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Biological bases of age specific behaviour- the companions in man's world.

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Summary. Konrad Lorenz gave a special meaning to the concept of "*Kumpan*" ("companion") to describe and discuss characteristic patterns in the social relations among birds and their change over the life cycle. This specific *Kumpan* concept can be applied to the human life cycle and integrated with Erik H. Erikson's concept of the eight stages of life, helping us in our understanding of human development.

Key words. Bond, companion, *Kumpan*, life cycle, stages of life.

Introduction

When we think about age-specific behaviour and the life cycle, and how to divide the continuum between birth and death into discrete stages, infancy, youth, mature life and old age come to mind. Thinking about these stages must have occupied the human mind since ancient times; one of the oldest and most widely known riddles deals with this issue, namely the riddle of the Sphinx as posed to Oedipus (according to Sophocles). The Sphinx asked what creature changes his nature, having two, three or four legs. My favourite version of this riddle stems from Mongolia (Latham 1859, p. 325) and goes like this: *Morning, four; noon, two; evening, three*. The answer, which saved Oedipus' life, is of course *MAN, crawling on four legs as an infant, then rising up to two, and finally using a stick as a third leg in old age* (Lesky 1928). The number of legs used for locomotion is a convenient behavioural variable that can be used to separate two relevant stages from the rest of life, namely infancy and old age, e.g., if we plot the percentages of individuals using 4, 2 and 3 legs. One more division, at puberty, gives us two more stages, namely youth and maturity. These four may be all the stages we really need (Fig. 1).

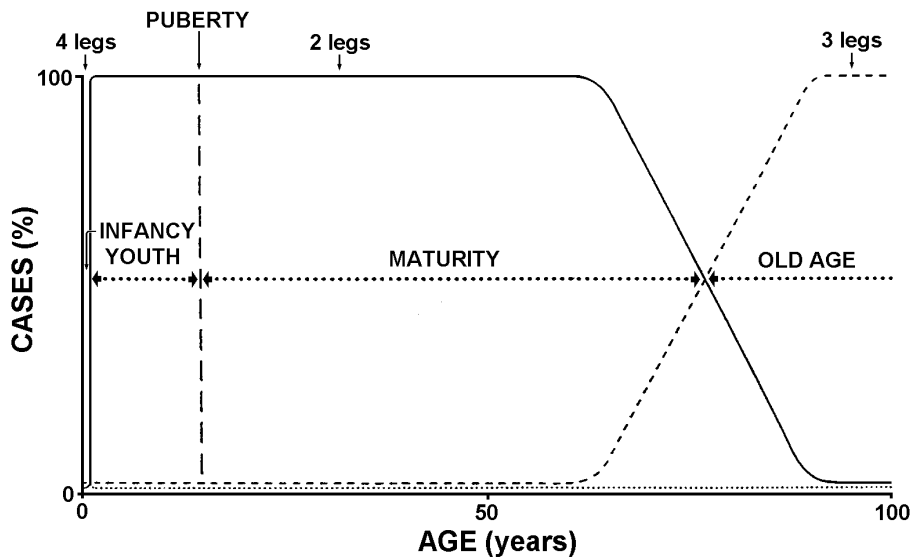


Fig. 1. Life stages, as defined by the frequency of locomotor behaviour (number of legs used) and by sexual behaviour (puberty).

The "number of legs used for locomotion" as biological variable can be replaced by other and possibly more relevant criteria which cut the thread of life at about the same places. The thesis I pose in this presentation is that among the most relevant biological variables which define the life stages of man are the various *bonds with other conspecifics, based on kinship, social utility and reproduction*. Since the first broad theoretical framework for the biological basis of bonding among creatures was presented by Konrad Lorenz in his paper "*Der Kumpan in der Umwelt des Vogels - Der Artgenosse als auslösendes Moment sozialer Verhaltensweisen*"¹, I shall first review relevant aspects of this paper, and then apply these concepts to the human stages of life.

