LC 1102

# SENSORY ENVIRONMENT STAFF


**U.S. DEPARTMENT OF COMMERCE / National Bureau of Standards**
National Engineering Laboratory / Center for Building Technology

LC1102
February 1979

Arthur I. Rubin

Chief, Sensory Environment Program
Center for Building Technology
National Bureau of Standards

B.BA., Industrial Psychology, City University of New York, 1957.
M.S., Industrial Psychology, Pennsylvania State University, 1959.
Ph.D., Experimental Psychology, George Washington University, 1968.

Dr. Rubin has been at the Bureau since June 1968, his first assignment being the development and management of a research program for the Post Office Human Factors Laboratory. After his transfer to CBT (then the Building Research Division) he conducted research concerned with the measurement and evaluation of the responses of people to their environments. Among his research interests are: How do we determine and measure the responses of people to their environments? Are the present research methods available to researchers adequate? What are the effects of noise on people? How safe from fires are building occupants? How can more effective emergency signalling systems be designed? What are appropriate lighting levels for buildings? How should post occupancy building evaluations be conducted?

Dr. Rubin was employed at the U.S. Army Behavioral Science Laboratory, Roslyn, Virginia (1961-1968), prior to coming to the Bureau; where he was a project manager responsible for developing and conducting experimental studies in the areas of performance under stress, visual display of information, decision making, learning and human factors.

Prior to this, Dr. Rubin served as a research psychologist at the Human Engineering Laboratory, Rome Air Development Center (RADC), Rome, New York. At RADC, he conducted speech communications research, served as a human engineering and visual display consultant and participated in the establishment of the Personnel Subsystem Concept in the Air Force by being a member of the first subsystem team associated with Command and Control Systems (480L).

Born in New York City in 1930, Dr. Rubin served in the Army during the Korean War (1953-1955). He is a member of Sigma XI and the author of many publications in his field.

Publications

"Window Blinds as a Potential Energy Saver -- A Case Study," NBS BSS 112, May 1978, co-author.

"The National Cancer Institute's Emergency Virus Isolation Facility: A Case Study for Use in Developing a Methodology of Post-Occupancy Evaluation," NBSIR 77-1402, December 1977, co-author.

"Emergency Communications in High-Rise Buildings," in Human Response to Tall Buildings, Hutchinson and Ross, June 1977, co-author.

"Noise Emission Measurements for Regulatory Purposes," NBS Handbook 122, March 1977, co-author.

"Energy Conservation in Buildings - A Human Factors/ Systems Viewpoint," BSS 88, November 1976.

"Occupant Safety Requirements in Building Fires," NBS TN 818, February 1974, co-author.

"User Requirements in the Home - Data Collection Methodology - A State of the Art Report," NBS Report 10852, December 1971, co-author.

"The Social Impact of Noise," EPA Report NTID 300.11 (NTIS PB206724), December 1971.

"Fundamentals of Noise: Measurement, Rating Schemes, and Standards," EPA Report NTID 300.15 (NTIS PB206727), December 1971, co-author.

"Automobile Tire Sounds - Acoustical Grading System Feasibility 2. Coastby Study," NBS Report No. 10359, October 1970, co-author.

"Automobile Tire Sounds - Acoustical Grading System Feasibility 1. Endurance Wheel Study," NBS Report No. 10292, May 1970, co-author.

Jacqueline Elder

Research Psychologist
Sensory Environment Program
Center for Building Technology
National Bureau of Standards

B.A., Psychology, George Washington University, 1968.

Ms. Elder works primarily in the area of Man/Environment relations with particular emphasis on behavioral research methodology. In this area, she is serving as principal investigator of a research project designed to develop building evaluation methods, as well as serving as project leader for the assessment of occupant response to a building with several innovative energy conserving design features.

She is also currently completing work as co-author of a comprehensive document on behavioral science measurement methodology as it relates to user requirements in buildings. This document is a follow-on to an earlier report concerned with methods available for assessing user needs in housing.

