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Aggressive Man and Aggressive Beast

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AGGRESSIVE MAN AND AGGRESSIVE BEAST

ALLEN W. STOKES

FACULTY RESEARCH LECTURE

No. 39

1968

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no. 39

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Utah State University

Logan, Utah 84321

AGGRESSIVE MAN AND AGGRESSIVE BEAST

ALLEN W. STOKES

9th FACULTY HONOR LECTURE

Utah State University

Logan, Utah 84321

AGGRESSIVE MAN AND AGGRESSIVE BEAST

by ALLEN W. STOKES^{*}
Professor of Animal Behavior

THIRTY-NINTH FACULTY HONOR LECTURE DELIVERED AT THE UNIVERSITY

A basic objective of The Faculty Association of the Utah State University, in the words of its constitution, is:

to encourage intellectual growth and development of its members by sponsoring and arranging for the publication of two annual faculty research lectures in the fields of (1) the biological and exact sciences, including engineering, called the Annual Faculty Honor Lecture in the Natural Sciences; and (2) the humanities and social sciences, including education and business administration, called the Annual Faculty Honor Lecture in the Humanities.

The administration of the University is sympathetic with these aims and shares, through the Scholarly Publications Committee, the costs of publishing and distributing these lectures.

Lecturers are chosen by a standing committee of the Faculty Association. Among the factors considered by the committee in choosing lecturers are, in the words of the constitution:

(1) creative activity in the field of the proposed lecture; (2) publication of research through recognized channels in the field of the proposed lecture; (3) outstanding teaching over an extended period of years; (4) personal influence in developing the character of the students.

Allen W. Stokes was selected by the committee to deliver the Annual Faculty Honor Lecture in the Natural Sciences. On behalf of the members of the Association we are happy to present Dr. Stokes' paper:

AGGRESSIVE MAN AND AGGRESSIVE BEAST

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AGGRESSIVE MAN AND AGGRESSIVE BEAST

Allen W. Stokes

Whether man can live in harmony with his environment depends in great measure on his ability to live with his fellow man. Can man learn to engineer human society in time to prevent a holocaust? More specifically, can we learn to prevent aggression or to channel it harmlessly? The ethologist looks upon man's behavior as just part of the total spectrum of animal behavior. Therefore, much of what we learn about the behavior of lower animals should relate to human behavior.

Aggression is in the headlines every day, and in the past few years there has been a steady stream of books about the causes and prevention of aggression. Perhaps we can look at human aggression more objectively if we study it in lower animals. In this paper I will discuss the origin of aggression, its proximate causes, and the ways that its occurrence is minimized in lower animals. I will then compare these findings with what we know of human aggression; finally, I will make some suggestions on possible ways to reduce the dangers of human aggression.

It is important that I make clear my meaning of aggressive behavior at the outset. I define aggressive behavior as all behavior which is more likely to lead to attack than escape. It includes outright attack and many forms of display which may accompany or substitute for attack. Thus in the rooster aggressive behavior includes crowing, ruffling the hackles, circling the rival, and waltzing. In the dog it includes raising the ruff, laying back the ears, and growling. In functional terms aggressive behavior establishes or reinforces an individual's social position. In humans aggressive behavior includes the wearing of certain costumes, use of titles, and protocol in seating at tables or entering rooms. Therefore, my term aggressive behavior includes far more than actual attack or fighting. I use the terms aggression and aggressive behavior more or less interchangeably. In its strictest sense, aggression refers to actual or symbolic attack upon another individual. Finally, I will speak often of aggressive animals.

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non-aggressive. The term refers to the internal motivation of the individual. How then did aggression originate?

THE ORIGIN OF AGGRESSION

All animals need to obtain certain critical resources for their livelihood and reproduction. Certain of these resources may be in short supply at a given time and place. The limitation of these resources causes competition between individuals for those items in short supply. Aggression has evolved as a result of this competition. The more aggressive individual enhances its chances of securing its necessary resources. Uncontrolled aggression, however, leads to anarchy. This is detrimental to the individual and to the group, for unbridled aggression diverts an undue share of an animal's energy into unproductive activity as opposed to growth and reproduction. It is not surprising, therefore, to find that all vertebrates and many lower animals have evolved systems of social organization to avoid anarchy. The particular type of organization for a society depends upon the distribution of the critical resources over space and time, but there are essentially three major types.

