stated that the Focus article did not "adequately explore the artist's or art faculty responsibility for learning to use art materials properly," and that Monona Rossol and I didn't believe that the hazard labeling regulations for art materials were adequate. Gottsegen also states that Rossol and I "place the blame for all this in the laps of the manufacturers of art materials or consulting toxicologists."

Speaking for myself, I said in the Focus article that the Labeling of Hazardous Art Materials Act of 1988 improved labeling. My comments related to enforcement of labeling of imported art materials and the labeling of products from small companies. I agree with Gottsegen that the Consumer Product Safety Commission does not have an adequate budget for enforcement and education. However, that is not the fault of the users of art materials and does not take away from manufacturers the responsibility to follow existing regulations and to manufacture the safest possible art materials. Without adequate labeling, artists cannot know the hazards and needed precautions.

Concerning the responsibility of artists and faculty to use materials properly, an extensive part of the article deals with the responsibility of the art schools to provide a safe environment, a point ignored by Gottsegen. In addition, Gottsegen well knows that education of artists and art teachers has been the major thrust of my more than 20 years of experience in this field, as illustrated by the several books and hundreds of lectures I have done on art hazards. I agree with his statement that it is the responsibility of artists to find out about the safe use of materials that are not marketed as art materials. That is why I emphasize the need for education of art students and teachers about art hazards and the need to change existing attitudes.

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The NIEHS Predictive-Toxicology Evaluation Project: The Need to Distinguish Informed Uncertainty from Ignorant Equivocation

During the public meeting that followed the first phase of the NIEHS Predictive-Toxicology Evaluation Project (*1*), a discussion took place regarding the status of equivocal predictions of carcinogenicity in relation to equivocal classifications of carcinogenicity. The matter was not resolved at that time. The same question resurfaced in the recent letter by Bristol et al. (*2*) in relation to the second (current) collaborative study. Given that the public meeting that will follow the present study will have many issues to debate (*2,3*) it seems worth discussing in advance how equivocal predictions should be handled.

In situations where a predictive technique has been established as providing reliable indications of the carcinogenicity of chemicals, the mechanistic basis for that success will probably be apparent. That will elevate the technique from being empirical to rational. Such a technique may sometimes make an equivocal prediction of carcinogenicity that will reflect the true situation, i.e., after balancing the evidence used by the technique, the carcinogenicity of the agent under study will be considered uncertain and an equivocal prediction will be made. If it transpires that the agent is classified as equivocal for carcinogenicity, it could be accepted that the predictive technique had correctly anticipated that outcome, equivocal being snynonymous with ambiguous, uncertain, indeterminate, puzzling, obscure. Even in that optimum situation, a generally reliable technique may be requested to venture into an area of chemistry for which it is untrained, and an equivocal prediction made under such circumstances would simply reflect the ignorance of the technique in that area, as opposed to its genuine inability to come to a firm conclusion when faced with conflicting evidence. For example, the technique may be capable of making sound predictions of carcinogenicity for organic chemicals (some of which predictions may be genuinely equivocal), but be unable to predict the carcinogenicity of, for example, inorganic chemicals or organic arsenicals. In such situations the challenge will be to distinuish informed uncertainty from ignorant equivocation.

The techniques being evaluated in the present study (*1*) are probably best regarded, at least initially, as being both equal and only partially validated. That will enhance their objective evaluation. In that situation the optimum conditions outlined in the above paragraph will not hold, and a healthy skepticism will be in order. Thus, to polarize the issue, it will be inappropriate to classify a technique as 100% predictive of carcinogenicity should it transpire that all of the chemicals under study are equivocal for carcinogenicity, and all of the predictions made by the technique are equivocal.

The need for this discussion is illustrated by the 17% incidence of equivocal and/or no-predictions made in the current study [87 of the toal of 510 predictions made for the 30 chemicals (*3*)]. Over half of this equivocal predictions emanate from 5 of the 17 techniques used, and 36% of them are associated with the four inorganic chemicals included in the study (*3*). Such nonrandom groupings indicate that some of the predictive techniques presently under evaluation are either under-developed, invalid, or are not generally applicable.

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