RLE

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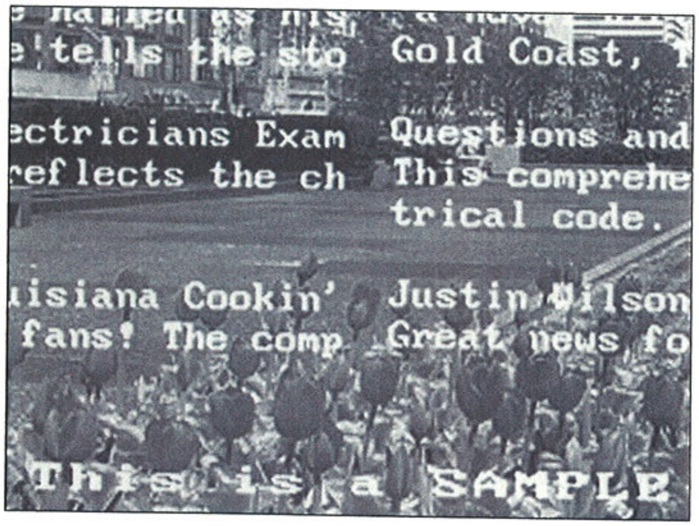
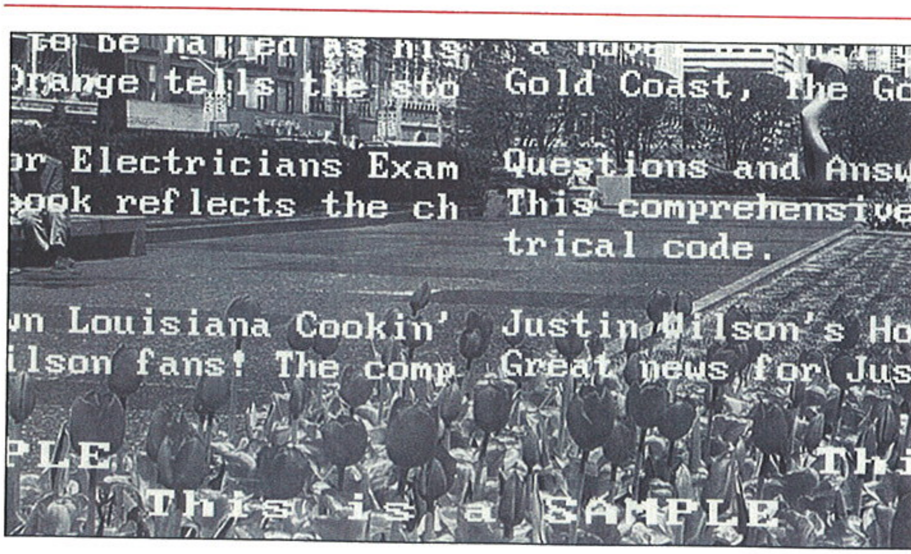
The Research Laboratory of Electronics at Massachusetts Institute of Technology



Although no single person or invention can be credited with the development of television, the so-called electronic hearth of today has its roots in the 1817 discovery of light-sensitive selenium by Swedish chemist Jöns Jakob Berzelius. By 1881, silhouettes were transmitted using selenium and a scanning phototelegraph device. However, there was a growing desire to transmit sound with *moving* images.

In 1884, German scientist Paul Gottlieb Nipkow patented the first mechanical television system. The Nipkow disk consisted of a rotating perforated disk placed between an image and the element selenium. The disk rotated before an image, effectively dividing the scene into lines, while the selenium behind the disk captured the moving image. Nipkow's design was the first to propose scanning a moving image. Unfortunately, a working system was never built by Nipkow himself because an amplified electric current was needed to drive a receiver. In 1906, American *(continued on page 2)*

CHANGING THE IMAGE OF BROADCAST TECHNOLOGY: RLE's Advanced Television and Signal Processing Group



Corresponding portions of a National Television System Committee (NTSC) image (top) and a high-definition television (HDTV) image are shown. An HDTV image contains more than two million picture elements (pixels) and is approximately six times the spatial resolution of current NTSC images. HDTV employs a 16x9 aspect ratio, compared to NTSC's boxy 4x3 ratio, and provides a wide-screen effect that viewers are accustomed to in movie theaters. HDTV's digital image is free of all transmission impairments such as noise and ghosting, and is accompanied by CD-quality surround sound. The realization of HDTV and other advanced television systems has been made possible by developments in signal processing, telecommunications, digital compression and transmission, and very large-scale integration.