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SOME ETHICAL CONSIDERATIONS REGARDING THE USE OF MAN AND PRIMATES IN SCIENTIFIC RESEARCH

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SUMMARY — The ethics of experiments on man and animals are discussed separately, as clearly a different outlook is involved. From the earliest times experiments have been performed on man, and gradually codes of conduct have been developed which show little improvement on the Hippocratic Oath. Detailed rules often fail to meet the case and very general principles are better; full confidence should be placed in the physician provided he is technically and morally qualified. The ethics of experiments on animals involve two aspects: 1) the vivisection issue on which legislation exists in a few countries only and 2) the reduction and the extinction of the population, especially of rare species. Various ways of solving these problems are discussed.

The biologist is often confronted with ethical problems involving experiments on both man and primates, and various sets of rules and laws have been devised to cope with the situations that arise. Clearly a different outlook is taken in

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regard to research on man and animals respectively, but the metaphysical background of this point of view is beyond the scope of the discussion. The objective of this research however is identical — to unravel the physiology of the creatures and the effect on them of drugs, parasites and changes in the environment. Other ethical problems such as genetic manipulation, euthanasia, etc. are outside the range of this paper.

Human experimentation

Experiments on man have been carried out from classical times and earlier — on slaves, prisoners, volunteers or on the experimenter himself. Our paleolithic ancestors in Europe undoubtedly tested the efficacy of plants for curing disease and probably killed some of the subjects on whom they tried out their herbs, like deadly nightshade (*Atropa belladonna*), hemlock (*Conium maculatum*) or foxglove (*Digitalis purpurea*). Later came the priest-physicians of Ancient Egypt, who tested various herbs e. g. the castor oil plant, and recorded the results in the " medical papyri " — one account ends laconically " really excellent — proved many times ". These early experiments on man were repeated by the Ancient Greeks, including Herodotus and Hippocrates, whose oath is the foundation of medical ethics (see Beecher, 1970). The oath begins " I swear by Apollo the physician and Aesculapias, Hygeia and Panacea and all the Gods and Goddesses that I will keep this oath and this stipulation: to reckon him who taught me this art equally dear to me as my parents, to share my substance with him and relieve his necessities if required " — and continues " I will follow that system of treatment which according to my ability and judgement, I consider for the benefit of my patients and abstain from whatever is *deleterious* and *mischievous* ", and the oath ends " In whatever I see or hear in connection with my professional practice, which ought not to be spoken abroad, I will not divulge ". Later he explains

that " Life is short and the art long, the occasion instant, *experiment perilous,* decision difficult ". No subsequent codes have really bettered the central idea of Hippocrates, in spite of the legal phraseology and ten principles of the Nuremburg Code (1946-1949), the Declaration of Helsinki (1964), the International Code of Medical Ethics (1949), the Medical Research Council's Recommendations (1962-1963), the Catholic Hospitals' Recommendations (1955), etc. These codes have no statutory powers, but to infringe them is to court scientific death and many editors refuse to accept papers for publication, if the experiments do not conform with the recommendations.

A useful report on human experimentation was presented by Bastenie (1974) to the Académie Royale de Médecine de Belgique. This clarified the problem by dividing it into two parts, one dealing with drug trials and the other with physiological experiments; both have common guiding principles as follows: 1) the investigation must be concerned with important questions which could not be answered by the use of animals; 2) a precise protocol must be followed and the investigator must be competent and well equipped; and 3) the dangers of the work must be clearly explained to the volunteers or to those responsible for them, while it is desirable that the experiment itself should be sanctioned by some committee composed of scientists and laymen. It was stated however that legislation could only formulate very general rules and that physicians should be accorded full confidence provided that they are technically and morally qualified. One of the most debatable issues is the application of the foregoing rules to " informed consent " of the volunteer. J. C. Garnham (1975) emphasizes that " consent " can only be " informed " if the subject is a physician, and even then the nature and consequences of the experiment may not be properly understood; to non-medical volunteers it is unlikely that the full implications could ever be explained. It is essential to be completely truthful in all thoughts of the situation and that merely lip service to the multitude of rules should be avoided. Charles

NICOLLE (1961) appreciated the delicacy of the problem, but began his lucid exposé of experiments on man with the following words " La prudence me conseillait de me taire. La franchise ne veut pas que j'écoute la prudence ".

One of the simplest questions to ask is " would the investigator be prepared to use himself? ". But when the investigator is himself the subject of an experiment, it may be difficult for him to retain objectivity.

Other ethical problems arise in relation to volunteers. The use of prison volunteers is usually distasteful and has been disallowed in most European countries, and it is condemned by the World Health Organisation. However, until recently, experiments on prison volunteers were permitted under most stringent conditions in the U.S.A. A valuable service was thus provided for the good of humanity; it certainly seemed justifiable and felt ethically unobjectionable in practice. Talks with prison volunteers invariably showed that they were proud of their participation and the prison officers confirmed that morale was heightened.

