



## COOPERATIVE EXTENSION SERVICE

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AGRICULTURAL BIOCHEMISTRY AND  
PEST CONTROL DIVISION

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### MEMORANDUM

69-31

TO: Dr. Joseph Stein, County Agents, Assistant Agents, and Home Economists

FROM: Loyd L. Stitt Loyd L. Stitt Pesticide Specialist

SUBJECT: Science and Man - Things We Know Nothing About.

In the Chronicle Sunday Punch section of the San Francisco Chronicle for October 26, 1969 was the above title that attracted my attention. As I read the article I became fascinated about certain points the writer discussed. The writer was Dr. Joshua Lederberg, Chairman, Department of Genetics, Stanford University School of Medicine. He was one of the three American scientists to receive the 1958 Nobel Prize in medicine. Dr. Lederberg has conducted outstanding research in genetic mechanisms of bacteria, breeding and cross breeding of viruses, biochemical origin of life, and other genetic investigations.

It has been our policy to obtain permission to use articles appearing in various publications. In this case we first checked with the San Francisco Chronicle and they informed us that Dr. Lederberg's article first appeared in the Washington Post and we would need their permission to reprint. The Washington Post has granted permission to use the article and credit is here given the Washington Post for the use of the article. The Washington Post asked us to obtain permission of Dr. Lederberg before using the article. Dr. Lederberg has granted us the privilege of using the article for your information. If you have the opportunity to read the Sunday issue of the San Francisco Chronicle, look in the Sunday Punch Section, usually on page 2, for the articles under the headline "Science and Man".

The complete article, "Things We Know Nothing About" is copied for your information.

#### SCIENCE AND MAN

Things We Know Nothing About

by Joshua Lederberg

Besides radiation, our environment is laced with many chemicals suspected by geneticists of causing genetic damage. Many of these are synthetics, which the radical ecologist may insist on condemning out of hand without further thought of the economic consequences-- and perhaps properly so.

But our policy dilemmas may be brought to sharper focus when we think about natural products to which we have been accustomed for many years



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although we have no deeper understanding of their biological effects than we have about many synthetic additives.

Some weeks ago, I read that the manufacturers of glue for hobbyists had determined to take some responsible initiatives to help control the glue-sniffing habit, even at the expense of their sales and profits. The Testor Corp. announced that it had perfected a denaturing additive, allyl isothiocyanate, that would not interfere with the proper use of plastic glues but would make sniffing intolerably spicy.

They also recommended that solvent manufacturers consider using the same material in a variety of other products with which disturbed youngsters have learned to poison themselves.

The safety of the denaturant was not brought into question. Under the common name of "mustard oil," it is (I learned on further inquiry) a food additive "generally regarded as safe" and so certified by the Food and Drug Administration on the basis of common-sense experience with mustard and horseradish, in which it is the active ingredient.

I have a vivid recollection about a paper on mustard oil published in Nature magazine in 1944 by Professor Charlotte Auerbach of the University of Edinburgh. That report 25 years ago was a small landmark in the history of genetics -- the first authentic discovery of the production of mutations by a chemical substance.

Mustard oil caused a five-fold increase over the natural rate of occurrence of lethal mutations in the sperm cells of fruit flies.

Dr. Auerbach commented on the significance of naturally occurring mutagens for biological evolution but not on their relationship to public health -- perhaps for reasons of concern about civic alarm.

As far as I know, there has been no further genetic study of mustard oil, for many synthetic substances are more striking in their activity. The only work on its toxicology is a controversial claim that mustard in the diet causes high blood pressure.

On balance, I would not inveigh against the use of mustard oil as substance to discourage sniffing. The very nature of its use will discourage its being taken in. Nor can one seriously propose an anti-horseradish campaign without attracting an unwarranted ridicule for more obviously serious concerns about additives.

But there is still a serious problem, for example, in the handling of mustard oil in quantity. Furthermore, we have to ponder whether a government agency can ever certify a compound as "safe" outside the context of actual experience and testing of it.

A proper test of mustard oil (and therefore of horseradish) for mutagenic effects in mice and in human cells will cost tens or even hundreds of thousands

of dollars, and even that may not resolve all of our uncertainties. Other environmental insults need even more urgent attention.

But we will be plagued by serious and inescapable doubts--even about horseradish--until we can properly attend to the thousands of products that we encounter in our daily life about whose biological effects we know next to nothing.

Washington Post

Two points that were of particular interest to me was the fact that some of the natural products have substances that can produce biological effects as well as our synthetics and the problems of what is a safe product.

Dr. Lederberg sent me information which discusses various points on safety which I hope we can send to you for your information and reference.