TYPES OF SOCIAL ORGANIZATION

Perhaps the most rudimentary social system is the "individual distance" (Hediger, 1950). In many animals there is some minimum distance below which an individual will not tolerate the approach of another. When this distance is breached, the individual will either attack or move away. Individual distance operates throughout the year and reflects the level of aggressiveness of the individual. In birds it is greater among males than females (Marler, 1956). However, the distance at which intolerance manifests itself depends upon the actions of the intruder. Aggressive actions by an approaching animal release intolerance at a greater distance than non-aggressive actions. An animal can come closer if it approaches from the rear than in front (Marler and Hamilton, 1966, p. 167).

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piece of suitable habitat and defends this against all others of the species. The defense may be by actual fighting, but far more likely it occurs through displays and supplementary signals such as calls and scents to repel rivals. In this way, the suitable habitat is divided up and the individuals of a population are dispersed. Some males fail to win a territory and as a result do not secure a mate or breed. The reasons for establishing a territory are not necessarily for food or breeding site, but always the territory does provide some essentials for survival or reproduction. Once territorial boundaries are established the population is stable and relatively peaceful, with occasional displays, calls, or scents being used to maintain territorial boundaries. Those animals that do not establish a territory are likely to suffer much higher mortality. Thus Jenkins, *et al.* (1964) found predation on non-territorial red grouse was seven times that of territorial birds.

The third type of organization is the social hierarchy. When chickens are first placed together, they will fight and display. Gradually they form a hierarchy in which an individual pecks only those birds of lower rank (Schjelderup-Ebbe, 1935). This dominance-subordinance relationship occurs throughout many vertebrates and arthropods and usually lasts throughout the year. Males generally dominate females; age, weight, familiarity with surroundings, and hormonal levels are also important in determining an animal's rank. Newcomers to a group are almost always subordinate at first, but may later rise in rank. While newcomers are attempting to join a group, it is often the lowest-ranking members of the group that are most hostile to the newcomer. Once rank has been established, aggression wanes rapidly. Hence, a stable social hierarchy shows little aggression.

For dominant animals, the advantage of this type of society is obvious. They get first choice of food and shelter and generally have first right to a mate. In contrast, where resources are in short supply, the lowest-ranking individuals suffer. They may die or be forced to disperse in search of less-contested resources elsewhere. Or they may find sufficient food and shelter but fail to secure a mate.

It might seem better for an animal to continue fighting rather than be most hostile to the newcomer. Once rank has been established, aggression wanes rapidly. Hence, a stable social hierarchy shows little aggression.

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death from predation. Subordinates may be better able to secure food than when alone and to benefit from communal shelter. Finally, and most importantly from the standpoint of transmission of genes, these low-ranking individuals may rise in rank with increasing age, weight, and familiarity with their surroundings and as the older members die off. In this way their chances for reproducing may, in balance, be better than if they had left the group.

In some animals a social hierarchy may form not only within a group, but between groups. Thus Watts (1968) found that several all-male flocks of wild turkeys may use the same wintering grounds. Within each flock of about 30 birds there are several groups each consisting of from two to six siblings. There is a precise social ranking of the birds within a sibling group, of the groups within a flock, and between the individual flocks using the same wintering habitat. A male establishes his rank among his male siblings in his first few months, and thereafter his rank remains fixed. Later, when breeding begins, it is the alpha (top ranking) male in the alpha group within the alpha flock that does most of the mating with hens. In primates there is often a social ranking within the group and between groups, as seen when they contest the right of first access to artificial sources of provisions as is dramatically shown in a film of the rhesus monkeys of Santiago Island (N.I.H.).

Watts' observations in turkeys illustrate that an individual's eventual social status as an adult can be largely determined during its early life. The same is true of the European rabbit where the progeny of dominant females are also dominant, in part because they grow faster and have this early advantage (Mykytowycz, 1960).

All three of these forms of social organization occur in humans. We take it as a violation of individual distance when a person approaches too closely while talking with us. Our response is to back away; and if the person persists in coming closer we may react with hostility. The old saying "A man's home is his castle" attests to the widespread acceptance of territorialism; and disputes over territorial boundaries have been historically a common cause of war.

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groups to rise in rank in the face of stern opposition are a major cause of our civilian disturbance and warfare today.

