Letters to the Editor

Reply to Professor Reed

Many of us at the Naval Ordnance Laboratory have read with much interest the letter from Professor H. S. Reed to Senator Downey (*Science*, 1945, **102**, 524) which was unanimously approved by certain of our colleagues of the American Association for the Advancement of Science. The letter seems to portray a lack of understanding of the problems confronting some of us in the employ of the Government and, I am sorry to say, is not likely to be very helpful in our attempts at their solution.

Those of us who have had considerable experience in research in Government are well aware of the difficulties encountered, yet we have seen programs carried out effectively and economically in spite of them. We are making strenuous efforts to obviate these difficulties and to raise the prestige of governmental scientific establishments. It is unlikely that we will be successful unless we have the approval and support of other scientists in the country. Therefore, a letter such as Professor Reed's assumes to us a very considerable importance.

Unless the United States assumes a more positive, constructive, and powerful position in world affairs from a political point of view, it is unlikely that we shall be successful in maintaining world peace. Whether our attempts to maintain peace are implemented by strong and wise political action or whether we take our chances with partial isolation as we have in the past, it is likely that a strong Navy will be necessary. There are a few hundred of us working in naval laboratories who have a very direct responsibility, in view of the present state of military technology, to keep the Navy strong. The naval laboratory programs make it necessary for us to carry on basic research in certain parts of certain fields simply because no other agency is interested in, or has the facilities for, doing this work. We, of course, carry on a very great amount of development also, again because neither academic nor industrial establishments are interested in doing, or are equipped to perform, this particular type of development.

We have observed with great interest the course of the Magnuson and Kilgore bills and the testimony which has been given in the hearings on them. We have a keen appreciation for the need of Federal support of research in this country and realize that this implies new sources of support for institutions which rely on the diminishing returns from endowments to maintain their high standards of productivity. The Bureau of Ordnance plans to spend about one-fourth of its research budget in such support by means of very general research projects assigned to universities. We are glad to see these things being done and give our wholehearted support to Congressional action in this direction.

However, *unless and until the great body of American science gives concrete evidence of its willingness to mix into naval affairs, to do the work which the Navy needs in the way of basic and applied research,* and *to prove that it will take continued interest in so supporting the Navy,* these naval laboratories must carry the responsibilities which they now bear.

We have instigated machinery for bringing about the changes necessary to make naval and all governmental laboratories more attractive places for scientists to work. We have fortunately received enthusiastic support for our efforts from a substantial number of very prominent and competent scientists, and we are inclined to doubt that Professor Reed's letter really expresses the sentiment in the rank and file of scientists in the United States toward the amount of consideration which we merit or the importance of the responsibilities which we carry.

R. D. BENNETT, Captain, USNR
Naval Ordnance Laboratory
Washington, D. C.

Subaqueous Mud Cracks Formed by Settling

Mud cracks in strata have been accepted as a criterion that the sediments in which they were formed had been exposed to air. A recent observation on the part of the writers indicates, however, that this conclusion is not always a safe one.

In the process of making a ditch by means of dynamite, a pool of considerable extent was left filled with water for a period of about a month. The clay forming the bottom was originally smooth, but after three weeks developed a mud-crack pattern under water which could not be distinguished from sun-crack patterns formed subaerially. The dynamite blast served to loosen the soil to a considerable depth. In fact, the material at the very surface had been raised into the air by the explosion and had fallen back. However, in so far as direct observation could indicate, such material formed only a thin, negligible surface layer and probably had little, if anything, to do with the crack pattern which ultimately developed. The soil consisted mainly of fine clay material. That at the surface compacted, forming a relatively rigid bottom. Subsequently the deeper soil settled, the surface layer yielding to the movement by developing a typical polygonal mud-cracking pattern.

This observation suggests a need for caution in the interpretation of mud cracks in the geological record as evidence of exposure to air. Earthquakes produce a shock which tends to loosen soil. That settling following earthquakes may produce such patterns subaerially in soil has not escaped observation. Fossil mud cracks should be examined more closely in order to determine whether they are a true record of emergence or whether they may conceivably be a record of disturbances, particularly when they are found in sediments deposited at the time of some of our major orogenies. The Paleozoic mud cracks which have come to the attention of the senior author differ from those formed by settling, in that they are relatively shallow, rarely over