Mr. VIVIAN. Mr. Chairman?

Mr. DADDARIO. Yes, Mr. Vivian.

Mr. VIVIAN. There are three questions I would like to ask on the subject of algae. You mentioned that you expect to induce the growth of algae and then to remove it from the water. I presume this is possible because there is a mechanical process available to do this.

Mr. WARNE. Yes.

Mr. VIVIAN. You can assimilate the materials into organic material which then can be filtered out?

Mr. WARNE. That's what we were thinking of doing in this pilot plant operation to discover whether in this manner we could reduce the dangers of introducing an excessive amount of nutrients from the San Joaquin drain into the estuaries of the San Francisco Bay.

Mr. VIVIAN. Has this process been used elsewhere?

Mr. WARNE. Yes; it has been but I think on an inadequate basis for the demonstration we need here.

Mr. VIVIAN. Are there large portions of the oceans which contain extensive weed area? Is this in any way related to the problem in the San Francisco area?

Mr. WARNE. I'm sure that they do utilize the nutrients in the sea. I haven't thought of them as being on a par with this particular problem, but the sea is a big place.

Mr. VIVIAN. Is there any likelihood that similar sea grasses or kelp could be utilized for removing various types of pollutants?

Mr. WARNE. It is conceivable, but by the time you get the mixture in the sea itself, I think probably the problem is beyond our management. Our fear is introducing these relatively large quantities of nutrients into shallow or confined waters where they peak rather rapidly.

Mr. VIVIAN. For example, between San Francisco and Sacramento Bay?

Mr. WARNE. Yes; or in the San Francisco Bay itself.

Chairman MILLER. I believe that there is a difference between the sea grasses or seaweeds and algae?

Mr. WARNE. Yes, there is, though they are types of algae growth.

Chairman MILLER. Seaweed is found on every coast throughout the world. In California, the collection and production of algae is an important industry. For instance, algae is used as the fixation in cake icings to keep them from running, and is a very valuable product. The Japanese have long used sea algae as a food substance.

Mr. WARNE. Well, actually, there's a possibility of using algae for stock feed and other feeds.

Mr. VIVIAN. Are there growth processes such as with seaweeds which can be used in addition to the growth of algae to remove nutrients?

Mr. WARNE. Well, we suspect that the algae would be the quickest one since it tends to peak first in the receiving waters. I think the others do use the same nutrients, as a matter of fact, but these big seaweeds are much slower growing.

Chairman MILLER. Incidentally, the seaweeds are very high in iodine and certain other elements. During the war the Japanese taught their people who lived on the isolated islands how to supplement their diets by using algae.