As Sir Theodore Fox has put it, "We shall have to refrain from doing things merely because we know how to do them."

Beecher places the problem in historical perspective:

> It was the practice in ancient Persia for the king to hand over condemned criminals for experimental purposes in science. The Ptolemies used criminals in Egypt, and so did Fallopius in Pisa during the Renaissance. . . . In 1722, inmates of the infamous Newgate prison volunteered to be innoculated for smallpox—as an alternative to hanging, it might be added [pp. 5–6].

Nor does he spare the ethician the shock of confrontation with experimentation's past realities:

> Beriberi was a particular problem. In December, 1905, William Fletcher took the lunatics in an asylum at Kuala Lumpur, marched them to the dining room, and numbered them off. The odd-numbered patients were given the regular hospital diet of uncured rice, and the even-numbered received cured rice, containing sufficient vitamin B to prevent beriberi. Some 43 of the 120 patients on uncured rice developed the disease, and 18 of them died. No patient of the 123 on the cured rice died, and only 2 developed beriberi. (They had it on admission.) [p. 11].

Particularly timely and helpful is the discussion of the problem of free, voluntary, informed consent to experimentation. Among the criteria of the validity of human experimentation—which include adequate preparation by animal experimentation, a consensus of informed medical opinion as to its legitimacy, and absence of legal prohibition—certainly consent by the subject is one of the most important. If the author fails to crystallize a certain norm of voluntary "informed consent," settling for the notion that it is a *"goal toward which we must strive"* (p. 28), who can blame him? Are we much more specific or meaningful with our concept of "voluntary confession" in criminal law administration? He does warn against the myth that rigid codes emphasizing consent will guarantee security. He sees wisdom in the common-law method of evolution of principle from case to case.

At times the discussion fails to suggest the clear-cut distinction which, this reviewer believes, should always be maintained between (i) experimentation for the benefit of a particular patient in a patient-physician relationship, and (ii) experimentation for the general interest of scientific learning in an experimenter-subject relationship. Indeed, at one point the author asks:

> Does it really make a difference in the relationship whether the beneficiary is a man or the beneficiary science in general? The physician's qualities and qualifications of probity, discretion, honesty, skill, knowledge, and insight, which are the bed-rock of the doctor-patient relationship, have not altered as he proceeds from directly benefiting his patient to generally benefiting science [p. 89].

But is it not a sufficient answer that the rights of the recipients of the services *are different*? The author's own statement of "Some Guiding Principles for Clinical Investigation," 1966, reproduced in appendix A, clearly delineates the two types of experimentation. (This appendix, whose contents range from the Hippocratic Oath to the 1968 Code for Self-Experimentation of NIH, is a rich source for the scholar.)

The most timely and significant discussion is that concerning the ethical problems of transplantation, including the question of restating the criteria for pronouncement of death. This, coupled with the concluding chapter, "Science in relation to moral, ethical and religious issues," often strikes at the core problem of the dilemma of human experimentation. The rapid, perhaps precipitous facilitation of transplantation by almost overnight adoption throughout the states of the Uniform Anatomical Gift Act, or similar statutes based on its premises, leads this reviewer to hope that soon the author, eschewing the modesty that causes him to announce he is only an investigator, not a philosopher, will focus his experienced and informing light on even more basic problems of transplantation: How good is it psychologically and morally for people to continue on with the hearts or other vital organs of other people? How desirable is such extraordinary prolongation of life in today's assumedly exploding population? How much expense can be justified from the social viewpoint to keep extant life that nature would forfeit? When does the time come to surrender one's claim upon the earth to the needs of new life? Is the distinction between ordinary and extraordinary means a viable basis for determining when the resuscitator may, or should, be turned off? Is not the *motive* for transplantation the potentially corrupting factor that makes too simplistic such statements as that in the Harvard Medical School Report of the Ad Hoc Committee to Examine the Definition of Brain Death (reproduced in appendix B; the author served as committee chairman): "Obsolete criteria for the definition of death can lead to controversy in obtaining organs for transplantation"?

And, finally, his insights would be valuable on perhaps the ultimate question: Is the noisy rush to the scientific wonder of transplantation blurring a possible threat to the autonomy of man?

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The Falconiformes

Eagles, Hawks and Falcons of the World. LESLIE BROWN and DEAN AMADON. McGraw-Hill, New York, 1968. 2 vols., boxed. 946 pp., illus. $59.50.

This authoritative, definitive (and weighty: 12½ lb in slipcase) treatise comes at an opportune time. Many of the better-known (and who knows how many of the lesser-known?) birds of prey such as the osprey, the bald eagle, and particularly the peregrine falcon have recently suffered drastic reduction in population and curtailment of range over much of the Northern Hemisphere. Little is known about conditions in the Southern Hemisphere, but the heavy and increasing export by the U.S. chemical industry of "hard" pesticides to countries in South America and Africa leaves little doubt that major problems in species survival are arising in those regions. It is now generally believed that much or most of the high concentrations of pesticide residues in Arctic populations of the peregrine falcon are acquired while the birds are on their wintering grounds in South America, as well as through feeding upon migrant species of birds in the Arctic which have acquired *their* residue concentrations in South America.

The peregrine and many other birds of prey are at the upper ends of food chains and are therefore most vulnerable to ecosystem poisoning. But man has been unconcerned with and largely ignorant of this upper region of the ecosystem; his historic exploitation of such lower-level herbivores as cattle and sheep and his longer history of the hunting of such trophically low-level animals as deer and rabbit have conditioned him to viewing the higher-level consumers such as wolf and eagle as competitors. Today sheep and goat raisers in Texas and New Mexico make war by gun, trap, and poison on the golden eagle, and even more bitter persecution is suffered by the wedge-tailed eagle in Australia; in each case

the principal food of the eagle is rabbits, the control of which by the eagle actually betters the conditions for sheep.

