

11 June 1951

Dear Saunders,

Time was too limited during our telephone conversation Sunday night for me to say much in detail about the questions you raised. And, of course, there are always the frustrating but really necessary security restrictions. But I'll try to be more specific now, to answer the questions raised in your letter, and to give you as clear a picture as I can of the general nature of the assistance we are seeking.

First let me say that I'm not trying to rush you into a decision; in fact, a formal invitation to join the advisory group cannot be issued until your clearance has come through. Having the clearance is probably a good thing from this point of view; if and when the big blow-up comes, we'll all be in defense work of some sort, and work that doesn't require clearance is certain to be dull (while work that does require clearance is only probably dull!). I hope the CIC man didn't inconvenience you seriously, and that you will send me the pink form when you have had a chance to complete it; as the advertisements say, "this puts you under no obligation whatever".

Secondly, concerning the amount of time that members of the advisory group will be expected to devote to our problems, it's up to the individual members. If a man feels he has time for no more than two or three days in Washington each quarter, we'll give him all the information we can in that time and be grateful for whatever advice he can give us. If, during a quarter when he is not teaching, he wants to spend considerable time here, so much the better. If he thinks about our problems at home, comes up with an idea, and feels he has not time to bring it to us, or if he feels the need of information too highly classified to be sent to him by mail, we can send a man out to talk with him. In short, each member of the group will decide for himself how much time he wants to contribute.

Thirdly, I understand what you mean about the military "research" assigned to you in World War II (wasn't that the same stuff Mackey worked on?). Let me assure you emphatically that our work is nothing like that. We do not deal with dirty differential equations, we don't carry slide rules, and in general our problems are not amenable to the methods of what is usually called "applied mathematics". I don't mean to say that we are unconcerned with calculation, approximation, and numerical methods, but we have competent people to deal with those aspects of the problems. Our pressing need is for a high order of abstract thinking, for new ideas and approaches rather than mere technical facility.

Finally, I'll try to convey the spirit of an important class of problems. Suppose we are given explicitly a finite set  $A$  of axioms which define a poverty-stricken algebraic system. Suppose further that we know there exists a non-empty class  $\mathcal{A}$  of comparatively rich systems, in each of which  $A$  may be embedded. Problems: (1) to find at least one element of  $\mathcal{A}$ ; (2) among whatever elements of  $\mathcal{A}$  have been constructed, determine which are simplest in a certain sense; (3) find a common homomorph (in a peculiar sense) of the elements of  $\mathcal{A}$ . This isn't much of a description, but I think it will give you a general idea of the mathematical nature of our problems, and it's as far as I can go.

Please give Dorothy my regards.

Sincerely,

15/ D. Miller  
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