periments (Fig 38–2), and the probable lethal dose for humans can be estimated (Table 38-B) These ratings are based on the results of short-term acute exposures only

It is quite possible that actual long-term chronic exposures to a substance could prove highly toxic even though short-term exposure tests indicate a low order of toxicity

Brown (see References) states that measurements of relatively crude physical effects—such as body and organ weight changes, anatomical changes, and lethal results—are usually involved in tests of toxicity To assess the subtle effects a chemical may have, consideration must be given to measuring central nervous system effects during toxicity testing

Animal experiment data are difficult to interpret and apply to human exposure Such data are valuable *only* as guides to be used by the industrial toxicologist in estimating the gross toxicity of a substance and as leads for further investigation.

Toxic Substances List

The Occupational Safety and Health Act of 1970, Section 20(a)(6), requires that "the Secretary of Health, Education, and Welfare shall publish within six months of enactment of this act and thereafter as needed, but at least annually, a list of all known toxic substances by generic family or other useful grouping, and the concentrations at which such toxicity is known to occur" The first such list was prepared in 1971 The 1972 edition represents a substantial revision and expansion of the earlier list Under the OSHAct, the Secretary of Labor must issue regulations requiring employers to monitor employee exposure to toxic materials and to keep records of any such employee exposure This requirement is set forth in Section 8(c)(3) of the act

The purpose of *The Toxic Substances List* is to identify "all known toxic substances" in accordance with definitions that may be used by all sections of our society to describe toxicity It must be emphatically stated that the entry of a substance on the list does not automatically mean that it is to be avoided A listing does mean, however, that the listed substance has the documented potential of being hazardous if misused, and, therefore, care must be exercised to prevent tragic consequences

The absence of a substance from the list does not necessarily indicate that a substance is not toxic Some hazardous substances may not qualify for the list, because the dose that causes the toxic effect is not known

Other chemicals associated with skin sensitization and carcinogenicity may be omitted from the list, because these effects have not been reproduced in experimental animals, or because the human data are not definitive Of necessity, there had to be reliance on the published comments and evaluations of the scientific community, also, there has been no attempt at an evaluation of the degree of hazard that might be expected from substances on the list—that being an ultimate goal of the hazard-evaluation studies

It is not the purpose of the list to quantify the hazard by way of the toxic concentration or dose that is presented with each of the substances listed Hazard evaluation involves far more than the recognition of a toxic substance and a knowledge of its relative toxic potency It involves a measurement of the quantity that is available for absorption by the user, the amount of time that is available for absorption, the frequency with which the exposure occurs, the physical form of the substances, and the presence of other substances, toxic or non-toxic, additives, or contaminants

Ventilation, appropriate hygienic practices, housekeeping, protective clothing, and pertinent training for safe handling may diminish any hazard that might exist

Hazard evaluation requires, therefore, engineers, chemists, toxicologists, and physicians who have been trained in the fields of toxicology, industrial hygiene, and occupational health, to recognize, measure, and control these hazards

Many companies employ people with this type of professional background, particularly those companies that routinely handle hazardous chemicals Other companies acquire occupational health services from the many consulting firms or group medical practitioners as well as from some state and community offices

In order that all work-places may be evaluated properly, there must be standards for the concentrations of hazardous substances in