

ASA STUDIES

*First titles*

- 1 Biosocial Anthropology  
edited by Robin Fox
- 2 Marxist Analyses and Social Anthropology  
edited by Maurice Bloch
- 3 The Interpretation of Symbolism  
edited by Roy Willis

# Biosocial Anthropology

Edited by

Robin Fox



MALABY PRESS LONDON

First published in 1975  
by Malaby Press Limited  
Aldine House, 26 Albemarle Street, London W1 X 4QY

This book has been set in 11 on 12pt Times New Roman  
and was printed by The Aldine Press  
Letchworth, Herts

© Association of Social Anthropologists of the  
Commonwealth, 1975

ISBN 0 460 14002 7

Bayerische  
Staatsbibliothek  
München

To Sherwood L. Washburn  
and Nikolaas Tinbergen  
this book is respectfully  
and affectionately dedicated  
by the contributors



# Contents

General Editor's Note	ix
ROBIN FOX	
<i>Introduction</i>	1
ROBIN FOX	
<i>Primate Kin and Human Kinship</i>	9
NORBERT BISCHOF	
<i>Comparative Ethology of Incest Avoidance</i>	37
N. BLURTON JONES	
<i>Ethology, Anthropology, and Childhood</i>	69
M. R. A. CHANCE	
<i>Social Cohesion and the Structure of Attention</i>	93
LIONEL TIGER	
<i>Somatic Factors and Social Behaviour</i>	115
W. D. HAMILTON	
<i>Innate Social Aptitudes of Man: an Approach from Evolutionary Genetics</i>	133
Biographical Notes	157
Name Index	159
Subject Index	164



## Comparative Ethology of Incest Avoidance<sup>1</sup>

### I INTRODUCTION

The special position held by man in the animal kingdom is usually defined within the framework of the terms 'culture' and 'nature'.

Lévi-Strauss (1970) gives two criteria for this differentiation: (i) Only culture establishes *rules*, natural behaviour being spontaneous; (ii) Cultural characteristics depend on historical coincidence, while only that which is natural in man is observable *universally*.

'In the light of these criteria,' the author continues, 'we are faced with a series of facts which are not far removed from a scandal: we refer to that complex group of beliefs, customs, conditions and institutions described succinctly as the prohibition of incest, which presents [. . .] and inseparably combines, the two characteristics in which we recognize the conflicting features of two mutually exclusive orders. It constitutes a rule, but a rule which, alone among all the social rules, possesses at the same time a universal character' (Lévi-Strauss 1970: 8). He continues: 'Here therefore is a phenomenon which has the distinctive characteristics both of nature and of its theoretical contradiction, culture', and so 'presents a formidable mystery to sociological thought' (ibid.: 10).

Lévi-Strauss attempts to solve this mystery as follows: 'The prohibition of incest is in origin neither purely cultural nor purely natural, nor is it a composite mixture of elements from both nature and culture. *It is the fundamental step because of which, by which, but above all in which, the transition from nature to culture is accomplished: the prohibition of incest is where nature transcends itself*' (ibid.: 24, italics added).

With this idea Lévi-Strauss is clearly following in Sigmund Freud's tradition (see Freud, 1924). Considering the influence exerted on cultural anthropology by these two authors, it is not surprising that similar trains of thought are nowadays prevalent (e.g. Maisch 1968; Wyss 1968).

At the present time comparative ethologists are interested in making the study of nature available for the comprehension of cultural phenomena. This being so, it is evident that the supposition of a point of transition of nature into culture should awaken their interest. This



interest gave rise to an investigation on which the following report is based. It should be mentioned in advance that the results so far obtained run counter to prevailing anthropological, sociological and psycho-analytical theories.

## II THEORIES ON THE INCEST TABOO

### *Classification of the theories*

As with the distinction made originally between the terms 'culture' and 'nature', the possible explanations of the incest taboo are usually classified under the headings 'biological' and 'sociological'.

It must be borne in mind, however, that such explanations may answer questions of totally different type. Some authors (Homans and Schneider 1955; Slater 1959; Coult 1963) therefore subdivide further according to the categorical form of the causes given for the incest taboo, using the Aristotelian distinction between *causa materialis*, *formalis*, *efficiens*, and *finalis*. Here we can confine ourselves, as also Homans and Schneider (op. cit.) have done, to the two last-named categories. In this way we arrive at a fourfold division, in that we first compare the biological and sociological explanations regarding the *final* cause (the reason, motivation, usefulness) of the incest taboo, and then proceed, again dividing the expositions into biological and sociological, to examine the *efficient* cause, that is, the mechanisms which actually ensure abstinence from whatever is forbidden.

### *Possible final causes of the incest taboo*

*1 Biological advantages* When motivating the prohibition of incest 'biologically', one generally thinks of the danger connected with the increased probability of homozygosity in incest, namely the manifestation of harmful recessive characters. The main supporters of this argument were Morgan (1877), Maine (1883), and Westermarck (1889). Among modern geneticists there is, for example, Lenz (1962) who takes this view. Empirical evidence of 'incest depression', i.e. deficiency symptoms such as retarded growth, lowered immunity and decreased resistance to disease, under-size, short life-expectancy, and reduced fertility among inbred progeny has not only been repeatedly observed in animal experiments (for survey, see Lindzey 1967), but has also been gained from systematic records on humans (Schull and Neel 1965; Adams and Neel 1967).

*2 Sociological advantages* Alternatively, comprehension of the incest taboo may be attempted through its value in the ready functioning of social institutions. The palette of these theories is wider, and we must limit our inquiry to a few outstanding examples.

(a) There is, first, the older opinion of McLennan (1896), Spencer

(1877; 1896), and Lubbock (1870; 1911), according to which the prohibition of endogamy stems from the practice of marriage by capture: wives are valuable possessions, and perpetual conflict within the group can only then be avoided when ownership is apparent; this can be guaranteed if every man provides himself with a wife from outside the group.

Similarly, it has been postulated that the taboo on sexual promiscuity within the nuclear family was necessary to protect the family from internecine strife caused by mutual jealousy (Freud 1924; Malinowski 1927; 1931; Seligman 1929; 1950).

There are, finally, authors who seriously hold that the incest taboo was invented to save hopeless confusion in kinship terminology (cf. however Fox 1967: 57, *et seq.*).

(b) While the three foregoing interpretations see a benefit to the nuclear family itself resulting from the taboo, other theories see in it an advantage for the social units one step higher, that is, for those larger groups which, under the effects of the taboo, have been promoted to providing partners.

The best-known such theory has it that with unbridled incest (to which people would in essence tend) no larger social structures could be built up, as over-reaching cultural achievements could certainly not survive in the atmosphere of selfish particularism created by small nuclear families perpetuating themselves (Tylor 1888; Fortune 1932; White 1948, 1959; Murdock 1949; Mead 1950; Lévi-Strauss 1970; Schelsky 1955).

A similar argument is advanced by Parsons (Parsons 1954, 1964; Parsons and Bales 1955): as it should be in the interests of society that the nuclear family produce *mature* scions, it is therefore required of the individual that he summon enough courage to turn his back on the shelter of his family circle, which would tend to keep him infantile, and stand on his own two feet. From this angle incest avoidance appears as something like an enforced documentation of social maturity.

### *Possible efficient causes of the incest taboo*

*1 Biological conditions* If we now turn to those factors which concretely hinder incest within a society, the 'biological' theory contends that man has an *instinctive* abhorrence of incestuous mating, and the corresponding taboo is a cultural ritualization of this inherited emotional aversion.

In its most naïve form this hypothesis assumes something like a 'voice of the blood' which sounds a warning when relatives meet. Maisch (1968) connects Hobhouse (1912) and Lowie (1920) with this obviously untenable opinion, without apparently having read the articles quoted.

As a matter of fact these authors agree in principle with a theory which must be taken far more seriously, that of Westermarck (1889) and Ellis (1906), according to which innate sexual repulsion is not felt automatic-

ally for blood relatives as such, but rather for persons with whom one has been closely associated in childhood. Some modern authors (e.g. Wolf 1966) endorse this view on the basis of new empirical findings (cf. below, p. 60); currently, however, the theory is generally regarded as repudiated (Maisch 1968: 30 *et seq.*), due to criticism by Freud, Lévi-Strauss, and many others, including incidentally Marx.

*2 Sociological conditions* While the biological theories postulate an inhibition of incestuous activity primarily 'from within', there are sociological theories which predicate repressions 'from without'—that is, repressions which may be internalized secondarily, but originating through the intervention of social partners, an incestuous inclination thereby initially existing on the part of the individual.

As agent of this repressive activity either the entire society may act or else—to name the most prominent example of this group of theories—the jealousy of the parent of the same sex and the unapproachability of the other-sexed parent in the Œdipus situation after Freud (1924).

*Arguments against the biological explanations*

*1 Against the supposition of biological final causes* There exist essentially two arguments at present, disputing the contention that incest between close blood relations damages the congenital fitness of the offspring.

(a) It is reasoned that genetic disadvantages resulting from inbreeding are certainly not observed with sufficient frequency to justify such a far-reaching prohibition.

(b) On the other hand, it is pointed out that inbreeding in itself cannot produce genetic depression; it merely promotes homozygosity and hence the manifestation of *recessive* characters. This is a disadvantage only when the recessive characters themselves are unfavourable, which of course does not necessarily follow.

To be sure, the proportion of unfavourable to favourable characters for recessive genes is indeed higher than for dominant. This significant circumstance seems to be unknown to some authors (e.g. Maisch 1968). The disparity is caused by selection acting constantly upon the dominant genes, whereas in the recessive pool, sheltered by the dominant alleles, all sorts of litter can collect unpenalized. Accordingly, it would indeed make sense to proscribe marriage practices by means of which the sediment of recessive factors is churned up—provided that inbreeding had been formerly suppressed for a considerable length of time, and consequently a biological depreciation of recessive gene material had already occurred. Even so, an inbreeding depression would be a temporary phenomenon only, as natural selection would soon cleanse the—now manifest—recessive gene pool (cf. East 1927). And if, finally, as Lévi-Strauss (1970: 15) assumes, mankind has developed from an ancestry

regularly practising incest, there would indeed have been no eugenic reason suddenly to forbid this.

