Hazards of Chemical Carcinogens and Mutagens

As pointed out in recent letters (26 Jan., p. 329; 11 May, p. 542; 13 July, p. 109), the lack of control of even the most potent of carcinogens is rather surprising, especially in view of the present degree of sophisticated control, at both the national and international levels, of ionizing radiation and radioisotopes (*1*). A recent laboratory incident with a potent carcinogen illustrates very well the reason for my concern.

In the course of our experiments, it was deemed necessary to have a supply of *N*-nitrosomethylurea (NMU), and we accordingly ordered 100 grams from a chemical supply company in this area. The container was an ordinary glass reagent bottle with no special warning of the hazardous nature of the contents on the label. The material was shipped to us via United Parcel and processed in a completely routine manner by our receiving department. Again, there were no labels on the carton indicating the hazardous nature of the chemical, precautions in handling or storage, or what to do in case of a spill. Since NMU is not only a carcinogen, and a very potent one, but also is a mutagen and teratogen, it is thus a triple threat (*2*), biologically speaking. Experienced users of this material generally keep it under refrigeration, but since we had not had previous experience and instructions given for its use did not indicate the necessity for keeping it refrigerated, it was simply placed on the shelf in the laboratory. A few weeks later we were greatly dismayed upon entering the laboratory to discover that sufficient pressure had built up in the bottle to blow the lid off and distribute most of the contents of the bottle over a considerable area of the laboratory. Fortunately, no one was present at the time of the accident, as it occurred on a weekend. After discovering the accident, the laboratory was sealed temporarily, and a committee was appointed to formulate procedures for cleaning up the laboratory in the safest possible manner and for making recommendations to prevent future occurrences of this kind.

The day after discovery of the accident, a phone call was made to the chief chemist of the company selling the material to warn him of the accident, and later a letter was sent giving more details of what had happened in the hopes of preventing a similar accident there or elsewhere.

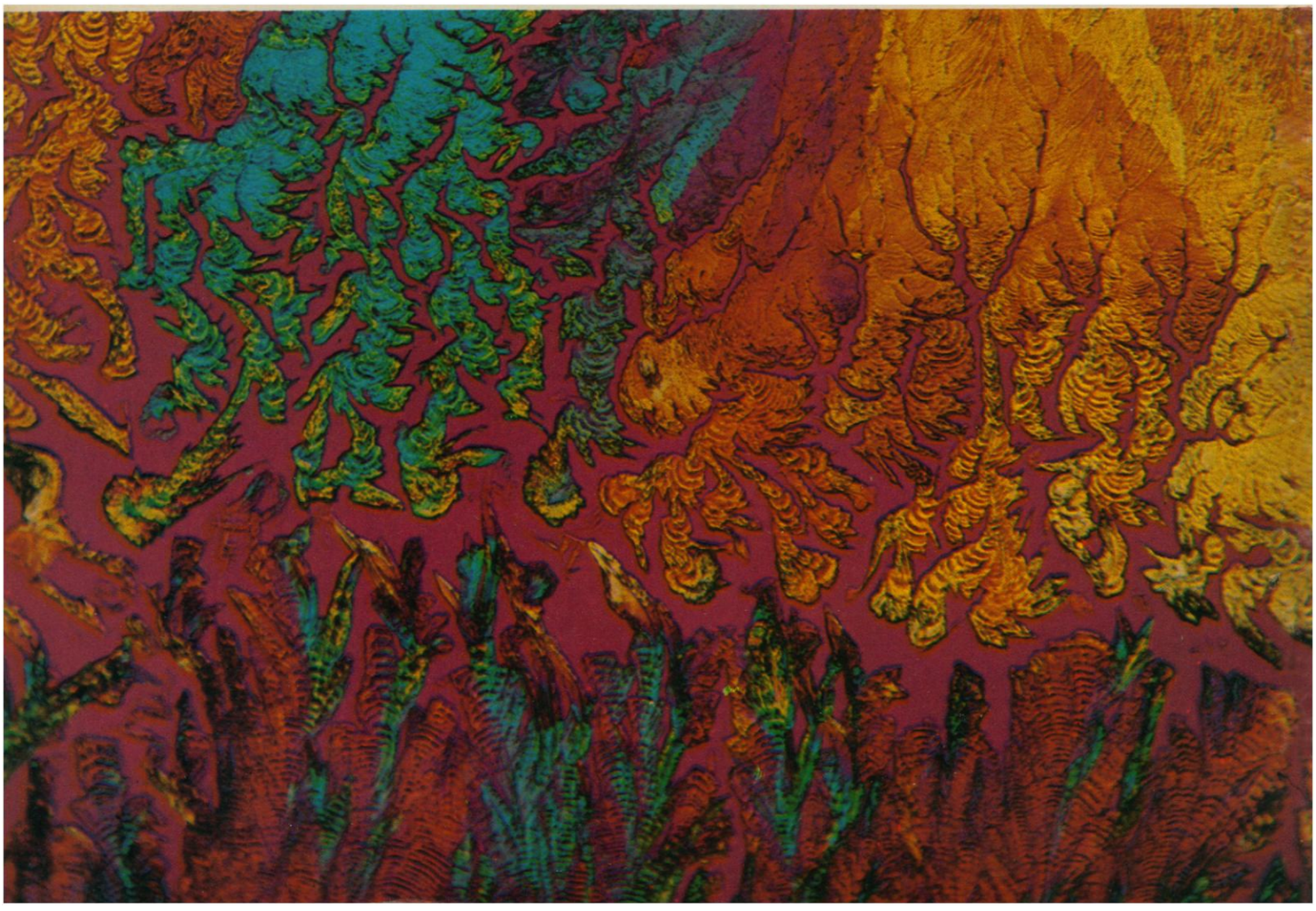
The possible hazards to employees of the chemical company, those involved in the distribution, or laboratory personnel are obvious (*2, 3*). Surely it is time that some organized effort be made to more adequately label such hazardous materials and to better control the conditions under which they are packaged and distributed. Regulations concerning use and disposal would also seem desirable. Physical carcinogens and mutagens have rigorous handling codes. Why none for equally potent chemical substances that are at least as hazardous in terms of their biological effect?

