partners and their relationship to their children, and the dissolution of marriage and its social consequences. Regulatory laws, such as the legal requirement of a marriage license, are not concerned with the behavior regulated, at least in part, by a biological program. However, many laws such as those addressed to pair formation, child rearing, social interaction, and mutual protection attempt to channel the group. The presence of higher ranking animals usually has a pacifying effect on the others. In human terms this could be interpreted as the effect of authority, which is necessary for maintaining social order.

Chimpanzees also use display behavior when confronted by natural events which seem to arouse feelings of frustration. At the beginning of the rainy season they perform very impressive rain dances (an expression used by Goodall). Id. at 52-54. They obviously dislike rain, but in spite of their intelligence, they have never erected any shelters which would protect them from rain (whereas, according to recent reports, orangutangs will do this). Address by Birute Galdikas-Brindamour, Leakey Foundation Lecture, in Pasadena, California (May 1976).

In general, chimpanzees try to avoid contact with water; they use stepping stones when crossing streams. Often their hair stands out while they do this, as is the case during displays. Chimpanzees will also display in front of waterfalls. Goodall suggests that the use of displays in this context could be seen as a rudimentary form of worship similar to the worship of natural forces practiced by early human groups. From these precursors the first religions may have evolved. Address by Jane Goodall, Stanford University Lecture Series, in Palo Alto, California (Oct. 1973).
behavior which is influenced by biological processes. Other examples are laws which regulate sexual behavior by outlawing premarital relations, incest, homosexual acts, rape, prostitution, and sexual offenses against minors. In the ethological view these behavior-channeling laws can be effective only insofar as their dictates are adapted in a coherent way to the behavior they are intended to regulate.

Sexuality serves various biological functions, and the laws regulating sexual behavior embody values and culturally determined attitudes toward these functions. Most of these values are not at cross purposes with the biological functions of the behavior they regulate, but laws may overemphasize some of the biological postulates of sexual behavior while minimizing and occasionally outlawing other functions. Sexuality has three primary biological functions: (1) social interaction leading to pair formation and pair bonding; (2) procreation; and (3) the exchange of genetic material.

The exchange of genetic material assures a great variety of inherited genes which enhances the ability to respond and adjust to changes in the environment. The greater the genetic pool, the greater the capacity for adaptation of a species. To enhance the exchange of genetic material, organisms need mechanisms that prevent inbreeding. Plants are equipped with complicated structural devices to prevent self-fertilization. Incest-inhibiting mechanisms in animals are usually unnecessary since mobility causes a sufficient exchange among populations. Parent-child bonds or sibling bonds ordinarily break up when the young are weaned. Where family ties are very strong and the danger of constant inbreeding arises, complex behavioral mechanisms that inhibit incestuous sexual relations become necessary.

Virtually all societies have an incest taboo; they also have incest. But the existence of deviance does not preclude the proba-

84. 17 Encyclopaedia Britannica 1008 (1964).
85. Chimpanzees have long-lasting mother-infant ties, and the chimp family, consisting of a mother and her offspring, often continues together even when the offspring reach maturity. Copulation between a physically mature male and his mother has never been seen during the observations at Gombe, although two infants were seen to mount and thrust on their mothers when they showed sexual swellings. Copulations between known siblings have been recorded, but the female concerned tried to escape the attempts of her two brothers to mount her. J. van Lawick-Goodall, supra note 34, at 182-83. Similar indications of a mother-son incest taboo have been observed among the Japanese macaques. Research involving rhesus monkeys also indicates an inhibition regarding mother-son mating. Rhesus males rarely mate with their mothers because the sons retain inferior, infant-like attitudes toward their mothers. This reflects a specific inhibition that is independent of rank, thus restricting males even when they are dominant over their mothers. In hamadryas baboons, father-daughter mating apparently is reduced by the daughters' being carried off by young adult males before they are of sexual interest to their fathers. Kummer, supra note 30, at 117-24.
86. Claude Levi-Strauss speaks of the “problem of incest” and states that the pro-
bility of a biologically programmed mechanism for the ontogenetic development of an inhibition against incest. Some ethologists feel that humans develop strong sexual barriers during puberty and that these reflect the maturation of innate inhibitions. Sexual taboos existed in societies long before people fully understood biological fatherhood or the implications of genetic inheritance. Even in Western civilizations, scientists did not clearly understand fertilization or the rudimentary facts of genetics until well into the eighteenth century. Apparently the inhibition against incest is neither totally rigid nor of equal force at all ages. The different types of incest (father-daughter, mother-son, and brother-sister) may be regulated by different mechanisms which mature independently. Sexual play among children is a common phenomenon; it occurs among brothers and sisters in many societies. However, incest inhibition between brothers and sisters may be strengthened by processes that occur during puberty. Robert Sorenson's research, published in 1973, reveals that in a group of adolescents between thirteen and fifteen years of age, sixty-nine percent of the boys and eighty-four percent of the girls (who mature at an earlier age) expressed the feeling that sex between a brother and a sister was abnormal and unnatural. Among sixteen- to nineteen-year-olds, eighty-six percent of the boys and eighty-five percent of the girls expressed this attitude. One may guess from this attitude change that behavior mechanisms inhibiting incest are not innate, rigid controls; rather they have a phylogenetic base on which ontogenetic development builds during the individual's maturation. Normally, this development leads to behavior which coincides with the content of laws against incest. Compliance is high.