*2 Against the supposition of biological efficient causes* The chief arguments against the assumption of an instinctive abhorrence of incestuous mating can be arranged in four groups, of which the first two have indirect, the last two direct, empirical reference.

(a) According to Lévi-Strauss (1970: 16) the 'alleged horror of incest can only be manifested when a kinship relationship is supposedly known, or later established, between the guilty parties, and this sufficiently substantiates that its source cannot be instinctive'. And Freud (1924: 149) could not believe, of a biological instinct, that 'it could err so widely in its psychological expression, that instead of blood relatives harmful to reproduction, it took aim at house-mates and fire-side companions who in this respect are perfectly harmless' (author's translation).

(b) Freud (*ibid.*: 149 *et seq.*) voices a second objection, quoting Frazer (1910: 97):

It is not easy to see why any deep human instinct should need to be reinforced by law. There is no law commanding men to eat and drink or forbidding them to put their hands in the fire [ . . . ] The law only forbids men to do what their instincts incline them to do; what nature itself prohibits and punishes, it would be superfluous for the law to prohibit and punish [ . . . ] Instead of assuming, therefore, from the legal prohibition of incest that there is a natural aversion to incest, we ought rather to assume that there is a natural instinct in favour of it.

(c) Immediately following this quotation, Freud states rather presumptuously that 'psychoanalytical experience makes the assumption of an inborn abhorrence of incestuous relationship perfectly impossible. It has on the contrary taught us that the earliest sexual impulses of the human child are regularly of an incestuous nature'. Lévi-Strauss (1970: 17) refers to this passage as follows: 'Psychoanalysis, namely, finds a universal phenomenon not in the repugnance towards incestuous relationships, but on the contrary in the pursuit of such relationships.'

(d) It is Lévi-Strauss again (1970: 18) who offers a last empirical argument for the cultural foundation of the incest taboos, in calling incestuous mating 'a natural phenomenon found commonly among animals'. Similarly, Wyss (1968: 136) writes 'that the incest taboo [ . . . ] is agreed by most investigators to be the cultural step which differentiates man from the anthropoids'.

An answer to the first two objections will be given further on (pp. 59 and 62). The nature of the third argument makes analysis extremely difficult, and it will be attempted elsewhere. Thus the fourth argument remains to be tackled now; if correct, this would indeed be of considerable weight.

III SOCIAL STRUCTURES AND INCEST BARRIERS IN MAMMALS

*Individual bonding and the necessity for incest barriers*

It is characteristic of the fourth argument that its many proponents have hardly ever seriously tested it. Had they done so, they would surely have come up against the empirical fact that *in the whole animal world with very few exceptions no species is known in which under natural conditions inbreeding occurs to any considerable degree.*

This statement is trivial as long as we are dealing with animals having no attachment to conspecifics, or at best only collective-anonymous attachment, and which furthermore are not sedentary. In this case the general diffusion occurring soon after birth makes for ample intermingling. In animals of such a low level of socialization no instinctive incest barriers have been observed: brother and sister cannot single each other out among other conspecifics, and so accept each other readily as sexual partner if they happen to meet.

It is quite different with bonding-motivated animals, however, that is, animals having the ability to recognize each other *individually*, and the *inclination to affiliate with* acquainted conspecifics. This selective preference must generally hit family members, and one could expect that the maturing young would practise sexual activity inside this ready-formed zone of sympathy. *This, however, is precisely what nature systematically avoids*, and the measures adopted will be presented below.<sup>2</sup>

'Bonding motivation' is one of the concrete specifications, necessary for scientific clarity, of the hazy term 'love'. It is in no way synonymous with sexual eroticism, and is probably not even derived therefrom; this emphasis is necessary, as psychoanalysis shows little inclination for such differentiation either in theory or in terminology. The distinctive nature of the bonding motivation has been stressed repeatedly by ethologists (e.g. Fischer 1965; Lorenz 1965) and by ethologically-oriented psychoanalysts (Bowlby 1969). But human psychological research has also reached this conclusion, chiefly in connection with the motivational content analysis of projective techniques ('need for affiliation', see Atkinson 1958).

The following considerations are confined to those animal species evidencing bonding behaviour, at least in the form of attachment of offspring to parent, which corresponds then regularly with parental care of the young. In the space available we must limit the survey substantially to mammals.

Even in such a reduced field, however, an exhaustive report cannot be made. Fairly reliable field observations are available for only a small sample of the species concerned, and what relevant information we can extract for our purpose is nearly always a by-product, as the incest question proper is scarcely ever attacked by fieldworkers. Indeed, it has

been rather neglected in ethological literature. Although the issue was raised by Heinroth in 1910, and re-stated by Lorenz in 1943, there are, save for a paper on animal psychology by Brückner (1933), only two more recent dissertations by an ethologist or with ethological cooperation (Kortmulder 1968; Aberle *et al.* 1963, respectively), dealing with the general problem of incest barriers in animals.

A thorough examination of field data so far collected concerning the social life of mammals, and an evaluation of this material especially from the aspect of incest avoidance was first carried out by Bischof and Schottenloher (in preparation). The following is an outline of this work.

### *A brief survey of mammalian social structures*

*1 Plain solitary structure* In some species the need for individual attachment is confined to infancy; in adolescence, it wanes or is at least reduced to a point at which the partners lose each other. Adults are indifferent or even intolerant to conspecifics, except in the differently motivated periods of mating and, in females, brood-care.

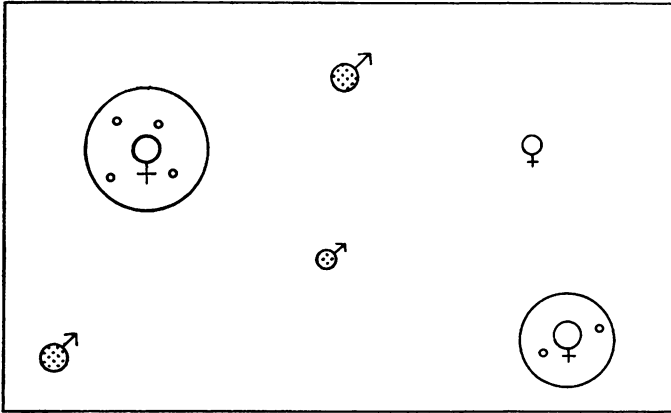
Infants of both sexes leave their parents once they are able to do so. In some species, this process *may* be aided by the mother becoming intolerant towards yearlings when she gives birth to her next litter. Males also, when approaching the mother in a new mating period, may show aggression towards the yearlings and drive them away. This, however, is not as general a phenomenon as was sometimes assumed, and can often be shown to be a surplus mechanism which becomes effective mainly when spontaneous separation does not occur for some special reason.

*Figure 1* symbolizes the typical social pattern of a species of this kind. Examples can be found among marsupials (opossum: Reynolds 1952; kangaroo: Caughley 1964) and rodents (e.g. hamster, lemming, squirrel: Eisenberg 1966; Eibl-Eibesfeldt 1951, 1953, 1958). A solitary structure in both sexes is also claimed to be typical of some lower primates such as lemurs (Petter 1965), and of most cats, the latter finding being controversial (cf., e.g., for the tiger: Schaller 1967 and Estes 1969: 68 *et seq.*). In this kind of social organization a particular incest barrier is obviously not required. The waning of the need for attachment in adolescence leads to sufficient separation so that the probability of consanguineous mating is lowered to random level. In what follows this process is referred to as 'isolation'.

*2 Male solitary structure* Isolation would reduce the probability of inbreeding even if it occurred in males only. As long as all male adolescents leave the family to become solitary the females might as well stay with the mother.

Indeed, there are some species exemplifying this kind of social structure, as demonstrated in *Figure 2*. Of these the coati has been most

Figure 1 First non-conjugal structure: Solitary life in both sexes



Explanation of symbols (for Figures 1–7):

♂ = adult and juvenile male

♀ = adult and juvenile female

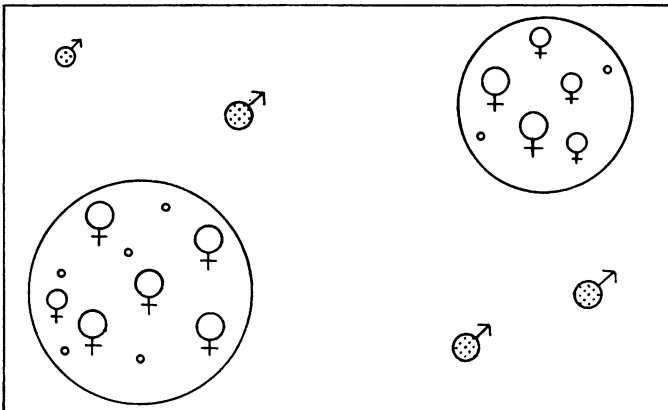
○ = infant

Circle = social group, connected by bonding forces (tendency to joint locomotion)  
 Broken circle (in Figure 6) = privileged subgroup

exhaustively investigated (Kaufmann 1962). The European wild boar (Gundlach 1968) can also be reckoned in this group.

Animals of these species can be encountered simultaneously in two different states of socialization, viz., solitary and in bands. All solitary specimens are adult males, whereas the bands consist of several females,

Figure 2 Second non-conjugal structure: Multi-female family groups and solitary males

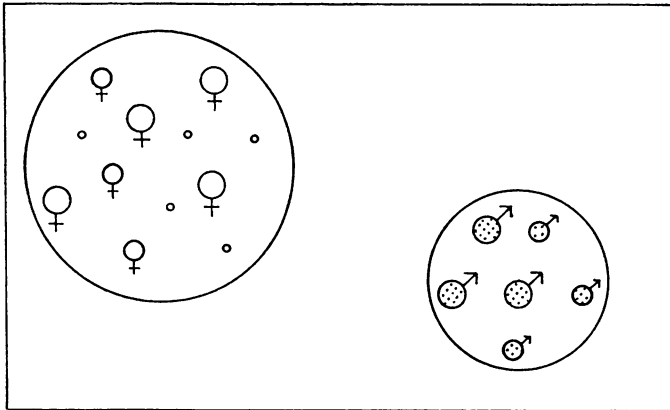


which are presumably all near relatives, and their infants. The young males leave the band before they become sexually mature. In the coati there is evidence that they do so on their own, not being driven away by their mother or by other adults.

