Letters

Colony of Hemophilic Dogs

A colony of beagles with classic hemophilia has been established through the cooperative efforts of staff members at Oklahoma State University College of Veterinary Medicine and the University of Oklahoma Medical Center. The colony is housed on the campus of Oklahoma State University, Stillwater.

All hemophilic animals in the colony have documented clinical and laboratory evidence of factor VIII deficiency, which has been shown to be functionally similar to the disorder in man [*Arch. Pathol.* **76**, 464 (1963)]. Because of the infrequency of episodes of hemarthroses and severe bleeding, the defect in clotting has been postulated to be less severe than that reported in the North Carolina Colony of Brinkhous and his associates [*Trans. Amer. Clin. Climatol. Abstr.*, **75**, 137 (1964)]. This mild form of canine hemophilia permits greater longevity of the animals and facilitates their care during experimental procedures.

The dogs are purebred beagles weighing between 7 and 9 kilograms. They are fed a balanced ration as recommended by the National Research Council. Special efforts are made to keep them parasite-free. All animals are inoculated at 4 months of age and each succeeding sixth month with a triple vaccine (distemper, hepatitis, and leptospirosis).

A core of ten hemophilic animals and ten genetically predicted transmitter females are maintained in the colony at all times. An optimal breeding program is established to obtain hemophilic animals. Hemophilic bitches are bred to proven hemophilic males to obtain all hemophilic offspring.

The colony is supported by a research resource grant from the National Institutes of Health, HE-09013. Investigators interested in obtaining these animals for basic or applied research are invited to address: Dr. Ralph G. Buckner, Department of Pathology, College of Veterinary Medicine, Oklahoma State University, Stillwater, Oklahoma 74075; or Dr. James W. Hampton, Department of Medicine, School of Medicine, University of Oklahoma, Oklahoma City, Oklahoma 73104.

Research applications and further information about the colony will be mailed upon request.

JOSEPH M. WHITE
Special Training and Research Programs, School of Medicine, University of Oklahoma, Oklahoma City 73104

GLEN C. HOLM
College of Veterinary Medicine, Oklahoma State University, Stillwater 74075

The Reuss Report

In his account headed "R&D boom: House report sees harm to higher education" (22 Oct., p. 464), Greenberg reports without critical comment a contention of the Reuss subcommittee that the Universities of California (Berkeley) and Michigan and "a number of the other great State universities" are neglecting their undergraduates because " 'No close relationship is discernible' between the volume of federal research funds and objective tests of undergraduate achievement." Apparently, the chief evidence for this argument is the percentage of graduating seniors at various colleges and universities who between 1960 and 1963 were awarded NSF, NDEA, or Woodrow Wilson fellowships for graduate study. ". . . the subcommittee noted that a poor showing was made by undergraduates from many of the universities that are major recipients of federal research funds. Caltech led the list of [good showings], with 20.1 percent of its 1960-1963 baccalaureates winning fellowships, but next came Reed, Haverford, Swarthmore, and Carleton colleges, whose total federal research receipts probably wouldn't pay 1 week's electric bill for a medium-sized accelerator." Greenberg quotes from the subcommittee report a statement by a state-college history professor, that "if Berkeley had produced fellowship winners . . . [at] the enormous rate achieved by Reed College of 72 awards among 600 students, Berkeley would have had 3240 fellowships. . . . instead of the 132 which it actually achieved."

This is specious logic. Persons familiar with characteristics of freshmen entering state universities and the best liberal-arts colleges know that such postgraduate accomplishments as fellowships received and Ph.D. degrees earned can be predicted nearly as well before the freshmen take a single course as they can by considering the characteristics of the beginners and of the institution together. In *Who Goes Where to College?* (Science Research Associates, Chicago, 1965), A. W. Astin reports that "the college actually attended by a student of high ability appears to make only a slight difference in his eventual career choice . . . , persistence in college . . . , and the eventual level of education that he obtains . . . . Those characteristics of an institution that are generally believed to be educational assets—select student body, highly trained faculty, high faculty-student ratio, superior facilities (such as a large library, etc.)—appear to have little impact on the student outcomes that have been studied thus far." The ability and aspirations of the entering freshman seem to be of paramount importance.