The companion in the bird's world

Konrad Lorenz's 1935 paper is among the most widely known and cited of his papers. Even though it is the first presentation of his revolutionary views of the evolution of behaviour, it already exposes his concern for the sound epistemological basis of his considerations and his amazing wealth of factual information about animal behaviour. The central thesis of this paper is that although Darwinian theory of evolution would lead us to expect that each species has an instinctive, innate ability to recognize a conspecific in all situations and respond accordingly, very few birds actually exhibit such an ability (p. 139). Lorenz phrases the problem in a Kantian frame of reference ("*das Ding an sich*") and speaks even of a "*Dingidentität des Artgenossen*" (p. 118; "thing identity of the conspecific"). Since in many species such a unitary identity of "the conspecific" is absent, he

proposes that not one but five different functional and cognitive categories of the conspecific exist. Using the term "*Kumpan*", coined by Jakob von Uexküll, he labeled these categories *ElternKumpan*, *KindKumpan*, *GeschlechtsKumpan*, *sozialer Kumpan* und *GeschwisterKumpan* (parental companion, infant companion, sexual companion, social companion, sibling companion; Lorenz 1970). As a definition, I propose that a *Kumpan* of a particular animal is an individual object - usually another organism and under natural conditions most commonly a conspecific - to whom a specific bond has been formed and who is addressed by - and interacts with - the animal in a specific functional context.

In an abbreviated English version of his 1935 paper Lorenz himself translated *Kumpan* as "companion" (Lorenz 1937b), but later realized that

The German word '*Kumpan*' denotes a concept somewhat different from that associated with the word 'companion'. The German word has a slightly derogatory meaning; a '*Kumpan*' is not the companion of your soul but a fellow who shares your pleasure in hunting, drinking, frolicking, etc." (Lorenz 1970, p. 374).

The American "buddy" and the British "mate" are closer in meaning. Even though Lorenz himself introduced the translation "companion" in his 1937 paper, I prefer to let the term stand in its original German, as introduced by Lorenz in 1935. I must emphasize, however, that in doing so I do not intend to carry over any derogatory meaning, especially when I reapply the term to the human case in which it had its origin. This is notwithstanding the fact that a fellow who merely shares one's pleasure "in hunting, drinking, frolicking, etc." (Lorenz 1970, p. 374), is a particular case of social *Kumpan*.

The epistemological basis is laid in the first sentence of the *Kumpan* paper: "The concept of an *object* in our environment arises from a process of compilation of stimuli emanating from one given thing, by means of which we relate the assembled stimuli to that particular source of stimulation (the 'thing')" (Lorenz 1935, English translation 1970, p. 101). This theoretical approach, which foreshadows Lorenz's concern for the biological basis of epistemology, owes much to Jakob von Uexküll, who very strongly influenced Lorenz in such issues. Only in matters of evolution did they disagree: von Uexküll ridiculed Darwin's theory of evolution (e.g., 1920, p. 230) while Lorenz accepted it as a matter of fact.

Lorenz had at first expected

that higher animals, to which we must attribute the concrete perception of objects in their environment on grounds of general behaviour, would also perceive the stimulatory sources related to all their instinctive behaviour patterns as objects. One is particularly prone to make this supposition in cases where a conspecific represents the object in a particular response. Strange as it may seem, in many cases a cohesive identification of the conspecific as one object linking several behavioural complexes cannot be demonstrated. (1935, English translation 1970, p. 104).

Instead, he finds that

the conspecific represents, with each functional system (*Funktionskreis* in Uexküll's terminology) in which it appears as a reciprocating object, a separate object in the environment of the subject. The peculiar role which the conspecific thus plays in the bird's environment has been neatly described by J. von Uexküll as that of a 'companion'. By 'companion' we of course understand a fellow human being to whom we are bound only by the links of a single functional system, which themselves have little to do with higher emotional impulses, as is the case with a drinking or (at the outside) a hunting companion." (1935, English translation 1970, p. 108; compare with Lorenz's note in 1970, quoted on page 153 of this paper).

