



March 12, 1984

Major General W. E. Odom  
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Pentagon  
Washington, DC 20310

CONFIDENTIAL

Dear General Odom:

I'll organize my letter regarding our conversation last Wednesday around your specific questions.

1. Is the paper on a firm scientific footing? The answer to this is an unequivocal No. Shopping lists rarely are. Almost all of the science is either misrepresented as to consequence, or erroneous, or incomplete as to content. a) Statements such as they use "ion exchange chromatography, or can make P<sup>32</sup>", are as meaningful as "my wife cooks with pots". These are the SOP of even primitive science. b) The coli aerosol story involves, in fact, a special coli mutant (UVR) which is sensitive to a variety of agents, including ultraviolet light. It lacks a DNA repair system. c) The genes transferred in the Vibrio cholera experiment were normal housekeeping genes involved in intermediary metabolism, not toxin genes. In any event, cholera toxin genes have been cloned in the U.S. d) Flu virus, although highly changeable in nature, is remarkably refractory, because of its lifestyle, to laboratory manipulation. Among viruses, it and its relatives would be the most difficult to change in a particular direction. It has been tried here. e) The majority of the neuropeptides known to date have physiological effects only when injected directly into the brain. In this sense, small molecule neurotransmitters such as GABA should be more effective. This area has little to do with genetic engineering.

2. Is the analysis logical, consistent, and reasonable? The analysis is not logical, consistent, or reasonable. From (a) above we only learn that the Soviets do science, nothing special in implication. From (b) above we have a story only partly told, again with no implication as to super biological agent vectors. Normal coli are quite resistant to dying etc., and are standardly stored by lyophilization. The American Type Culture Collection insists on lyophilization before cultures are deposited there. From (c) we are invited to believe that toxin genes were transformed, which isn't true. This really doesn't matter as every molecular biologist knows how to transfer toxin genes. They are no different than any others for state-of-the-art manipulations. I could send you a step-by-step manual of the procedures. Similar failures of logic, or should I say absence of pertinent connections of the scenarios to BW, abound.

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3. What are the gaps in intelligence data? An analysis of the infrastructure of Soviet science is completely lacking, as is the mission the newly constructed agents might fulfill. Modern molecular genetics is easy to understand and easy to perform if one has continuously available a set of some dozen special enzymes at high purity, a few dozen chemicals both radio-labeled and cold, efficient centrifuges, power packs, radioisotope counters, and high sensitivity film, with of course the usual laboratory bench-top facilities. There are a few expensive instruments now on line which can expedite matters: a nucleotide synthesizer, a peptide synthesizer and a peptide sequencer. However, what they do can be done by hand. The fundamental question is, how are all these obtained on a routine basis in the Soviet Union? Are they made or bought, and from where? How do different Institutes compare? If orders must pass special privileged security through the KGB or other channels of authority, the inevitable bureaucratic delays could allow (my opinion) for slow but concentrated work on one or two systems but certainly not a shopping list of them. Indications of significant changes in procurement procedures could be important.

On the status of Soviet molecular biology institutes or on Darth Vader, I've nothing to offer. I don't know whether one of the purposes of the intelligence community is to help define missions for weapon systems. However, it should help focus intelligence gathering were potential missions defined. This refers to super power confrontation. The use of CBW weapons for terror by small nations requires special consideration.

4. Does this paper portend a threat to the U.S. Army? In our thinking, we must separate Soviet capacities from the contentions of this paper. Since the paper is replete with fundamental scientific errors of fact and logic, its basic thesis must be suspect. Thus, my own feeling is that it does not in any way add to our knowledge of Soviet actions and should be ignored or redone. The Soviets may have moved, or will move, into serious BW work, but that would be independent of the evidence in this paper.

I have two recommendations to make. First, the intelligence community should have ongoing access to the wisdom of a few molecular biologists. These individuals could not only help monitor this area but in time also help determine the direction of intelligence. Second, would be the setting up of a workshop to analyze Soviet biological science. The current status of Western science and its infrastructure could provide benchmarks for the Soviet equivalents. In this manner, a more realistic picture of Soviet capabilities in this area could be obtained.

If I can be of further aid don't hesitate to call on me.

Yours sincerely,

Norton D. Zinder  
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