Incest is the least common sex offense and accounts for only three to six percent of the total number of offenses in various jurisdictions. The legal rules against incest are apparently in harmony with the "exchange" function of sexuality and thus complement the biological inhibition of incest, because its formal characteristic is universal, has been taken from nature. C. Levi-Strauss, The Elementary Structures of Kinship 10, 24 (1969). Robin Fox, on the other hand, concludes that the incest taboo is part of our cultural heritage. "It originated either because it was of selective advantage in preventing disastrous results of inbreeding, or because it was the inevitable outcome of demographic limitations of inbreeding." R. Fox, supra note 63, at 75. See I. Eibl-Eibesfeldt, supra note 57, at 186.

87. Sorenson asked a representative sample of adolescents between ages 13 and 19 to respond to the following statement: "A brother and sister having sex together is something I would consider abnormal or unnatural, even if both of them wanted to do it." R. Sorenson, Adolescent Sexuality in Contemporary America 385, Table 45 (1973).

88. Id.

functions of sexual behavior to which these particular legal rules are directed. The rules advance the exchange of genetic material, even though mankind has just recently become aware of the biological implications of this function of sexuality.

During the past several thousand years most cultures have known the role that sex plays in procreation. The connection between sexual intercourse and pregnancy has influenced the moral and ethical premises underlying Western marriage laws. Most of these laws reflect the traditional Judeo-Christian ethical premise that the sole purpose of sex and marriage is reproduction. Religious institutions have used these laws for purposes of concentrating their power. When the state assumed legislative control of marriage and divorce, religious values were often integrated for ideological and political reasons.

Emphasis on reproduction disregards other primary functions of sexuality, which include the creation of new attachments among individuals and families, mutual protection, and reciprocal altruism. Perhaps most importantly, it disregards the fact that sexuality can strengthen the pair bond which in turn, contributes to family stability and normal maturation.

A characteristic of homo sapiens is the female's continuous sexual receptivity. This has contributed to a close personal relationship between sexual partners, since the male is sexually potent throughout his entire adult life. Female orgasm, too, must be an important ele-

90. Those who imposed the rules might well have been aware that laws regulating sexual practices would be disobeyed by a great number of those to whom the laws were directed. Legislation did not aim at compliance by the majority but at establishing a moral code which could not be flaunted openly. This strict code inevitably would be violated by almost everyone, thereby making the dogma of human sinfulness evident to each individual. This, in turn, led the individual to seek absolution by the established church, which could grant or withhold its absolution depending on the sinner's willingness to do penance in accordance with the dictates of the church. Defining sexuality as sinful and condoning only those sexual practices directed toward the goal of procreation proved to be an effective means used by the Roman Catholic Church in its efforts to rule men. Through the confession, the most intimate details of the individual's private life were laid bare to the Church. This influence of the Church is even today very powerful in many societies and only slowly fading in more highly developed nations.

91. Hitler's aim to increase the German population, whom he considered to be the "chosen" people, resulted in a number of laws regulating marriage and divorce. Again, the purpose of marriage was seen to be procreation. Infertility became a ground for divorce. Ehegesetz vol. 6.7.1938 (RGB 1.I; S. 807).