Even though Lorenz's classification of *Kumpane* is based solely on functional relations between the interacting conspecifics (parent and infant, infant and parent, mate and mate, etc.), his proposal of the *Kumpan* concept is closely tied to his concepts of *angeborenes auslösendes Schema* (precursor of the "Innate Releasing Mechanism", IRM), *Auslöser* (social releaser) and *Prägung* (imprinting). He proposes that the object serving as *Kumpan* is recognized on the basis of features that fit a specific IRM or that were acquired by means of imprinting, and that this object serves as releaser for several specific "performances" (*Leistungen*) of behaviours. In extreme cases, particular behaviours are elicited by different releasers of the same object, as if each releaser were a separate piece of a mosaic, so that the apparent unity of one *Kumpan* is an illusion. Here,

the conspecific represents a separate environmental 'thing', a separate companion in the functional system of each individual instinctive pattern which is related to a particular releasing mechanism. Strictly speaking, it is not permissible to refer to 'parental companion' and the like with such birds, as will be done in the following discussion, since the parental bird can represent in the environment of the offspring a 'feeding companion', a 'warming companion', a 'guiding companion' and various other autonomous entities. (Lorenz 1935, English translation 1970, p. 134).

But for many higher animals particular types of *Kumpan* appear as more unitary objects, presumably because these animals have a more highly-developed capability for individual recognition.

Some historical perspectives of the *Kumpan*

For historical perspective, I should mention that the original concept was apparently developed by von Uexküll and Lorenz in personal discussions and exchanges of letters. The first use of the term *Kumpan* I found in print (Uexküll & Kriszat 1934) is illustrated with sketches by Lorenz, showing his jackdaw "Tschock" and her four different *Kumpane* (*Mutter-, Liebes-, Adoptiv- und FlugKumpan*; mother-, love-, adoptive- and flight-*Kumpan*). Lorenz dedicated his 1935 paper to Jakob von Uexküll in commemoration of his seventieth birth-

day, and at that time renamed the functional categories according to the object of bonding as parental, sexual, infant and social *Kumpan* and added the sibling *Kumpan* as a new type. Considering that the *Kumpan* paper established Lorenz's scientific reputation and through its early translation into English spread his ideas internationally, it is surprising that neither the term *Kumpan* (companion) nor the specific thesis connected with this term, namely, that a unitary concept of conspecific does not exist in many birds, were elaborated, commented on, or even mentioned in his later writings. The paper was reprinted much later in a collection of his papers (Lorenz 1965) and an unabbreviated English translation was also published (Lorenz 1970). The term *Kumpan*, however, was abandoned by Lorenz and is conspicuously absent in his next famous paper on "The establishment of the instinct concept" (1937a; 1970).

The cause of this change of mind was apparently Tinbergen's criticism of the *Kumpan* concept, which is on record only in a few sentences of his 1948 paper on social releasers, a critique aimed primarily at Lorenz's term "*angeborenes auslösendes Schema*". Tinbergen objected because "*Schema*" could be mistaken for belonging

to the object in the outer world to which the animal is reacting. It is also this reason that the term 'releasing mechanism' is to be preferred to the word 'Schema' with its more or less mystical tinge. It is for the same reason that the word *Kumpan* (companion) as originally used by Lorenz has to be either carried *ad absurdum* or abandoned... This was, indeed, clearly recognized by Lorenz himself; in his later papers he has abandoned the concept of '*Kumpan*' and has also accepted the idea that the 'releasing Schema' belongs to a reaction, not to an object. (Tinbergen 1948, p. 31).

I have discussed this shift in emphasis away from *the object in the outside world* and toward *the action of the animal* in the context of the concepts "Schema" and "releasing mechanism" in detail (Schleidt 1962) and should add the following only as an afterthought: I think this shift reflects the tendency at that time to emphasize the action (Instinktbewegung 1937a) as something "objective" to be described, documented and experimented with, and to avoid speculative, hypothetical objects in an Uexküllian Umwelt of another animal. Lorenz returned to the problem of how the world is viewed in connection with his encounter with Kant's philosophy after he became professor in Königsberg. The resulting ideas are discussed in his 1943 paper and more extensively in his book "Behind the Mirror" (1977).

