Guest Editorial: Image Quality Assurance for CRT Display Systems—Part II

THE SERIES of articles on this subject, which began in the previous issue with contributions from Dr Mertelmeier of Siemens Medical Corporation in Erlangen, Germany, and from Dr Chakraborty of the University of Pennsylvania in Philadelphia, continues in this issue with reports by Dr Flynn and Mr Badano from Henry Ford Health Systems and by Dr Hangiandreou et al from the Mayo Clinic.

Dr Flynn's article deals with the important subject of contrast. He reviews the various sources of scatter that contribute to loss of contrast in the image (scatter of electrons and of light) as well as the various ways to characterize scattering (Veiling Glare, or Glare Ratio, defined as $[L(\text{max})/L(\text{min})]$, or its inverse $[L(\text{min})/L(\text{max})]$). Using a specially designed luminance probe, the authors provide measurements showing that the glare ratio for film is approximately 555; that for a monochrome monitor is 89 and that for a color monitor is about 25. At the same time, the diffuse reflection coefficient is 0.026 per sr for film, 0.058 for a monochrome monitor, and 0.025 for a color monitor with an antireflective coating.

Loss of contrast in CRT images is a potential problem for the radiologist. Much needs to be done to improve the contrast for electronic display devices. The radiologist can do a great deal by insisting on optimal ambient lighting conditions, as explained by Dr Mertelmeier in the previous issue.

Dr Hangiandreou's article, entitled "Optimization of a Contrast-Detail-Based Method for Electronic Image Display Quality Evaluation," introduces a new testpattern for CRT evaluation, which actually is not really all that new. It is a contrast-

detail phantom, based on the well-known CDMAM contrast-detail phantom, developed in the Netherlands for full-field mammography. The authors develop a figure-of-merit reflecting overall display quality, called Maximum Threshold Contrast, or MTC, which appears promising. Preliminary experiments demonstrate the response of MTC measurements to increased noise in the displayed image. We look forward to applying this technique to the characterization of various electronic display devices.

Again, as with the reports in the previous issue, whether practical or proposed, the methods described in these two articles present ideas that are essential if QA and QI programs are to be successfully applied to digital imaging systems. It is my belief that such programs are a necessity if PACS and PACS technologies are to be accepted by the clinical community. The community that has designed, implemented, and evaluated PACS and PACS technologies is perhaps best able to develop the tools for quality paradigms.

I thank the authors for their excellent contributions, the reviewers who provided valuable constructive criticism of the reports, and Dr Roger Bauman for his invitation to serve as guest editor. Unsolicited papers on CRT image quality continue to be of interest to the *Journal of Digital Imaging*.

Hans Roehrig, PhD

Guest Editor

Department of Radiology
and Optical Sciences Center
The University of Arizona
Tucson, AZ