How able are the students who enter the institutions cited? According to Austin, the "estimated selectivity" of these institutions is as follows, on a scale where the average accredited 4-year college in the United States has a mean of 50 and the standard deviation of such colleges is 10: Caltech, 81; Swarthmore, 78; Reed, 74; Carleton, 73; Haverford, 72; Berkeley, 67, and Michigan, 66. Only Radcliffe is (by Astin's index) as selective as Caltech, whereas Berkeley is less selective than about 4.5 percent of all colleges in the U.S. Note how closely these scores agree with the ranking according to fellowships in the subcommittee report ($r = .83$); only all-male Haverford is much out of line, exceeding its most selective but coeducational neighbor, Swarthmore.

When one considers that the state university performs a vastly broader undergraduate service function than does the liberal-arts college, it seems unlikely that the argument of the Reuss subcommittee on the basis of fellowships won has much validity. Most freshmen entering Caltech and Reed are hell-bent on winning graduate fellowships and have the ability to do so, whereas considerably fewer at Berkeley and Ann Arbor (the two most selective state universities) have so strong a drive toward the Ph.D. degree. Even if every Nobel laureate at Berkeley did nothing but work with undergraduates, Caltech and Reed would still win the race overwhelmingly.

JULIAN C. STANLEY
Center for Advanced Study in the Behavioral Sciences, Stanford, California

. . . The statistics gathered by the Reuss subcommittee are so misleading that they must be corrected before they are completely assimilated into the folklore of science education. For example, we learn from the report that the University of California receives more government money than certain midwestern universities but does not produce Ph.D.'s in proportion to what it extracts from the federal till. This argument completely overlooks the fact that the large sums of money received by the University of California are primarily required for certain expensive, but very important, research installations. The cost per Ph.D. is high at California because it costs more to train a student in high-energy physics than in horticulture. The cost-per-student comparisons are valid only if students undergoing the same type of training are compared. They are still inaccurate, however, if postdoctoral students are not included. The Reuss committee's figures would probably be quite different if the number of postdoctoral students at the University of California were added to the number of Ph.D.'s granted.

The congressmen are also bothered by the huge discrepancy between the amount of research funds granted to certain institutions and the number of their undergraduates receiving national competitive graduate scholarships. Berkeley is compared in this respect with colleges like Reed and Oberlin, which have little federal money but send a high percentage of their students to graduate school with national fellowships. This comparison is ridiculous. Many of Berkeley's undergraduates are in professional schools and go to work when they graduate. Even its College of Letters and Science, which is the part of the institution most comparable with a Reed or Oberlin, is a vastly different kind of place from either of them. If the congressmen wanted to make a fair comparison, they should have taken 600 students (size of Reed) from the College of Letters and Science who were selected for entrance in the same way and have the same interests and goals as the Reed students. . . .

It has long been known, at least in biology, that the big research-oriented institutions do not produce very many potential graduate students. Graduate students come to places like Berkeley from Reed and Oberlin, where they have spent their 4 years preparing for graduate school by learning about the things that were discovered at places like Berkeley. The characterization of the carbon reduction cycle in photosynthesis cost a lot of money, and almost certainly did little to win more graduate scholarships for Berkeley undergraduates. It had a great deal of influence, however, on biological research and teaching in the rest of the country. Does Congressman Reuss think that a little more federal money at Reed would result in similar achievements?

The subcommittee's basic misunderstanding of research activity is most apparent in its conclusions and recommendations concerning research productivity. The logic behind them appears to be that if a professor can produce a given amount of research in 1 year while doing 6 hours of teaching, he can produce the same amount of research in 2 years while doing 12 hours of teaching. The effect of a heavy teaching load on research is generally quite different. . . .

Congress should be told something about research which the academic world knows but seldom admits. A large percentage of the scientists in colleges and universities which produce little research are there because of that fact. . . . This is not meant as criticism of such institutions or individuals, but creative research has been and always will be the pursuit of a minority. Science has flourished under government patronage up to this time because it has stimulated the concentration of this minority in institutions providing a favorable ecology for research. There are certainly ways to improve the allocation of research funds, but the congressmen in question cannot hope for improvement if they base their recommendations on faulty statistics and a passion for quantity rather than quality.

W. M. LAETSCH
Department of Botany, University of California, Berkeley

. . . Few people would argue that the present system of federal support of basic research does not have some faults, but if we are to improve the system, we must aim at correcting real faults and not imagined ones. Despite the obvious competence of Chairman Reuss and the subcommittee members in other areas, it appears that they have reached their conclusions in this report on the basis of very nebulous arguments and would advocate changing the system for what are, for the most part, the wrong reasons.

