lively and informed interest in the language and its development, and a sharp eye for the manifold abuses that are heaped on it in the technical prose of our day. He warns for instance against 'verbification', as he calls it ('to formularize' is a grisly example), but he endorses 'keyboarding' (as does Day). Those of us who have never boarded a key may console ourselves with many classical examples of what can happen when nouns and verbs get confused. Consider for instance the celebrated wartime headline EIGHTH ARMY PUSH BOTTLES UP GERMANS (which also has a lesson concerning nouns of multitude). Young sets up what seems to me to be a number of straw men: do we really harbour in our profession people who say "few number", or "to downsize" or "volunteerism"? He excoriates analogue (instead of analog), catalogue and dialogue as archaic, and he asserts that collective nouns take the singular in America but the plural in England; thus Congress *is* in session, but Parliament *are* in session. Well are it? Fowler, at least, lays down no rules for 'nouns of multitude', and says we may use whichever sounds more euphonious.

Young has allowed some solecisms to slip through. He does not care for "Neither Randi, Maddox, or Stewart has a background in immunology"; you should write "neither Randi, Maddox, *nor* Stewart" has such a background. But surely 'neither' can refer only to one of two things, not of three. Sometimes the solecism is calculated, as when Young urges that we should do away with 'whom' (except after prepositions) because, he says, it is hardly ever used correctly. Yet this is not a new problem — compare " 'Whom are you', he said, for he had been to night-school", from a novel of 60 years ago — and Young's solution dismays me. He also believes that it is time to abandon the distinction betwen 'shall' and 'will', and it is true that there occur in the American literature sentences on the lines of: "this technique shall be the method of choice". Fowler encapsulates the distinction in the cries of the victim ("I shall drown and no one will save me") and of the suicide ("I will drown and no one shall save me").

Elsewhere also Young takes a confessedly permissive line. He writes judiciously about hyphens, but in the end is content to let the journal be the arbiter, and, as he observes, the trend seems to be to extirpate the hyphen altogether, with further sacrifice in precision. Fowler's exemplar of ambiguity is "the hard working man"; newspaper headlines are ever a good source — HORSE BACK UP SNOWDON is one that I recall. So 'save the hyphen' should have been Young's plea (not that even hyphens are proof against misreading: another headline, this one from the Korean war, went MACARTHUR FLIES BACK TO FRONT. Here it seems as though the imagination supplies the phantom hyphen).

Well, I have done. But I find that I have not obeyed Professor Day's injunctions in his chapter "How to Write a Book Review". It is just that I seem to be unable to decide whether it is a pair of monographs, reference books, textbooks or trade books that I have been considering (for these must be assessed by different criteria). No matter, for in all cases my brief is to ensure that "a potential reader will know whether or not to read the book under consideration and why". So yes, the Potential Reader should read these books, if he has time; but not before he has read Fowler. And the reason why he should read them is that if he follows the precepts set out in both he will write shorter, clearer (and, who knows, fewer) papers, and that will be all to the good. □

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Sally on trial

J.A. Gray

The Unheeded Cry: Animal Consciousness, Animal Pain and Science. By Bernard E. Rollin. *Oxford University Press: 1989. Pp.320. £17.50. To be published in the United States in June, $29.95.*

BERNARD Rollin hopes that his book will "help scientists break the ideological bonds which keep them from ascribing mental states to animals", and so free them to hear the "unheeded cry" of its title — the cry of laboratory animals. By the end of the book, I at any rate had come to feel that Rollin's heart and mind are both in the right place, as he claims that:

> Moral theory and a science of all animal consciousness . . . will inevitably stand in a dialectical relationship, for the burgeoning questions regarding the moral status of animals lead to a variety of questions about animal awareness which science must try to answer, and the study of animal awareness in turn generates its own moral questions.

Here is a promising programme of work — capitalizing on the new moral awareness, in large measure due, as Rollin rightly claims, to the animal welfare movement, but not threatening the whole research enterprise. But, had I not agreed to review the book, I doubt that I would have read as far as this sane and forward-looking conclusion.

