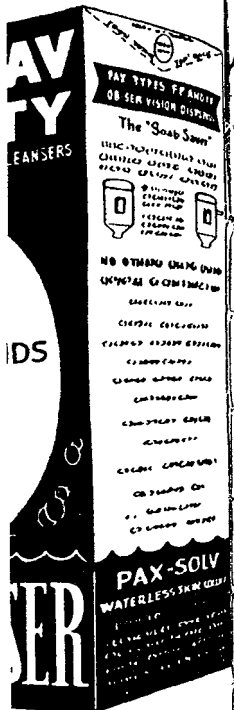


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Henry F. Smyth, Jr.



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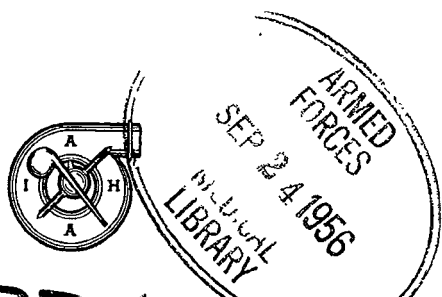
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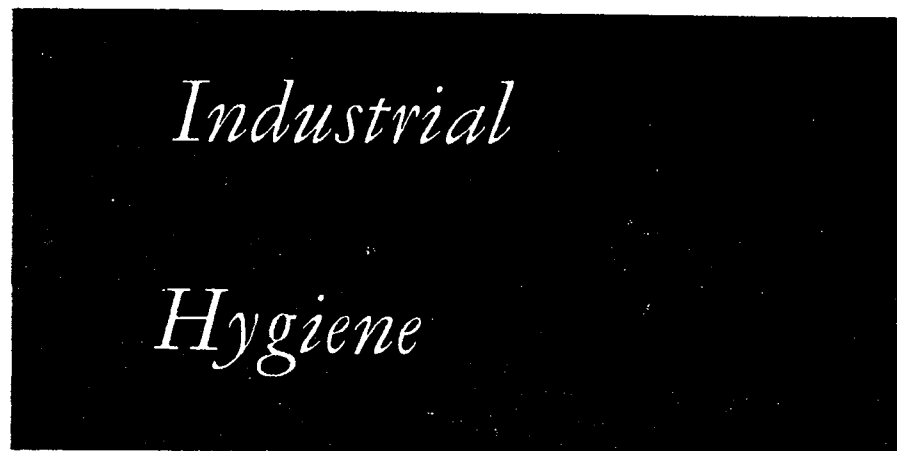
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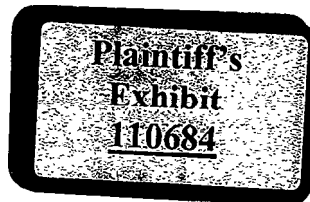
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AMERICAN INDUSTRIAL HYGIENE ASSOCIATION QUARTERLY, published by the American Industrial Hygiene Association in March, June, September, and December. HOWARD N. SCHULZ, Editor; HERBERT J. WEBER, Advisory Editor; LLOYD E. GORDON, Associate Editor; WILLIAM S. JOHNSON, Advertising Editor; PAUL D. HALLEY, Circulation Editor; A. D. CLOUD, Publisher; DORIS FLOURNOY, Editorial Assistant. Publication and Editorial Offices, 605 North Michigan Avenue, Chicago 11, Illinois. Subscription \$4.00 per year in the United States; \$4.50 per year in Canada; \$5.00 per year in other countries. Single copies, \$1.50—except the June, 1956, issue which is \$2.00. Copyright, 1956, the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION. Entered as second class matter May 3, 1948, at the post office at Sheboygan, Wisconsin, under the Act of March 3, 1879. The AMERICAN INDUSTRIAL HYGIENE ASSOCIATION QUARTERLY reserves the right to edit all advertisements and to refuse advertising copy when it does not meet the high professional standards adopted by the Association.

Prepared Discussion

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Pittsburgh

DR. SACHS has established that the vast majority of our colleagues recognize their need for a list of threshold limits. She distinguishes between the need of the official agencies for a screening device to apply to thousands of industrial processes they encounter in field work, and the need of the private industrial hygienist for an engineering bench mark for planning and evaluating environmental control. To satisfy each of these needs vapor concentrations must be measured under operating conditions before the threshold limits values can be useful.

There is a third group which uses threshold limits and needs them because nothing better suited to the need is available. Every one of our profession is a part-time member of this group and some are full-time members. Reference is made to the arm-chair industrial hygienist. He may never measure a concentration and he may never observe an industrial operation. He uses threshold limits to advise upon the selection of a chemical for a particular application, to select a suitable application for a little known chemical and to bolster sales arguments for a chemical or mixture of chemicals.

When the industrial hygienist is asked to advise whether acetone, propyl acetate, or methylene chloride would be the safest solvent in a particular application, it may be believed that his answer is based on a profound knowledge of toxicology, but actually he recalls the threshold limits, or refreshes his memory by consulting the list while the questioner waits on the telephone. Then the answer is given as if the list recorded comparative toxicities, perhaps adding a bit of qualitative information on fire hazard and type of injury from an excess.

What better data are available for the arm-chair industrial hygienist than the annual list of threshold limits? He must have some guidance if he is to do more than toss a coin. If he is given a list based on uniformly conducted animal experiment, he is deprived of the benefit of the years of carefully observed and evaluated human experience

which is recorded in some of the threshold limit values. Whether we want him to or not, he (and that includes every one of us at times) will use threshold limits as estimates of comparative toxicity to meet his urgent requirement for finding some basis for opinion.

To what extent is he wrong? A threshold limit based on comfort, irritation or good engineering practices certainly is not comparable to one based on pathological effect. But the former limit is certainly lower than one based on injury. The error is on the side of safety if it is stated that material A has a threshold limit based on comfort higher than that of material B which is based on injury, therefore material A should be used in the process.

No matter which material is chosen it will be employed by persons subjected to the same degree of industrial hygiene and medical scrutiny. By choosing the material with the higher threshold limit the probability of safe operation has been increased, even if the basis on which the choice was made is not numerically sound.

There is one important short-coming in this argument which points out an important way in which threshold limits do not meet the needs of the arm-chair industrial hygienist. If the volatility of a material with a high threshold limit is greater than that of a material with a low limit, then in a particular process the less toxic material may be more hazardous, because a greater vapor concentration will be in the atmosphere.

I maintain that the list of threshold limits is our best available source for judgments on comparative toxicity of vapors to humans. It can be improved for this purpose, but there is nothing better for us to use. However, it refers to toxicity, not to hazard. It is the single-phased toxicity of K. B. Lehmann. A table of comparative hazards would go back to Lehmann's two-phased toxicity by combining vapor pressure (or evaporation rate) with toxicity. This table of comparative hazards is what the arm-chair industrial hygienist really needs. It would go a long way toward satisfying all of his needs, particularly if it included information on nature of injury, on the penalty for exceeding the limit and on the degree of hygienic urgency for observing the limit.