

# Reports—Current Topics—Queries

## Science Teachers Issue Global Plea

The following is a resolution adopted by teachers of science and mathematics who attended the first Institute on the Interrelationships of Science and Society, held in June at Knox College, Galesburg, Ill., under sponsorship of the National Science Foundation:

### Whereas

1. The world's rapidly growing population will soon be too large for the earth to sustain;
2. The indiscriminate use of technology by society is leading to shortages of power sources, food sources, and irreplaceable natural resources;
3. The pollution of our land, air, and water deprives the people of health and the enjoyment of our country;
4. The high cost of excessive nuclear deterrence seriously reduces funds needed for health, education, and well-being; and
5. All of the above place severe strains on human interactions and on our social structures;

**and whereas** the members of the first Summer Science Institute on the Interrelationships of Science and Society are firmly convinced of the above and are committed to action in the solution of these problems;

**be it therefore resolved** that we, the members of said institute, hereby

1. Urge the President of the United States to
  - a. Exert leadership to enlist worldwide cooperation in problems of a global nature,
  - b. Exert leadership to commit the people of the United States to stabilize its population by the year 1980 as an example to the world, and
  - c. Encourage assessment of technologic innovations and problems by *ad hoc* groups composed of scientists, sociologists, economists, legal experts, and lay citizens;
2. Urge all teachers (particularly science and social-studies teachers) to educate themselves and their students as to the above problems; and
3. Urge decision-makers at all levels of government and other institutions to develop policy within the constraints imposed by the environment, natural resources, and the well-being of man.

**Signed** by Elaine M. Abels, R.S.C.J., Lake Forest, Ill.; Jerry J. Aldrich, Alden, Iowa; Francis E. Antonacci, Skaneateles, N.Y.; Darrell C. Bahm, Tacoma, Wash.; Peggy D. Baird, Peoria, Ill.; Carol A. Baumeister, Oak Lawn, Ill.; Grace Chou, O.S.F., Aurora, Ill.; Winston E. Cleland, Wilmington, Del.; Ronald G. Crampton, Omaha, Neb.; Laura M. Daniels, Winnetka, Ill.; Jerrald L. Daugherty, Park Ridge, Ill.; Glenn K. Detro, Greendale, Wis.; Paul E. Drangeid, St. Louis Park, Minn.; John L. Haraughty, Prairie Village, Kan.; Marybeth Harrington, C.S.J., Bristol, Conn.; Anna Landwehr, O.S.U., Shawnee Mission, Kan.; Marion L. Magill, Scottsdale, Ariz.; James D. Maloney, Jr., Cuyahoga Falls, Ohio; Imelda T. Marquez, S.L., St. Louis, Mo.; Raymond W. Merry, Brooklyn, N.Y.; Wayne R. Mikach, Pittsburgh,

Pa.; John Mudrak, Sharon, Pa.; Robert N. Patten, Wichita, Kan.; Alice M. Quinlan, Evansville, Ind.; Charles V. Raffay, Succasunna, N.J.; Clementina Rodriguez, Raymondville, Texas; Jack E. Sadler, Brentwood, Mo.; Charles E. Sauter, Park Ridge, Ill.; Fred C. Smith, Northbrook, Ill.; and Donald L. Williams, Scotch Plains, N.J.

## IP-CFAA: Fixing and Preserving Reagent for the Use of Travelers

Some years ago we were studying the ears of grasshoppers. We wished to collect these insects while traveling under all sorts of circumstances and to preserve them with reasonably natural colors, while still having the tissues fixed for slide preparation. We needed a killing agent that would snuff out the lives of these rather large insects rapidly, for otherwise when dropped into liquids they kicked violently and badly damaged other specimens. Because we expected to be stopping at motels on our collecting trips and were traveling in our own car, we wanted a reagent that if spilled would evaporate completely, leaving no stain. And, because we were not going to be at home base, we wanted to be able to buy all the chemicals in local stores without the need for special identification or licenses.

Out of these requirements came CFAA. Since its first development, about 1958, we have found it to be excellent for many fixing and preserving uses. We describe it here in the hope that it will be useful to others who take classes on field trips or wish to collect, fix, and preserve animal specimens without risk of staining their own or others' car, furniture, or floor.

We started with a standard formalin-acetic-alcohol (FAA) mix, widely used in routine histologic fixation or for fixing small animals, such as parasites, for whole mounts. To increase penetrating power and particularly for our insect work to speed up the killing rate, we added chloroform. After experiments with a great variety of formulas, the following was selected as meeting all the requirements: chloroform 100 ml, ethyl alcohol (95%) 450 ml, formalin (40% formaldehyde) 100 ml, glacial acetic acid 20 ml, and water 350 ml. This we call CFAA. (The total, 1,020 ml, actually gives somewhat less than a liter, because of "shrinkage" of ethyl alcohol with water.)

