

ARBEITSGEMEINSCHAFTEN

The Socio-Biology of Man

Chaired by: Diane McGUINNESS
Karl PRIBRAM

Session I. Introduction

This was a purely organizational session. Participants introduced themselves and the course was explained in format and in purpose.

Session II. Evolutionary Theory Part I an overview (D.McGuinness)

Evolutionary theory is based on the notion that Creationism, with each creature being separately created by a supreme being, is in error. This is because there is a relationship and a connectedness between species that implies a progression from simpler organisms to more complex. The essentials of evolutionary theory are:

1. Connectedness between species
2. Extremely long time periods for species to evolve
3. Unidirectional arrow of time

Darwin's major mechanisms by which this process occurs are:

1. Diversity or variety of a biological origin within each species (Darwin spoke of "memes" as his notion of what we now understand as genes.)
2. Natural selection of properties by virtue of fitness to an ecological niche.
3. In humans, natural selection is Lamarkian because cultures feed back upon natural selection.

and that they "know" this in the absence of data from the social sciences.

Part II. Twentieth century departures from evolution (K. Pribram)

Twentieth century science has led us beyond the limits of evolutionary theory. The major contributors to this shift have been Jantsch, Prigogine, Bohm, and Pribram.

Evolutionary theorists proposed an essentially closed system in which it has become fashionable to search for ultimate and final causes. In traditional evolutionary thought, the starting point is stability and this leads out to adaptation and back to stability, essentially a negative feed-back process. Newer theories argue that systems are open and that temporary states "far from equilibrium" exist which are extremely difficult to predict.

Darwin's central concern, as opposed to much of what has followed, was that of diversity rather than origins or morphology. Prigogine has described Darwin's quest as one of "fittingness" rather than fitness. The question is: How can such a variety of forms exist in nature, given the improbabilities of the existence?

The major turning point of twentieth century thinking has come with the recognition of two orders of reality. One domain is the space/time domain and the other is composed of energy and momentum. Phenomena occurring in each domain can be studied together, but the relationship between the two orders is unamenable to direct and scientific measurement. You cannot measure a particle and wave at the same moment. Bohr saw these two domains as complementary and more recently Gabor and others that followed (Bohm, Chew, Stapp, Pribram, etc.) have recognized that these two domains can be related by a Fourier transform.

Both domains are equally real. As a metaphor, Domain I relates to Domain II as potential energy in a lake relates to kinetic energy of the stream flowing into the lake. A metaphor can also be applied to some forms of human social interaction. For example information from Domain I, individual behavior and individual patterns of trading and use of monetary systems are "enfolded" into a larger dynamic system (Domain II) which is holographic in nature. The unit of currency thus enfolds the information in all of the subsystems. In the brain memories (potential) can be transformed into communications. Memories are distributed throughout the brain and stored holographically. Pribram believes this holographic organization is highly ordered whereas Prigogine and Jantsch do not.

The implications of this for evolution of species is that species will appear at stable intervals in time, under very particular circumstances. Predictability is limited, and these systems will decay or dissipate into another organization or order.

Session 3 (K.H.Pribram) Information, Novelty and Familiarity

Outlined a short history leading to research on localization of function in the brain, especially with respect to work of Kluver and Bucy and temporal lobectomies in monkeys. This research indicated that the Limbic system was important in certain types of learning, especially those with an emotional component, that sensory areas of the brain were sharply demarcated from other systems and that the frontal lobes were critical in planning and what might now be called "list structure programming"

The posterior regions of the brain cortex deal with the problem of choosing among alternatives, making categories and discriminating between events,

whereas the frontal regions provide an open system for flexible planning. This occurs by means of a feed-forward process in which two feed-backs are coupled in parallel and influence each other. Frontal lobes are feed-forward systems whereas posterior sensory systems are "information processing systems". As such they deal with uncertainty and process sufficient input to reduce uncertainty. By this definition maximum uncertainty or maximum complexity is chaos. The other critical aspect of information is its redundancy structure. If there are two "bits" of information A and B, these can be related in completely redundant ways: ABABABABABA, or less redundant ways: AABAABAABAAB. Scientific prose is highly non-redundant, whereas conversation is highly redundant. The information content may, however, be the same.

The basis of information processing begins with an analysis of the sensory input. This is done by Fourier analysis in all sensory systems. Research on vision has shown that cells are tuned to patterns of light and dark across space (spatial frequency or wave number) and that each cell is tuned to a limited band width of these frequencies. Each transform carried out by the brain imposes a Gaussian envelope over the network processing the input. This is called a "Gabor function", and has the consequence of damping the spread of excitation in a regular fashion.