On the other hand, the use of prisoners under capital sentence is ethically repellent, even though the experiment may entail not the slightest harm to the subject who could well be unaware that it was being performed. A famous or infamous example was that of KÜCHENMEISTER (1857) who fed measly pork to a condemned murderer, and after the execution the investigator was able to demonstrate the maturing tape worm in the intestine — thus establishing for the first time the method of transmission of the disease.

Strong emotions are likely to arise if death or crippling disease follows an experiment on the investigator himself. There are many examples of which I will mention one that occurred in Peru in 1885. A serious disease — Oroya Fever or Carrión's Disease — occurs in the High Andes of that country, together with a mild skin infection (Verruga Peruviana). Carrión, a medical student in his final year in medicine in Lima, was interested to find out if the latter could change into the

more severe form and he inoculated himself with material from a patient. His fellow students helped him in his observations and were horrified when Carrión developed a fulminating attack of Oroya Fever from which he died within a few days. A public outcry followed, the students were charged with manslaughter and only just escaped conviction (see SCHULTZ, 1968).

Fortunately many experiments can be performed on animals instead of man, and the best to use are those primates, such as chimpanzees, which are phylogenetically closest.

Experiments on animals may involve the use of large numbers, and we are faced with two great ethical problems:

1) The vivisection issue.

2) The reduction in the population of certain species and their possible extinction.

No normal person likes the idea of vivisection and most biologists share to some extent the feelings of the antivivisectionists. Some psychological experiments on the higher apes feel ethically wrong. Thus, chimpanzees can be rendered easily addicted to heroin and when the drug is stopped, severe and traumatic withdrawal symptoms follow.

Many experiments cause the animal no pain and a minimum of discomfort; the better the animal is looked after, the more valid will be the results. A badly kept animal makes an unsatisfactory model and the experiment may be ruined. Thus a monkey which is starved or in poor condition proves a poor host for malaria parasites; on the contrary a well-fed animal means a well-fed and healthy parasite.

One must however avoid becoming fond of experimental animals. Their destiny is usually to be killed at the end of the investigation; it is difficult not to make a pet of an animal like a chimpanzee. This applies especially to technicians who look after them daily; on several occasions in my own labora-

tory, the technician has said " if you sacrifice 'Bonnie' or 'Susy', I go! ".

In a few countries, the law compels the investigator to comply with strict rules to avoid all unnecessary cruelty and these are rigidly enforced. The legal restrictions together with the natural tendency of most people to be kind to animals, solve to some extent the ethical issue. The best legislation, dating from the 1876 Cruelty to Animals Act, exists in the United Kingdom where experiments on animals may only be carried out by licensees who are obliged to comply with certain conditions which progressively entail the avoidance of suffering by the animal. In a small minority of instances it is recognised that the suffering must be severe. The law is enforced through periodical visits (once or twice a year) of Home Office Inspectors, who pay particular attention to the maintenance of animals under suitable conditions. Indian legislation closely follows the British pattern but owing to the philosophy of the Indian religions, animals are given a higher place and experimentation is more actively discouraged. The Scandinavian countries and Germany pursue an equally enlightened course, but other European countries and the United States have little or no detailed legislation, though many countries issue generalised injunctions to prevent unnecessary pain.

The outlook of the antivivisectionist as expressed, for instance, by RYDER (1975) is unpalatable to the scientist both for its illogicality, exaggeration and patent untruths. It is unnecessary to discuss this question in the present paper, beyond pointing out the profound fallacy of equating man with the lower animals. This is based on the assumption that evolution of man's (physical) body from primate and remoter ancestors entails that " man is just an animal ,one species among many ". Such an idea is contrary to Christian doctrine and leads to nonsensical conclusions.

Let us now turn to the problems created by the capture of primates for use in scientific research. Apart from the great brutality which their capture often entails, there is a

real danger that the species may be reduced to a dangerously low level in numbers. To my mind, such extinction of a species is the greatest of all ethical questions in the subject under discussion. Certain primates are today being caught in tens of thousands in the forests of Latin America and a perilous situation regarding their survival is developing. I refer particularly to the wide use that is being made in medical research of the owl monkey (*Aotus trivirgatus*). Streams of these animals are being exported to the USA and Europe. The *Aotus* is a delicate monkey and the death rate during the journey is high; sometimes only 4 or 5 out of a batch of 100 survive, and they do not take to captivity very easily. The supply at first seemed to be inexhaustible, but in the last year or two the danger of a famine became as obvious as the threat to the oil supply: there are substitutes for oil but there are none for a unique animal! Fortunately, Peru, Colombia and Brazil have now banned the export of *Aotus,* marmosets and other monkeys, while a meeting of the Pan American Health Organization has recommended urgent measures for the conservation of American non-human primates as an aid for their utilization in bio-medical research. Tissue culture acts as a useful alternative for animals in some experiments and efforts are being made to extend this technique.