It may be noted that the asymmetry of the structure depicted in *Figure 2* is not reversible as far as mammals are concerned. We never encounter the case of females becoming independent and solitary, leaving an all-male family group behind. This seems to be an indirect consequence of the fact that in mammals it is indispensably the mother who nurses the infants.

*3 Male cohorts* In the coati and, more pronounced, in the wildebeest (Estes 1969) we encounter, as a transient phase, a noteworthy phenomenon: Juvenile and subadult males, on their way to independence, show

Figure 3 Third non-conjugal structure: Multi-female family groups and multi-male cohorts



an initial tendency to associate in same-sexed groups. Quite often as, for instance, in most cervids (cf. for the red deer: Darling 1951, Etkin 1964; for the wapiti: Altmann 1963), this tendency persists throughout life. Here, the adult males, as well as the females, form unisexual groups (*Figure 3*). Juvenile males segregate themselves increasingly from their group of origin, but at the same time seek association with others of like sex, so that typical all-male groups are formed, which we call *cohorts* after Chance (1967). Unlike the familiar and quite firmly integrated female groups, they are mostly loosely organized, less intimate, and of variable composition. Such cohorts break up each year during the rutting season, and their members associate with female groups for the duration of sexual activity. During this time the males are intolerant of other cohort members but they nevertheless seek male companionship again



when the sexual season is over. In a variant of this structure (e.g. in elephants, cf. Nicholson 1955; Ewer 1968; Hendrichs 1971), the males maintain contact with their cohort even during the rutting season; sex-linked intolerance being replaced by a well-established ranking-order in this case.

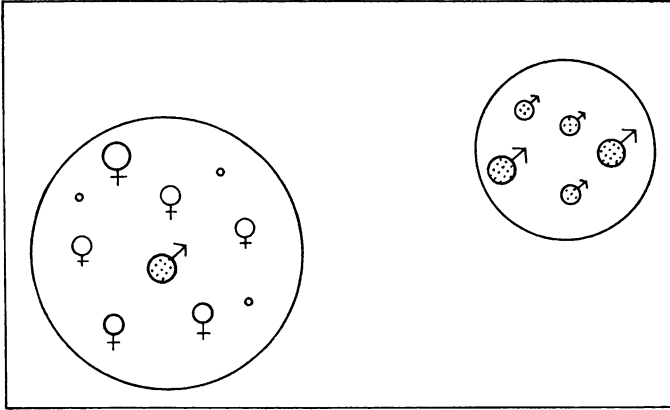
It is obvious that with such an organization incestuous mating becomes as unlikely as in the aforementioned social patterns. The mechanism, however, is different now in that the need for social attachment seems to persist up to adult age in both sexes, whereas in males it is obviously the *object* of this attachment which undergoes a *change* before or during adolescence.

For the moment, it must remain a moot point which properties of the old and new attachment objects are decisive in this change from family to cohort. The new companions of an adolescent male are (i) of the same sex and (ii) unfamiliar in so far as they usually do not belong to the group of early childhood association. Either factor could be crucial for the change of object. There might develop a proclivity towards males and an aversion against females; in this case, however, one must additionally postulate an increased readiness to affiliate with unfamiliar conspecifics as well. On the other hand, this second factor alone would suffice to account for the formation of male cohorts, as long as the shift of interest from familiar to strange conspecifics occurs in males only. The absence of females in cohorts would then just follow from a lack of female interest in making new acquaintances.

*4 Polygynous structure* The social patterns thus far described can be subsumed under the general label *non-conjugal*. It is characteristic of them that adult males and females do not associate for other than sexual purposes, and then only during a limited period of the year. There are, however, species in which adult animals of both sexes form a lifelong conjugal state. Such a state can occur in the form of polygyny, monogamy, or polygamy.

Polygyny, or harem-formation (cf. *Figure 4*) can be observed in equids like the zebra (Klingel 1967), also in some primates, as, e.g., the hamadryas baboon (Kummer 1957; 1968a, b; 1971) and in a qualified sense, the patas monkey (Hall 1968, Grzimek 1969) and the hanuman langur (Jay 1963; Sugiyama 1967; Yoshida 1968; Vogel *et al.* 1969). This kind of mating can be formally derived from the non-conjugal structure depicted in *Figure 3* with which it has some features in common, as, for instance, the spontaneous grouping of juvenile, subadult, or (unmarried) adult males in so-called 'bachelor cohorts'. Under the influence of the sexual drive, individuals leave those cohorts and affiliate with females, but once they have done so they stay in a lasting conjugal attachment with them and do not return to cohort life; although a loose contact to former cohort companions may be maintained, as in hamadryas baboons.

Figure 4 First conjugal structure: Polygyny



With regard to our question this type of organization poses two problems. First we have to ask the nature of the process which binds the males to the females. Sexual drive would hardly suffice as an explanation. Provided even that the females of the harem come into heat at different times, thus ensuring a certain amount of overlap, there is sufficient indication that the males remain attached also to those females which are momentarily not of interest as sexual partners.

It looks more as if the object of social attachment is exchanged again when a harem is formed. After previously having left their family to associate with other individuals of the same sex, males of these species leave their newly acquired companions for the sake of female conspecifics, which are initially alien, but become after a while as familiar as the members of the original family. We are dealing here with the mechanism of a *double* change of objects. It considerably reduces the probability of mating within the family of origin, which suggests that this is precisely the biological reason for this complicated procedure. Why otherwise should a species which is programmed for lasting matrimony have adolescent males attach themselves in an interim phase to same-sexed peers, instead of just remaining affiliated with the females of their original family?

A second problem that arises as soon as the father stays permanently within the family unit pertains to the destiny of the growing-up daughters. Emancipation of the young males alone would no longer be sufficient to avoid incest now.

Here, indeed, mechanisms have evolved which serve to separate the adolescent daughters from their father. Interestingly enough, in polygynous groups this separation does not seem to occur by means of active emancipation on the side of the female; the activity is rather taken over by young males from outside who abduct the daughters in one way or another.

Female zebras, for instance, when coming into their first oestrus, exhibit a very conspicuous posture. This attracts the attention of young males in the vicinity, who chase these females and cut them off from their family, against the active resistance of the father. One of the males eventually gains the prize, who will usually change her partner several times until she ceases to show her soliciting signals when in heat. Only then does she become uninteresting for cohort males.

In hamadryas baboons the daughters are abducted while still in childhood. Subadult males 'kidnap' girls from neighbouring families, at a stage when the latter are still too young to be of sexual interest to their fathers. The successful 'thieves' have to wait quite a time for the first oestrus of their brides to occur. So, in an initial phase, they just act as caretakers and foster-mothers for them.

Another variant of peaceful taking-over of females occurs also in hamadryas baboons. A harem-leader can sometimes be found accompanied by a so-called 'follower'—a young male whom he has adopted as a kind of apprentice, and to whom he eventually cedes his females.

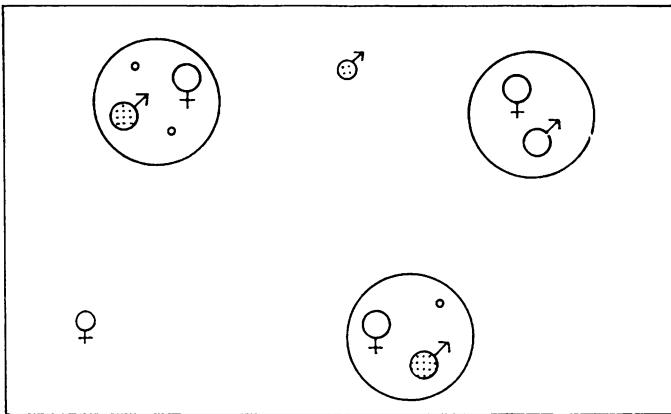
The same occurs in a much more violent fashion in hanuman langurs, according to Sugiyama (1967) and Yoshiba (1968). At times, a cohort of males invades an existing harem group, and expels or even kills the former leader. Eventually, one member of the cohort even expels his former companions and takes the harem for himself.

*5 Monogamous structure* It may be asked why, as a rule, in a polygynous group there is place for only one sexually active male, but for several females, although the harem—unlike the all-female family groups of *Figures 2* and *3*—may be composed of individuals who have been initially alien to each other. This asymmetry seems to be caused by a sex-specific intolerance in males which, however, is still lacking in the cohorting phase. Apparently it is bound to a higher maturation level or, as actually in hamadryas baboons, to the presence of females.

If we assume a sex-specific avoidance tendency in females as well, this should result in monogamy. This social pattern occurs occasionally in mammals as, for instance, in the dikdik antelope (Hendrichs & Hendrichs 1971) and, among apes, in gibbons (Carpenter 1940, cf. *Figure 5*). We are not yet able to determine whether this formally very simple, but functionally highly complicated, social structure is due solely to sex-specific aggression. However, as far as the *detachment* of adolescents is concerned, it is indeed reported that this is mostly enforced by aggressive behaviour of the same-sexed parent.

At first glance it may seem that the young remained virtually passive during such a process; that they, for their part, cling to the familiar and secure, only to have maturity thrust upon them by the parent's intervention. Closer observation, however, has shown that often enough the juveniles do make their own positive contribution to the brawl.

Figure 5 Second conjugal structure: Monogamy  
First variant: Monogamy by separation



They set the ball rolling by aggression, or at least insubordination, to which the older animals react with increasing impatience.

Here too, apparently, the dissolution of the family seems to be triggered by an 'emancipatory' change in the juveniles; by the building-up of a motivational state, which can perhaps be described as an 'autonomy claim', conceivably analogous to terms such as 'ego-strength' or 'self-confidence' used in human psychology.