When Lorenz reviewed his *Kumpan* Paper in his first postwar lectures in Vienna in March 1949, ² he put great emphasis on imprinting but spent very little time discussing the theoretical significance of the *Kumpan* concept. He gave only a listing of the different types of *Kumpan*, and added: "I find interesting something funny which occurred to me only now: what's missing is the rival who elicits fighting". The term *Kumpan* continued to be used by Lorenz's staff as jar-

gon and was mentioned in reviews (e.g., Tembrock 1961, Eibl-Eibesfeldt 1987), but otherwise rarely made it into print (e.g., Seitz 1950).

An example for this disregard for the *Kumpan* concept is found in our discovery in Seewiesen in the late fifties that a newly hatched baby turkey is characterized solely by its calls, while older conspecifics are recognized mainly by their visual appearance. A deaf turkey hen, who grew up socially integrated within her flock, mated, laid fertile eggs and incubated, was unable to recognize her own newly-hatched babies and instead treated them as she would any small predator approaching the nest: she killed them without hesitation (Schleidt, Schleidt & Magg 1960). Further experiments with silent and peeping dummies clearly showed that on the basis of their calling newly hatched turkeys form a separate category, distinct from other conspecifics, supporting Lorenz's 1935 hypothesis that *KindKumpan* and *sozialer Kumpan* are distinct entities. However, we completely ignored this aspect and emphasized only the significance of auditory releasers for the turkey's ability to differentiate between its own young and a predator approaching the nest.

After I returned to Austria in 1985 and regained the opportunity to visit Konrad Lorenz on a regular basis, I very much looked forward to discuss his *Kumpan* concept with him, especially in light of new findings concerning individual recognition of conspecifics (e.g., Rolls 1984) and classification of natural objects (e.g., Herrnstein 1985). I tried to bring up the topic of *Kumpan* on several occasions, but Lorenz evaded the issue. When I mentioned this to colleagues, Jürgen Nicolai remembered a comment by Konrad Lorenz in the fifties: "Alas, the *Kumpan*, that stems from the stone age of ethology".

I rediscovered the *Kumpan* concept in the context of attempting a description of the individual organism's environment in terms of patterns (Schleidt 1985), applying earlier methods of describing behaviour patterns (Schleidt & Crawley 1980) and of pattern detection, description and classification in general (Duda & Hart 1973). To keep this complex problem as simple as possible, I started by focusing my attention on the environment of a newly-hatched bird or newborn mammal. I assume that such an organism is endowed with a basic ability to detect and classify patterns and that this ability becomes progressively refined as additional patterns are processed. Thus we can ask: of what kind are the first patterns handled by a naive organism in his natural environment, and how do his skills in dealing with different kinds of patterns develop? The kernel on which this process crystallizes is in many cases an "object" that emerges as a highly significant and conspicuous pattern from the noisy background of its environment. This is most commonly the mother, who becomes the object of imprinting, the powerful process which secures the first social bond. This first object of social attachment, the *Eltern Kumpan*, is likely to play a central role in the whole process of cognitive development in higher organisms, including our own species. Individuals that are deprived of the opportunity to form a bond with

an *ElternKumpan* or are impaired in their interactions suffer great damage (Lorenz 1935, 1988, Spitz 1965, Bowlby 1969). Bowlby's work on attachment and loss in the child (1969, 1973, 1980) has especially inspired close scrutiny of bonding (e.g., Parkes & Stevenson-Hinde 1982; Hinde 1982, Weiss 1982).