Ms. Elder has also worked as project coordinator for an interdisciplinary project investigating issues related to residential energy consumption, and has conducted research in the area of institutional factors which might affect the development and implementation of an innovative utility project.

In the past she served as laboratory supervisor of a Human Factors Laboratory for the Post Office Department.

Publications:

"Multi-Position Letter Sorting Machine Operator Work Rotation System," (coauthor), NBS Report 10480, 1970.

"Interim LTV Keyboard Validation, Task 1 Under LMCSS Human Factors Research Program," (coauthor), NBS Report 10513, August 1970.

"User Requirements in the Home - Data Collection Methodology - A State of the Art Report," (coauthor), NBS Report 10852, December 1971.

"Some Institutional Considerations Affecting MIUS - A Case Study and Annotated Bibliography," NBSIR 76-1103, June 1977.

"The National Cancer Institute's Emergency Virus Isolation Facility: A Case Study for Use in Developing a Methodology of Post-Occupancy Evaluation," (coauthor), NBSIR 77-1402, December 1977.

"Norris Cotton Federal Building - User Acceptance," Letter Report, February 1978.

"Norris Cotton Federal Building User Acceptance - Results of Second Questionnaire," Letter Report, March 1978.

"Energy Conservation and the Homebuyer," (awaiting sponsor approval).

"The Richard H. Poff Courthouse and Federal Building in Roanoke, Virginia: A Case Study for Developing Post Occupancy Evaluation Methods," (coauthor), NBSIR (in review).

"Buildings for People - Research Approaches and Directions," (coauthor), Special Publication (in review).

"The Norris Cotton Federal Building - User Acceptance," (coauthor), NBSIR (in draft).

Talks:

"Behavioral Research and Energy Conservation, NBS Workshop, September 1975.

"User Requirements in Buildings, Michigan Society of Architects, October 1975.

"The Norris Cotton Federal Building - User Acceptance, NBS Seminar, Fall 1977.

Robert A. Glass

Research Psychologist
Sensory Environment Program
Center for Building Technology
National Bureau of Standards

B.A., Psychology, University of Toledo, 1969.
M.S., Experimental Psychology, University of Maryland, 1971.
Ph.D., Sensory and Perceptual Psychology, University of Maryland, 1974.

Dr. Glass is engaged in research for the Occupational Safety and Health Administration to improve standards for work in visual alerting. In conjunction with this project, Dr. Glass is also responsible for the development of the Center for Building Technology's Color Applications Laboratory. He designed and built the color and visual experimentation system (Cave System), a multi-channel electro-optical system which will be used during phases of the current research effort.

Dr. Glass joined the National Bureau of Standards in November 1974, as a research psychologist in the Sensory Environment Section. During his first years at NBS, he helped develop early phases of the Center for Fire Research's Program for design concepts, to research occupant safety during fire emergencies. He also helped design, build and calibrate two standard reference lighting systems and an experimental illumination chamber for illumination engineering research.

Dr. Glass is the author of several papers on human color vision and perception. His publications include research on color-naming, visual responses of the eye to flashing monochromatic lights, visual response of the eye-brain system to steady fields of monochromatic light, the sensory needs of people in fire emergencies, and the legibility of alpha-numeric displays.

Prior to joining NBS, Dr. Glass was a graduate researcher and lecturer at the University of Maryland. He has taught courses in General Psychology, Sensory and Perceptual Psychology, and Advanced Sensory Psychology.

Professional Activities:

National Academy of Sciences
Member, Building Research Advisory Board Ad Hoc Task Group on Directional Graphics

American National Standards Institute
Visual Alerting Systems Committee (VASCOM)
Chairman, Research Committee

Publications

"Fire Safety for High-Rise Buildings: The Role of Communications," BSS, Spring 1978, co-author.

"Emergency Communications in High-Rise Buildings," in Human Response to Tall Buildings, Dowden, Hutchinson and Ross, June 1977, co-author.

"Evidence for Cone and Rod Contributions to Common 'Adaptation Pools'," Vision Research, Vol. 15, pp. 277-281, 1975, co-author.

