Comments and Communications

Mustard—Its Preparation and Use

Numerous articles are appearing in which results of laboratory tests with mustard are reported. A large part of this work was done with samples obtained from the Chemical Corps, but since the substance is easily made, it may be assumed that some experimenters have prepared samples for their own use. It should be emphasized that the laboratory preparation of mustard by the novice is a much more dangerous procedure than the laboratory use of small quantities in clinical research. The writer has observed many workers over a period of 20 years and can report that a very small fraction have avoided being burned when using the material in bulk. Because of this experience it is believed that the instructions for the laboratory preparation of mustard by Bent (*Science*, October 17, 1947, p. 374) are not quite adequate.

During the past year the Chemical Corps has refused to supply samples of mustard to a number of applicants, but has furnished instructions for its preparation and handling. Since it appears to be desirable to give this information wider distribution, it is presented elsewhere in this issue (p. 204) as a contribution by personnel of the Chemical Corps Technical Command.

In connection with the simplicity of the preparation of mustard from thiodiglycol, it is of interest to point out that the latter compound is now sold under the trade name of Kromfax solvent and that, although the advertising literature of the Carbide and Carbon Corporation advises the user not to add hydrochloric acid to it, no mention is made of the fact that mustard is the reaction product. More amusing still, the compound $(HOCH_2\text{-}CH_2)_2S_2$ is now sold by Thiokol Corporation under the name Thiokol SC–10, with the warning that hydrochloric acid should not be added to it, but, if it is, then the reaction product is only one-third as toxic as that obtained with the monosulfide, namely, Kromfax solvent. It is not clear why the advertising literature should so studiously avoid use of the name *mustard* when addressed to chemists.

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Method for Changing Units

I was attracted by an article by F. L. Robeson, entitled "A Simple Method for Changing Units" (*Science*, October 10, 1947, p. 352).

While the author is justified in presenting his method as a simple one, a slight modification, which I have always used, appears to me to eliminate additional possible sources of confusion, such as memorized constants, fractions in numerator and denominator, etc.

Axiom: No value is changed upon multiplication by unity.

Rule: Units may be treated mathematically like numbers, *i.e.* they may be multiplied, divided, etc.

I trust that the author will not object when I cite his example to illustrate:

Given, the coefficient of thermal conductivity of glass:

$$k = 0.00250 \frac{\text{cal cm}}{\text{cm}^2\ ^\circ\text{C sec}}$$

Required, k in terms of Btu per inch thickness per ft^2 per hr per °F.

Carrying out cross-multiplication by fractions having the value 1, we obtain:

$$k = 0.00250 \frac{\text{cal cm}}{\text{cm}^2\ ^\circ\text{C sec}}$$

$$= 0.00250 \frac{\text{cal cm}}{\text{cm}^2\ ^\circ\text{C sec}} \times \frac{1\ \text{Btu}}{252\ \text{cal}} \times \frac{1\ \text{in}}{2.54\ \text{cm}} \times \frac{(30.48\ \text{cm})^2}{1\ \text{ft}^2} \times \frac{5\ ^\circ\text{C}}{9\ ^\circ\text{F}} \times \frac{3600\ \text{sec}}{1\ \text{hr}}$$

$$= 7.26 \frac{\text{Btu in}}{\text{ft}^2\ ^\circ\text{F hr}}.$$

In addition to carrying out a direct slide-rule calculation, the worker can fix the position of the decimal immediately by inspection.

The above method is not applicable to calculus problems, in which the carrying of units is undesirable.

I feel happy to give credit for this method to one of my former instructors, the late E. Frenkel, who lost his life in a concentration camp in Holland during the German occupation of that country.

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The "Polished Rocks" of Cornudas Mountain, New Mexico

Walter B. Lang, of the U. S. Geological Survey, has recently published two articles (*Science*, October 24, 1941, p. 390; January 17, 1947, p. 65) which may be paraphrased as follows: Some igneous boulders are found in the Hueco and Cornudas Mountains along the Texas-New Mexico boundary which exhibit highly polished patches near the edges or corners. These polished surfaces may be accounted for by their having been used by animals long extinct—possibly the cave bear or ground sloth—as places for rubbing and scratching their bodies. Minute particles of grease from their hides have become trapped within the outer fiftieth of an inch of the rock and may still be recovered by chemical reagents.

I believe that biological factors have had more effect in modifying the surface of the earth than is generally admitted. As a consequence, these two articles interested