It is well known that in many species siblings are recognized at the same time as or soon after the bond with the parent(s) has been formed. The *Geschwister Kumpan* becomes then the second type of object that helps to secure the existence of the individual in an unpredictable and potentially dangerous environment. In interactions with siblings the young organism further develops his abilities to recognize and interact with conspecifics; these abilities are indispensable for later social and/or sexual attachments (e.g., Eibl-Eibesfeldt 1963, 1987). Thus, the sibling group becomes the cradle of sociality, in many species preceding eventual bonding with *soziale Kumpane*, *GeschlechtsKumpan* and finally, *KindKumpane*. Seen in this sequence the *Kumpane* imply a series of developmental stages, and it was in this context that I was reminded of Erik H. Erikson's *Childhood and Society* (1950/1963). To my surprise, I learned that Lorenz and Erikson were familiar with each other's work and were apparently good friends. This fact inspired me to search for corresponding elements in Lorenz's *Kumpan* concept and Erikson's "life cycles" and subsequently, to write this paper.

***Kumpane* define life stages**

Let me return to the basic problem of detecting and distinguishing among behaviour patterns, a problem I have touched upon in the context of examining a *Kumpan* as an object in the environment. When I have talked or written about "a behaviour pattern", I have thought primarily of a relatively short "piece" of the string of life, marked and separated from the rest by a more or less distinct beginning and end. By "relatively short", I mean lasting a fraction of a second to an hour, with a mode around a few seconds, in the order of magnitude of our attention span. The arbitrariness of such limits first occurred to me when I tried to describe behaviour more generally in terms of patterns changing over time and found no upper limit for the duration of a behaviour pattern. In fact, it is difficult and in some cases impossible to sharply distinguish between "behaviour" and "growth" (Schleidt & Crawley 1980). In general a growth process occurs only once and in a specific sequence, while a behaviour pattern can be performed several times and in different contexts. For example, puberty in humans occurs only once between childhood and adolescence while sexual intercourse can be repeated many times. Note, however, that some animals show an annual reproductive cycle, and that an octopus can mate only once. If we accept the similarity between behaviour and growth, we can view behavioural development

as a set of "nested processes" in which each piece is a developmental process composed of other developmental processes or behaviours. Going to an extreme, we can consider an entire life as one developmental process composed of behaviour patterns of varying length.

In this sense, a relatively long piece of the string of life can be viewed as one behaviour pattern, e.g., the migratory phase in Spring or Fall, the reproductive season, etc. Keeping this use of the concept of behaviour pattern in mind allows us to discern a new and very interesting aspect of the *Kumpan* concept, namely, that particular developmental stages in the life of higher animals are dominated by one of Lorenz's five types of *Kumpan*: Infancy is characterized by *ElternKumpane*, childhood by *GeschwisterKumpane*, adolescence by *SozialKumpane*, the courtship phase by *GeschlechtsKumpane* and the reproductive phase by *KindKumpane*. This particular sequence is not fixed in an absolute sense, but it has been shown that deficiencies at an early stage can result in difficulties or inabilities in bonding at a later stage (Eibl-Eibesfeldt 1963, Harlow & Harlow 1962). These five stages, each identifies with a particular type of *Kumpan*, can be matched with several of "the eight stages of life" proposed by Erik H. Erikson (1950, 1963). Erikson's first five stages correspond to Sigmund Freud's oral, anal, phallic, latency and genital phases; his contribution was not only to add the stages of young adulthood, adulthood and old age, but also to link especially the first phases to erogenous zones and to propose an underlying epigenetic principle, namely, that the problems of one stage have to be resolved in a "crisis" before the problems of the next stage can be tackled. For a side-by-side

Table 1

Sigmund Freud	Erik H. Erikson	Generic Term	K. Lorenz
ORAL year 1	INFANCY	INFANCY	Elternkumpan
ANAL year 3	EARLY CHILDHOOD		
PHALLIC up to 5, 6 years	PLAY AGE	CHILDHOOD	Geschwi- sterkumpan
LATENCY	SCHOOL AGE		Sozialkumpan
GENITAL up to legal age,	ADOLESCENCE years 18-21	ADOLESCENCE	
	YOUNG ADULTHOOD	COURTSHIP PHASE	Geschlechts- kumpan
duration of one generation	25 to 33 years		
	ADULTHOOD	REPRODUCTIVE PHASE	Kindkumpan
up to retirement age,	years 60 to 70		
	OLD AGE		