It is a universal rule that a social organization comes about through aggression, usually fighting. As the individuals learn their position within the social group the intensity of aggression wanes. Thereafter the individuals need use only low-intensity threats or submissive postures to maintain stability within the group. Since a stable society brings such advantages to the group, then aggression must serve, at least in this connection, a highly useful function. Only where the fighting is prolonged, thus leading to continued wasteful use of available resources, can one say that aggression is maladaptive.

Man's various forms of social organization are especially identical with those of lower animals. They provide the same basic resources of food, shelter, space, and a mate. Learning is as essential for forming a social organization in lower animals as it is in man. The initial establishment of a territory or hierarchy in man is likely to be accompanied by violence. Thereafter a multitude of specialized rites and customs serve to maintain stability, just as in other animals. It is only when the established order is challenged that violence erupts. What, then, are the factors that release aggression?

FACTORS RELEASING AGGRESSION

The urgency for controlling aggression in human society is now so great that it is vital we attempt to understand the causes of aggression. How an animal behaves depends upon both the internal and external stimuli operating upon it. Some believe that aggression builds up spontaneously within the individual to the point where it breaks out. Lorenz is the current champion of this theory in his book *On Aggression* (1966). He likens the aggressive drive to the build-up of hunger within animals. The longer the starvation, the greater the hunger. When the individual becomes sufficiently hungry, he embarks on a search to find food. Lorenz believes that an isolated animal also builds up an internal aggressive drive to the point where it must be vented. Freud (1959) also believed aggression

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where it must express itself. If so, the only way to handle this situation is to find harmless channels into which to divert the aggression.

Most others disagree with Lorenz, and believe that aggression must be triggered by some appropriate external stimuli (Barnett 1967, Berkowitz 1962, 1965; Dollard, *et al.*, 1939; Scott, 1958, 1967).

To be sure, the expression of aggression is under some endogenous control. Thus internal secretions have an important influence on levels of aggression. Injections of testosterone into young chicks cause early sexual development and enhanced aggression. Adult birds treated with testosterone may rise in the social hierarchy (Guhl, 1962, p. 505). The seasonal rise in aggression with onset of breeding, often associated in males with the defense of a territory, stems from increased levels of testosterone. However, castrated males retain their aggressiveness so this hormone is not the only factor involved. Females are also aggressive but usually at lower levels than males. This may be the result of some output of androgen or luteinizing hormone in females (Mathewson, 1961).

Other endogenous factors besides hormones also affect aggression. Thus hungry animals are more likely to fight over food. However, this arises because hungry subordinates are more apt to encroach within the individual distance for the species and then be attacked by dominants. The actual *level* of aggression, *i.e.* internal motivation, seems unchanged (Marler, 1955, p. 113-115).

These endogenous influences, however, are not sufficient by themselves to release aggression. Animals confined away from others of their species do not display aggression against substitute objects. There must always be some more or less appropriate object in the environment to release the aggression. For example, administering an electric shock to a rat will cause pain in the rat. If another rat or even another animal of similar size is in the same cage, the shocked rat will fight it. The number of fights per minute is a function of the intensity and frequency of shocks. Such a rat will not attack an inanimate object, even a dead rat. Therefore, the shock appears to enhance the internal aggressive motivation of the rat, but the motivation, seems unchanged (Marler, 1955, p. 113-115).

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but also upon such inanimate objects as a ball. But even here there must be some external stimulus to release aggression (Azrin, *et al.*, 1965).

Aggression in animals is usually directed toward others of the same species. The situations in which this aggression occurs have been intensively studied in many forms of animals, notably the three-spined stickleback. When he is in breeding condition and on breeding territory, he will attack almost any object of the approximate shape of another stickleback so long as it has some red on the body. This may be a life-like model or something as remote as a red mail van moving outside the laboratory window. These particular cues in another animal that trigger a response are known as sign stimuli, or in social situations as social releasers. Sign stimuli may involve structure, movement, color, sound, or odor. They are additive in effect, with the strongest elicitation of aggression resulting when all sign stimuli occur together and at maximum stimulus value.