The subcommittee cites testimony that "600-odd colleges awarding 55 percent of all bachelor's degrees in physics received only 12 physics grants in 1964." Since most university research is an integral part of a graduate program, it would be instructive to know how many research proposals the federal agencies received from these 600-odd colleges and how the ratio of grants to proposals for this group compared with that of the institutions receiving the bulk of the grants. It was my experience when I had the responsibility for the programs of engineering research support at NSF in 1963–64 that, within the limits of funds available, good research proposals from whatever university were supported. There was even a tendency among the program directors to give extra attention to a proposal from a promising researcher in one of the "have-not" institutions. . . . In the engineering programs we did impose the constraint that with the relatively small amount of basic-research money available, we would limit support primarily to those projects in which graduate students were involved. Used in this way, research funds serve the dual purpose of supporting high-level research and of encouraging the flow of advanced-degree holders into the economy. . . .

The subcommittee notes that there is no direct relationship between the federal research funds received by a university and its output of Ph.D.'s. This, however, is the wrong comparison to make. What should be noted

is the excellent correlation between Ph.D. production in given areas of research at the various institutions and the federal research funds which they receive in these areas. The point raised by the subcommittee simply shows the great disparity among the disciplines in the cost of research per graduate student. For an institution specializing in research in oceanography or radio astronomy, for example, the cost of equipping a student may be hundreds of times that found in a university which is strong in research of a purely theoretical nature.

A third concern of the subcommittee is the decrease in some disciplines of the percentage of new teachers holding the Ph.D. degree, and this is laid to the failure of federal research funds to raise the general level of training in university faculties. The figures given include teachers in universities, colleges, and junior colleges. One might legitimately wonder how we have managed to do as well as we have in the face of the tremendous growth in the number of science students and the increase in numbers of junior colleges in recent years. Perhaps the subcommittee should have asked what these statistics might be if we had *not* had federal research funds, and, to be fair, it should also have noted that the proportion of Ph.D. teachers in some science and engineering disciplines has actually increased. . . .

The key argument in the report, and that of most critics of federal support of basic research, concerns the concentration of funds in a few institutions. This concentration exists as a result of the policy of using research funds to support what is judged by scientists and engineers to be the best research. If we are to use research money to accomplish the additional purpose of spreading research more widely, with immediate quality as a secondary objective, then let's do this honestly and not blame the federal agencies for failing to do a job they were not commissioned to do. There are, of course, several programs already in existence which have the effect of spreading research support to more individuals and more institutions. Examples are the various institutional research grants which delegate to the university the choice of the specific research to be supported, and NSF's Engineering Research Initiation Grants, in which young faculty members compete for support only with their peers and not with established researchers. I would favor more programs of this sort to broaden the nation's research capability, but I believe it would be a grave mistake to use the bulk of our research funds for any purpose other than that of supporting the best research. . . .

Finally, the subcommittee seems to have missed completely the intent of NSF's Science Development Program and to have taken the testimony of Henry Riecken out of context to mean that the program would be used for "improving . . . lagging departments in already important research institutions." Any honest observer will agree that the grants made to date have not been made for this purpose, but rather, as is the intent of the program, have gone to departments which are currently strong enough to give reasonable expectation that they might achieve excellence with the infusion of grant money, properly used. And, although the universities receiving these grants are not completely devoid of prior research support, they are also not on anyone's list of the nation's research-affluent institutions. . . .

The federal research baby is a precocious youngster whose health is vital to the future of our nation. Let's work to keep him well fed and well scrubbed. Let's not throw him out with the bath.

W. EDWARD LEAR
College of Engineering,
University of Florida, Gainesville

The report of the Reuss subcommittee entitled "Conflicts between the Federal Research Programs and the Nation's Goals for Higher Education" gives me concern, especially after carefully comparing it with the published responses to subcommittee inquiries and the published testimony. The one excerpt from my written statement to the committee, while accurately quoted in this report, gives no hint of my general response to the questions asked.

My general position was that, in a modern university, science teaching and research are inseparable. The direct role of research is small at the undergraduate level, growing in importance through the junior and senior years and becoming the key educational vehicle in the practically tutorial relationship between a faculty member who guides thesis research and the student working for an advanced degree. But even at the more elementary under-

graduate level, the student benefits indirectly from university research because it helps to keep the teacher current in his field and enthusiastic about it. Without the federal research policies which have made possible the present high level of academic research in science, many of the most capable members of the science faculties in our colleges and universities would not be in the universities at all, but would instead be in industrial or governmental research positions, or even in other nations, and American students would be attempting to learn science in a kind of backwater remote from the mainstream of advances in science.