It makes sense to assume that the change of object described above is also based upon the growth of this motivational state, that is—to use an anthropomorphic expression—one may ascribe it to increasing 'self-confidence' if the strange and alien is no longer feared but challenged, and if the familiar, which earlier offered security, now engenders merely boredom and surfeit.

It is therefore also in monogamous species that we encounter, behind the superficial spectacle of expulsion, a process of spontaneous object-change, which derives from the double change characteristic of many polygynous species in that the cohorting phase is skipped (see *Table 2*, p. 55).

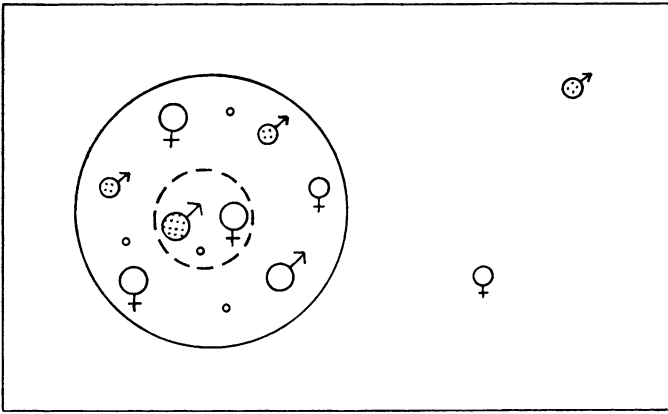
An *active* component in the process of detachment on the basis of an increasing claim for autonomy is also indicated by the following consideration. In addition to the 'pure' pattern described above, monogamy occurs in a second form. Occasionally, as in wolves (Zimen 1971), marmosets (Rothe, personal communication) and dwarf mongooses (Rasa 1972, and in press) we encounter extended bisexual groups in which, however, only one female and one male are sexually active (see *Figure 6*). This selectivity is warranted by a rank-order that excludes subdominants from propagation.

As yet ethologists have not arrived at full agreement as to the most appropriate definition of rank-order. There is no doubt, however, that

this phenomenon must be closely related to the 'claim to autonomy' introduced above. If different individuals form a group, and each of them claims autonomy, i.e. realization of his private interests, then conflicts are bound to ensue. These conflicts can be resolved only if some individuals either give up their group-membership, or change their interests in the direction of a more flexible adaptation to the interests of the others. The latter would mean a reduction of their claim to autonomy.

In some animal societies, compromises of this kind are not equally distributed over all group-members. Instead, a stable asymmetry is built up, in so far as some individuals constantly maintain more auto-

Figure 6 Second conjugal structure: Monogamy  
Second variant: Monogamy by rank-order



nomy, i.e. more readily exhibit and realize their own interests, as compared with others. It is these cases in which we speak of rank-order. Disagreements concerning the rank position are settled by fighting it out. To make this feasible without disruption of the group, two conditions have to be fulfilled: the aggressor must be appeasable by the symbolic gesture of submission rather than by direct flight on the part of the defeated; correspondingly, the latter should not feel motivated to withdraw, but at least to remain in his place. In fact, he might even show a tendency to attach closely to the aggressor.

This surprising phenomenon has its parallel in the so-called 'identification with the aggressor' which is dealt with in the psychoanalytic theory of neurosis (cf. A. Freud 1936). It may be explained as follows: other things being equal, the consolidation of the claim for autonomy can be taken as a criterion of maturity. Therefore, its revocation when defeated in a rank-order fight can be understood to be a form of regression towards a more infantile stage of social behaviour. According to the above consideration, however, this should also attenuate the

readiness to change the object of affiliation. The loser, that is, should return to an attitude of shyness towards strangers and of dependent attachment to the familiar, even though, paradoxically enough, the latter has been the aggressor who initiated the whole process.

Imagine a species which is aggressive in both sexes. Almost inevitably the parents of a growing-up youngster will feel challenged in their superiority when the adolescent displays an ever-increasing autonomy claim by acting in a provocative and inconsiderate manner, or by demonstrating eagerness to change objects. This might indeed incur parental aggression and amount to a generation conflict which has two possible outcomes: either the subadult retracts his autonomy claim and submits himself to parental dominance, which means that a rank-order is established (*Figure 6*), or he maintains his claim until it has become strong enough to bear a change of object. Having reached this point, he emigrates, leaving a monogamous couple of parents behind (*Figure 5*).

This bears substantially on how to interpret the parents' 'chasing away' of the juveniles. Parental aggression alone could scarcely result in family disintegration as long as the young were not yet ripe for it; on the contrary, the effect would more likely be an increase in dependence. If a son's rank-order fight with his father ends with his departure, it shows that for the first time he has *not* knuckled under; the father may have won the fight but he has not managed to curb the son's autonomy claim any longer (cf. also Chance and Jolly 1970: 196 *et seq.*). A strengthened autonomy claim is often indicated, among other things, by sexual activity. Consequently, high-ranking animals tend to interpret courting and copulatory behaviour of subdominant group members as a challenge, and to react by aggressive intervention. This is the reason why in groups structured according to *Figure 6* the rank-order is accompanied by a quasi-monogamous confinement of sexuality to the dominant couple.

The suppression of sexuality in low-ranking group members may occur in two forms. In the simpler case, the need for sexual activity persists in spite of the threat of the group leader, only as a rule the subdominant animals do not *dare* to indulge, but, when they feel themselves unobserved, they may attempt copulation regardless. In another case, the social stress leads additionally to a change of motivation, in that the sexual interest wanes altogether, and may be accompanied by corresponding somatic changes (e.g. reduction of testes, absorption of embryo). This effect, which seems to be present in marmosets (Epple 1966, 1967, 1970; Hampton & Taylor 1970), and tree-shrews (von Holst 1969, 1970) has been referred to as 'psychological castration' (Baldwin 1969). In fact, both mechanisms are effective as incest barriers; the grown-up animal is not able to propagate as long as he stays in his family group. Other than the incest barriers treated above, which are based on spatial separation of potential incest partners before sexual maturity, we en-

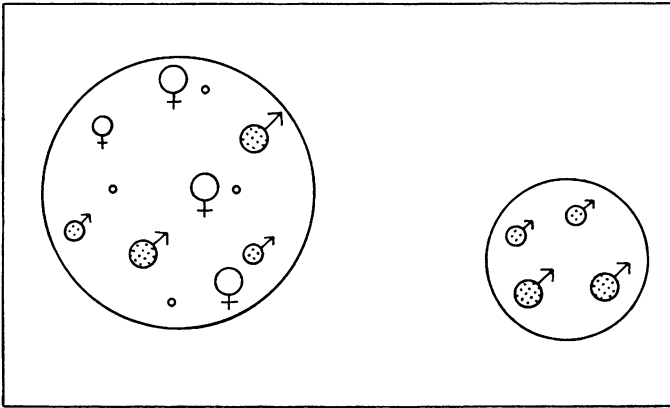
counter here a further group of mechanisms which become effective if the family does not dissolve in time.

*6 Polygamous structure* This other group of incest barriers, which work by supressing intra-familial sexuality, is of particular importance in the third conjugal structure which is typical of many primate societies (*Figure 7*).

It is characteristic of this kind of social organization that several adult males and females and their progeny are associated in a band.

These bands may be more (rhesus monkeys: Carpenter 1942a, b; Altmann 1962; Koford, 1963, 1965; Kaufmann 1965) or less (chimpan-

Figure 7 Third conjugal structure: Polygamy



zees: Reynolds & Reynolds 1965; Reynolds 1968; Goodall 1965, 1967; Van Lawick-Goodall 1971; Albrecht & Dunnett 1970) exclusive against strangers. As opposed to the structural type shown in *Figure 6*, the sexual relationships tend to be promiscuous here; they are rather free of jealousy and not confined to high-ranking animals.

A social structure of this kind seems obviously predisposed to promote inbreeding. Nevertheless, there are factors counteracting this. In thorough studies on free-ranging macaques, several investigators observed a striking rarity of mother-son mating (Imanishi 1965; Tokuda 1961-62; Sade 1968). The best-known investigations on this subject have been carried out by Sade (1968) in rhesus monkeys, although, recently, his findings were partly modified by Missakian (n.d.).

Sade considers two mechanisms to be responsible for the reduction of mother-son mating. One of them is a change of object, as described earlier: many males leave their group of origin before becoming sexually mature. The motives for this are not yet quite clear. At any rate, they are not driven away by other males, although in some cases they undergo a loss of rank position shortly before separation. A conflict with

the mother is not crucial for the emigration either, because orphans are even more likely to disperse. After leaving their group of origin, some of the young males become solitary, but most of them join bachelor cohorts, until they find a chance to re-enter a mixed-sex band.

Not all young males, however, leave their group before reaching maturity. In those remaining, Sade observed a second incest barrier. Such a juvenile would prefer to be near his mother, with whom he would maintain intimate social contact, entailing close bodily proximity, mutual grooming, and mutual defence. In this association the son displays a permanent *childish* attitude towards the mother, and as long as he does this all *sexual* interaction is ruled out. It looks as if infantile and sexual behaviour were incompatible to a degree, and as if in this case the incest barrier becomes effective by activating the former. We refer to this effect as 'infantilization'.

Missakian (n.d.) has repeated Sade's observations in the same colony but in a different and larger group, and has partly modified them. She also recorded a reduction of mother-son matings, although they occurred somewhat more frequently than in Sade's group. More than two-thirds of mother-son couples proved free of any sexual activity. In the remaining cases the son copulated even exclusively with the mother. Virtually none of those sons, however, had outgrown puberty by more than two years. The older the males grew, the less likely were copulations with their mothers, even if they did not eventually leave them, which, as a rule, they did.

In rhesus monkeys, there is also a striking reduction in the number of observed brother-sister matings. Neither Sade nor Missakian offers an explanation of this phenomenon. Recently though, van Lawick-Goodall (1971) made known her observations on an interesting parallel in chimpanzees. Here—as, incidentally, in some other animal species—sexual play among juveniles is quite common, and in this immature stage familiarity, and therefore relatedness, presents no obstacle (see also pp. 60–1). The author describes, then, how a female who had just reached sexual maturity displayed keen and rather indiscriminate sexual interest in males of casual acquaintance, but at the same time repulsed the advances of her brothers with loud screams, though earlier she had not objected to these advances. We refer to this behaviour as 'repulsion' (when regarded from the standpoint of the male) or 'surfeit-response' (from the standpoint of the female). These terms, to be sure, are only descriptive rather than explanatory. For a first step towards a functional analysis of the underlying processes, cf. Bischof (1972 and in press).

