

This talk will review some key moments from the author's experience (a third of a century) working with the giants of modern image science (going back a half century). The talk will have four major sections: 1) Quantum-limited imaging; 2) Anatomical-background-limited imaging; 3) Artifact-limited imaging; and 4) Doctor-limited imaging. The early work of Albert Rose and Otto Schade from the field of analog TV will be used to set the stage. Next, we review Rodney Shaw's analysis of the statistical defects of the photographic detector, together with his historic marriage of statistical physics and Fourier analysis of images. A summary of the ICRU (International Commission on Radiation Units and Measurements) document on Image Quality will be presented, with illustrative examples. The work of Arthur Burgess and colleagues will be used to demonstrate a contemporary quantitative approach to the problem of masking of lesions by anatomical background. The work of Peter Joseph and Ray Schulz provides a demonstration of fundamental concepts regarding artifacts, with examples from limited-angle CT. Contemporary work of Charles Mistretta and colleagues on related issues in MRI encourages a fundamental approach to the more general detection problem. Finally, the current issues related to great reader variability and the role of computer-aided diagnosis will be reviewed.