

Chairman MILLER. Mr. Vivian, Michigan State University conducted some studies some time ago on the effect of insecticides upon robins. Are you familiar with that?

Mr. VIVIAN. Yes.

Mr. WARNE. We have fish kills in California almost every year where, oh, for example, the waters from riceland is permitted to enter a stream without proper dilution. This kind of thing, and also the tendency for the food chain in the waters to concentrate the poisons so that while they might be present in quantities that can't be detected or can just be barely detected, through the food chain they are concentrated to the point where they appear, from time to time, in some of the fishes in pretty high concentrations. We found this to be true. We need to know more about this. We need to know how to control it.

Chairman MILLER. Some of these poisons particularly affect shellfish more than any other fish.

Mr. WARNE. They will concentrate in the powers of 10's.

Mr. VIVIAN. Mr. Chairman, we no longer have any serious problem with insecticides poisoning certain fish in the Great Lakes because all the fish of that type are already dead.

Mr. WARNE. They have already poisoned them.

Well, we have our problems in California, but sometimes I am happy that I don't have to worry about it in the same degree of responsibility of the problems in Lake Erie, for example. But, we are trying our best to handle our situation out there in the estuaries and basin lakes in a way that will keep them from becoming stagnant wastes, and it is a difficult problem.

During the past several years much publicity has been given to the detergent dilemma. Several years ago detergent foam was a common sight on streams receiving municipal wastes. This foam was related to the ABS used as the active ingredient in the detergent products of that time.

In a massive, voluntary effort, the major manufacturers of soaps and detergents developed a replacement product—a so-called biodegradable detergent—which is known as LAS, which is substantially eliminated in sewage treatment plants, particularly those utilizing the activated sludge process for secondary treatment. Studies show, however, that only about a quarter to a third of the Nation's sewage wastes have this degree of treatment.

Since the changeover to LAS, the technical journals have been filled with claims and counterclaims regarding the biodegradability of the new detergents. The manufacturers of the present products insist that they have solved the problem. Their competitors contend not so and claim that a more degradable product, usually, coincidentally, of a type they manufacture, will be needed as population increases and related waste loadings continue to increase.

To determine progress in changing over from the old ABS to the new LAS, it is necessary for us to measure the amount present in our water supplies and the relative proportions or the ratio between the old and new products. As with insecticides, sampling and measurement is a series of involved procedures, the last of which requires the use of a \$15,000 infrared spectrophotometer for measuring the LAS/ABS ratio. Here again the problem of calibration standards