There is a difficulty with this: ethyl alcohol is expensive unless obtained with special permit, and in many places it is hard to come by without a license. So we tried substituting isopropyl for ethyl alcohol, because isopropyl alcohol is available in all drugstores. (One can even buy rubbing alcohol, which usually is compounded mainly of isopropyl alcohol.) This forced some changes in proportions

of ingredients, and the following was finally found to work as well as the mixture based on ethyl alcohol: chloroform 80 ml (1 cup), isopropyl alcohol (100%) 450 ml (5½ cups), formalin 100 ml (1¼ cups), glacial acetic acid 20 ml (¼ cup), and water 350 ml (4½ cups). We call this IP-CFAA. The formula is given in cups as well as milliliters because a measuring cup is easy to get anywhere, even where a graduated cylinder is not.

Both of these formulas have as much chloroform in them as will remain in stable solution. If, on addition of specimens, the water content rises, the chloroform may separate. To redisperse it, one need only add alcohol little by little until the mixture is again homogeneous.

Fixation of tissues, even in whole large insects, is rapid. For even the biggest grasshoppers only 30 to 120 minutes is needed. These animals when dropped into the reagent usually manage only one kick, if that, and perish. Sensitive students need not witness an animal's struggling in fluid. Furthermore, if one wishes to collect and hold a number of specimens in one bottle, sudden immobility is essential if the specimens are not to be damaged.

The tissues are fixed for sectioning within a short time, but they can be left in the liquid for long times without harm. We have left whole insects or tissues removed from larger animals in CFAA for up to four weeks with little adverse change in staining properties, except for fatty tissues. However, it seems best to transfer the fixed material within six to eight hours to some nonfixing preservative. The usual 70% ethyl alcohol or 30% isopropyl alcohol can be used. We prefer to add glycerol to the preserving fluids to keep insect specimens pliable for dissection. A wide variety of mixtures can be used. We have settled on the following: isopropyl alcohol 20%, glycerol 10%, water 70%. This is an economical mixture: it is mostly water (again, without color). The glycerol does not evaporate; if, on an extended trip, the lids of bottles become loose, the glycerol remains and the specimens are saved.

For travelers stopping in hotels, motels, or friends' homes who want to collect some animals or tissues for later anatomic, histologic, or cytologic study, IP-CFAA has some advantages over the usual fixing agents. For students around a lab it is cheap and fairly foolproof, with only minor toxicity, and it will not stain tables, clothing, or fingers.

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### A Born Climber

A young porcupine is able to climb a tree from the second day of its life. It does not become an accomplished climber, however, until about six months old.

## SUGGESTIONS FOR CONTRIBUTORS

**STYLE.** *American Biology Teacher* would rather receive an ill-written article containing worthwhile ideas than a stylistic masterpiece that says little: our editors can mend bad writing in a good cause. However, we do hope for clear terse prose, free of jargon. Sensible advice for writers will be found in the Conference of Biological Editors' *Style Manual for Biological Journals*, 2nd ed., published by the American Institute of Biological Sciences; and *How to Write Scientific and Technical Papers*, by Sam F. Trelease.

In matters of punctuation, enumeration, and the like we follow generally the above-mentioned C.B.E. manual and the University of Chicago *Manual of Style*. Our spellings are usually those preferred by *Webster's Third New International Dictionary* (G. & C. Merriam Co., 1965) and its abridgments.

Technical measurements are in metric, not English, units.

Avoid footnotes of any kind. References to the literature are made on-line (not by means of superscripts) within the text. If only one, two, or three works are cited, each is given in full, in the form "A. B. Smith, 1969: *Elements of Biology*, 4th ed., Jones Publishing Co., New York" for a book and "W. X. White and Y. Z. Green, 1965: 'The Inquiry Process,' *Journal of Pedagogy* 7 (2): 53-56" for an article. If four or more works are cited, they are presented at the end of the article as a bibliography arranged alphabetically by (principal) authors' last names, in the following forms for books and journals.

SMITH, A. B. 1969. *Elements of biology*, 4th ed. Jones Publishing Co., New York.

WHITE, W. X., and Y. Z. GREEN. 1965. The inquiry process. *Journal of Pedagogy* 7 (2): 53-56.

(Note that publishers' names and addresses are given and that names of periodicals are not abbreviated.) Reference to the bibliography from the text takes the parenthetical form "(Smith, 1969)"; if the same title is cited a second time this short form is repeated or, better, the reference is recast as, for example, "Smith also says. . ." The aim is to disburden the text of apparatus-*ibid.* and its relatives. Within text or bibliography a reference may be made precise by adding, for example, "pp. 123-145" or "ch. 8." Responsibility for exact quotation lies with the writer, not the editor.

**MANUSCRIPT.** Double-space *all material*, on one side only of standard (8½-by-11-inch) bond paper, allowing 1½-inch margins all around. Avoid line-end division of words.

**ILLUSTRATIONS, ETC.** Photos should be glossy prints not less than 5 inches wide. Other kinds of illustrations should be rendered in black ink on heavy paper, preferably with labeling done expertly on a transparent overlay. Key each illustration, on the back, to its legend ("caption") written on a separate sheet—being sure to mention credits, including "photo by author." Tabular material, too, must be presented on separate sheets—regardless of length. Within the body of the manuscript simply indicate relevance at the proper place, as, "see fig. 1" or "see table."

**GENERAL CONSIDERATIONS.** The editor welcomes letters of inquiry describing, in some detail, articles he may wish to see. Manuscripts that arrive unannounced may be considered, but will not be returned unless accompanied by a stamped, self-addressed envelope.

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