To begin with, Rollin's softly-softly message is not helped by the rhetoric in Jane Goodall's foreword ("atrocities . . . perpetrated behind the closed doors of underground animal research laboratories around the world"). Even less is it helped by the straw scientist he sets up as his Aunt Sally. This person is supposed to have accepted an 'official' scientific orthodoxy, according to which animals experience no feelings, and especially no pain, so it doesn't matter what one does to them in the name of science. This orthodoxy has been foisted upon our straw scientist by a conspiracy of psychologists, the chief devils being Watson, Lashley, Skinner and Hull (yes, it is time to kick the behaviourists again). Challenged with the oddity of his beliefs, our scientist retreats into moral confusion and incoherent recitation of his creed ('science is value-free', 'all I want is the facts', 'keep philosophers out of the laboratory'). But hope is at hand: scientific credos are largely a matter of fashion, anyway, and times are changing, thanks to those splendid fellows the 'animal activists'. So it won't be long before we all accept again — as commonsense did all along — that animals have feelings, and stop committing atrocities.

This caricature is constructed almost entirely from anecdotes (Rollin appears to attend a large number of dinner parties). Far from being apologetic, Rollin prides himself upon this: "like Hegel, I am a believer in . . . particular cases which vividly instantiate and communicate a general truth". So I shall make no apology for answering anecdote with personal history. After all, as a psychologist working on the brain, I am just the kind of guy that Rollin's straw should be stuffing. But his anecdotes barely begin to fit. It has never occurred to me to doubt that animals experience pain. Why else would I use anaesthetics during surgery? (According to Rollin, the official answer to this question is "for chemical restraint".) Nor do I doubt that animals experience other feelings: on the contrary, it is precisely in order to understand the nature of feelings such as anxiety that I work with them. It is, I believe, possible to do this neither immorally, nor in a state of moral confusion, but trying to minimize the harm done to the subjects of the experiments while maximizing the good that comes to people, in the form of both knowledge and medical advance. (This is known, in Peter Singer's phrase, as "speciesism", a charge I am not ashamed to accept.) That is what the reality of hard moral choices is about.

To be sure, some — a very few — psychologists espoused a radical form of behaviourism, according to which conscious experience is simply a fiction. I remember asking one such person to tell me the difference between what happens when a Mozart string quartet is played to a hearing man and to a deaf man; his unconvincing answer turned upon the verbal behaviour they would emit under appropriate circumstances later. But, for most

of us, behaviourism has always been a methodological principle. Behaviour (or the workings of the brain) is all that you can observe (and neither Rollin nor anyone else has yet come up with any viable alternatives); the rest is theory. And, as a methodological principle, behaviourism says nothing about the existence or otherwise of feelings. But what behaviourism has done, and Rollin signally fails to recognize, is enormously to raise the standards of evidence required for the ascription of feelings or other psychological constructs to animals; and it is this rise in standards that makes the research programme he adumbrates at the end of his book realistic.

The trouble with anecdotes is that there are no rules for choosing between them (though Rollin devotes much space to Romanes' suggestions for such rules). But, apart from the protagonist in the Mozart story, I have never met a scientist who does not believe in the reality of pain and other feelings in animals (which is not to deny the formidable obstacles to their empirical study). It seems likely, then, that Rollin's book will fail in its stated aim: if the scientists who experiment with animals already believe them to have feelings, then convincing them further of this fact will be a poor way to persuade them to desist. So what does the book achieve? It contains a useful review of pre-behaviourist attempts to theorize about animal behaviour (Romanes, Lloyd Morgan, Loeb, Jennings); some examples of the influence of social and ethical factors upon scientific beliefs (though these do not show — as Rollins sometimes seems to argue — that the truth of these beliefs depends upon such factors); and a valuable personal account of recent shifts in scientists' moral concerns about animals.

