

EVEN LESS LIKE A HUMAN IN 2006 THAN IN 2002?

I.E. Addison, Currie Lodge, Ireby, Wigton, Cumbria, CA7 1DS

How human are animals? Can they worry like us? Few would deny that this depends on their brains. First, what does neuroscience say of their mental apparatus compared to ours; second, what does comparative psychology say of what mental abilities lie behind their observed behaviour

NEUROSCIENCE. The effects of injury, disease and surgery together with very recent techniques including those which 'look' at the brain in action (neuroimaging), show that in humans their cortex, in particular its frontal lobes (FLs), is necessary for specifically human mental abilities. These would include imagination, abstract thought, sense of a personal past and future and conscious emotion, hence would determine psychological trauma as we would experience it. There is a marked reduction in size of the FLs in apes compared to humans, yet more reduction in monkeys compared to apes and a much, much greater diminution and other changes in moving from these primates to other mammals (size, proportion of brain, complexity of 'wiring', types of nerve cell etc). On these grounds alone one would expect apes to be less able than us to understand implications, imagine disaster, immediately fear the worst, be haunted by the past, in short to worry, and other primates even less so. Non-primates would be way, way behind.

COMPARATIVE PSYCHOLOGY. (To be distinguished from untested interpretation of observed behaviour). This section refers mainly to primates, as only they manifest much of what is to be studied, but is of general interest, as being our closet animal relatives, they must indicate an upper limit for animal ability to worry as a human. Possibly for apes (still a huge argument over them!) but agreed for other primates, psychological studies suggest reduced, or sometimes absent human mental capacities such as self awareness, awareness of others mental intentions, thinking beyond the immediate future and capability of abstract concepts. If this is where primates are, what of non-primates which neuroscience would put so far behind?

NEW NEUROSCIENCE. In 2002, the year of the last meeting, this is where the message stopped but since then there have been new findings of considerable significance. They begin with the anatomical demonstration in humans of a new path for the nerve tract which provides sensory information from all over the body. It bypasses the old integration site in the hind brain and runs direct to a new integration site the cortex and replaces an original multi-modal relay station with one dedicated to its own use. Thus it fast-tracks sensory information to the cortex with reduced risk of 'noise' (e.g. cross-over within a multi-purpose relay), thereby representing/modeling bodily events with increased immediacy, resolution, detail and precision, in the cortex itself. This system is rudimentary in higher primate and absent in non-primates. Such integration or 'body modeling' is held to provide the basis for consciousness and such a 'new and improved' model may have allowed, and been necessary for, progression to self-consciousness. These new findings continue with a host of neuroimaging studies supporting this idea: they show that there is further movement of activity forwards through the cortex to an FL site on one side only - n.b. lateralisation is a peculiarly human attribute. Tellingly, this is maximally active if, and only if, the subject is expressing/experiencing feelings related to themselves or is subjectively aware of their own emotional state. Moreover in identical tests, subjects who cannot do so/be so, do not

show activity. This activation can be induced in normal subjects even in the absence of any external stimulus, by the very human faculties of imagination or recall of emotional events, hypnosis or placebo-induced analgesia. In the absence or rudimentary state of the anatomical system underlying these phenomena, subjective consciousness, introspective feelings, are likely to be greatly reduced, at the least, This would not be surprising as not only is much of the cortical apparatus for thinking as a human reduced if not lacking in other mammals, but a requisite data-base remains untransformed in an early region of the brain,