When an animal is highly motivated internally, the strength of the external stimuli can be correspondingly weaker to elicit the same level of aggressive response. Thus, Lack (1943) found a mere fluff of red cotton mounted on a stick was sufficient to elicit vigorous attacks upon it by a male European robin in its territory. Hence, most ethologists today believe that the expression of aggression depends upon some minimum level of internal motivation, plus one or more appropriate external stimuli.

To achieve a stable society or pair bond, it is equally important to inhibit aggression. Otherwise, individuals might always be emitting sign stimuli which elicit aggression. Animals use various devices to inhibit attacks. Fish undergo dramatic, rapid changes in color, thus extinguishing those sign stimuli that would normally elicit attack. Erection or depression of hair, feathers, or fins achieves the same end. In general, inhibitory behavior is the opposite of aggression-eliciting behavior, involving slow movement, orientation away from the rival, decrease of apparent body size, concealment or loss of bright coloration, and silence. All such actions tend to reduce the probability of attack.

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interference with some goal-directed activity (Berkowitz, 1962, p. 27). Frustrations may arise from, (1) physical barriers; (2) delays in the completion of some activity; (3) omission or reduction of some customary reward; and (4) the conflict that arises when an individual is faced with two incompatible paths of activity (Brown and Farber, 1951). These conditions certainly cover many of the situations where aggression occurs in humans. However, in lower animals aggression often seems to occur without these conditions. Therefore, ethologists take the more parsimonious view that many external stimuli can elicit aggression. Some of these are learned, others essentially unlearned. Regardless of semantics, however, psychologists and ethologists agree that there must be external stimuli to elicit aggression.

Density is another factor that affects aggression. Aggression within a population has been observed to rise as much as six times as fast as the increase in density (Myers, 1966, for European rabbit; Burns, 1968, for Uinta ground squirrel; and Southwick, 1955, for house mouse). However, Lloyd and Christian (1967) found no change in rates of aggression in breeding populations of house mice as their density increased. Southwick has postulated that fighting may be low in well stabilized hierarchies; but as new individuals enter the population, this may disrupt the social grouping and result in higher aggression. Likewise, the aggression may be directed toward different segments of the society. Thus Myers and Poole (1961) found in European rabbits that in males a rise in density resulted in greater aggression between breeding units; whereas in females, the increased aggression was directed to other females within the breeding unit.

It is not always clear whether the rise in rate of aggression is because of reduction of space or of other resources. However, studies of confined populations often have such resources as water, food, and shelter in excess so that the variable is space rather than resources. There is some evidence that animals "assess" the density of competitors in relation to the availability of the resource (Wynne-Edwards, 1958). Thus Myers and Poole (1961) found in European rabbits that in males a rise in density resulted in greater aggression between breeding units; whereas in females, the increased aggression was directed to other females within the breeding unit.

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Aggression, like many behavior patterns, may be modified through experience. Thus, if one places two male fighting fish in adjacent tanks so they can see each other, they display vigorously almost at once. However, the display gradually wanes and after two hours it stops except for infrequent bursts. This is the process of habituation, or extinction, under conditions of non-reinforcement. If the fish are then separated, full recovery of the initial level of display will take a week or longer.

A similar process occurs in many species when a male in breeding condition first encounters a female. He will attack her just as he would any stranger or rival, for she emits certain aggressive sign stimuli. If the female cannot escape, the male may eventually harass her to death. However, if she can withdraw into escape cover, the male gradually becomes less agonistic with each successive encounter with the female and finally accepts her. This is more than mere habituation, for usually the female adopts certain appeasement behavior that speeds acceptance. Similar appeasement permits a newcomer to be accepted by a well established group of animals. The waning of aggression in all of these circumstances is fastest where there is a minimum of aggressive sign stimuli in the other animal.

The aggressive behavior of adult animals is also a product of learning during development. If chicks reared in isolation are placed together at 10 days of age, they may peck each other vigorously, but at the same time may avoid others. In contrast, a group-reared chick, when placed in the same cage with other group-reared chicks which it previously has not seen, will almost at once run toward them and remain close together with little or no pecking. Only after a few weeks will the isolate-reared chicks accept each other without aggression.

Likewise, when male mice are isolated when weaned until sexual maturity, they then are very aggressive when placed in a cage with other isolate-reared mice. In contrast, group-reared male mice, when reshuffled and placed with other group-reared mice, show little aggression (Wing and Gungor, 1954), but at the same time may avoid others. In contrast, a group-reared chick, when placed in the same cage with other group-reared chicks which it previously has not seen, will almost at once run toward them and remain close together with little or no pecking. Only after a few weeks will the isolate-reared chicks accept each other without aggression.

