

# STANFORD UNIVERSITY MEDICAL CENTER

## DEPARTMENT OF GENETICS

November 7, 1977

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Ruth M. Davis  
Deputy Director  
Office of Defense Research and Engineering  
Washington, D.C. 20301

Dear Dr. Davis:

I was most pleased to have your letter of October 28th and the enclosures on DSEP. I was glad to know that you have enlisted Bill McElroy, and if I don't get a chance to see you in Washington, perhaps there might be an opportunity to connect during one of the meetings he will organize. I found your presentation so thoughtful and thought-provoking that it is difficult for me to make a coherent response brief enough for you to want to read it.

There is a grave temptation, much to be avoided, to try to remount a 'bandwagon' for generalized support of universities and of basic science on national defense rationalizations. I agree that the DOD is a most inappropriate vehicle for such an effort, and even if it worked during an interval of enthusiasm, we would end up suffering from the same seesaw effect that we have seen in the past. On the other hand, ultimate support of national security should surely be one of the manifest justifications for federal investment in higher education and basic research, through channels like NSF and NIH, for those areas that are not clearly within the province of your department. So one of the criteria of choice should be whether a given area is being defacto undervalued by other civil agencies.

Two general categories of specialty interest may suffer in this light: those which are too far down the continuum towards applied science to appeal to a basic science agency like NSF, but not yet ripe enough for straight commercial investment. The other zone would concern those regimes that deserve extraordinary additional weight from a national defense standpoint beyond their interest to basic science. The oceans, the atmosphere and sub-orbital space would be the obvious candidates for this characterization. I have surely left out others, and a better definition of likely areas of neglect by the civil departments is a task worthy of one of your new study groups. (Another one that comes to mind is research into disease problems not typical of the continental United States. Tropical health is a world priority which is not reflected in the research programs of our national agencies. The decline of colonialism, especially with respect to the British Empire, has resulted in a sharp degradation of sophisticated interest in tropical diseases and there would be substantial justification to sustain and enhance DOD support in this area. The contributions of existing modest efforts like NAMRU have been monumental in proportion to their costs.)

Although I may seem to have been discouraging certain levels of involvement of DOD in basic research, my remark about the defense rationale for NSF, NIH, etc. should be taken seriously, and ways explored of making that view stick in the actual budgetary process. If that cannot be done, then we really are in "Catch-22."

One of the underlying hinderances to a more vital relationship between DOD and the universities is the prevalent lack of understanding of the task of national security among academic circles. In a sense we are stymied from the word go. I would hope that we would both prefer a much larger view of the universities' responsibilities than in providing the intellectual steam for refinement of existing weapons gadgetry. At a place like Stanford the main locus of attention to national security problems is in programs in international relations and in arms control. Fortunately, we have a number of part-time advisors to the national security establishment on our faculty, but we are still highly deficient in teaching the fundamentals of military strategy and the role of weapons system and military force in the international order. I am not sure that I have a clear-cut recommendation to make on this point; although there might be some merit in encouraging a few universities to establish specialized graduate programs in these areas that could help serve educational needs for rising officers in uniform, as well as a civilian academic roster. The schools have no abundance of resources at hand right now to experiment with such programs, and modest investments on the educational side have as much leverage as direct investment in research programs that overlap the missions of civil agencies.

There are, of course, any number of technical areas where the DOD does have readily justified interest, and which are complementary to clearly identifiable needs and opportunities at the universities. I would hardly be able to offer an exhaustive list, but I would think that innovations in computers and in communications, their interaction, and the most searching study of command and control should have a very high priority. Of course they do already and this suggests that your office might be willing and able to take an even more cogent interest in enhancing the efficiency of developments in computer science -- especially in software -- as a matter of urgent national interest. I am deeply concerned that the emerging era of cheap and therefore highly distributed computer hardware will greatly accentuate the centrifugal tendencies of the Babel phenomenon in software development. The ARPANET and the way in which it has helped to unify the TENEX operating systems at a wide variety of sites illustrates an effective countermeasure that I hope you will continue to foster. In fact, even a modest step like opening ARPANET further to wider exchange among computer science departments involved in the development of major computer systems and languages for the purpose of facilitating coordination and standardization would be an important and not very expensive step, impeded now more by doctrinal than economic considerations. It would be a simple matter technically and administratively to invite every relevant department to submit quite modest proposals for participation whose main payoff would be access to the NET. I am sure that much sterner measures will be required on the part of government funding agencies to keep the larger Babel problem from going totally out of control, and perhaps DOD could play a role with those agencies in examining the question and furthering the necessary steps.

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Above all, I would hope to stay out of a model that attempted to recruit the universities into competing with industry as sources of purely technical ideas within the state of the art for the solution of well-defined military challenges. Rather, it should be our task to be in a position to discover problems that DOD did not realize it had, because it did not understand the availability of possible solutions. I can illustrate that with a brief reference to DSTAR (see enclosure), a concept that Dick Garwin and I have tried to further with rather little success. As you might expect, the responses all have to do with reasons why this approach won't work, rather than any comprehension of the importance of finding ways to make it feasible. The issue has not really been engaged properly anywhere, perhaps because of the obvious impact that it might have on the existing plans of the affected services. Whatever the merit of this particular proposal, I use it mainly to illustrate the kind of initiative that one might hope to get from a better informed academic community and one that related to the underlying issues of national security in a way more nearly analogous to our role in health research and similar fields.

Yours sincerely,

Joshua Lederberg  
Professor of Genetics

Enclosure

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