All of us agree that the nation's efforts in higher education and the government's policies in supporting science can probably be improved. Discussion of problems by those of us who responded is not evidence for conflicts between research and higher education. I find the recommendations of the Reuss subcommittee report to be generally very sensible, but I am fearful that real damage can be done to our fine national programs in higher education and in science if individuals or the press accept the picture of "conflicts" which the report seems to me to paint by selecting unrepresentative excerpts from statements made to the subcommittee.

GEORGE E. PAKE
Office of the Provost,
Washington University,
St. Louis, Missouri 63130

Exclusive Rights

Recently I received in the mail, as part of a general mailing, a copy of the statement dated 19 August 1965, of Walter A. Munns, president of Smith, Kline and French Laboratories, before the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, United States Senate. The statement attempts to justify alterations in the current patent policy of government agencies supporting research in the life sciences. Though the justification is inadequate, the statement points up a number of issues which have been developing just below the surface of discussion in other fields of science as well as pharmacy whenever the industrial and academic communities share common interests.

For those of us who have spent parts of our careers in both industry and academe, it is, perhaps, a little easier to recognize some of the absurdities which arise in the so-called "collaboration" of industry and university on some problem of "mutual" interest. The situation is summed up by the highly improbable juxtaposition of ideas in the phrase "reasonable exclusive rights" used in the statement. The main issue arises from the fact that what is "reasonable" from one point of view may not be "exclusive" enough from another. In our ever more market-oriented lives, a confusion has grown up between the proper roles of the university and of the profit-making industrial concern. Collaborations between universities and industries clash (all too inaudibly at the moment) on these differences in purpose—for, though some of us seem to have forgotten, the primary function of the university is to acquire knowledge through research and then disseminate that information to as large an audience as possible, whereas industry's primary function (as honestly stated by a number of distinguished American businessmen) is to maximize profit. The conflict of motives is, therefore, a basic one. Industry must keep "company-confidential" as much of its special knowledge as possible, while universities are obligated to disperse their knowledge to all who are willing to listen.

Usually this conflict of motives is ignored both by university administrators eager for any additional support of research activities and by corporate attorneys trying to safeguard their corporation's investment and potential profit. Often this results in outright restrictions on the publication of experimental results. The acceptance of this censorship by the university should be explicitly and vigorously condemned as an abrogation of its prime responsibility.

Since university collaborators are often supported by additional funds from state or federal grants, the "collaboration" may represent an economical way for the corporation to develop and test new concepts without making the investment required for either the establishment of a permanent industrial laboratory or full support of the academic project through a conventional overhead contract. The president of the drug company is essentially asking to enter the game after the major inventions have been conceived and to obtain exclusive rights for work which is more properly in the public domain.

I am very much in favor of public ownership of patents emerging from university research projects supported by public funds. I am also very much in favor of legislation which will prevent the indirect subsidy of some of our most prosperous corporations through the mechanism of "collaborative" projects which do not fully cover the costs of the projects. I would hope that this would also minimize the extent to which industrial motives can be imposed upon (or accepted by) public academic institutions through restrictive confidential agreements.

The drug industry is not alone in its unreasonable search for "reasonable exclusive rights." A situation is developing with respect to computer teaching machines such that the issue of public control and ownership of educational facilities may actually be opened to serious question during the next few years.

WILLIAM R. UTTAL*
University of Michigan, Ann Arbor

* Current address: Kyoto Prefectural University of Medicine, Kawaramachi, Hirokoji, Kamikyo-ku, Kyoto, Japan.

The Camelot Affair

John Walsh's report on *l'affaire* Camelot (News and Comment, 10 Sept., p. 1211) was an essentially correct account of the facts insofar as they are known. One passage, however, bears closer scrutiny. He writes:

> There is a surprising degree of agreement, in and out of government, that studies with the objectives of Camelot are necessary. At a time when stage-managed "wars of national liberation" are emerging as the number-one foreign policy problem for the United States, the potential contributions of social sciences research abroad can hardly be ignored.
>
> Project Camelot can be viewed as a reaffirmation of the old saw, "It ain't what you do, it's the way you do it." At the lowest level, the name Project Camelot, with its echo of military jargon, its quixotic ring, and its cloak-and-dagger aura, was regrettable in the context of Latin American sensitivities.

I wish to address myself to two issues implicit in this passage. The first is moral, the second technical.

It is perfectly reasonable that practical social scientists should wish to offer their services to their country or, in a less charitable view, should be eager to obtain research grants from any of the numerous government agencies sponsoring research. But a difficulty arises when the purposes which they