

V. Poisoning from Radioisotopes	722
A. Radium Poisoning	722
B. Thorium Poisoning	739
Handbooks of the National Bureau of Standards on Radiation Protection	742
XX. Lighting for Seeing. By SYLVESTER K. GUTH and E. A. LINSLEY	743
I. Lighting Terms and Units	744
II. Visibility	745
III. Ease of Seeing	751
IV. Quality of Lighting	752
V. Color	755
VI. The Human Element	755
VII. Light Sources	759
A. Filament Lamps	759
B. Mercury Lamps	759
C. Fluorescent Lamps	760
D. Germicidal Lamps	760
E. Infrared Lamps	761
VIII. Lighting Benefits	761
IX. General Lighting	774
A. Maintenance	778
X. Supplementary Lighting	780
XI. Infrared Radiation	787
XII. Ultraviolet Radiation	787
XXI. Heat Control in the Hot Industries. By T. F. HATCH	789
I. Effects of Heat on Man	790
II. Physiological Limits of Heat Exposure	791
A. Haldane's Wet-Bulb Temperature Limits	791
B. Exposure Limits in Terms of Effective Temperature	792
C. Physiological Limits Based on Performance Ability	792
D. Maximum Permissible Sweat Rate	793
E. Calculated Limits of Heat Exposure to Maintain Thermal Balance	794
F. Physical Basis of Tolerance Lines	795
G. Limits of Heat Exposure Fixed by Thermal Balance and Maximum Permissible Sweat Rate	798
III. Physical Evaluation of Hot Environments	799
IV. Heat Control	801
A. Control at Source	801
B. General Building Ventilation	804
C. Localized Ventilation and Cooling at Fixed Work Stations	804
V. Supervision of Employees in Hot Industries	805
A. Safe Tolerance Limits and Intermittent Rest Periods	806
B. Medical Supervision	807
Index	809

CHAPTER I

Industrial Hygiene—Retrospect and Prospect

FRANK A. PATTY

Historical accounts down through the ages are replete with allusions to the unattractive lot of the man who has earned his livelihood by manual labor. In ancient times a considerable portion of such work was done by slaves, a practice that has been extended in instances even into the twentieth century. Where slave labor has been employed there has not been sufficient incentive or opportunity to study the adverse effects of occupational environments.

Early beliefs that unhealthful conditions are inherent in certain trades have now been disproved and are no longer generally expressed; when plant operators today are presented with clear-cut evidence of unhealthful working environments they are almost universally ready to institute any practical control measures. One of the industries that rather recently joined the modern trend toward providing clean as well as healthful environments was the foundry industry, and even today some foundry operators still believe that considerable dirt, dust, and fumes are inherent in the industry. This is not an expression of conservatism among foundry management, but rather the result of the failure of the layout man, the industrial hygienist, and the ventilation engineer to provide information on the correct design of foundries and foundry equipment as well as on correct ventilation practices. No one wants a dirty work place if it is easy, practical, and economically feasible to have a clean one. Neither does management want to spend huge sums for dust control only to find that it does not do what it was intended to do. Although there may still be isolated employers who regard labor as a commodity purchasable on the market and more easily replaced than preserved, the vast majority of workmen in the United States today are in a very enviable position with respect to the safeguards taken to protect them from occupational diseases and accidents.

I. Historical Résumé

A. MEDICAL AND INDUSTRIAL HYGIENE LITERATURE

Lead poisoning is the oldest recorded occupational disease. Hippocrates, who lived in the fourth century B.C. and is credited with lifting the practice of medicine from its basis of superstition and giving it a scientific foundation, has also been credited by some with being the first to record adverse effects upon miners and metallurgists from exposure to lead.