92. Washburn and Hamburg, supra note 77, at 277: [I]n all the nonhuman primates females have brief, clearly limited periods of estrus. Since this state is universal and highly adaptive, it is virtually certain that this condition was present in our ancestors . . . . The physiology of human females is quite different from that of any other primate . . . [and this] physiology may well be the result of selection for stable male-female relations.

93. W. Masters and V. Johnson, Human Sexual Inadequacy 70 (1970). In their clinical studies of the physiology of human sexuality, Masters and Johnson found that
ment in human pair-bonding, for it is not present in females of any other species.94 These facts suggest that the pair bond has an adaptive function apart from reproduction. Deviance is high for those laws that disregard or outlaw the pair-bonding functions of sexuality. The main motivation for sex need not be the desire to procreate; it may be the need for companionship, the release of tensions, or simply pleasure.

Traditionally, procreation has been considered the sole purpose of marriage. For centuries, marriage law and especially divorce law, even in Protestant countries,95 have embodied this belief. Although relatively effective birth control devices have long been available for men, it was not until recently that control devices made it comparatively safe for women to engage in sexual practices without danger of pregnancy. In addition, man's dependence on his environment has awakened public opinion to the dangers of unlimited reproduction. Therefore, abortion and birth control have become the subjects of intense legal activity.

As long as women could not rely on effective birth control devices, their role within society tended to be limited to bearing and caring for children. However, effective birth control methods enhance the possibility of equal rights for women, and new laws in the United States and other countries tend to confer on women one of the most important biological decisions—that of reproduction. This decision-making power may influence the familial and social roles of women more than any previous legislation; moreover, it will have far-reaching

sexual response varies in intensity and frequency among individuals and among age groups, but only by degree; the absence of sexual response is amenable to treatment. The symptoms of human sexual inadequacy are impotency and orgasmic dysfunction; they can be caused or aggravated by fear, pressure, and ignorance. The researchers, estimating that one-half of all American marriages are threatened by sexual dysfunction, attribute the cause of marital breakdown to a dysfunction of the pair-bonding element in sexual behavior. See also Sex Counseling and the Primary Physician, MED. WORLD NEWS, March 2, 1973, at 35. This article emphasizes the importance of sexuality as a pair-bonding element and views sexual dysfunction as the leading cause of marital discord. It calls for greater educational efforts by medical schools to close the glaring gap in the sexual knowledge of the medical profession.

94. This opinion of Eibl-Eibesfeldt is not supported by all ethologists. Interview with Wolfgang Wickler, supra note 62.

95. During debates on the reform of divorce laws prior to the adoption of the different Matrimonial Causes Act in Great Britain, it was stated that there was a profound difference between adultery committed by husbands and that committed by wives, since adultery committed by a husband does not cause "confusion of progeny." M. Gruter, Die Stellung der Ehefrau im englischen Scheidungsrecht (August, 1944) (unpublished dissertation at the University of Heidelberg, Heidelberg, Germany). In the British debates it was argued that this result was the essential and important part of the offense and that, therefore, adultery committed by a wife was more "criminal" than that committed by a husband. G. E. Howard, II A HISTORY OF MATRIMONIAL INSTITUTIONS 106-07 (1904).
effects on women's individual rights as they conflict with the concept of the family, the couple as an entity, the interests of the children, and even the interests of the state. The consequences can be positive or negative; it is difficult to predict what the new society will be like. For example, what rights will the father of an unborn child have? If the mother wishes to end her pregnancy and the father objects, whose rights should prevail? Many other complex questions must also be raised.

Biological facts cannot provide any dogmatic instructions about the rights of individuals in family relationships, but they may give some clues. Each individual has social and biological roles and functions within the family unit. Each individual is expected to act and react within a given range—to exercise "responsibility." Actions which may appear to an observer to be the exercise of power or of fundamental or overriding rights can perhaps be traced to responsibilities implicit in the individual's role. Rights are balanced by reciprocal arrangements or obligations.

Generally, man-made law regulating the child-parent relationship has followed lines set down by biological fact. The biological mother has been recognized as such whenever she gave birth to an infant. In complex modern society, the child is legally assigned to his biological parents if both are known but, in any case, to his biological mother.