comparison of the stages see Table 1; for a more elaborate comparison of the stages of Freud, Erikson, Piaget, Mahler and Bowlby, see Kaplan & Sadock (1988). Obviously, the placement of the categories *GeschwisterKumpan* and *SozialKumpan* in relation to the phases of Freud and the stages of Erikson is somewhat arbitrary, and will depend on the particular case or species under consideration. In many higher animals, the bond among siblings precedes bonding to *SozialKumpane*, so that the sibling group becomes the cradle of sociality. In the human case, as in most primates, all first-born infants establish a social bond to young or adult kin (cousins, aunts, uncles, etc.) before a sibling bond. Even those born second or later are likely to bond in this sequence, especially when the interbirth intervals are long. In fact, the concept of *GeschwisterKumpan*, as developed by Lorenz through his observations of corvine and anatine birds, does not fit the kind of bond that is characteristic for primates, and is irrelevant in animals lacking a sibling bond (e.g., eagles).

I think such differences do not invalidate my proposal to incorporate the concept of particular types of object relations and different types of bonds into a developmental sequence, but rather prove its heuristic value. These differences become obvious only when we dare to impose a hypothetical schema on our empirical data world and see where it fits and where it doesn't. That Erikson and Lorenz would agree with this attitude is illustrated well in the following quote, in which Erikson qualifies his own schema, which he had based on the shifting relevance of erogenous zones in the human infant:

There is another reason for proposing the schema's further discussion which I am not competent to make explicit, namely, my feeling that the relation of modes and zones points to a biological and evolutionary principle. Konrad Lorenz expressed this when in a meeting of the World Health Organization in Geneva he exclaimed: 'What irks me about the diagram which Erikson has just shown us demonstrating these differences is that it can be applied, with very little or no change, to animals which do not have, never have had, and never will have either a penis or a vagina. So the zone-theory certainly does not hold for these animals, but the principle of the diagram does. (p. 92, Erikson 1963).

Beyond Lorenz and Erikson

René Spitz (1945, 1965) was among the first to explore the bond between mother and infant, and this topic has subsequently drawn much attention (e.g., Bowlby 1969, 1973, 1980). Harry Stack Sullivan (1953) pointed to the important specific role of social interactions with compeers and peers of same and opposite sex during different cycle states. The transitions between stages and the place of attachment in human behaviour have been explored (Parkes 1971, Parkes & Stevenson-Hinde 1982). "Life-span developmental psychology" has become a field of its own. What is needed now is a comparative and multidisciplinary study of development (Baltes 1987, 1990). Even though it is generally agreed that there

are more or less discrete developmental stages and that social attachments vary in each stage, no attempt has been made, to my knowledge, to link each stage to a particular type of attachment, as I have done in my linkage of Erikson's stages with Lorenz's *Kumpane*.

The *Kumpan* concept, when applied to primates and especially to the human case, will lead to the definition of categories and features which go beyond what Lorenz saw in birds. Primates have evolved a special form of parental care characterized by a very intimate relation between a mother and the single infant she carries (a *Tragling* (Hassenstein 1973), *carryling*, literally, "one who is carried"). This "carrying relation" is likely to result in tighter bonding than one based on following and/or feeding. As multiple births are rare in primates, most infants of most primate species spend their *early* infancy almost exclusively with their mother and establish first social contacts with the mother's peers or with siblings much older than they are themselves. The avian *GeschwisterKumpan* corresponds in primates to a playmate who is not necessarily next of kin (*SpielKumpan*), while the relation among real siblings is often characterized by sibling rivalry as well as bonding. We are reminded of Lorenz's 1949 proposal to add a *Rivalen-Kumpan* (see p. 155 of this paper).