A. H. SPARROW

Biology Department,
Brookhaven National Laboratory,
Upton, New York 11973

References

1. For instance, see Committee on the Biological Effects of Ionizing Radiation, *The Effects on Populations of Exposure to Low Levels of*



Ionizing Radiation (National Academy of Sciences, Washington, D.C., 1972).
2. L. Fishbein, W. G. Flamm, H. L. Falk, *Chemical Mutagens* (Academic Press, New York, 1970).
3. H. Druckrey, R. Preussmann, D. Schmähl, M. Müller, *Naturwissenschaften* **48**, 165 (1961).

Inspiration

We were "inspired" by John Worrall's letter (26 Jan., p. 329), in which he talks of the "hissing" of trees disturbed by dissecting needles. A few years earlier we had stumbled upon this phenomenon while looking for inner bark color in order to differentiate certain species of oak. This experience reminded one of us, Daniel Smiley, of hearing a sucking sound from hickory while trail clearing in the 1930's. It had seemed curious to us, and we spent several hours perforating the bark of various species of trees and characterizing the responses. We checked with several of our plant physiologist friends and perused many current plant physiology texts to learn that the phenomenon simply did not exist. We put our notes away with some embarrassment. During our investigations, walkers had stared at us with something beyond mild curiosity, and had even started asking questions which we found difficult to answer.

Now we would like to augment the somewhat sparse record on this subject with several observations. First, we suggest that "hissing" is not quite the right word. It implies (as per the dictionary) exhalation and a simplicity of sound which demeans that produced by trees in the act of inspiration. The true sound, a tremulous and high-pitched burbling, can be well matched by pursing the lips and sucking in air at the corner of the mouth.

We also worry about the efficacy of using a dissecting needle. In our attack on the problem we used knives, awls, drills, ice picks, punches, and other devices and learned that a rude and somewhat conical opening was usually the most productive, probably because it tore the vessels rather than just displacing them.

Several specimens each of *Fraxinus americana, Acer rubrum, Acer saccharum, Nyssa sylvatica, Carya ovata, Quercus prinus, Quercus borealis, Pinus strobus, Pinus rigida,* and *Tsuga canadensis* were persecuted on the fall afternoon of 16 October 1972, when the temperature was around 65°F, and on 20 to 24 March 1973, several clear days with temperatures ranging from 40° to 55°F. Most trees examined were from 10 to 20 meters tall, with diameters at breast height of from 25 to 50 centimeters.

Three to five perforations at breast height were made in each tree, and, with the exception of the conifers and maples, sounds of inspiring air were heard in all species. Specifically, we noted a rapid ticking, clicking, and often the tremulous and high-pitched burbling comparable to that produced by pursing the lips and sucking in air at the corner of the mouth. Usually, the sound was vigorous at first, and then within 10 to 20 seconds it diminished to nothing. The white ash was the loudest and most persistent. One tree examined on 16 October, with only 10 percent of its leaves remaining, continued to inspire for 5 minutes and several seconds. The northern red oak was also notable; one tree that had shed only 5 percent of