The primacy of biological fatherhood is a rather recent concept. Adult males have always been part of the family group, but the relationship of such males with the infant, child, or adolescent depended on the males' roles within the family group. Generally, bonds between father and child developed only if the father accepted the mother of the child as a member of the group or family in which he lived (or if the family or group accepted her), or if he recognized and accepted the child as his progeny after it was born. In nonhuman primates the biological father is hard to ascertain. In most primate groups, the father of a newborn in the group could be any one of a number of adult males. However, where there is only one adult male in the group, as with gibbons, paternal behavior is apt to occur. In human societies the law assigns fatherhood to the husband of the mother, a principle that retains its soundness even though biological fatherhood can be disputed and sometimes excluded by scientific testing.

The mother-child relationship in nonhuman primates has been


97. Beach, Maternal Behavior in Males of Various Species, 157 Science 1591 (1967). Beach and other writers speak of "maternal" and "strongly paternal" behavior when referring to the father's role in the parent-child relationship.
studied in the famous experiments conducted by Harry F. Harlow on rhesus monkeys. Harlow's work indicated that bodily contact with the mother plays a primary role in the development of infant affection and that a cloth-covered wire surrogate could replace the mother. As the monkeys with cloth "mothers" got older, however, their behavior became strikingly abnormal. They sat and rocked in corners, were unable to interact with other monkeys in social encounters, and, when they reached maturity, were unable to mate. If the females were impregnated, they gave birth; however, these "motherless mothers" mistreated their infants, often to a degree that would have resulted in death had the experimenter not interfered. The "motherless" adult males also exhibited abnormal sexual behavior and mistreated and killed infants. Harlow concluded that "there is no adequate substitute for monkey mothers early in the socialization [of rhesus monkeys]."

How will the changing role of women affect the development of infants? Will greater rights of women be balanced by greater obligations? A sense of responsibility, one of the driving forces in human evolution, could influence the individual female's choice between alternatives: career or motherhood; postponement of motherhood until completion of education; part-time career and motherhood; adequate part-time child care during her absence; or some special arrangement of her time to meet the responsibility of being a mother while pursuing other interests. Will new laws strengthen a sense of responsibility and channel conduct accordingly?

Harlow's observations of "motherless mothers" among monkeys should at least caution us about the possible dangers of radical changes in child-rearing methods. Until very recently, children remained in close physical contact with their mothers. Since a growing number of women today want careers and social responsibilities, and since failure to fulfill maternal obligations would have irremediable consequences for the next generation, it is in the interests of society to grant women the right to avoid motherhood or to limit their number of children without foregoing sexual gratification. This implies a fundamental overriding right to decide on birth control, abortion, and the adoption of the children she has borne.

The drop in the birth rate during the last few years in the United States is a reassuring sign. In many countries where effective birth control devices are available, the birth rate and the number of illegiti-

98. Harlow, Love in Infant Monkeys, SCIENTIFIC AM., June, 1959, at 68.
100. See B. HASENSTEIN, VERHALTENSBIOLOGIE DES KINDES (1973), concerning the significance of the early infant-mother attachment and the long-lasting consequences of damage done during this developmental process.
mate children have declined. Liberalized abortion laws provide an additional safety factor in avoiding unwanted pregnancies. Such laws neither oppose innate sexual drives nor adversely affect the function of sexuality for pair formation, pair bonding, or pleasure. Furthermore, recent studies reveal that the new sexual freedom among young people—due, at least in part, to women’s control over contraception—has not led to a significant increase in promiscuity. On the contrary, there is a tendency among young people toward pair bonding:101 they are interested in a “strong emphasis on some sort of mutual commitment and loving relationship . . . .”102 Therefore, the new technology has led to the reformulation of ethical premises which serve as the basis for new laws.

Unfortunately, we are still far removed from the optimal state. Neither ethical concepts nor the laws have changed significantly enough to achieve the goal of decreasing or stabilizing the birth rate in the world as a whole. Some scientists have become so alarmed by the danger of human overpopulation that the regulation of reproduction by law has been discussed, at least academically. But attempts to change social behavior through law may bring undesirable results. Consider the unlikely hypothetical case of a law which would make it a felony for any female who had already borne two living children to engage in sexual intercourse. Despite any imaginable amount of resources exerted in enforcement, deviance would run impossibly high. The law would fail even if the majority of women agreed wholeheartedly with the law’s purpose. It would work at cross purposes with basic functions of sexuality and the deep desires of the bulk of the population. No one would suggest such a law. This extreme case, however, illustrates that the creation and application of any law intended to regulate deeply ingrained behavior mechanisms can be effective only insofar as it complements the function of the behavior to be regulated.