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these animals when adult (Levine, 1960, 1962; Denenberg, 1963). The infant rats that Denenberg exposed to frequent, often rough, handling later developed more rapidly, were heavier, and had better motor coordination than normal animals. This suggests that they would also rank higher socially because of these attributes.

Aggression also can be increased by more purposeful training. If mice or chickens are paired with others of their kind, fighting ensues and one becomes dominant, and the other subordinate. If one carefully schedules encounters so that an animal always wins, that animal then becomes more and more aggressive. In psychological terms, winning reinforces further aggression. Similarly, losers can be trained through repeated losses to become entirely submissive (Scott, 1958, p. 18-20). One can train animals to be non-aggressive in other ways. Scott (1958, p. 21) prevented puppies from making playful attacks on their handlers by picking them up frequently, thus rendering them helpless with their feet off the ground. Through this process of "passive inhibition," Scott trained puppies to be non-aggressive adults. He obtained similar results with young male mice by repeatedly stroking them at an early age.

There are, of course, genetic differences in aggression. Mice of certain strains regularly dominate others. Aggression has been enhanced through selective breeding, notably in chickens (Guhl, Craig, and Mueller, 1960), Siamese fighting fish (Scott, 1942), and mice (Langerspetz, 1964).

In summary, the tendency to act aggressively is a product of inheritance, maturation, various endogenous factors, and experience. In addition, the actual release of aggression depends upon the presentation of the proper external stimulus, usually from specific sign stimuli from other individuals of the same species. Aggression does not build up spontaneously from some internal drive as does hunger or sexual motivation.

MODIFICATION OF HUMAN AGGRESSION

Man today faces annihilation unless he can prevent a nuclear war. Yet man is an aggressive species; some people believe war and inheritance, maturation, various endogenous factors, and experience. In addition, the actual release of aggression depends upon the presentation of the proper external stimulus, usually from specific sign stimuli from other individuals of the same species. Aggression does not build up spontaneously from some internal drive as does hunger or sexual motivation.

increase. Even if technology were able to provide life's necessities for an increasing population, we cannot ignore the evidence that mere crowding leads to greater aggression. Only after the population has been brought under control will other approaches have much chance of success. I view the following approaches as most likely to be effective: (1) reduce the environmental stimuli that elicit aggression, (2) condition humans to be non-aggressive through their childhood and adult experiences, and (3) find harmless outlets for aggressive tendencies.

An effective way to reduce the external stimuli for aggression is to reduce the frequency or intensity of social interaction. One can do this through actual or apparent reduction of density. Thus in European gray partridges, the amount of interaction for a given density depends upon visibility. These birds live in fairly open country but Jenkins (1961) has observed that where the vegetation is high and birds cannot see each other so readily, the fighting is reduced. We see the counterpart of this in the design of campgrounds. It matters not so much how large the camping unit as the degree of screening from one's neighbors. The high walls surrounding the gardens of the smallest of British homes attest to the understanding of this basic behavioral concept.

There are severe limits to how much we can reduce interaction by physical structures. Fortunately, man has long since learned other ways to reach the same ends — by devising rituals that enhance privacy — or at least reduce the intensity of social interaction. People of the wide open spaces of Western America pride themselves on their open friendliness and feel rebuffed by the formality of people in big cities and even more so of Europeans. Yet they can take no special credit for this friendliness; they are a product of their environment, their life in low-density areas. Formality and ritual have evolved the world over to lower the level of social interaction and presumably social tension. The Britisher does this with his formal bow in lieu of a hearty handshake, his disregard for introductions, his exclusive clubs, his propensity for small talk at public gatherings. I recall how I looked forward to dining at high table with the dons and fellows of a Cambridge college and to participate in intellectual conversation. Instead, we rarely rose above the level of the weather, cricket, food, or service. I was shocked

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of social stimulation which is best for an individual. Man soon becomes restless if left entirely alone — he must have some social stimulation. Yet at the other extreme he is overstimulated. Calhoun feels that one way for people living in crowded conditions to meet this problem is to have deep involvement with a very few people and only the most impersonal relations with all others. I agree with Calhoun that one penalty of human crowding will be the growing necessity for formalizing most of our human contacts.