"Adaptive Interactions Between Photopic Mechanisms in Response to Chromatic Borders," Dissertation Abstracts International, 1975, Vol. 36-02B, p. 939, (University Microfilms #75-18099).

"Visual Sensitivity in the Presence of Alternating Monochromatic Fields of Light," Vision Research, Vol. 13, pp. 689-699, 1973, co-author.

"Visual Sensitivity in the Region of Chromatic Borders," Vision Research, Vol. 12, pp. 1715-1724, 1972, co-author.

"Effects of Reducing the Readability of the Words in the Stroop Color-Word Test," Psychomonic Science, Vol. 20, pp. 247-248, 1970, co-author.

Gerald L. Howett

Research Psychologist (Physiological and Experimental)
Sensory Environment Program
Center for Building Technology
National Bureau of Standards

A.B., Mathematics, Harvard University, 1952.
M.A., Experimental Psychology, Columbia University, 1953.
Ph.D., Experimental Psychology, Columbia University, 1958.

Dr. Howett arrived at the National Bureau of Standards in September 1958, as an NAS-NRC Postdoctoral Resident Research Associate, to work on color with Dr. Deane B. Judd. He was the first experimental psychologist ever to work at NBS. Becoming a regular NBS employee in 1959, he has continued his work on color psychophysics, colorimetry, and other aspects of vision until the present.

Dr. Howett's principle research effort at present is on an OSHA-funded project directed toward improved standards for safety signs. The project involves research in the state of the art of opaque, fluorescent, and retroreflective colors, the effect of colored light sources on the perception of color, and the criteria for good legibility of signs, including contrast and letter size.

Prior to his NBS experience, Dr. Howett attended Harvard University on several scholarships, including Westinghouse Science Talent Search, Pulitzer Free Scholarship, and Harvard Freshman and Upperclass Scholarships. He entered the psychology Department of Columbia University on a Eugene Higgens Fellowship, and continued at Columbia, specializing in vision and color under the principal guidance of Professor Clarence H. Graham.

Dr. Howett worked at Columbia as a research assistant from 1954 to 1957, on vision and color projects sponsored by the Navy and Air Force, and on a loudness-scaling project (under Wm. J. McGill) for the Air Force. During the academic year 1957-1958, he was a full-time lecturer in psychology in the Columbia School of General Studies.

Dr. Howett maintains heavy involvement in scientific and standards-oriented committee activities related to color and lighting, including chairmanship of the Color Committee of the Illuminating Engineering Society (IES), and membership on other committees of the IES, the U.S. National Committee of the International Commission on Illumination (CIE), the American National Standards Institute (ANSI), the International Society Color Council (ISCC), and the Vision Committee of the National Academy of Sciences - National Research Council.

Publications

"Legibility, Esthethnics, and Page Size," NBS Report 10 394, September 1972.

"Emergency Vehicle Warning Devices: Interim Review of the State-of-the-Art Relative to Performance Standards," NBS Report 10 478, July 1971, co-author; also Law Enforcement Standards Report 0501.00 (Dept. of Justice), May 1972.

"Scaling of Perceived Color Differences Near the Limits of the Matte-Paint Gamut," Journal of the Optical Society of America, Vol. 61, May 1971, p. 688 (Abstract).

"Chromaticness-Difference Scaling in the Munsell Value 6/ Plane," Journal of the Optical Society of America, Vol. 60, November 1970, p. 1572 (Abstract).

"Achromatic-Point Prediction," Journal of the Optical Society of America, Vol. 60, July 1970, pp. 951-958.

"Perception of Chromaticness Differences Among Near-Neutral Colors," Journal of the Optical Society of America, Vol. 59, April 1969, p. 503 (Abstract).

"Variation of Absorptance-Curve Shape with Changes in Pigment Concentration," Journal of Research of NBS, Vol. 72A, July-August 1968, pp. 309-340.

"Loci of Discrepancy Chromaticities for von Kries Transformations," Journal of the Optical Society of America, Vol. 53, April 1963, pp. 510-511 (Abstract).