Sadly, however, the book may also achieve something more sinister. One man's anecdote is another man's smear. The picture Rollin paints of scientists is not flattering (though some of his best friends, it seems, are scientists). We are motivated in the main by ambition and career; scientific fraud is rife; we anaesthetize our conscience by the myth that animals have no feelings; and (according to one after-dinner chat) the only reason we don't do our awful experiments on children is "because they won't let us". Rollin complains that a previous article of his was criticized as providing "a moral ground for laboratory break ins". He should have pondered this criticism more seriously. The distance between the smear and the break-in — or more dangerously, the bomb — gets shorter all the time. It would have been a pleasant surprise, in such a book as this, to see an unequivocal condemnation of such violence. Alas, it is not there. □

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Half a century of fear and of peace

John Maddox

Danger and Survival: Choices About the Bomb in the First Fifty Years. By McGeorge Bundy. *Random House: 1989. Pp.735. $24.95.*

McGeorge Bundy, once one of Harvard's youngest-ever Deans of Arts and Sciences, was translated in 1960 to Washington with and by John F. Kennedy, and promptly became part of the then liberal demonology. With a background in the international control of nuclear weapons, he became one of Kennedy's hard men, responsible for defining and then making clear the reasons why the government of the United States reacted with such force to the Berlin blockade (in 1961) and the Cuban missile crisis two years later. On the evidence of his book, Bundy's main difficulty may have been that he writes too clearly for what he means to be misunderstood.

Bundy is not of course a fully fledged hawk, as has been clear from his spell as President of the Ford Foundation and, now, as a part-time academic in New York and at the Massachusetts Institute of Technology. *Danger and Survival: Choices About the Bomb in the First Fifty Years* is about the personal and political consequences of nuclear weapons. Despite its bulk, it is a gripping tale of the incorrigible failure of the human imagination to comprehend the enormity of the success of the Manhattan project, and the later developments and their consequences.

The tale of how Stimpson, Secretary of War in 1945, failed to persuade Truman that diplomatic prudence required direct discussions with the Soviet Union of the fact of US nuclear weapons, has been told before, notably by Bundy himself. Some in Washington calculated that the mere knowledge that the United States had developed a nuclear bomb would ensure Soviet compliance in negotiations on other matters, principally Central Europe, but Stimpson argued for open discussions on how nuclear weapons would change the relationship between the powers, and for an exploration of international control. It is chastening to see how later heroes such as Acheson were so indecisive at the time.

Bundy is also good on Oppenheimer, coming close to saying that the man who had made the first bombs was afterwards deceitfully framed by Lewis Strauss, the chairman of the US Atomic Energy Commission (AEC) in 1954, when Oppenheimer's security clearance was withdrawn. That Strauss had arranged for the FBI to bug Oppenheimer's telephone conversations, even those with the lawyers representing him before AEC's review board, has been known from a biography of Strauss. Bundy provides the evidence that Strauss also fed Eisenhower a distorted and damaging account of the board's proceedings, thus making sure, when the board eventually recommended to AEC that Oppenheimer's security clearance should be withdrawn, the White House would not intervene.

My purpose is not so much to rake over old coals (however satisfying that may be), but to illustrate Bundy's theme that the recurring need to make decisions about nuclear weapons has been a constant test of character for half a century's statesmen and scientists. The losers in the Oppenheimer case were not just Oppenheimer, but Teller (who lost "friends and self-respect"), Strauss (who lost a better job at the hands of the US Senate much as Mr John Tower did earlier this year) and, importantly, Eisenhower himself: Bundy's Eisenhower shares Oppenheimer's sense of the danger of nuclear weapons.

Bundy was at the White House during the Cuban crisis; even now, the tale he tells is spell-binding. But was it wise to have risked nuclear war without first trying diplomacy, and while giving European allies almost no opportunity to protest? Bundy (who confesses to have leant towards an air strike, not a naval quarantine) carefully considers the options only to dismiss them. What if the outcome had been different?

The other theme to be found in the book is that governments, which are hardly better placed than people to get to grips with nuclear weapons, at least work hard to comprehend them. They learned from the Cuban crisis. That, says Bundy, is the chief reason why no later crisis brought such a risk of nuclear conflict as Cuba had done.

So has it all been down (or up) hill since? Of course not, says Bundy, it's been down and then up. Even great men's strategic doctrines (McNamara's assured destruction, for example) become recipes for over-providing nuclear weapons. The purchase by third powers of nuclear independence has, in Bundy's estimation, brought neither security nor respect, but only costs.

Bundy emerges as a hawk, but one of the most temperate kind. His account of Ronald Reagan's seduction by the Strategic Defense Initiative is delicate and ironical. Nuclear weapons will continue to keep the peace, as they have done for 40 years, but the safest number is the smallest possible. Bundy's present successors at the White House should read what he has to say. □

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