Of course, empathy is not the only criterion of advanced abilities by which to estimate the potential for suffering. If mere intelligence (problem solving and information processing abilities) is important to animal welfare – and especially if social intelligence , with its emphasis on the ability to form alliances (ie friendships) is important – then *Machiavellian Intelligence II* is relevant to the debate. While not specifically addressing the topic of animal welfare, this book provides anyone concerned with welfare with abundant information and ideas on the advanced nature of primates' intelligence. It therefore provides plenty of material to use in thinking about how intelligence might affect suffering.

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Anaesthesia of Rats

BSL Publishers: Houten (1997). CD-ROM. Obtainable from the publishers, PO Box 246, 3990 GA Houten, The Netherlands (ISBN 9031323063); or by e-mail from: rats@bsl.pub.com. Price US$225 or NLG450.

This interactive CD-ROM aims to introduce new research workers to the theory and practice of anaesthesia of rats. To run the software, the minimum system requirements are given as a 486DX2, 66MHz, 4MB RAM, 1 MB VRAM, SVGA graphics, MCI compatible sound card and a dual speed CD-ROM drive. The recommended configuration is a Pentium 133MHz, 16MB RAM, 2 MB VRAM and six-speed CD-ROM drive. Windows 3.1 or higher is required and Video for Windows 1.1 must be installed. This review was carried out using a P-166 Pentium running Windows 95 with 64 MB RAM. The computer was equipped with an 18-speed CD-ROM drive and an MPEG card. Quicktime movies are provided as an alternative to the MPEG compressed files and these provide a satisfactory alternative to the good quality MPEG movie clips. The audio commentary and text are in English. The program is copy-protected, requiring a serial number to be entered the first time it is run on a particular computer, and it requires the CD to be present in the drive. It is not compatible with DOS cards fitted in Macintosh computers, and is unlikely to run under software emulation on this platform (although this was not tested).

The teaching of anaesthesia to new research workers is of central importance if surgical procedures are to be carried out humanely. This presents tutors with a dilemma, since arguably the most effective means of teaching is to demonstrate procedures on living animals. Most of those involved in such teaching would wish to replace this use of animals, and this CD-ROM represents a step towards this goal. The program deals with both inhalational and injectable

anaesthetic techniques. Halothane and isoflurane are used as examples of volatile anaesthetics, and fentanyl/fluanisone, pentobarbitone and ketamine/xylazine as examples of injectable agents. It should be noted that this differs from earlier versions of the program, which used ether as an example of an inhalational anaesthetic. Another welcome feature of this new version is that 'open-drop' techniques are no longer illustrated.

The program is menu driven and deals not only with the specifics of the drugs themselves, but also with more general areas such as assessment of depth of anaesthesia. These general areas are the program's greatest strength, allowing users to view video clips of rats at different stages of anaesthesia, and allowing reflexes such as the pedal withdrawal response to be demonstrated. After anaesthetizing a virtual rat, the user is asked to assess the depth of anaesthesia and determine whether it is appropriate for surgical procedures to be undertaken.

The program is clearly intended to be used for self-tuition, but this would have drawbacks if local practices differed from those illustrated. The student assessments are very inflexible in what is considered a 'correct' answer; this seemed particularly pedantic when determining the correct sequence of events prior to anaesthetizing an animal. The program also insists that nitrous oxide is used with inhalational anaesthesia, and requires over-accurate MAC calculations (MAC being a measure of anaesthetic potency, used to calculate the concentration needed to produce surgical anaesthesia in the majority of animals). This section of the program is also at odds with most standard anaesthesia texts, stating that 2 MAC (defined as 68% nitrous oxide and 2% halothane) is required for induction of anaesthesia and 1.4 MAC for maintenance. Most anaesthetists would use higher concentrations of halothane for induction of anaesthesia, and would also point out to trainees the need to adjust concentrations to meet the requirements of an individual animal. Similar views which diverge from usually accepted veterinary anaesthetic opinion are present in the section an anaesthetic circuits. There are also some unusual statements: at one point I was told that halothane is 'not very potent' – but the program also provides the information that lower concentrations are required for maintenance with this agent than with isoflurane or nitrous oxide; we are also told that it works less well because it is 'not combustible'. There are also some inaccuracies in the descriptions of the drugs used in injectable anaesthetic combinations.

These points largely illustrate the difficulties in producing an internationally acceptable guide for teaching anaesthesia. Although they limit the program's use, this is still a most useful adjunct for investigator training. The program is probably best used in a tutorial or seminar setting, so that particular areas can be selected for use, and any local variations in practice explained. It is also possible to play individual video clips without entering the program, using third party software, so that this material can be accessed to demonstrate particular points in a tutorial. These features make the CD a valuable resource for those involved in the training of research staff, and I would recommend its purchase.

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