"Transformations of Trichromatic Coordinates in Colorimetry," (coauthor), Research Report from the Psychological Laboratory, Columbia University, May 1957.

"Detection of Separations Between Adjacent Signals on a Simulated PPI Radar Scope," (coauthor), Journal of the Optical Society of America, Vol. 46, October 1956, pp. 861-886.

Publications in Press or in Late Stages of Review:

"Emergency Vehicle Warning Lights: State of the Art," (coauthor), NBS Spec. Pub. 480-16. (Status: galley proofs in hand.)

"Some Psychophysical Tests of the Conspicuities of Emergency Vehicle Warning Lights," NBS Spec. Pub. 480-14. (Status: WERB approved; under review by LESL chief.)

"NILECJ Standard for Warning Light Systems for Law Enforcement Emergency and Service Vehicles," (anonymous; co-contributor), NILECJ-STD-0502.00 (Dept. of Justice). (Status: WERB approved; approved by International Association of Chiefs of Police, March 1978; under review by LESL Chief.)

"User Guide to Warning Lights and Sirens for Emergency and Service Vehicles," (coauthor), NBS Spec. Pub. 480-xx. (Status: WERB approved; now under major revision by LESL staff.)

Formal Oral Papers:

"Color Appearance," at Inter-Society Color Council, Annual Meeting, Washington, D.C., April 18, 1978.

"A Computer Program for Computing Effective Intensity," at Symposium on Visual Signalling (joint sponsors: CIE TC1.6, USCG, FAA, and FHWA), Washington, D.C., April 9, 1974.

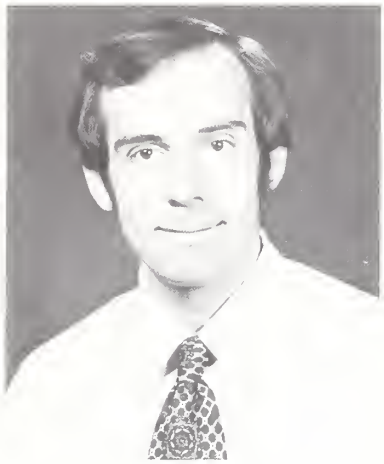
"Scaling of Perceived Color Differences Near the Limits of the Matte-Paint Gamut," at Optical Society of America, Spring Meeting, Tucson, Arizona, April 8, 1971.

"Chromaticness-Difference Scaling in the Munsell Value 6/ Plane," at Optical Society of America, Annual Meeting, Hollywood, Florida, October 1, 1970.

"Perception of Chromaticness Differences Among Near-Neutral Colors," at Optical Society of America, Spring Meeting, San Diego, California, March 13, 1969.

"Variation of Absorptance-Curve Shape with Changes in Pigment Concentration," at Optical Society of America, Spring Meeting, Dallas, Texas, April 1, 1965.

"Loci of Discrepancy Chromaticities for von Kries Transformations," at Optical Society of America, Spring Meeting, Jacksonville, Florida, March 25, 1963.



Robert L. Tibbott

Research Psychologist
Sensory Environment Program
Center for Building Technology
National Bureau of Standards

B.A., Psychology, Oberlin College, 1971.

Mr. Tibbott participates in planning and conducting research to improve the sensory environment of buildings. He is responsible for data collection and analysis of studies designed to determine optimum illumination levels in buildings and requirements for safety-related visual displays in workplaces. He works as a member of an NBS team evaluating the lighting systems in a Federal energy demonstration building in Manchester, New Hampshire.

Previously Mr. Tibbott performed research on window blind usage at NBS, acceptability of household appliance noises, heterochromatic brightness matching, and safety color codes. He also reviewed and analyzed architectural glass standards and accident reports to provide a basis for safety rules issued by the Consumer Product Safety Commission. He is familiar with the use of a variety of photometric instrumentation and automated information retrieval systems.

Publications

"Window Usage at the National Bureau of Standards -- The Venetian Blind as a Potential Energy Saver," NBS Building Science Series, 1978.

"Luminous Efficacy of Lighting Systems Installed in Norris Cotton Federal Building, Manchester, New Hampshire," Letter Report to Department of Energy, April 1978.

