

in Congress that they were briefing me on what might be the effects of dumping atomic wastes into the Pacific, and a young biologist mentioned this. I said, "Why do you catch them there?"

He said, "There is a big sea mount down there, Mr. Miller, and the ocean current comes in and it wells up." Of course, this brought the fish, the food life of the fish and such to the surface. I thought these upwellings were well scattered pretty much throughout the world.

Dr. CANTLON. That is right, and if you look at the matter of percentage of oxygen release, we need not contaminate the total ocean. Enough herbicide unintentionally released in a relatively selected group of local areas might add a serious additional burden on our oxygen circulation system.

Mr. DADDARIO. I have another question in my mind, but I think Dr. Deevey has something.

Dr. DEEVEY. If I may simply interject a related biogeochemical point to what Dr. Cantlon has said. The matter of the sulfide system is of extreme importance, likewise, to the maintenance of oxygen in the oceans and in the atmosphere. We have now begun to realize that the sulfate-reducing bacteria, most of which probably exist in the sea bottom or on the continental shelves in blue muds, and also in the bottom of lakes and marshes—in anaerobic situations, make their living by reducing sulfate to sulfide. That leaves the oxygen behind, you see, in the course of reducing the sulfur. Thus, although one understands this not at all on a global scale, it is essential to get a clear picture of the relative metabolism of sulfur as compared to the metabolism of carbon, which is what this amounts to.

It looks as though the sulfide-sulfate system is the major balance wheel that keeps the system operating. What follows then is that a threat to the metabolism of all of the sulfur bacteria in the sea would be as great a threat to the maintenance of oxygen in the atmosphere as the destruction of all the green plants.

Mr. DADDARIO. Dr. Cantlon, in answer to the chairman's question, you sort of capped it off by saying it is nothing that we really ought to be so concerned about at the moment. One of the points that sticks in my mind in Dr. Cole's statement is that these things ought to be planned. We are putting much of our land under concrete and macadam and what not, and in Vietnam we are certainly not planning what is going to happen by the defoliation processes. Shouldn't we be concerned and shouldn't we put this thing into perspective so it can be understood?

One of the problems in this whole area is that statements are made, some of them scary and some of them not so scary, so finally people just kind of shrug their shoulders about them. The more I hear about it the more I am convinced that there is a present need for planning so the people will understand why it is important.

Chairman MILLER. Mr. Chairman, the areas being defoliated in Vietnam would be miniscule compared to the rain forests in Vietnam and in Southeast Asia, let alone the rain forests in South America. I don't think we want to get too scared of what is going on there. It is a comparatively small strip. I think what we must be concerned with is the effect of chemical pesticides and certain chemical fertilizers that get into the river basins and are washed to sea and into our estuaries.