ment of our robust and practical ideals, can be gained by the study of the work of Faraday, Newton, Kepler, Franklin, Darwin and Pasteur, and the general conceptions on which their work was based.

In conclusion one must recognize that science is international, English, German, French, Italian, Russian, all nations cooperating in the interests of racial progress. Accordingly, a survey of the sciences tends to inincrease mutual respect, and to heighten the humanitarian sentiment. The history of the sciences can be taught to people of all creeds and colors, and can not fail to enhance in the breast of every young man or woman, faith in human progress and good will to all mankind.

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SOME INCONSISTENCIES IN PHYSICS TEXT-BOOKS

THE following is a quotation from Kohlrausch's "Physical Measurements":

> The coefficient of capillarity may be *defined* as the weight of fluid which is supported by the unit of length of the line of contact of its surface with a thoroughly wetted plate.

Now a coefficient is a proportionality factor, a pure number expressing the measure of some specified force or property. For example, the volume coefficient of expansion of a gas is the ratio between the increase in volume per degree rise in temperature, and the volume at zero degrees centigrade, the pressure remaining constant. If we keep the expression coefficient of capillarity or capillary constant it must be as the *ratio* between the weight of liquid raised above the undisturbed level and the length of the line of contact of its surface with a thoroughly wetted plate.

In my opinion there is a difficulty with ratios involving quantities measured in different units. It is much simpler, for instance, to grasp the significance of the ratio of the extension of a wire per given or unit tension, to the initial length (see Duff's "Text-book of Physics," p. 122) than of Young's modulus expressed as the ratio of the longitudinal stress to the longitudinal strain; the stress measured as tension per unit cross section and the strain as extension per unit length.

The quotation from Kohlrausch is not in any case a *definition:* it explains how the *surface tension* of a liquid may be *measured.* Capillarity is the phenomenon of rise or fall of liquids in tubes due to the surface tension of the liquids. In most recent text-books and laboratory manuals the term coefficient of capillarity, capillary constant or coefficient of surface tension is not used. Duff, for instance, and Ames in his "College Physics," state this:

> If a line be imagined drawn along the surface of a liquid, the part of the surface on one side of the line pulls on the part on the other side, and if the length of the line be supposed one centimeter the pull in dynes is taken as the magnitude of the surface tension of the liquid.

Another term used inconsistently is *specific.* A specific quantity is concrete and so should be expressed in a unit. But we find specific gavity defined as a *ratio.*

> The specific gravity of a body is the ratio of the mass of any volume of it to the mass of the same volume of pure water at 4° C. (Carhart's "College Physics"). Specific gravity may be defined consistently as the weight of unit volume of the substance (Watson's "Text-book of Physics"). But it is useful to keep in the definition, because of our methods of determining specific gravity, the idea of comparison. Kimball ("College Physics") calls it relative density, defining it as "the ratio between the density of the substance considered and the density of a standard."

The definition of the specific heat of a substance is consistently given, in most recent text-books, as the quantity of heat in calories which will raise the temperature of one gram of a substance through one degree centigrade. The specific inductive capacity of a medium is, however, defined as the ratio between the capacities of two condensers equal in size, one of them being an air condenser, the other filled with the specific dielectric. But this ratio is as often called dielectric constant, sometimes the coefficient of induction.

These points are small ones, but they are puzzling to beginners and always annoying.

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