

TABLE 42-A  
COMBINED TABULATION OF TOXICITY CLASSES

| <i>Commonly<br/>Used Term</i> | <i>LD<sub>50</sub><br/>Single Oral<br/>Dose for Rats<br/>(gm/kg)</i> | <i>4-hr<br/>Vapor Exposure<br/>Causing 2 to 4<br/>Deaths in 6-Rat<br/>Group (ppm)</i> | <i>LD<sub>50</sub><br/>Skin for<br/>Rabbits<br/>(gm/kg)</i> | <i>Probable<br/>Lethal<br/>Dose<br/>for Man</i> |
|-------------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------|
| Extremely<br>toxic            | 0.001 or less                                                        | Less than 10                                                                          | 0.005 or less                                               | Taste<br>(1 grain)                              |
| Highly<br>toxic               | 0.001 to 0.05                                                        | 10 to 100                                                                             | 0.005 to 0.043                                              | 1 tsp<br>(4 cc)                                 |
| Moderately<br>toxic           | 0.05 to 0.5                                                          | 100 to 1,000                                                                          | 0.044 to 0.340                                              | 1 oz<br>(30 gm)                                 |
| Slightly<br>toxic             | 0.5 to 5.0                                                           | 1,000 to 10,000                                                                       | 0.35 to 2.81                                                | 1 pint<br>(250 gm)                              |
| Practically<br>nontoxic       | 5.0 to 15.0                                                          | 10,000 to 100,000                                                                     | 2.82 to 22.6                                                | 1 quart                                         |
| Relatively<br>harmless        | More than 15.0                                                       | More than 100,000                                                                     | More than 22.6                                              | More than 1 quart                               |

*From Handbook of Toxicology, Vol 1, Acute Toxicities ' W S Spector, ed Philadelphia, 1956 W B Saunders Co*

axioms form the basis for experimental toxicology. Although they appear self evident they are not susceptible to rigid proof.

- 1 Any substance contacting or entering the body will be injurious at some degree of exposure and will be tolerated without effect at some lower exposure.
- 2 The nature of the injuries which may develop in men can be determined by the study of the reactions of experimental animals.
- 3 It is possible to define an exposure to animals that has no effect upon its health. Health and well-being, however, are not measurable. It is the injury that is measured.
- 4 From animal experiments, the degree of exposure that will not affect humans can be determined.

Experimental toxicology has done well for human safety by allowing regulation of exposure in accord with the results of animal experiments.

The first attempts in estimating the toxicity of a substance are usually made on the basis of animal experiments. Data from these experiments is expressed as lethal doses (LD) in milligrams of substance per kilogram of body weight of the test animal. The most commonly used expressions are these:

- 1 MLD—minimum lethal dose, the smallest dose which kills one of a group of test animals.
- 2 LD<sub>50</sub>—lethal dose for 50 per cent, the dose which kills one-half of a group of test animals (usually 10 or more).
- 3 LD<sub>100</sub>—lethal dose for 100 per cent, the dose which kills all of a group of test animals (usually 10 or more).

These doses may also be expressed as lethal concentrations (LC) for airborne toxic substances.

Substances can then be rated according to their relative toxicity as shown in animal experiments, and the probable lethal dose for humans can be estimated. (See Table 42-A. These ratings are based on the results of