A second way to reduce environmentally-induced aggression is to reduce situations leading to frustration. Berkowitz in his book *Aggression* (1962) holds out great hope for the prevention of many of man's frustrations and presents many ways to achieve this goal. Perhaps paramount is the use of reward rather than punishment, for all forms of punishment are thwarting and release hostility. But all other structuring of society that facilitates the attainment of our goals, including provision of adequate food, shelter, and employment, will also reduce frustrations.

There seems little doubt that much frustration and consequent aggression could be prevented if we were thoroughly trained in how to prevent it. It is incongruous in this era of training for highly specialized careers that we have neglected training in that most difficult and specialized job — that of rearing our children. We pay far more attention to the physical nurture of our children than their behavioral nurture. Courses in child psychology should be a requirement for graduation from high school and be freely available in evening classes for adults as well. It is an indictment of our intelligence when any serious dog-lover preparing to train his first puppy naturally turns for advice to experienced persons, but then blithely enters upon child-rearing without training. Fathers are especially ignorant. It is important that both parents agree to the same methods. Otherwise, the child will be further frustrated by the unpredictability of rewards or punishments meted out by the separate parents.

A second major hope for reduced aggression lies in the modification of behavior through learning. Thus, children learn to be aggressive — a requirement for graduation from high school and be freely available in evening classes for adults as well. It is an indictment of our intelligence when any serious dog-lover preparing to train his first puppy naturally turns for advice to experienced persons, but then blithely enters upon child-rearing without training. Fathers are especially ignorant. It is important that both parents agree to the same methods. Otherwise, the child will be further frustrated by the unpredictability of rewards or punishments meted out by the separate parents.

A frequent lament is that today's children grow up to be unruly and aggressive because of their parents' permissiveness toward such behavior. However, Sears, *et al.* (1957) found that the level of aggressiveness in children is a product both of the level of permissiveness and of the level of punishment from parents. The ideal method for rearing children to be non-aggressive is for the parents not to tolerate aggression in their children; but at the same time they should use reward rather than punishment in treating aggression when it does occur.

Another potential way to reduce aggression through learning is in the structuring of society. In lower animals aggression is greatest while individuals are striving for entrance to, or upward mobility in, a society. Gradually, through repeated punishment from their superiors, animals learn when not to fight. Once the hierarchy has been settled, the society lives fairly peaceably together. Exactly the same thing happens in humans. All societies have a class system. For a class system (social hierarchy) to work, the individuals within a class must learn to accept their position and not challenge the individuals in a higher rank.

Aldous Huxley (1932) suggests one way to a stable society in his *Brave New World*. There a ruling class determines the recruitment into each class of society. Through a rigorous program of conditioning starting with infancy each individual learns to accept his social position. Frustrations and aggressions are further inhibited by liberal doses of drugs. For a "Brave New World" to succeed strict control over reproduction by a ruling class which also has control over the resources is required. To most of us this seems an inhumane solution to aggression. Yet we cannot rule this out as a possibility. We see many of the same methods in use in lower animals: the differential nutrition of bees and rabbits, and indeed of present-day man, are means of ensuring dominance to the best-fed individuals. The continuous subtle postures and other sign stimuli that serve to reinforce an animal's position in its society and control over its resources are similar to those in the "Brave New World."

Today there is little evidence that we are heading toward Huxley's Utopia. Instead we have, through our New Society program, ~~created a Pandora's Box of great expectations for the underprivileged~~ strict control over reproduction by a ruling class which also has control over the resources is required. To most of us this seems an inhumane solution to aggression. Yet we cannot rule this out as a possibility. We see many of the same methods in use in lower animals: the differential nutrition of bees and rabbits, and indeed of present-day man, are means of ensuring dominance to the best-fed individuals. The continuous subtle postures and other sign stimuli that serve to reinforce an animal's position in its society and control over its resources are similar to those in the "Brave New World."

We have unleashed the expectations through the means of TV and other mass media, yet the actuality lags far behind.