The book before us was conceived in the 1950's when Leslie Brown, then chief officer for agriculture in the British Crown Colony of Kenya, searched in vain for works on the birds of prey. Recognizing that his own experience in Africa, India, and Europe fitted him for authorship of a serious work on eagles and falcons, he approached Dean Amadon of the American Museum of Natural History, who was familiar not only with New World species but with those of Australia as well, as co-author. Thus began a long and at times frustrating experience, with authors on widely separated continents and the London publisher on a third. Eventually publication was taken over by McGraw-Hill in New York. The text was largely completed in 1963 (but updated in places as new material became available); the plates were not completed for another five years.

Brown and Amadon's treatise brings before the general reader the best information the authors could find on each species in the raptor assemblage, not only the well-known species but the comparatively unknown ones as well. The most detailed information presented is not about the generally familiar golden eagle of the Northern Hemisphere but about the crowned eagle of Africa. In 1959 Brown discovered a crowned eagle building its nest in a great syzygium tree in view from his study window. The discovery of the nesting pair at the end of his own property allowed him to continue detailed studies on a species on which he had already made most important studies at his research station, Eagle Hill, near Mount Kenya. The alternate-year breeding of this eagle near the equator is explained by the extraordinarily long post-fledgling period of 11 months, during which the eaglet is fed by the parents.

The backbone of this work is the species accounts (290 species in 81 genera, all illustrated in 165 plates). This is preceded, however, by 16 chapters on subjects of general biological interest, including the functions of raptors in ecosystems, particular habits subserving particular functions, and, in turn, anatomic and physiologic adaptations furthering these functions. Chapters range over classification and distribution, physical attributes (the visual acuity of many birds of prey is probably eight times that of man), molt, flight, migration, hunting methods, productivity, longevity, and other topics. There are no photographs, but drawings illustrate some characteristic displays and flight. Ninety-four maps present ranges, migration routes, and in some cases even the distribution of subspecies (17 races of the peregrine falcon), and 15 halftone plates give flight and underwing patterns of 200 forms. There is a bibliography arranged by chapter and region, as well as a list of selected titles after most species accounts. The index is particularly useful, because many general characteristics are considered in introductory chapters which are not later described in the species accounts.

I find much that is new to me, even in the general chapters, some things which I question, and in some places views that may need altering with information that has appeared since the book was written. Although a kestrel (*Falco sparverius*) does have a postjuvenal molt, I know of no other example, and such a molt certainly is not general among Falconiformes. The juvenal plumage usually molts directly into the adult early in the bird's second year, and the molt is complete. The larger eagles have a more complicated plumage succession.

It is curious that there is so much difference of opinion with regard to classification, but of course the explanation is just that: it is opinion. In an arrangement of genera indicating phylogenetic trends in the Accipitridae, the Old World vultures are placed quite far from the aquilid eagles. This is not supported by observations on egg-white protein electrophoretograms, of which those of such birds as the white-headed vulture and Verreaux's eagle are closely similar. Further, in the family Falconidae electrophoretograms of *Polyborus*, *Herpetotheres*, *Polihierax*, and 15 species of *Falco* show varying degrees of intrafamilial resemblance but no resemblance to other families of the Falconiformes. The question of a polyphyletic origin of the falconiform assemblage is not given much attention in the treatise, and the work really concerns living eagles and falcons in the field rather than laboratory investigations or armchair philosophy.

I think one shortcoming of the treatise stems from the necessity to please not only ornithologists but also a wider public. The investment in color plates demands a considerable sale, and publishers do not like a "cluttered" text for the general reader. The serious student, however, wants to refer to the original sources for more information and, particularly in a nonexperimental science, feels the need for independent evaluation of the original accounts. The absence of text citations of pertinent literature is therefore distressing. There are also typographical errors, some of labeling, and some of factual detail.

The task of producing the plates (135 of which are in color) was distributed among eight artists, and the general accuracy and beauty of the plates will go a long way toward overcoming the price hurdle. Many of the plates are outstanding, not only in delineation and color but in "lifelike" pose as well, and there are many by less well known artists in addition to ones by such artists as Eckelberry, Peterson, and Reid-Henry. I liked particularly the remarkably delicate work of Albert Gilbert and C. E. Talbot Kelly, each of whom produced beautiful two-tone as well as color plates. I wish there were color plates of some nestling down plumages, particularly in such species as the bateleur, the osprey, and the martial eagle. All in all, however, I find this book hard to put aside. It will probably remain a chief reference for many years to come.

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Neural Linkages

The Interneuron. Proceedings of a conference, Los Angeles, Sept. 1967. MARY A. B. BRAZIER, Ed. University of California Press, Berkeley, 1969. xviii, 554 pp., illus. $20. UCLA Forum in Medical Sciences No. 11.

This nicely produced book, containing a series of papers and attendant discussions from a symposium held at the Brain Research Institute of the University of California at Los Angeles, is somewhat misnamed. It deals not with interneurons as individual entities but rather with groups of interneurons considered as interrelated sets.

Interneurons are nerve cells which serve as links for transmission of information between other nerve cells. Virtually all of the neurons within the central nervous system of vertebrates (and of many invertebrates) can be classed as interneurons, and consideration of central nervous system function in terms of interneuronal mechanisms