The receptive "fields" of the brain cortex can be influenced by activity in other brain systems and either enlarged or diminished in size. Frontal stimulation tends to push the entire brain more towards a connected and distributed activation (more holographic) whereas stimulation of posterior systems does the reverse, creating more independent channels, more related to space and time.

By contrast to these mechanisms, novelty and fa-

miliary are processed through a system coordinated by the amygdala of the forebrain working in conjunction with the frontal lobes. All brain systems that "habituate" are sensitive to novelty. Novelty is largely a property of redundancy structure and not of information per se.

Session 4 (K. H. Pribram)
Consciousness

There are three major uses of the term:

1. States of consciousness. The medical definition which outlines stages of alertness from coma to awake. States are largely controlled by brain chemistry but can be influenced by external input: sight of food, sight of attractive mate, etc. Some of the chemistry of these states was presented.

2. Contents of consciousness. The information available in any given state of awareness. Examples were given.

3. Process of consciousness. The philosophical concept is a process definition which includes attention, intention and thought. Intentionality is the capacity to intend without action. Intensional or intensive processes are "emotional" whereas extensional (space-time) processes deal with concepts of self and other, such as self-reflective awareness. The philosopher Searle makes a further distinction between prior intentions and intention-in-action, which is the only domain recognized by a legal system.

As against these definitions there is still the added concept of unconscious processes in which it is known that certain internal events can produce behavior but the determinants or antecedents of this behavior are not known to the actor. The phenomenon of hypnosis was used to clarify this concept.

Session 5 (K. H. Pribram)

Fittingness as Basic Evolutionary Principle:
application to evolutionary epistemology, as exam-
plified by an analysis of the mind/brain relation-
ship

Charles Darwin, during his voyage on the Beagle, was impressed with the variety of species he observed on the Galapagos Islands and the fitness of the various animals as indicated by their adaptation to the unusual terrain which they inhabited. On the basis of these observations Darwin developed the thesis that the processes of variation and selection could account for evolutionary change. In his later writings and in those of his followers such as Spencer and Huxley, little attention was paid to the process by which variety was achieved (it was implicitly assumed to be a biological given). At the same time, the definition of fitness, which was left to some extent ambiguous in Darwin's writings, became interpreted to mean "superior".

Some current evolutionary theorists, for example E. O. Wilson and the coterie of sociobiologists have attempted to build their approach around this definition of fitness. Specifically, fitness is defined as reproductive success - i.e. gene survival. What is of interest here is that evolutionary epistemology has implicitly and sometimes explicitly accepted this same approach to explain the evolutionary growth of knowledge.

Unfortunately, fitness defined as reproductive success is a tautology: the fittest (genes or ideas) survive; the survivors (among genes or ideas) are the fittest. This tautology lay at the basis of social Darwinism where it was discredited in this arena only to arise as a phoenix in current thinking. Thus Hayek (in this conference) has charted the mechanism of the evolution of morality in terms

of the effectiveness for group survival of certain prescriptions for individual behaviour: what is moral is what allows the moral (as opposed to the immoral) group to survive.

Does this recognition of tautology mean that the evolutionary paradigm in science and philosophy is to be discarded? Such a judgement is belied by the very vigor of the paradigm and the fact that it is still finding new applications (see e.g. McGuinness 1986). What one finds on careful examination is that the survival theme is in practice successfully applied within a limited domain of inquiry. It is only when the principle of "reproductive success" becomes the overarching basic principle forced into service to account for all of evolution that the tautology becomes so tightly circular that it becomes meaningless.

I propose that this problem with current as well as earlier evolutionary theory lies in the definition of fitness. In English fitness has two meanings: to be fit is to be able, healthy, intelligent and to some extent at least superior to those who are less or un-fit. But there is another meaning to fitness: fittingness. To the extent that evolutionary theory has dealt with fittingness and not superiority, to that extent it has proved scientifically defensible. To the extent that fitness is interpreted as superiority, scientific and logical arguments against the theory are overwhelming.