#### *Classification of incest-preventing mechanisms*

Table 1 summarizes the incest barriers which have been elaborated in the last section. The principle of classification is twofold: on the one



hand, we can discriminate between mechanisms of family dissolution before sexual maturity, and mechanisms which suppress sexuality in those individuals who remain with their family until after puberty; on the other hand, we must separate 'endogenous' from 'exogenous' mechanisms. In the endogenous case, incestuous activity is inhibited due to peculiarities of the individual's own motivational structure. The inhibition is exogenous if the potential incest partner or other individuals build up a barrier, while the individual himself may well be motivated to incestuous activity.

Table 1 Mammalian incest barriers

	<i>Mechanisms of family dis- solution</i>	<i>Mechanisms of sexual suppression</i>
<i>exogenous mechanisms</i>	abduction expulsion	threat repulsion
<i>endogenous mechanisms</i>	isolation change of object emancipation	psychological castration infantilization surfeit response

*Exogenous* mechanisms of family dissolution are the abduction of female adolescents out of polygynous hordes, and the expulsion of adolescents, by aggressive adults. Exogenous suppression of intra-familial sexuality occurs when higher-ranking group members by continuous threat prevent an animal from realizing his sexual intentions, or when the desired partner repulses him. Threat might even generate an *endogenous* inhibition, if it is internalized so as to entail partial or complete extinction of the sexual drive itself (psychological castration). Another endogenous barrier against intra-familial sexuality can be built up by the partner being *too* familiar. This may work either by infantilization, in the sense described by Sade, or by a surfeit reaction, as shown in chimpanzees in Goodall's observations. Finally, endogenous mechanisms of family dissolution have been described under the names of 'isolation' and 'change of object', on which some further remarks will be added below. Also the increasing autonomy claim which leads to the emancipation of adolescents has to be taken into account as an endogenous component in the process of expulsion (cf. p. 51).

The processes occurring in 'isolation' and 'change of object' are listed in *Table 2*. Initially there is always attachment to partners who have become familiar right at the beginning of life due to imprinting-like processes. This normally includes the mother, and sometimes other members of the group of origin as well. At some point during adolescence, a detachment from these individuals of reference will take place, in favour of one of three possible new forms of socialization: the animal

Table 2 Relation between processes of isolation and object-change in males

	infancy	post-infancy	Examples
isolation	<b>FI</b> —————→ <b>S</b> ←→ <b>FS</b>		Hamster
	<b>FI</b> —————→ <b>MS</b> → <b>S</b> ←→ <b>FS</b>		Wildebeest
change of object	<b>FI</b> —————→ <b>MS</b> ←→ <b>FS</b>		Cervids
	<b>FI</b> —————→ <b>MS</b> —————→ <b>FS</b>		Equids
	<b>FI</b> —————→ <b>S</b> —————→ <b>FS</b>		Gibbon

Explanations of signs: **FI** = female imprinting object  
**MS** = male stranger  
**S** = solitary  
**FS** = female stranger

The expression 'stranger' is equivalent to 'not familiarized in early childhood'. It does not exclude later acquaintance. Long-term stages are in bold type.

may associate with novel partners of the same sex; he may become solitary; or he may, as soon as possible, try to affiliate with strangers of the other sex.

These stages are normally passed through in the sequential order indicated by the arrows. As can be seen, some stages may be skipped, naturally with the exception of the last one; at least temporarily, i.e. in the rutting season, affiliation with other-sexed strangers will be attempted. This affiliation may or may not be abandoned afterwards in favour of one of the earlier post-infancy stages. One of the three post-infancy stages will be maintained more or less permanently in adult life, whereas the other two have a transient or episodic character.

Taking into account that the solitary stage is usually characterized by marked territoriality, the question arises whether what we have called 'isolation' is indeed caused by a mere deflation of the need for something to attach to (cf. above, p. 43). Quite possibly we are dealing here with a more complicated process, comparable to a change of object, in which the attachment shifts from the conspecific to the home-range. However, the clarification of this question would require us to unravel the whole problem of the equivalence of partner-bonding and home-range attachment, which must be dealt with elsewhere (cf. also p. 63, note 2).

### *Missing incest barriers in the animal world*

Summing up, it is clear that the die-hard fable of incest tolerance in animals, concocted, according to Maisch (1968: 15), by Diogenes in his tub and henceforth hawked about unscanned, just about turns the empirical findings upside down. There are, to be sure, certain exceptions. 1 First, we must consider that incest occurs habitually in some lower

animals with a high reproduction rate, living under ecological conditions which impede or preclude exogamic mating; particularly, that is, in certain *parasites* (mostly mites or worms: Mayr 1963: 408).

2 A further group showing enhanced incest tolerance is formed by the *domesticated animals*; the origination and persistence of the said fable are probably due to these. It is plain that incest barriers are likely to be rudimentary in domesticated animals: the breeder himself will wish to decide which mates with which and when; he has no use for breeding stock which is fastidious. Hence he necessarily exerts a selection pressure tending to breed out possible incest inhibitions.

3 It must be remembered that any interference with the natural living conditions of a species may also disturb instinctive mechanisms and thus reduce their effectiveness. For this reason incest among *zoo animals*, although these are not necessarily domesticated, is less infrequent than in the wild.

Finally, it remains to be noted that a possible selection pressure militating against incest (see below) may sometimes come to a halt at a minimum effect. A mechanism which impeded *all too habitual* inbreeding would suffice; juristic pedantry is not to be expected in nature. The barriers can for example be so low that incest is not made impossible but only improbable; or one of the three possible incestuous combinations (brother–sister, mother–son, father–daughter) could be left open (in polygamous primate groups this is often the last-named); and then again, inhibitions need in principle function with only *one* of the partners, while the other may well incline in vain towards incestuous practice.

#### IV THE BIOLOGICAL IMPORT OF INCEST AVOIDANCE

##### *On the concept of selectional advantage*

The multiplicity of mechanisms restraining incest in the animal kingdom compels us to reconsider the possible existence of a biological final cause, that is, of a selectional advantage in this phenomenon (cf. p. 38 above).

The concept ‘selectional advantage’ is much too complex to be identified with ‘chance of survival’. Such simplifications have fostered the habit of thinking only of hereditary disease in weighing the biological disadvantages attendant upon incest, whereby dismissal of this reasoning is taken as a dispensation from any biological argumentation whatsoever.

In actual fact, a biological value of quite another character can be shown to attach to the incest barriers, i.e. a selection pressure, the power of which dwarfs the small advantage of hereditary fitness in comparison. This selection pressure is identical, as will be explained below, with that which favours *biparental reproduction* above all other forms of propagation.

*The selectional advantage of biparental reproduction*

To the biological layman the terms 'mating' and 'propagation' seem practically synonymous; nevertheless, propagation can indeed occur without mating throughout the world of organisms including man: that is, it is biologically *possible*.

It appears in three forms (see Hartmann 1956): *asexual reproduction* (agamogenesis), i.e. propagation by division of the whole individual (in protozoa, polyps, and some worms; further in the formation of identical twins) or by budding (found on the very brink of the vertebrate stage); *unisexual reproduction* (parthenogenesis), in which new individuals are produced from unfertilized egg-cells (in some insects); finally *self-fertilization* (autogamy) in hermaphrodites (occasionally observed still in some species of fish).

Thus it is evident that neither fertilization nor indeed propagation necessarily implies the sexual union of two individuals; yet the three above-named forms of monoparental reproduction are remarkably *rare* throughout the vegetable and animal kingdoms. This focuses attention on the biological significance of biparental reproduction: it must have been the outcome of substantial selective forces, as its vulnerability entails so many evident disadvantages.

This biological significance lies, as Weismann realized as long ago as the turn of the century, in the increase of *variety* through the recombination of genetic material.

Evolution is fed by the variability of the species. Only a wide spectrum of distinctive features can ensure, in times of environmental change, that there are enough individuals available who are just then better adapted, and can help the species to pull through the crisis; other, ill-equipped members die out: the species has 'adapted itself to changed conditions'—because it contained sufficient diversity of features, but evidently at the cost of such diversity. Only the constant creation of new variety can save this procedure from grinding to a halt. The source of variety is, after all, the mutation, but this source is a mere trickle. And here, heterogeneous fertilization comes into play, acting as a powerful 'variation-amplifier'.

One can work out what astronomical period of time it would take to effect a somewhat more complex genetic adaptation, if a species were forced to transact all the necessary steps of mutation successively and independently in the *same* germ cell; how much swifter is this process if the 'inventions' are interchangeable between different germ cells! In this sense Mayr (1963: 179) calls recombination 'by far the most important source of genetic variation'.

*The selectional advantage of exogamy*

The answer to the question of the selectional advantage of exogamy

should now be apparent: a species which allowed the obligatory mating of siblings only would retain almost all the disadvantages of biparental generation, without being able to profit from a single one of its advantages. Its variety would sink to the low level of self-fertilization, and its evolutionary rate would accordingly be so halting that it could stand up against competition only under highly favourable conditions of life; as a general rule the lack of adaptive plasticity would act as a death warrant. This means in effect: *existing* species are those which have escaped the danger of obligatory incest, either through favourable circumstances, or through development of special inhibiting mechanisms.

Such mechanisms, however, in the animal species concerned, are integral parts of the genetically fixed instinctive structure, and it would be astonishing if there were not at least rudimentary traces left in man. If so, the biological final cause expounded above would also ultimately be responsible for the universal appearance of the cultural incest taboo.

