I think they are consuming as much oxygen as some of these other things. Isn't this a real threat that we are concerned with right now?

Mr. DADDARIO. Mr. Chairman, I am subject to the same problem in my thinking process as you people. When these points are raised, such as defoliation, and it may not be the most important, but certainly you have to take all of these things into consideration.

They all play a part; don't they?

Dr. COLE. Yes.

Chairman MILLER. Long before the word "defoliation" was introduced, 'way back in the eighties, a copper plant was established in California that completely defoliated 10 times more, or 100 times more area as will be defoliated in the war in Vietnam. It left red hills that eroded. I know you know where the area is I am talking about. Now fortunately it is under water. It is part of that area that forms Lake Shasta. However, as a result of a copper operation, you went through lands that looked like the deserts of Australia.

Dr. COLE. I agree with Mr. Daddario and I am worried about these things. I think the important point is that man is now so completely predominant in the world and he is doing all of these things at once and just trusting to luck that he won't bring on a disaster.

For example, DDT is now practically a normal constituent of the world environment. It has turned up in the fat of penguins in the Antarctic and can be found in the ice on Alaska glaciers and places where it has never been used, but if that happened to be a deadly poison for some of the essential microorganisms, we could have put the world out of business by now.

Chairman MILLER. Isn't it deadly to microorganisms?

Dr. COLE. Very recent studies have shown DDT is definitely damaging the algae growth in Long Island Sound.

Mr. DADDARIO. You did say that ecological studies now could be used to forecast the consequences of defoliating tropical forests, and ecology is not a traditional factor in planning. I don't understand that to mean it is a dangerous situation, but because it has been done it gives you a laboratory within which you can come to some determination about what this does mean and you can put into better perspective what ought to be done in other areas.

Dr. COLE. Some tropical rain forests probably can stand the use of defoliants and others can't. The important thing is that most of these tropical soils are very low in nutrients and the nutrients that come down with leaf fall and falling trees and so forth have to be recycled. The plants have to be in growing condition there to seize these or they leach out in the ground water.

Now this can be studied ecologically. You can study the streams draining an area before and after defoliation and actually measure the losses of these essential nutrients, such as fixed nitrogen and phosphates and things of that sort. A very recent study published in Science refers to an area up in New Hampshire where they have done just this. They have measured the mineral content over several years of the streams draining this watershed and then they cut the trees off up there and sprayed a herbicide to keep the vegetation from regenerating and found a tremendous increase in the outflow of nutrients that plants require.