Another aspect of the *Kumpan* concept is the obvious asymmetry in the bond between male and female. Even though the cultural environment is likely to have a early and deep-reaching influence on the differences between sex roles there are clear indications for behavioural differences related to physiological, especially neural and hormonal differences. As an example in which cultural and other influences are intimately intertwined I mention the observation that in the age group of 6 to 18 girls significantly outnumber boys in their interest in and attachment to horses. Klopfer, Klopfer and Etemad (1981) speculate

that the horse may for some individuals serve as a substitute attachment figure during a developmental phase characterized by a gradual emancipation from attachment to parent figures and a corresponding move towards extrafamilial relationships" (p. 7).

Another striking sex difference, possibly related to the tendency toward polygynous mating systems in man, concerns the *number of sexual bonds* maintained. Males are often engaged in bonds with several females, while females often prefer to bond with a single male. This appears to be carried to the extreme in homosexual relations, where males go to one extreme of thousand of contacts, with little or no bonding, while females tend toward a stable pair bond. Why do such differences in the number of relations not exist in the parental bond? I haven't heard anyone claim that mothers tend to give preferential treatment to one particular child more often than fathers, in other words, that fathers bond evenly with all of their children while mothers can form a firm bond with only to one child at a time. There must be rather deep seated differences among the types of bonding and different types of *Kumpane* that require clarification on the cog-

nitive level of social objects and object relations. It may be necessary to add new categories of *Kumpane*, and new types of attachment. Konrad Lorenz, for example, played in my life the role of "mentor", a type of *Kumpan* intermediate between parent and social, resulting in master/apprentice relation. This relation differs, however, significantly from that between a master and his slave, or a leader and his follower, even though they are all modelled after the parent/infant case and, in the particular instance, one individual may personify several of these types. How does a cult figure and his or her followers relate to those just mentioned, and an idol and his or her fans? And, how about the variety of other social *Kumpane*, e.g., the trusted friend, coworker, neighbor, acquaintance, all the way to the mail man. Is there an infinite number of different types of social objects? Certainly not. The number of categories is limited, and they all converge toward a few central objects: mother, father, sibling, fellow human being, sex partner.

The discovery of neurophysiological correlates to social objects, notably in the case of face patterns (Perrett, Rolls & Caan 1982, Rolls 1984, Hasselmo, Rolls & Baylis 1989), has raised the question of what cognitive categories are represented at this level, e.g., whether the particular features of a specific social object, such as an individual's mother, are stored as one complex. Jokingly, someone referred to the neurons which are related to the storage of facial information as "grandfather neurons" and we should have the creative phantasy to think and speculate, how information concerning different types of *Kumpan* may be encoded in the brain.

Finally, the evolutionary aspects of the concepts of *Kumpan* and of life stages should be evaluated in view of the importance of next of kin for the genetic evolution of social behaviour (Hamilton 1964) and the resulting potential for parent-offspring conflict (Trivers 1974). One can now better understand why it is so important that different *Kumpane* (parent, infant, sibling, peer, mate) are treated differently, and why the problem of how an animal can distinguish between such particular types of *Kumpane* has gained additional significance. Although it is doubtful that many animal species have the perceptual and mental capacity to recognize and keep track of the various forms of relatedness, our own species is conspicuous in its universal awareness of kinship. Thus, Lorenz's *Kumpan*, which he created to better understand and explain the world of birds, should not only be applicable to the various forms of bonds in man, but also may well help us to better understand and explain a variety of biological problems.

Notes

1. English translation: "Companions as factors in the bird's environment - The conspecific as the eliciting factor for social behaviour patterns" (Lorenz 1970). he labeled these categories *ElternKumpan*, *KindKumpan*, *GeschlechtsKumpan*, *sozialer Kumpan* und *GeschwisterKumpan* (parental companion, infant companion, sexual companion, social companion, sibling companion; Lorenz 1970). As a definition, I propose that a *Kumpan* of a particular animal is an individual object--usually another organism and under natural condition most commonly a conspecific--to whom a specific bond has been formed and who is addressed by--and interacts with--this animal in a specific functional context.

2. Lecture notes of 4 and 11 March 1949 (9 pages); Archive, Konrad-Lorenz-Institute Altenberg.

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