VIII. SOCIOBIOLOGY AS A POINT OF DEPARTURE FOR BASIC LEGAL RESEARCH

As previously discussed, the sociology of law can build upon socio-

101. R. Sorensen, supra note 80, at 358–59. This tendency towards pair bonding is confirmed by Sorensen’s findings that 85% of all boys and 92% of all girls, and equally high majorities of those with and without intercourse experience, expect someday to marry and have children.” Id. at 358. A tendency toward permanent and monogamous pair bonding seems to be present in three-fourths of the adolescents, who said they “do not want to marry until they are satisfied that their marriage will last for the rest of their lives . . . . A strong factor in adolescents’ desire for a lifelong marriage is their belief that children need two parents in the household.” Id. at 359.

102. Katchadourian & Lunde, supra note 89, at 481.
biological theories and hypotheses in formulating lines of inquiry concerning the evolution of legal behavior and the effectiveness of law. The environment influences family structure and determines the shape and organization of other social groups. Furthermore, adaptation of the group takes place through changes in the behavior of the individual group members or, more precisely, in the individual's functions within the group. The legal order as an integral part of culture contributes to this process. Thus, the role of law is to balance the rights and obligations of the individual within the group and to provide a yardstick by which the individual can recognize not only his rights but also his duties. The individual becomes capable of predicting the consequences of his actions or choice of alternatives. This balance of mutual expectations is the basis of group life. Research supports the view that readiness to obey the rules of group life has an ultimate basis in the biological program of the species. But the plasticity of human behavior profoundly affects human obedience to legal norms and those norms are almost infinitely various. Obviously, any efforts to change the social order through law are attempts to change behavior. Therefore, insights into the limits of human ability to alter behavior could reveal the limits of planned reform.

Observations of the Gombe chimpanzees (a study of free-living apes that has continued over fifteen years) have shown that two factors are primarily responsible for the structure of the group and the rules of group life: kinship (family attachments) and the dominance order. Both factors contribute to an arrangement of reciprocal actions among the group members. Kinship leads to attachments based on mutual dependence; the claims of one party are regarded as obligations of the other. Attachments are weakened by a lack of reciprocity; they deteriorate when mutual dependence or reciprocal actions cease. When attachments are necessary for survival, they are strongly supported by drives based on hormonal processes, as, for example, sexual relationships. Pair formation is all that is needed for procreation, whether the relationships be monogamous or polygamous. But when the care of the helpless infant demands the presence and cooperation of two parents over an extended period of time, a strong pair bond is advantageous. Another attachment necessary for survival is the mother-child bond: without close physical contact with the mother, the infant will develop abnormally. The death of the mother can lead to the death of the infant.103

103. Among the free-living chimpanzees at Gombe, the fate of young motherless chimpanzees has been observed on several occasions; development was retarded in all cases, and they frequently died within a few months even if they were already more
Humans are apparently able to use behavior patterns as freely convertible elements in creating attachments outside of the family unit; however, there may be limits to the human capacity to form attachments. Family ties are triggered and shaped by sensory inputs, and they mature on the basis of mutual dependence and an arrangement of rights and duties. For this reason it seems almost absurd to expect the development of attachments and ties between all members of the homo sapiens species similar to those which exist among family members. Yet among humans, as with other primate species, each individual during his maturation can be and usually is a member of various groups for differing time periods. Attachments among friends, professional associations, religious affiliations, athletic organizations, peer groups, and national and ethnic groups are developed. Group formation occurs with such regularity that a hereditary basis or innate predisposition can be assumed. Behavior that is deeply rooted in man's biological heritage will be enormously stable, and law must take this into account.

As we have seen, a rudimentary form of behavior which resembles man's respect for possession has been observed in chimpanzees and baboons. Kummer observed among the hamadryas a respect for possession once a pair bond has been established. Among other primates a rudimentary form of respect for possession occurs independently of the pair bond. The chimpanzees use a begging gesture which implies a certain respect for possession, especially if a dominant animal begs from a less dominant one, and even more so if he is refused. Adult chimpanzees usually respect possession of a desirable food regardless of dominance position or physical strength. Food is rarely shared among adult chimpanzees. Observations in the wild as well as in captivity suggest that chimpanzees choose to share when kinship or friendship ties are influential. This indicates that chimpanzees have a rudimentary respect for possession and that they are influenced in their choice of alternatives by their likes and dislikes or by sexual stimulation.