Even more dangerous to the survival of the species is the capture of the rarer primates, such as the lemurs of Madagascar, certain marmosets (e. g. the golden lion marmoset) of South America and rare primitive primates of S. E. Asia and tropical Africa (the tarsier and *Tupaia* of the former and the anguantibo of the latter). It is too late already in some instances — for intance, this century has seen the extinction of 14 species of lemur in Madagascar.

Probably the best model for scientific purposes is the chimpanzee. The cost of this animal is so high (£ 500) that it cannot be used on the scale of white mice. But even so, a serious depletion in the number of chimpanzees is liable to occur, owing to the horrible methods used in capturing them.

The animal collector shoots the mother and her infant is caught, but often is unable to survive on its own. The zoologist himself is not free from blame — in the words of Tom Harrisson referring to the slaughter of orang-utans by Alfred Russell Wallace, " natural history was not necessarily done by observation but by assassination ". But it may be difficult to comply with ethical principles if one is hot on the trail of some evolutionary problem, even though the capture of a *Tupaia* or tarsier for instance, may represent another nail in the coffin of a rare species.

I have mentioned a few of the ethical problems regarding conservation of wild life. There are essentially two solutions: 1. Legislation to prohibit the killing or capture of animals on the danger list, and 2. Breeding of such animals in captivity and their maintenance in special reserves.

The legal approach has answered the purpose particularly well in Europe and North America. The survival of the bison in Poland has been almost too successful; the forest of Białowieza has become overstocked and it is difficult to dispose of the surplus. The special macaque in Gibraltar, the bear and elk in North America are other examples. In the tropics, STANLEY DE SILVA (1971) in Sabah has managed to put the clock back in regard to the dwindling population of orang utan, but in many tropical countries, survival of threatened species hangs by a thread.

Special reserves and breeding in captivity seem likely to constitute a more permanent solution. The extensive game reserves of East and Southern Africa at present offer a refuge for wild-life which under stable régimes and in the absence of a need for land for the human population, might persist well into the future. Artificial reserves are being created today, particularly in the New World. Thus " Gorgas Island " is to be created by damming the Bayano river in Panama; the upper slopes of a former forested hill will thus be left in the artificial lake and will constitute an isolated reserve for certain species of rare monkeys, while a small island in the Archiepe-

lago de las Perlas off the Pacific coast is being made into a reserve (GALINDO, 1975). Another project comes from the Delta Primate Center in Louisiana, where a large tract of land is to be excavated with the exception of a few areas; the excavation will be flooded and the latter areas will remain as islands or sanctuaries for special primates. Even in the northern parts of the USA, land belonging to primate centres (e. g. Washington State Primate Research Center) is available for use as a reserve for primates like *Macaca cyclopis* from Taiwan or perhaps even the Mountain Gorilla from Zaire, both of which primates can withstand low temperatures.

Of course, large numbers of primates are trapped for other than scientific purposes and the same ethical considerations prevail. They are beyond the scope of this paper, but I should mention the question of zoos, because these can provide an answer to the all important question of preservation. Fortunately some of the better zoos take one or more endangered species as their own particular responsibility for breeding and multiplication in captivity. This constitutes a logical *quid pro quo* for their, otherwise unethical, activities.

This leads to my final point — the ethical principle of " what is taken out of the natural habitat, must be put back ". And, as a beginning, it should be the duty of any establishment, be it zoo, primate research centre, pharmaceutical laboratory or research institute, which uses primates on a large scale, to include in their programme, the breeding of the animals. Eventually not only will they be able to dispense with new importations, but they should also be in a position to re-seed the forest from which the animals originally came.

My recommendations can be summarised as follows, and they apply only to primates. The ethics of human experimentation are another question and are usually adequately observed.

1. Legislation regarding the prevention of unnecessary cruelty to animals exists in some countries, but is subject to the national outlook, and should be extended.

2. Regulations should be improved to reduce the trauma and mortality associated with the capture and transport of primates, and an absolute veto should be imposed on the use of wild primates as listed in the Red Book (on " Animals and Plants under Thread of Extinction ", 1969).

3. Support of national game parks should be encouraged.

4. Artificial reserves should be created in suitable places with emphasis on the breeding of rare species.

5. Special attempts should be made to increase the population of threatened species in primate centres, biological institutes and zoos, by concentrated efforts at breeding.

6. Successful breeding should be followed by reseeding the natural habitat, which itself should be made subject to limitation of tree-felling and to designation as a special reserve.

If such steps are not taken, biological research will be seriously hampered by the end of this century, and the progressive extinction of rare animals will continue.

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