It must be borne in mind that explaining cultural features as being influenced by natural selection in no way necessarily implies that *cultures* without these features are doomed. We are confronted here with a selectional force which had been operating for untold ages prior to man's emergence, and which had already led to the development of genetically determined motivational structures in the animal kingdom. If any vestiges of these structures still lurk in man's emotional make-up, and he, as with so much that baffles him, has interpreted them mythicomagically, then the cultural taboo emerges indirectly from biological advantages, *without* these last having had a chance to bear fruit in the ridiculously short span of cultural history. In the following section an attempt will be made to establish whether observations on man himself will support this interpretation.

#### V INCEST BARRIERS IN MAN

##### *Two preliminary questions in an anthropological evaluation*

In examining the material basic to Section III we find that some of the incest barriers therein described can be grouped as 'sociological efficient causes', in accordance with the classification introduced on p. 40. Above all, the mechanisms of *abduction* and *threat*, in part also *expulsion*, are 'inhibitions from without'—and of course, from the male point of view, the mechanism of *repulsion*.

Looking at the whole picture, however, these are clearly outnumbered by the 'inhibitions from within' occurring regularly in the species observed, that is, spontaneously developing counter-inbreeding tendencies entered in the instinct inventory of the species. In the higher animals the most important of these are the *change of object*, *repression of sexuality* and—from the female point of view—*repulsion*; also the mounting of the *autonomy claim* which leads to expulsion.

If we now try to estimate the value of this synopsis for the under-

standing of man, a twofold question must be asked: first, whether 'inner' inhibiting mechanisms of the kind discussed can be shown to exist in man, too; if so, second, given a background of such mechanisms, how we are to understand the development of corresponding cultural norms. These two issues will be discussed shortly, whereby we shall be able to pick up the threads of the two still unresolved objections to the biological theory of the incest taboo, which were introduced on p. 41.

*Emotional avoidance of incest*

*1 Justification of Westermarck's hypothesis* The first of these objections was based upon the naïve surmise that an instinctive aversion to consanguineous mating must be linked, as it were, with a sixth sense for detecting blood relationship: according to this argument, whoever admits the possibility of instinctive incest barriers must necessarily believe in a 'voice of the blood'.

This contention seems incomprehensible, all the more so since Westermarck (1889) and Hobhouse (1912), often quoted ironically in this respect, opposed such conjectures with amazingly modern-sounding arguments.

Contemporary study of instinct does not expect to find nature performing supernaturally. If birds only rarely catch wasps, then the biological reason is that wasps are poisonous. The quality of being poisonous, however, is invisible, and so the mechanism restraining the birds operates, quite simply, as if every insect with black and yellow stripes were a wasp; the hover-fly and other insects with wasp-mimicry have this simplification to thank for their undeservedly carefree lives.

Westermarck therefore advances a legitimate argument, biologically speaking, when he assumes that nature recognizes early-childhood familiarity as a sufficient cue for consanguinity, just as black and yellow stripes stand for poison, the biologically unnecessary inhibition against marrying an adopted sister being tolerated just about as readily as the bird's abstinence from a meal of hover-flies.

*2 Endogenous tendencies towards family dissolution* In *Table 1* an attempt was made to distinguish between the mechanisms of family dissolution and of suppression of intra-familial sexuality. If we now turn to the first of these, it is easy to find parallels between the psychological alterations of human puberty, on the one hand, and the phenomena of increased *autonomy claim* and *change of object*, as formerly described, on the other.

The more or less radical emancipation of adolescents of both sexes from the child's referential structure of security and obedience—the surfeit with the established order, the lure of the distant, of the exotic, the forbidden, the dangerous—all this is common knowledge in developmental psychology. Even without citing parallel features among animals

there can be little doubt that these phenomena are due by and large to *maturation*, although social forces can facilitate, inhibit, or channel them. Still, it may come as somewhat unexpected when, of all things, it is precisely at the bottom of young Oedipus' fight with his father that we find archaic motivational structures whose biological sense is none other than the *prevention* of incest (cf., for a more detailed discussion, Bischof, in preparation).

*3 Endogenous suppression of intra-familial sexuality* It is less simple to answer the question whether the phenomena of *inhibition* and *repulsion* of intra-familial sexual activity are also observable in man. Fortunately, however, there is a possibility to test this empirically in societies in which prospective spouses are thrown together as children and grow up together.

Such a culture has been examined by Wolf (1966; 1968) in North Taiwan. Here, among others, two patrilocal marriage forms exist, whose main difference is that in the one the partners come together as adults, whereas in the other the bride is taken into her future husband's family as a child, and the two grow up practically as brother and sister.

The second form of marriage is not esteemed by most young people. This could be partly due to the small prestige actually accruing to this marriage form; yet there are some peculiarities which can scarcely be thus explained, and which have led the author to conclude that such marriages suffer primarily under a disturbance of sexual harmony. At any rate if questions are asked, the repudiation is not ascribed to social disadvantages, but veiled hints are made that such marriages are 'embarrassing' or 'boring'. Adultery of both sexes, concubinage, and recourse to prostitutes are of significantly higher frequency in marriages resulting from child-engagement than in those resulting from adult-engagement.

As moving force behind the arrangement of child marriages Wolf suspects the jealousy of the mother: 'A woman's son is too important in Chinese society for her to accept an intimacy from which she is excluded' (1968: 869). '*The sexual aversion created by the couple's intimate childhood association* [ . . . ] precludes the development of an exclusive conjugal bond [ . . . ] The effect [ . . . ] is to drive a wedge between husband and wife and thereby take the strain off the bonds between the generations' (ibid.: 870, italics added).

A second example is reported by Fox (1962) following Spiro (1958); cf. also Bettelheim (1969) and Shepher (1971). It refers to juvenile development in certain Israeli kibbutzim. The children of a settlement grow up together, grouped separately according to age; living-rooms, dormitories, and bathrooms have, on principle, no separation of the sexes.

Up to about twelve years of age there are no signs of embarrassment

between the sexes; on the contrary, the children indulge extensively from an early age in heterosexual play, both in the dormitories and in public. This behaviour is tolerated by the adults in the interests of a repression-free sexual development.

On the threshold of puberty, however, there develops, more markedly in the girls, a mounting tendency to embarrassment, with a considerable admixture of *antagonism* towards the other sex in the same group. The girls reject the co-ed showers and seek to avoid being seen naked by the boys; at the same time their interest turns to young men outside the group.

As far as the authors could discover, no marriages ensued within any one of these peer groups; nor are any cases known of adult sexual relationship of group members. The reason for this abstinence, given by the juveniles themselves, is that they would 'feel like siblings'.

These two instances suggest an obvious parallel to the mechanisms of *inhibition* and *repulsion* of intra-familial sexuality. Other examples point in the same direction, although their substance may not be so apparent at first glance: one illustration is the general damping of sexual activity among the Mountain Arapesh in New Guinea (Mead 1935), who also practise child marriage; another is the report of Rey (1969) according to which celibate professions are preferred by those men having a supernormal attachment to their mothers.

Reverting to the kibbutz example, it remains to be said that here, as with chimpanzees (p. 53) and incidentally as with other mammals and some birds, the incest aversion of puberty is preceded by a period of infantile sexual play with other members of the family. If psychoanalysis, by misapplication of Haeckel's rule that ontogeny recapitulates phylogeny, deduces from this infantile tolerance an 'original' (i.e. precultural) incestuous tendency in man (cf. p. 41) this would be in no wise biologically convincing; for if an incest-aversion should mature rather than be acquired by learning, this process need nevertheless only coincide with the commencement of the reproductive phase, not with the first, still 'harmless' try-out of sexuality in the 'oedipal phase', which may therefore very probably deserve its name.

### *Nature and culture*

*I Cultural ritualization* The brief survey undertaken in the last section has already shown that forces are at work in man's motivational make-up which must seriously be taken into consideration as being homologous to instinctive incest barriers. As a rule, however, they appear stylized in the framework of cultural superstructures.

In a comprehensive monograph Cohen (1964: 54 *et seq.*) places the ritualized incest barriers in two groups which are very nearly analogous to the two mechanisms identified above (cf. *Table 1*), viz. (i) family dissolution, and (ii) suppression of intra-familial sexuality.



(a) Cohen describes, under the title of *extrusion*, the daily or nightly removal of children aged between eight and ten from their parental homes, and their quartering either with a strange family, in a 'mens. house', a separate hut, or simply in the open. Generally only the boys are extruded, sometimes both sexes, very seldom the girls only

(b) The term *brother-sister avoidance* he uses to denote restriction of contact between siblings remaining in the household, as soon as they attain pre-puberty. Siblings may communicate, for example, only through a third person, may not touch or look at each other, or remain together under one roof, etc.

Cohen points out (*ibid.*: 58-59) that these rites are not merely imposed upon the child, but fall within a stage of development which meets them half-way. Here we see the cultural norm tracing a rather close copy of natural inclinations. From other aspects, however, the original pattern seems to have undergone considerable change. We could expect little success from an attempt to establish a 'biological' explanation for this: cultural anthropology has here its legitimate domain.

Another peculiarity of the cultural incest proscription must be touched upon: its occasional reversal into an incest *prescription*. The experience of psychoanalysis, it should first be remembered, has revealed that, in coming to terms with emotional tendencies, it seems easier to adopt a contrary attitude than to silence them completely. An explicit command to incest is therefore closer to the universal taboo than is an indifferent tolerance. Moreover, according to Sidler (1971: 9), 'In a monistic world-view, conceiving good and evil as emanating from the same numinous source [. . .] any forcible intrusion upon this numinous sphere, as occurs in the violation of the incest taboo [. . .] can also mobilize healing powers' (cf. also Caillois 1959). One can therefore break a taboo to become taboo, and at least in the case of the incestuous practice still persisting in parts of the Bantu dynasties, it is possible to evidence this motivation (De Heusch 1958).

2 *On the function of cultural norms* So far, the question raised in the second objection, cited on p. 41, has been left unresolved: why, if natural inhibitions are effective, do cultural ones exist at all?

The answer seems to be that natural inhibitions, as also natural propensities, do not determine but only motivate our behaviour. How we realize them with respect to a given situation, and what compromise we make thereby, has on the whole to be settled by our own initiative, and we are free enough to act contrary to our own nature; but we are not free enough to do so with impunity. We can live at odds with ourselves, and this danger makes us inclined to narrow down the newly gained fullness of scope to within bearable boundaries by means of collectively created norms. Again, however, these norms should keep

the emotional field of tension in a sufficiently stable state of equilibrium; and such states cannot be decreed, but must be found.