There is a general pattern throughout the world of societies becoming more rigid as they mature. Class lines become less flexible and individuals become conditioned to their position. In America it would be political suicide to defend the class system of older societies. Yet this seems an inevitable direction in which societies evolve as they mature. It suggests there must be long-range adaptiveness resulting from greater social stability just as there is in lower animals. Perhaps the political solution for social stratification for those in power is to guarantee a minimum standard of living and enough opportunity for upward mobility to prevent frustration and consequent social unrest. Moreover, a stratification based upon intelligence and motivation rather than race or creed would seem to offer the greatest promise of stability.

Industrialization seems to be taking us into just this sort of society, at least in a capitalistic world. Competition for markets places a premium on intelligence and specialized training. The boss' son can no longer count on moving automatically into his father's job. This force should create greater equality between the individual's social and economic status. Kerr, *et al.* (1960) believes that the economic forces of industrialization will create a very large middle class, with only relatively few in the upper and lower classes. Within this middle class, at least, there will be much greater opportunity for upward mobility. If all individuals were allowed to rise in economic status purely on their performance rather than race, religion, or social status, this should do much to reduce frustration and consequent aggression. Certainly within the academic world, with which I am most familiar, we respect the academic hierarchy. Promotions hinge largely upon performance and professors are generally content with this arrangement.

If everybody in a society were constantly striving to reach the top, the problem of controlling aggression would be insurmountably difficult. Fortunately this does not happen. The great majority of persons seem remarkably content to remain just about where they are. The factory worker may aspire to be a foreman, but not the plant manager. The teacher dreams of becoming a principal, but not allowed to rise in economic status purely on their performance rather than race, religion, or social status, this should do much to reduce frustration and consequent aggression. Certainly within the academic world, with which I am most familiar, we respect the academic hierarchy. Promotions hinge largely upon performance and professors are generally content with this arrangement.

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likelihood of emotional strife that comes with administrative positions deters others. The required conformity to more rigid codes of dress and behavior is still another deterrent. Perhaps as important as any is the emotional stress involved in moving into a new position — the new social relationships to be worked out as well as the fear of failure. These and many other factors serve as a damper on mobility. Probably to a great extent, these dampers have come about through a conditioning every bit as real as that in *Brave New World*, albeit largely unplanned.

It will never be possible, or even desirable, to prevent all frustration and other causes of aggression. It may still be possible, nevertheless, to divert aggression into harmless outlets. We find numerous examples in lower animals in what is termed redirection. Thwarting may lead to redirected attacks upon some inanimate object such as grass-pulling in gulls, stropping of the bill in songbirds, or violent pecking at the ground in chickens. Similarly, humans may redirect their aggression by kicking the furniture, pounding the table, or speeding recklessly. Unfortunately, judging by their relative frequency, as well as from Neal Miller's learning theory (Miller, 1948), these harmless outlets for redirected aggression are not as satisfying to the aggressive individual as redirection of aggression against some innocent person or group. It is far more likely that an aggressor will vent his aggression against some member of his family or minority racial or religious group than upon some inanimate object.

Many persons believe that aggression itself has some valuable function in that it reduces tension and the likelihood of further aggression within the individual. This is the catharsis theory originating with the early Greeks. It is a widespread belief among laymen, social scientists, and psychoanalysts that the individual feels better after an aggressive act, the very act of aggression being a catharsis. Proponents of the catharsis theory liken the hostile act to the draining of a reservoir filled with aggressive energy. The reservoir must then be recharged before the individual will be aggressive again. Despite the widely held belief in catharsis, at present there is insufficient evidence to either prove or disprove this theory (Berkowitz, 1962, p. 196-228). To be sure a person may feel better after being aggressive,

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further aggression; or the hostile act may have permitted the individual to reach some goal which had been previously blocked until the time of the aggression.

Perhaps the most ardent backers of the catharsis theory today are recreation directors who propose active athletic contests as a means to drain off aggressive energy. Lorenz is a strong proponent of both national and international sports for this reason.

Possibly a more beneficial function of team sports is the joining together of individuals for some common goal. Individual differences are likely to be buried in the process of such group endeavor. However, this function is true of all group endeavors. Both sinners and saints united during the Crusades under the common banner of Christian righteousness. Both winners and losers at the primary elections forget their earlier vituperation to join in a common political front against the opposing political party. There is an inherent danger in this subduing of individual aggression within a group. For the purpose of the group may be to be aggressive against some other group, be it social, religious, or political. If so, the aggression is merely transferred from one level to the next higher one. Not all social groups, however, need be aggressive. The vigorous cooperative activities of the former Civilian Conservation Corps, and today's Peace Corps, VISTA, and many local social organizations provide opportunity for individuals who might otherwise be aggressive toward each other to join in some common goal. In the group activity the individual can boost his ego, and in other ways overcome the very frustrations that contributed to his aggressiveness. To date, however, social psychologists have not had sufficient influence upon national policy to institute a well-designed plan for sublimation of aggression.