Such behavior probably existed in early man. The degree of respect for the possessor depended on the situation and the readiness of the possessor (regardless of whether he was stronger or weaker) to defend his possession. As our human ancestors became more intelligent, respect for the possessor became respect for possession of those objects than three years old and could live without the mother's milk. J. Van Lawick-Goodall, supra note 37, at 225-32. In one case the death of the mother brought on a severe state of depression in a seven-year-old chimpanzee (Flint), who died within three weeks after he lost his mother (Flo). See notes 52 and 66 supra.

104. Nonhuman primates also express individual likes and dislikes toward each other. See note 69 supra.
which had special value to the possessor. Chimpanzees throw away their tools after they have used them. When early man started to fashion more complicated tools which required considerable time and energy to make, he no doubt wanted to use these tools more than once. Out of these attitudes developed rules, norms, and, finally, our modern laws concerning property and contract. At some time during this slow evolution of man-made law, a social machinery had to develop in order to resolve conflicts inherent in all group life. When enforcement or restoration in kind was not possible, breach of contract and disrespect of property rights, as well as other actions detrimental to the social order, had to be punished. Punishment of the individual who did not comply with the rules could bring the desired result—group order—only because punishment, like compliance, can yield pleasure or satisfaction and give a sense of security. The effect of punishment can be rewarding if it constitutes an atonement and serves to reinstate an erring individual to his position within his group.105

Nonhuman primates seem capable of developing personal responsibility sufficient to function properly within the group if they are exposed during maturation to rewards and punishments within the family which are used in a constructive way for socialization. In human society we have come to accept three main goals of punishment: protection of society, deterrence, and rehabilitation. In nonhuman primates a common punishment is ostracism, which is also often used in small, face-to-face human societies.106 Excluding the deviant from the group protects society and its rules; it also deters others from committing a similar infraction. Among nonhuman primates, threat alone suffices as a deterrent in most cases; rehabilitation applies, if at all, only to juveniles and infants. There is no indication that nonhuman primates attempt to rehabilitate adults.

Attempts at penal reform benefit from a clearer understanding of the "pleasure principle" in the sense described here. Punishments that operate not only to trigger behavioral responses essential to group life but also those that generate positive feelings of responsibility may be the most effective. More research is needed to test the validity of these assumptions and speculations. Legal scholars do not have to study animals in the wild or perform laboratory experiments; however, they do need to broaden their data base to include investigations of the behavioral element in legal conduct.

105. Among chimpanzees, the "law enforcer's" threatening gesture (punishment) is followed by the deviant's submissive gesture, which wins from the "law enforcer a "reassurance gesture, representing atonement and reinstatement of normal relations.

IX. SUMMARY AND CONCLUSION

In evolutionary perspective, many aspects of man-made laws can be traced to the rules (innate, learned, or a combination of both) which regulated the behavior of early man and his ancestors. The behavior of the individual and the group has always followed rules necessary for the survival of the species. During the course of hundreds of thousands of years these rules developed into commands and taboos, and as culture and civilization grew, these rules became written law. By studying the behavior of different animal species and primitive societies, we can gain some insights into the evolution of law. Ethology can contribute to a better understanding of the origins of law and human legal behavior.

This article has focused on the pair bond, child rearing, and the family law which developed out of and which regulates these aspects of human behavior. Since mechanisms which are instrumental in family formation and family cohesiveness have great survival value in the human species, it is likely that they are supported by biologically programmed behavior. The organization of the family unit may influence a child's growing sense of right and wrong. Strong family bonds might also affect the individual’s acquisition of a respect for possession.

Man's evolution has depended on his ability to obey rules and to feel guilty about breaking them. Selection has favored those groups whose members learned to control their actions within the rules of group life. Legal behavior has a selective advantage. At the same time, a fundamental conflict between individual rights and the interests of the group or society has always existed. This conflict is present even in the most primitive societies where only rudimentary forms of legal rules exist. The more complex a society and its culture, the more difficult it is to find even temporary solutions to this conflict. Yet solutions are necessary for the ultimate survival of the species. To find them will call for the skills and insights of all the disciplines that concern themselves with law and human behavior.