"Levels of Illumination and Legibility," NBSIR 77-1306, November 1977.

"Background Report on Architectural Glass," NBS Interagency Communication, June 1974.

Gary T. Yonemura

Supervisory Research Psychologist
Sensory Environment Program
Center for Building Technology
National Bureau of Standards

B.S., Psychology, Columbia University, 1954.
M.A., Psychology, Columbia University, 1955.
Ph.D., Psychology, Columbia University, 1961.

Dr. Yonemura is the Project Leader of the Visual Environment Project for the Sensory Environment Program. He conducts research dealing with light and vision with emphasis on visual performance and energy conservation. This involves basic laboratory investigations concerned with the visual processes, as well as the development of associated instrumentation, methodology, and standards. He is actively involved in investigating laboratory based criteria for recommending levels of illumination under conditions more nearly resembling situations encountered in the real world. He is currently developing the instrumentation, methodology, and standards necessary to assess the effectiveness of lighting systems for visual task performance. In addition he is developing prediction methods for design purposes, and evaluating field conditions and tasks in order to develop visual standards for testing inspectors working in visual nondestructive evaluation techniques.

He was previously involved in problems dealing with television viewing, facial identification criteria, color conspicuity, visual signalling and development of color vision models for quantifying color phenomena. Dr. Yonemura is active at the national and international levels with technical committees concerned with visual performance criteria for lighting and energy conservation. He provides consulting support for other governmental agencies, industry, and consumers.

Dr. Yonemura's past experience includes teaching Psychology at Indiana University; a Fulbright Fellowship (Japan) from the Department of State; and lecturing in Psychology at Columbia University.

Publications

"Task Lighting," Lighting Design and Applications. November 1977, pp. 27-30.

"Levels of Illumination and Legibility," (coauthor), NBSIR 77-1306, November 1977.

"Considerations and Standards for Visual Inspection Techniques," in ASTM STP No. 624 Nondestructive Testing Standards - A Review, H. Berger (ed.), June 1977, pp. 220-230.

Also: NBSIR 76-1142, October 1976.

"A New Look at the Research Basis for Lighting Level Recommendations," (coauthor), in Proc. Symposium on The Basis for Effective Management of Lighting Energy, D. K. Ross (ed.), April 1976, pp. 151-183.

Also: NBS Building Science Series 82, March 1976.

"Modification of Fluorescent Luminaires for Energy Conservation," (coauthor), NBS Tech Note 886, October 1975.

"What are the Lighting Needs of the Occupant (Worker)?", in Proc. Symposium on the Occupational Safety and Health Effects Associated with Reduced Levels of Illumination, A. P. Heins (ed.), NIOSH, March 1975, pp. 87-92.

"An Image Quality Criterion for the Identification of Faces," Phot. Sci. & Eng., July/August 1975, pp. 223-227.

Also: LESP-Rpt-0303.00, May 1974.

"CIE 1960 UCS Diagram and the Muller Theory of Color Vision," (coauthor), J. of Res. of the National Bureau of Standards, A. Physics and Chemistry, January-February 1970, pp. 23-30.

Also: Proc., Intl. Color Assn., Stockholm 1969, Musterschmidt, Fottingen, 1970, pp. 266-274.

"Opponent-Color-Theory Treatment of the CIE 1960 (u,v) Diagram," J. Opt. Soc. Amer., October 1970, pp. 1407-1409.

"Target Conspicuity and Its Dependence on Color and Angular Subtense for Gray and Foliage Green Surrounds," (coauthor), NBS Report 10 120, November 1969.

"Report on Literature Review and Recommendations on Visual Aspects of Television Viewing," NBS Report 10 466, February 1969.

"Color Discrimination Under Reduced Angular Subtense and Luminance," (coauthor), J. Opt. Soc. Amer., February 1969, pp. 131-135.

"Luminance Threshold as a Function of Angular Distance from an Inducing Source," J. Opt. Soc. Amer., September 1962, pp. 1030-1034.