The creation of cultural norms, therefore, can be regarded as a cognitive achievement, an act of self-interpretation, and these norms will only then remain satisfactory and stable if man is able to recognize his own natural image in this interpretation.

As a rule, to be sure, it will no longer be possible to fathom the original meaning of inherited inhibitions and drives; culture will therefore seek other, more plausible explanations for the emotions which are, after all, there, and demanding their rights, and culture will moreover try to attain other ends by their means. Thus it is quite possible that the various 'sociological' final causes (p. 38 *et seq.*) have all played their part, on a higher level, in the shaping of the incest taboo.

The cogitations of modern structuralists may therefore prove to be an adequate delineation of a superstructure, to lay bare the biological foundations of which has been the object of this report.

## Notes

1 This paper is in part based on the following two articles:

The biological foundations of the incest taboo. *Soc. Sci. Inform.* **11** (6): 7-36, 1972.

Inzuchtbarrieren in Säugetiersozietäten. *Homo* **23**: 330-351, 1972.

2 Quite the same problem, incidentally, should arise even in non-social animals, provided they are highly *sedentary*. Such a *substitution* of family attachment by home-range attachment can be observed in some fish and in birds, but there are no examples known in mammals. A *combination* of both forms of attachments, or an ontogenetic *change* is somewhat more frequent. This ought to be mentioned here, although we shall not be able to discuss the implications of home-range attachment and territoriality in the present chapter.

## References

- ABERLE, D. F., BRONFENBRENNER, U., HESS, E. H., MILLER, D. R., SCHNEIDER, D. M., & SPUHLER, J. N. 1963. The incest taboo and the mating patterns of animals. *American Anthropologist* **65**: 253-265.
- ADAMS, M. S., & NEEL, J. V. 1967. Children of incest. *Pediatrics* **40**: 55-62.
- ALBRECHT, H., & DUNNETT, S. C. 1971. *Chimpanzees in Western Africa*. Munich: Piper.
- ALTMANN, M. 1963. Naturalistic studies of maternal care in moose and elk, pp. 233-253. In: H. L. Rheingold (ed.), *Maternal Behavior in Mammals*. New York: Wiley.
- ALTMANN, S. A. 1962. A field study of the sociology of rhesus monkeys *macaca mulatta*. *Annals of the New York Academy of Sciences* **102**: 338-435.
- ATKINSON, J. M. (ed.) 1958. *Motives in Fantasy, Action and Society*. Princeton, NJ: Van Nostrand.
- BALDWIN, J. D. 1969. The ontogeny of social behavior of squirrel monkeys (*Saimiri sciureus*) in a semi-natural environment. *Folia primatologica* **11**: 35-79.
- BETTELHEIM, B. 1969. *Children of the Dream*. New York: Macmillan.
- BISCHOF, N. 1972. Inzuchtbarrieren in Säugetiersozietäten. *Homo* **23**: 330-351.

- BISCHOF, N. In press. A systems approach towards the functional connections of attachment and fear.
- In prep. *Das Rätsel Ödipus: Inzesttabu und Generationenkonflikt aus der Sicht der vergleichenden Verhaltensforschung*. Munich: Piper.
- BISCHOF, N., & BÖTTGER, H. In prep. Untersuchungen zur Familienauflösung bei Wildgänsen. *Zeitschrift für Tierpsychologie*.
- BISCHOF, N., & SCHOTTENLOHER, T. In prep. Group structure and motivational structure in mammalian societies.
- BOWLBY, J. 1969. *Attachment*. London: Hogarth Press.
- BRÜCKNER, J. H. 1933. Untersuchungen zur Tiersoziologie, insbesondere zur Auflösung der Familie. *Zeitschrift für Psychologie* **128**: 1–110.
- CAILLOIS, R. 1959. *L'homme et le sacré*. Glencoe, Ill.: Free Press.
- CARPENTER, C. R. 1940. A field study in Siam of the behavior and social relations of the gibbon. Later published in: Carpenter (ed.). Op. cit., pp. 145–271.
- 1942a. Sexual behavior of free-ranging rhesus monkeys: Specimens, procedures and behavioral characteristics of œstrus. Later published in: Carpenter (ed.). Op. cit., pp. 289–319.
- 1942b. Sexual behavior of free-ranging rhesus monkeys: Periodicity of œstrus, homosexual, auto-erotic and non-conformist behavior. Later published in: Carpenter (ed.). Op. cit., pp. 319–342.
- 1965. The howlers of Barro Colorado Islands, pp. 250–292 in: DeVore (ed.). Op. cit.
- CARPENTER, C. R. (ed.) 1964. *Naturalistic Behavior of Nonhuman Primates*. University Park, Pa.: Pennsylvania State University Press.
- CAUGHLEY, G. 1964. Social organization and daily activity of the red kangaroo and the grey kangaroo. *J. Mammal.* **45**: 429–436.
- CHANCE, M. R. A. 1967. Attention structure as the basis of primate rank orders. *Man* **2**: 503–518.
- CHANCE, M. R. A., & JOLLY, C. 1970. *Social Groups of Monkeys, Apes, and Men*. New York: Dutton; London: Cape, 1971.
- COHEN, Y. 1964. *The Transition from Childhood to Adolescence*. Chicago, Ill.: Aldine.
- COULT, A. 1963. Causality and cross-sex prohibitions. *American Anthropologist* **65**: 266–277.
- DARLING, F. F. 1951. *A Herd of Red Deer*. London: Oxford University Press.
- DE HEUSCH, L. 1958. *Essais sur le symbolisme de l'inceste royal en Afrique*. Brussels: Université Libre de Bruxelles.
- DEVORE, I. (ed.) 1965. *Primate Behavior*. New York: Holt, Rinehart and Winston.
- EAST, E. M. 1937. Heterosis. *Genetics* **21**: 375 et seq.
- EIBL-EIBESFELDT, I. 1951. Beobachtungen zur Fortpflanzungsbiologie und Jugendentwicklung des Eichhörnchens. *Zeitschrift für Tierpsychologie* **8**: 370–400.
- 1953. Zur Ethologie des Hamsters (*Cricetus cricetus* L.). *Z. Tierpsychologie* **10**: 2040–2054.
- 1958. Das Verhalten der Nagetiere. In: G. H. Helmcke, H. von Lengerken, and D. Starck (eds.), *Handbuch der Zoologie* **10** (13): 1–88. Berlin: Gruyter.
- EISENBERG, J. F. 1966. The social organization of mammals, pp. 1–83 in: G. H. Helmcke, H. von Lengerken, D. Starck (eds.), *Handbuch der Zoologie*. Band 8. Berlin: Gruyter.
- ELLIS, H. 1906. *Sexual Selection in Man*. Philadelphia, Pa.: F. A. Davis.
- EPPLÉ, G. 1967a. Soziale Kommunikation bei *callithrix jacchus* Erxleben 1777, pp. 247–254 in: D. Stark, R. Schneider, H. J. Kuhl (eds.), *Neue Ergebnisse der Primatologie*. Stuttgart: Fischer.
- 1967b. Vergleichende Untersuchungen über Sexual- und Sozialverhalten der Krallenaffen (*Hapalidae*). *Folia primatologica* **7**: 37–65.
- 1970. Maintenance, breeding and development of marmoset monkeys (*callithricidae*) in captivity. *Folia primatologica* **12**: 56–76.

## Comparative Ethology of Incest Avoidance

- ESTES, R. D. 1969. Territorial behavior in the wildebeest (*Conochaetes taurinus* Burchell 1823). *Z. Tierpsychologie* **26**: 284–370.
- ETKIN, W. (ed.) 1964. *Social Behavior and Organization among Vertebrates*. Chicago, Ill.: University of Chicago Press.
- EWER, R. F. 1968. *Ethology of Mammals*. London: Logos Press.
- FISCHER, H. 1965. Das Triumphgeschrei der Graugans. *Zeitschrift für Tierpsychologie* **22**: 247–304.
- FORTUNE, R. 1932. Incest, pp. 620–622 in: E. R. A. Seligman (ed.), *Encyclopedia of the Social Sciences*. Vol. 7. London: Macmillan.
- FOX, R. 1962. Sibling incest. *British Journal of Sociology* **13**: 128–150.
- 1967. *Kinship and Marriage*. Harmondsworth: Penguin.
- FRAZER, J. 1910. *Totemism and Exogamy*. Vol. 1–4. London: Macmillan.
- FREUD, A. 1936. *Das Ich und die Abwehrmechanismen*. English trans. *The Ego and the Mechanisms of Defence*. London: Imago, 1937.
- FREUD, S. 1924. Totem and Tabu. *Gesammelte Schriften*. Vol. X. Leipzig-Zürich: Internationaler Psychoanalytischer Verlag. English trans. *Totem and Taboo*. Standard Edition, Vol. XIII. London: Hogarth.
- GOODALL, J. 1965. Chimpanzees of the Gombe Stream Reserve, pp. 53–110 in: DeVore (ed.). Op. cit.
- 1967. *My Friends the Wild Chimpanzees*. New York: National Geographical Society.
- GOODALL, J. VAN LAWICK 1967. Mother-offspring relationship in free-ranging chimpanzees, pp. 287–347 in: D. Morris (ed.), *Primate Ethology*. London: Weidenfeld and Nicolson.
- 1971. *In the Shadow of Man*. London: Collins.
- GUNDLACH, H. 1968. Brutfürsorge, Verhaltensontogenese und Tagesperiodik beim europäischen Wildschwein. *Zeitschrift für Tierpsychologie* **25**: 955–995.
- GRZIMEK, B. (ed.) 1969. *Tierleben*. Band 10 (Säugetiere, Teil 1), Band 13 (Säugetiere, Teil 4). Zürich: Kindler.
- HALL, K. R. L. 1968. Behavior and ecology of the wild patas monkey in Uganda, pp. 32–120 in: Jay (ed.). Op. cit.
- HAMPTON, H., & TAYLOR, A. C. 1970. *Gonadal Development in Marmosets*. (Paper given at the Third International Congress of Primatology, Zürich.)
- HARTMANN, M. 1956. *Die Sexualität*. Stuttgart: Fischer.
- HEINROTH, O. 1911. Beiträge zur Biologie, namentlich Ethologie und Psychologie der Anatiden, pp. 589–702 in: H. Schalow (ed.), *Verhandlungen des 5. Internationalen Ornithologenkongresses in Berlin, 1910*. Berlin: Deutsche Ornithologische Gesellschaft.
- HENDRICH, H., & HENDRICH, U. 1971. *Dikdik und Elefanten*. Munich: Piper.
- HOBHOUSE, L. 1912. *Morals in Evolution*. London: Chapman and Hall.
- HOLST, D. VON 1969. Sozialer Stress bei Tupaia (*Tupaia belangeri*). *Z. vergl. Physiologie* **63**: 1–58.
- 1972. Renal failure as the cause of death in *Tupaia belangeri* exposed to persistent social stress. *J. comp. Physiol.* **78**: 236–273.
- HOMANS, G. C., & SCHNEIDER, D. M. 1955. *Marriage, Authority and Final Causes*. Glencoe, Ill.: Free Press.
- IMANISHI, K. 1965. The origin of the human family—a primatological approach. In: K. Imanishi and S. A. Altmann (eds.), *Japanese Monkeys*. Atlanta: privately published.
- JAY, P. 1963. The Indian langur monkey (*Presbytis entellus*), pp. 114–123 in: Southwick (ed.). Op. cit.
- JAY, P. (ed.) 1968. *Primates*. New York: Holt, Rinehart and Winston.
- KAUFMANN, J. H. 1962. Ecology and social behavior of the coati (*Nasua narica* on Barro Colorado Islands, Panama. *University of California Publications in Zoology* **60**: 95–222.