The unconfounding, unpacking, of the meaning of what is meant by fitness has consequences beyond the "rescuing" of the evolutionary approach. The whole point of thinking in evolutionary terms is that some trend, some directed change along a time arrow can be discerned. If this trend is not "superiority" what then might it be? The answer was given by Darwin in the observations which gave rise to this life-long search: the amazing diversity of species and

of cultural development. According to the hypothesis presented here, "better" is to be defined as fittingness not superiority in terms of the tautology of reproductive success. What survives is what better fits. But, of course, this immediately raises the question as to what it is that knowledge becomes fitted to.

The question may be rephrased as follows: What in epistemology corresponds to an ecological niche? Given selforganizing and selection processes, what determines fittingness?

Let us consider the possibility that a data base (made up of observations and observables) serves epistemological evolution much as an ecological niche serves biological evolution. If this were so, evolutionary epistemology would in essence become scientific epistemology: the criterion for "truth" would shift from earlier definitions based on "logical" analysis to fittingness to data. As a consequence, the sterile pursuit of intrinsic superiority based on such premises as endogenous fitness and reproductive success would be abandoned in favor of enhanced diversity + fitting an ever increasing range of observation.

Session 6 (D. McGuinness) The evolution of the family

This session addressed two fundamental questions: What is the natural basis of human social organization and what are the unconscious determinants of our social behaviour?

The archaeological record reveals that several species of Homo existed contemporaneously, therefore we cannot accept the "missing-link" hypothesis which suggests that the progression of the human species was from monkey to ape to protohuman to human. All of these species existed simultaneously and most

still do. The real mystery is what became of the other Hominid species, specifically Australopithecus and Neanderthal.

If we wish to determine the antecedents of the "proper" organization of the human family, we have to turn to our nearest relations the Great Apes. Here we see that Gorillas adopt uni-male systems with one Patriarch and many females, Orangutans are solitary and do not live in social groups. Mother and offspring are isolated. Chimpanzees are flexibly organized groups with a strong bonding among related males, and with highly promiscuous females that frequently transfer between troupes. What then can we say of the "proper" human family from this information?

The archaeological record. Here we find earliest upright Hominid was 4 million years B. P. Camps with kill sites date from 2 million years, and stone tools from 2.5 million B. P. We have data that indicate that Australopithecus was forced down the food chain to excess of roots and leaves because of the increasing size of the jaw over time. By approx. 200,000 years this species may have disappeared. Neanderthal disappeared from the record around 40,000-50,000 years ago and by 35,000 years ago there is one clear species remaining: CroMagnon man.

This transition over time led to the prototype human family which is in evidence in the group organization of hunter/gatherer peoples. It is perhaps most productive to compare and contrast their social organization with that of the Apes which are most similar: the Chimpanzees.

Similarities: Sub-group size = 10-30, Unit size = 60-100, members shift between sub-groups (especially females), very large feeding ranges, long infant care and late weaning (4 years), reproductive age 15 in the chimap and 18 in the human, 4-5 years birth spacing, patterns of intra-group aggression and do-

minance systems are similar.

Differences: sex ratios in humans are consistently 1:1, strong paternal investment in offspring and tendency to monogamy - thus in one sense the father defines the human family. Female is continuously receptive, hidden ovulation, neoteny especially in female is pronounced, food sharing is regular and predictable, sex roles in infant care and food gathering and production, greatly enhanced infant survival rate due to food sharing. Humans are omnivorous instead of frugivorous, and they are bipedal and hairless,

Human behaviours that are enhanced in scale:

Stronger bonding of mate to offspring, stronger empathy, greater memory and enhanced cognitive skills, complex system of referential communication, symbolization, knowledge of death, complex manufacture and use of tools.

The earliest characteristics of the social structure from archaeological record show that there was a home base, harnessing of fire, tenderizing food with tools, hunting of very large animals, tools used as weapons. Based on hunter/gatherer data one assumes a sex-role division of labor and an extreme amount of leisure due to group cooperation,

Hunter/gatherer data also indicate that females conceive late and that pattern of intermittent and continuous nursing means that birth spacing is 4-5 years. Highly mobile patterns of gathering food keeps fat at low level and reduces onset of ovulation. Juveniles are consistently left to play and some have suggested that this forms the basis for discovery and invention. The primary feature of early human life is an extremely short work week of about 2 days, and 5 days leisure.

The transition from this pattern appears to be determined by competition for resources forcing people down the food chain to horticulture. Fixed territories derive from population stress. In horticultural or

herding societies with small bands, the marriage pattern shifts to polygyny because females are the "gardeners" and thus are crucial for productive wealth. In agriculture the pattern reverts to monogamy as females tend not to invest their labor in food production. There is now considerable evidence of the impact of ecological pressure on the structure of the human family (see Sanday and also Martin and Voorhies).

