

### **Just Give Me a Freeze Dried, Talking Fish on a Stick**

Some months ago, I attended an interdisciplinary meeting where problems of pollution were discussed. One of the nonecologists present plaintively but humorously asked, "Why can't you environmental toxicologists just give us a freeze dried, talking fish on a stick? This fish could be inserted in any aquatic ecosystem where pollution problems were suspected and the fish would immediately expand, determine the biological condition of the water, and give the person holding the stick the answer verbally."

If one vigorously suppresses the automatic impulse to explain the complexities of ecology and toxicology to this "ignorant" individual, it becomes abundantly clear that those two simple sentences contain a beautiful description of the kinds of methods the rest of the world wants from ecologists and environmental toxicologists. My interpretations of these characteristics follow:

- The method is simple and the apparatus portable.
- The all-purpose method will work well in any aquatic ecosystem.
- The method can be used by a variety of individuals with little or no professional training.
- Results are obtained immediately and communicated in generally understood terms.
- Because of the stick, the investigator need not expose himself unnecessarily to the potentially harmful material.
- The device is inexpensive and readily available. (This is less apparent from the two-sentence hypothesis, but on checking with the originator of the statement, I found my assumption is correct.)

Although there is always the possibility that some creative individual who does not know "it can't be done" will develop the freeze dried, talking fish on a stick, for the foreseeable future, we must live with the existing methodology.

When developing or improving methods to assess the probable or actual damage caused by persistent chemicals, ecologists would do well to keep these criteria in mind, particularly in terms of communicability. Scientists could, of course, adopt the "trust us" attitude of some professionals – the matter is too complicated to explain to laymen and, therefore, no attempt should be made to so.

This has not been a smashing success in the past for environmental problems and is unlikely to be so in the future. What will probably happen if this is done is that unqualified persons with simplistic solutions will take over. Of course, meeting the needs (which are not well understood) of others is just as difficult as meeting the needs within a discipline, even though the requirements are different. This requires an investment of time and energy in a period when it is impossible to keep up with all the literature within a single discipline. Nevertheless, it is abundantly clear that we must improve methods as well as communication among ourselves.

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