In summary, aggression is widespread in animals. We now have a fair understanding of its causes, its functions, and its origins. Aggression is fundamentally the same in man as in lower animals. Aggression is internally motivated, in part, but requires some appropriate external stimulus to express itself. We can minimize aggression in lower animals by controlling these external stimuli, through proper activity the individual can boost his ego, and in other ways overcome the very frustrations that contributed to his aggressiveness. To date, however, social psychologists have not had sufficient influence upon national policy to institute a well-designed plan for sublimation of aggression.

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learn enough about social behavior to manipulate it for the benefit of mankind.

In closing, a final caution may be in order. Social scientists look for the control of aggression in the development of improved person to person relationships. Economists and political scientists, on the other hand, tend to seek international and global stratagems for reducing aggression. With the threat of nuclear war hanging over us, the latter approach seems crucial. Yet if we look at the gradual evolution of social systems, it is clear that they began with cooperation within the family, and from there extended to the clan, tribe, nation, and finally global levels. We certainly need improved global cooperation, but such proposed systems probably come unstuck just because we have not yet been able to develop truly successful means of cooperation at the lower levels of organization. For this reason it seems essential that we continue to study the factors that cause aggression in both man and animals in relatively simple types of social organizations. For it is only this kind of study that can be done under controlled conditions and with adequate repetition to draw reliable conclusions.

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ABOUT THE AUTHOR

Allen W. Stokes was born on September 16, 1914, in Philadelphia, Pennsylvania. He was graduated Phi Beta Kappa from Haverford College in 1936; in 1942 he received his M.A. in Chemistry from Harvard; and in 1952 he earned his Ph.D. in Wildlife Management and Zoology from the University of Wisconsin. His doctoral thesis, "The Ring-necked Pheasants of Pelee Island, Ontario," was published by the Ontario Department of Lands and Forests in 1954 and received, the same year, the Terrestrial Ecology Award of The Wildlife Society for the year's outstanding publication in wildlife ecology.

He has been interested in natural history since childhood, an interest that finally won out over his early training in chemistry. His earliest research was in population ecology, first while working at the School of Hygiene and Public Health at Johns Hopkins University and later at the University of Wisconsin.

Dr. Stokes joined the staff of the Department of Wildlife Resources in 1952 as assistant professor and is now professor in that department.

His interest in animal behavior crystallized when he spent a year at Cambridge University in 1958-59 under a National Science Foundation Senior Postdoctoral Fellowship. Since his return he has been devoting his time to teaching and research in animal behavior. His major publications have dealt with the behavior of gallinaceous birds, with emphasis upon the development of vocalizations. He is currently on leave to study vocal behavior of numerous galliforms at the San Diego Zoo.

He is a charter member of The Animal Behavior Society and has served in several capacities for that society. In 1965 he was director of the Summer Institute in Animal Behavior held at Utah State University. Thereafter he served for several years as member and chairman of the Education Committee of The Animal Behavior Society and similar positions on the Education Committee of The American Society of Zoologists. He is currently Second President Elect of the Animal Behavior Society.

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Last year he organized a symposium on the use of zoos and aquariums for the teaching of animal behavior. He is now preparing a popular booklet on behavior of zoo animals.

A Quaker and a long-time believer in non-violence, Dr. Stokes is now teaching an Honors course at Utah State University entitled "On Aggression," an exploration of the possibilities of understanding and controlling aggression in man and lower animals.

Dr. Stokes began his course in animal behavior when there was no more than a small handful of such courses being taught in the United States. Now over a hundred colleges offer graduate training in animal behavior and the study of animal behavior permeates all of the classical zoological disciplines. He believes that an understanding of animal behavior greatly enriches a person's understanding of the animal world and especially of his relations with his fellow man.

Allen Stokes married Alice Harper in 1945. They have two children, Allen W., Jr., and Susan Jean.

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