## Norbert Bischof

- KAUFMANN, J. H. 1965. A three-year study of mating behavior in a free-ranging band of rhesus monkeys. *Ecology* **46**: 500–512.
- KLINGEL, H. 1967. Soziale Organisation und Verhalten freilebender Steppenzebras. *Zeitschrift für Tierpsychologie* **24**: 518–624.
- KOFORD, C. B. 1963. Rank of mothers and sons in bands of rhesus monkeys. *Science* **141**: 356–357.
- 1965. Population dynamics of rhesus monkeys on Cayo Santiago, pp. 160–175 in: DeVore (ed.). Op. cit.
- KORTMULDER, K. 1968. An ethological theory of the incest taboo and exogamy. *Current Anthropology* **9**: 437–449.
- KUMMER, H. 1957. Soziales Verhalten einer Mantelpaviangruppe. *Schweizerische Zeitschrift für Psychologie und ihre Anwendungen* **33**: 1–91. (Beiheft.).
- 1968a. *Social Organization of Hamadryas Baboons*. Basel: Karger.
- 1968b. Two variations in the social organization of baboons, pp. 293–312 in: Jay (ed.). Op. cit.
- 1971. *Primate Societies*. Chicago, Ill.: Aldine.
- LENZ, W. 1962. Grundlagen der genetischen Beratung, pp. 3–12 in: F. Linneweh (ed.). *Erbliche Stoffwechselkrankheiten*. Munich: Urban Schwarzenberg.
- LÉVI-STRAUSS, C. 1970. *The Elementary Structures of Kinship*. London: Social Science Paperbacks.
- LINDZEY, G. 1967. Some remarks concerning incest, the incest taboo and psychoanalytic theory, *American Psychologist* **22**: 1051–1059.
- LORENZ, K. 1943. Die angeborenen Formen möglicher Erfahrung. *Zeitschrift für Tierpsychologie* **5**: 235–409.
- 1965. *Das sogenannte Böse*. Vienna: Borotha Schoeler. English trans. *On Aggression*. London: Methuen, 1966.
- LOWIE, R. H. 1920. *Primitive Society*. New York: Boni and Liveright.
- LUBBOCK, J. 1870. *The Origin of Civilization and the Primitive Condition of Man*. London: Longmans.
- MCLENNAN, J. F. 1896. *An Inquiry into the Origin of Exogamy*. London: Macmillan.
- MAINE, H. J. s. 1883. *Dissertations on Early Law and Custom*. London: John Murray.
- MAISCH, H. 1968. *Inzest*. Hamburg: Rowohlt.
- MALINOWSKI, B. 1927. *Sex and Repression in Savage Society*. London: Kegan Paul.
- 1931. Culture, pp. 621–646 in: E. R. A. Seligman (ed.), *Encyclopaedia of the Social Sciences*. Vol. 4. London: Macmillan.
- MAYR, E. 1963. *Animal Species and Evolution*. Cambridge, Mass.: Harvard University Press.
- MEAD, M. 1935. *Sex and Temperament in Three Savage Societies*. New York: Mentor Books.
- MISSAKIAN, E. A. (n.d.) Genealogical mating activity in free-ranging groups of rhesus monkeys (*Macaca mulatta*) on Cayo Santiago. MS. New York: The Rockefeller University.
- MORGAN, L. H. 1877. *Systems of Consanguinity and Affinity in the Human Family*. Washington, DC: Smithsonian Institution.
- MURDOCK, J. P. 1949. *Social Structure*. New York: Macmillan.
- NICHOLSON, B. D. 1955. The African elephant. *African Wild Life* **9**: 31–40.
- PARSONS, T. 1954. The incest taboo in relation to social structure and the socialization of the child. *British Journal of Sociology* **5**: 101–117.
- PARSONS, T., & BALES, R. F. 1955. *Family, Socialization and Interaction Process*. Glencoe, Ill.: Free Press.
- PETTER, J. J. 1965. The lemurs of Madagascar, pp. 292–322 in: I. DeVore (ed.), *Primate Behavior*. New York: Holt, Rinehart & Winston.
- RASA, A. 1972. Aspects of social organization in captive dwarf mongooses. *J. Mammal.* **53**: 181–185.

## Comparative Ethology of Incest Avoidance

- RASA, A. in press. Intra-familial sexual repression in the dwarf mongoose (*Helogale parvula*). *Naturwissenschaften*.
- REY, K. G. 1969. *Das Mutterbild des Priesters*. Einsiedeln: Benziger.
- REYNOLDS, H. C. 1952. Studies on reproduction in the opossum (*Didelphis virginiana*), *University of California Publications in Zoology* **52**: 223.
- REYNOLDS, V. 1968. Kinship and the family in monkeys, apes and man. *Man* **2**: 209–223.
- REYNOLDS, V., & REYNOLDS, F. 1965. Chimpanzees of the Budongo forest, pp. 368–425 in: DeVore (ed.). *Op. cit.*
- SADE, D. S. 1968. Inhibition of son–mother mating among free-ranging rhesus monkeys. *Science and Psychoanalysis* **12**: 18–38.
- SCHALLER, G. B. 1967. *The Deer and the Tiger*. Chicago, Ill.: University of Chicago Press.
- SCHESLSKY, H. 1955. Die sozialen Formen der sexuellen Beziehungen, pp. 241–278 in: H. Giese (ed.), *Die Sexualität des Menschen*. Stuttgart: Enke.
- SCHULL, W. J., & NEEL, J. V. 1965. *The Effects of Inbreeding on Japanese Children*. New York: Harper and Row.
- SELIGMAN, B. Z. 1929. Incest and descent. *Journal of the Royal Anthropological Institute* **54**: 231–272.
- 1950. The problem of incest and exogamy: A restatement. *American Anthropologist* **52**: 309–316.
- SHEPHER, J. 1971. *Self-imposed Incest Avoidance and Exogamy in Second Generation Kibbutz Adults*. New Brunswick, NJ: Rutgers University. (Unpublished doctoral thesis.)
- SIDLER, N. 1971. *Zur Universalität des Inzesttabu*. Stuttgart: Enke.
- SLATER, M. K. 1959. Ecological factors in the origin of incest, *American Anthropologist* **61**: 1042–1059.
- SOUTHWICK, C. H. (ed.) 1963. *Primate Social Behavior*. New York: Van Nostrand.
- SPENCER, H. 1877. *Principles of Sociology*. London: Williams and Norgate.
- SPIRO, M. E. 1958. *Children of the Kibbutz*. Cambridge, Mass.: Harvard University Press.
- SUGIYAMA, Y. 1967. Social organization in langurs, pp. 221–236 in: S. A. Altmann (ed.), *Social Communication among Primates*. Chicago, Ill.: University of Chicago Press.
- TOKUDA, K. 1961–62. A study of the sexual behavior in a Japanese monkey troop. *Primates* **3**: 1–40.
- TYLOR, E. B. 1888. On a method of investigating the development of institutions: Applied to laws of marriage and descent. *Journal of the Anthropological Institute* **18**: 245–269.
- VOGEL, C. 1969. Sozialverhalten indischer Affen. *Naturwissenschaftliche Rundschau* **22**: 383–389.
- WESTERMARCK, E. 1889. *The History of Human Marriage*. New York: Allerton Press.
- 1934. Recent theories of exogamy. *Sociological Review* **26**: 22–44.
- WHITE, L. A. 1948. The definition and prohibition of incest. *American Anthropologist* **50**: 416–435.
- 1959. *The Evolution of Culture*. New York: MacGraw-Hill.
- WOLF, A. P. 1966. Childhood association, sexual attraction and the incest taboo: A Chinese case. *American Anthropologist* **68**: 885–988.
- 1968. Adopt a daughter-in-law, marry a sister: A Chinese solution of the incest problem. *American Anthropologist* **70**: 864–874.
- WYSS, E. 1968. *Strukturen der Moral*. Göttingen: Vandenhoeck und Ruprecht.
- YOSHIBA, K. 1968. Local and intertroop variability in ecology and social behavior of common Indian langurs, pp. 217–242 in: Jay (ed.). *Op. cit.*
- ZIMEN, E. 1971. *Wölfe und Königspudel*. Munich: Piper.

© Norbert Bischof 1975