Session 7 (D. McGuinness)
The Evolution of the Modern Family

From the work of social anthropologists we can see that family systems are determined by three major factors: The type of economy, the characteristics of how property is owned and inherited, and the relationship of women to property. In societies where a few own large tracts of wealth-producing land, the wealthy tend to polygyny to keep the kin group intact, as well as to show off their power. The levirate (wherein heads of kin groups marry their deceased relatives' wives) and cousin marriages were common throughout the Near East. It was the Christian church that broke this practice and worked against an extended kin network.

In this session we reviewed the very persuasive documentation by Jack Goody of how the Catholic Church changed the marriage laws to produce a strict inviolate monogamy which had the primary advantage to the church of splintering off widows from any family support system. As females could inherit wealth, and often lived longer than their husbands this meant that wealth frequently was bequeathed to the church either at death, or through dispensations on behalf of their deceased husbands.

Practices that were common until the early middle ages were condemned. These were: The levirate (it is

believed that Christ was the son of a levirate marriage, and he preached in its support in Matthew), cousin marriages, transfer of children by adoption, concubinage, divorce and remarriage (even after death of spouse), and children born out of wedlock. It took about 700 years to enforce a celibate priesthood, but this succeeded totally in 1073, at least in church law if not always in practice. By preventing these common practices, the extent of inheritance rights was drastically curtailed. In fact none of these practices were prohibited by the bible or in early Christian teachings, and the founders of the church had little to say on the subject of marriage and the family prior to the fourth century. Goody believes that it was the institutionalization of the church, their need for lands, for monasteries, churches, etc. etc. that fed into the practice of gleaning wealth through prohibitions on marriage and adoption. The written will was unknown in the countries when it was formally introduced by the church.

Much data were reviewed in connection with these topics and the lecture pointed to a strong contrast between the complexity of these variables and their impact on human social behaviour and the impoverished set of assumptions of sociobiology.

Session 8 (McGuinness)

Aggression

Aggression models as "drive" or "instinct" were discussed, with the data pointing more strongly to an instinct based approach. The intensive dimensions of brain function were reviewed to indicate how aggressive behaviours are modulated and expressed from a biological perspective. The six categories of aggression in mammals outlined by Moyer were presented and discussed. These are the following:

1. Irritable (threshold for frustration), 2. Re-

active (response to threat from any source), 3. Maternal (instinct to protect one's offspring), 4. Sexual (aggression occurring during sex acts, the female being the recipient), 5. Predatory (against other species, usually for food), 6. Inter-male (threats against other males of the same species triggered by a. Strange male, b. Overcrowding, c. Shortage of food, d. Threat to dominance status).

The major point here, is that all aggressive action has its basis in environmental triggers which act back on the nervous system in special circumstances. Individuals can vary in aggression because of internal body chemistry and neural systems which lowers their threshold for aggressive behaviour, verbal or physical. At the same time, this behaviour does not appear, at least in most individuals, without a source of threat or a need to acquire food, if a carnivore.

Two major brain systems operate in all reactive types of aggression as opposed to predatory types.

One of the most under-investigated areas has been the inter-male aggression system and how it is managed and contained by dominance hierarchies.

Session 9 (McGuinness) Dominance Systems in Non-human Primates

This session began with a detailed analysis of the dominance take over in a group of free-ranging, but captive chimps at the Arnheim zoo. The data and the analysis were taken from Frans de Waal's book titled Chimpanzee Politics. The consistent and unrelenting strategies for gaining power and control were apparent as was the obvious connection between this behaviour and human politics.

Chimpanzees have a set of very precise non-verbal and verbal signals that indicate who is dominant over whom. It was by use of these signals in connection

with a variety of coincident behaviours that the shifting patterns of political action could be determined. de Waal presents his material very anecdotally and therefore, it does not always seem "scientific". However, on very careful reading and analysis, it is clear that there are highly specific mechanisms for seizing and maintaining control in a social group. These can be summarized as follows:

1. Dominate females. If this cannot be done, then the male will be unsuccessful in any further attempts at dominance take-overs. (This is especially true in the Arnheim situation where females outnumbered males by about 3 to 1.)

2. Challenge the alpha male. Do this by display, threat, intimidation and do it in public.

3. Isolate the alpha male by these strategies:

a. Win away his support group (Devices are kind actions, eliciting sympathy, and supporting losers)

b. Punish strongest alpha supporters and do so relentlessly.

