

Letters

Computer Searches: Effect on Animal Research

As a research physiologist of 30 years experience and a lifelong animal lover, I am angered by the unwitting, but nonetheless serious, impact that increasing reliance on short-term computerized literature searches is having on the efficient use of animals for research. Studies with live animals were relatively more common 10 to 30 years ago than now and were, not uncommonly, of such high quality that the findings stand to this day. Yet, because routine computer searches typically extend back only 5, or sometimes 10, years and young investigators are increasingly reluctant to retrieve publications "by hand," it is not unusual to come across recent studies that do little more than substantiate older published work of more than 10 years ago. Moreover, because there was then less pressure to publish quickly, many older studies were, in fact, better performed and better controlled, lacking only the glossy trappings of modern computer-assisted presentation. What, then, of those animals that now die needlessly because no one troubles to study the earlier work? And, with the present geometric increase in the rate of publication, will computer searches in the near future be reduced to even fewer years? We can justify killing animals humanely in the course of needed investigations directed towards the betterment of all living things. We cannot justify repeating an already definitive study using live animals for no better reason than that we are unaware that the work has been done already.

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The Münchhausen Effect

I was most interested by the discussion of animal deception generated by Roger Lewin's Research News article (4 Dec. 1987, p. 1350; Letters, 18 Mar., p. 1360) and am moved by it to recount the following tale, which is absolutely true in all respects and is vouched for by several of my relatives and neighbors.

My English bulldog, Münchhausen, likes cats very much, especially as a dietary sup-

plement to his normal fare of old shoes, table legs, and small children. He showed much interest in observing the gathering of birds at our birdfeeder during the winter and in the consequent attempts by local cats to take advantage of such a high concentration of food. His first attempts to deal with the cats were completely straightforward and met with no success, as the cats could all outrun him. He, therefore, after some reflection, took to lying under the bird feeder in the attitude of an (uneaten) sunflower seed. His reasoning clearly went, "seeds attract birds; birds attract cats; therefore I will become a seed to attract cats."

I marveled at (while deploring) his cunning, but feared to lose him. Lying in the snow for hours on end was obviously undermining his health. Threats, entreaties, prayers—all were useless. In the end, I was forced to construct a 10-foot-high model of an Eastern grosbeak, a species noted for its love of sunflower seeds. While the model was secretly being constructed, the eating habits of this species (and its well-known nearsightedness) were the topics of much household discussion in Münchhausen's presence. He appeared to take no notice; but as soon as the model appeared above him, lowered by wires from the attic of our house, he left his post under the bird feeder and went inside. He no longer lies under the feeder.

Unfortunately, in order to prevent his relapse into a deceitfulness which I, personally, found rather unedifying, I have felt it necessary to leave the model standing by the bird feeder. Now the birds worship the model from a reverent distance, and the cats get all the seeds.

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Impact Assessment

The 11 March issue of *Science* opened with three impact assessment pieces—Daniel E. Koshland, Jr.'s, call for judicial impact assessment (Editorial, p. 1225), Frederica Perera's challenge to the Environmental Protection Agency (EPA) to set scientific standards for risk assessment (Letters, p. 1227), and a News & Comment article about a National Research Council panel report criticizing NASA for not using "probabilistic risk assessment" methods for safety analyses (p. 1233). These commendable pieces suggest that we take a look at the intellectual infrastructure for impact assessment.

The United States pioneered technology

assessment, environmental impact assessment, social impact assessment, and risk assessment in the 1970s; in the 1980s, we have fallen behind. We still perform environmental impact statements where mandated by law, and the Office of Technology Assessment produces fine studies; but we have stopped supporting intellectual advancement in these areas. The Council on Environmental Quality's scientific capabilities have been emasculated; The National Science Foundation's research support has withered (with a modest exception for risk assessment); the EPA's once energetic assessment research and development is stifled. The International Association for Impact Assessment (IAIA) was founded in the United States in 1981; U.S. contributors intellectually dominated impact assessment then. The situation is now reversed; we look to Canadians for professional activism, to the Dutch for initiatives such as the "second opinion" program to aid developing nations, to the United Nations for its Advance Technology Alert System to assess changing technology. Over the past 5 years, the two IAIA meetings in the United States (in New York and Philadelphia) have been attended by fewer than half those attending the five non-U.S. meetings (in Calgary, Utrecht, Barbados, Brisbane, and Leiden).

Public policy increasingly relates to changing technology. Perhaps the scientific community could interest the next Administration in strengthening American technology policy analysis.

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Clarification of Donor Status

The article "Human experiment roils French medicine" by David Dickson (News & Comment, 18 Mar., p. 1370) requires some clarification of the terms "coma," "brain death," and "death." A careful distinction is needed to avoid errors of interpretation that can have an impact on organ donor families and the transplant community. Medical and legal opinion is clear that brain death is death, despite the continued viability of other organs. A brain-dead individual cannot be kept "artificially alive" or in "deep coma by artificial means." Coma or irreversible coma are not equivalent terms for brain death. The pathology of brain death involves autolysis of the tissues of the brain and brain stem occurring after the cessation of blood flow to the brain. The legal time of death is the time that brain

death is pronounced, not the time that artificial support measures are stopped or organs are removed.

The legal status of the brain-dead, but heart-beating, cadaver may need further clarification, but there is an ethical framework in which to proceed. My view is that the cadaver donor is still entitled to the protections and safeguards due a hospitalized patient until the body is released to the morgue or funeral home and becomes a "traditional" corpse. Hospitals currently have extensive review processes to ensure proper declaration of brain death and proper procedures leading to organ donation. Informed consent of the donor family is essential. Any experimental protocol for "organ maintenance" would require approval by institutional review boards and consent of the deceased's family. Additional safeguards exist as a result of the "required request" procedure for organ donation, which provides for the identification and documentation of brain-dead individuals and provides data that would disclose questionable practices.

The transplant community has worked hard for years to establish public trust in order to have access to donor organs. Every effort is made to ensure accountability for

actions related to donation and to exclude conflict of interest between the care of the patient and the obtaining of donor organs. It is essential to maintain this trust, which may well require further clarification of the donor status. It also requires careful use of the terms defining patient status.

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Macho Work Week

I strongly disagree with the letter from Alina C. Lopo (18 Mar., p. 1362) implying that no professional can make a worthwhile contribution to his or her field without putting in a 60- to 80-hour week. Counterexamples in science include Newton, Einstein, and Ben Franklin, all of whom did science on the side. The country is in dire straits if productive professionals are excused from contributing to family, community, and political activities because they are too busy with their jobs. In addition, experience gained in the outside world can be

valuable in professional situations.

Both quality and quantity of work are issues. Careful, quality work can be done at least as well in a 40-hour work week as in the first half of an 80-hour week. Furthermore, a tired professional is likely to produce lower quality work than a rested one. Hence the current controversy concerning decisions made by doctors on duty for 30 hours at a time. Quantity of work will decrease with hours spent, but not linearly, because the marginal extra hours may be less productive. Many difficult problems require intense concentration that cannot be sustained for an extended period or can lead to dead ends. In such cases, taking a break and starting fresh can be much more productive than beating one's head against a wall.

The argument is for flexibility and freedom of choice. If a professional chooses to work a macho week, he should be rewarded for whatever is accomplished by so doing. Likewise, the high-quality work done by people who choose to keep normal hours or work part time should be acknowledged for its value.

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