4. Prevent any possible coalition between the alpha and other high-ranking males.

5. Once the goal is achieved, bypass the alpha if now #2, and form a coalition with #3 or #4. Play them off against one another and especially against #2.

6. Constantly monitor any impending shift in alliances that could work against you.

When a dominance order is truly established, then there is exceptional freedom from aggressive encounters. However, this seems to take a considerable time following a bid for power by a younger adult male.

Session 10 (McGuinness) Dominance in the Human Primate

This topic is extremely novel, and computer searches of large data bases in the various social scien-

ces reveal that little research has been carried out on human dominance behaviour. This is despite the fact that de Waal's work and his publication on the Chimpanzees is so clearly related to human politics. The parallels are exceedingly transparent. Despite this poverty of information, there are some excellent studies that are both methodologically solid and highly informative.

Data were reviewed from three primary sources: Knudsen's work with preschool children in three geographic locations in the U.S.A.

Savin-Williams' research on the behaviour of boys and girls in summer camps.

McGuinness' work on small group interactions in all-female or all-male groups of strangers.

All of these studies reveal that males set up linear dominance systems within minutes of initial interaction. These dominance systems are highly stable for the time period under examination. In Savin-Williams' work this was for six weeks; in Knudsen's for one semester. Dominance styles vary considerably and this has not been well studied, but all dominant males succeed in obtaining what they want. In the preschool they get the toys they demand and the space they want to occupy. In summer camps they stand first in line, are captain of the teams and choose the players, they get the best bed in the dorm, etc. In small group interactions they take over 50% of the talking time in groups with 4 members.

The strategies they adopt vary with age and sophistication. Young dominant males never ask, they just take. They behave as if they have a right, and they are granted the right by others' giving way. Young adolescents tend to use more physical prowess, and overt verbal ridicule or abuse. By late teens, this has become extremely subtle and dominance is almost entirely expressed in subtle verbal ways, with the use of sarcasm, interruptions of other's conver-

sation, and so forth. In the college age students of McGuinness' study, it was almost impossible to understand the mechanisms at work without detailed coding of transcripts and extensive analysis of video material. But the same process was at work. Interruptions, negations, demands for justification from other speakers, negative feedback for other's ideas were common tools in the male groups. Even more surprising was the finding the speakers frequently contradicted their own position in order to gain a momentary advantage and put the other person off guard. The result of this "hidden agenda" was that males generated one-third less ideas in a problem solving session than females, and these ideas were far less well articulated and coherent, as might be expected.

The research also confirms that female behaviour is totally different, with females forming flexible dominance "cliques" in which no single person is in control. However, these cliques can be organized hierarchically in some situations, as Knudsen found. Females do not have hidden agendas. They can, of course, form dislikes and indicate this, but they are more transparent and read each other well. Females dislike confrontation or friction and consistently back down to avoid it. These behaviours can have disastrous consequences for many women invading the bastions of male power. Women are usually focussed on the task and not on the game. Men appear to be task oriented when they are not.

Session 11 (McGuinness) Dominance and War

Given what we had learned about aggression, dominance and the sex differences that are notable in each area, the group was asked to focus on several issues:

Can understanding male dominance hierarchies shed

any light on warfare? Males in large armies are not "aggressive" when they go to fight. They usually don't hate the enemy, or want to kill anyone. It is political leaders, playing out dominance games who get us into wars. Why do males follow them?

How do male coalitions work and how and why do they promote In-group-/Out-group hostilities? What is the mechanism that allows the human race to extend its boundaries and include the old Out-group into a new In-group? Could we use this mechanism to extend global boundaries to include the Earth and all its peoples versus the common enemy, the atom bomb?

How do beliefs and ideologies function in maintaining these group boundaries? When and how does a dynamic process leading to a belief system take a means/end reversal in which the belief itself takes control and mobilizes action?

Here is a list of what the group suggested could help to reduce the likelihood of war:

1. Insure a just distribution of resources.
2. Learn how to play win-win games.
- 3 Achieve a balance of power through coalitions based upon trade and mutual protection.
4. Indoctrinate children against violence.
5. Promote a political system which allows multiple moral perspectives.
6. Political/military decentralization. Solve local problems at the local level.
7. Freedom to cross borders and to relocate.
8. Democratic elections
9. Free press.
10. Understand the function of male coalitions and alpha males in creating stable and unstable situations.