Production Format (the *Journal* of the SMPTE, June 1989, pages 439-443), Iredale introduces a new format to fill the needs of production and post production.

The HD-PRO format features high spatial resolution, which makes it ideal for the multiple generation rigours of the post-production process. It is presented as an adjunct to the already accepted SMPTE standard 240M.

Iredale refers to the three elements of the HD system — production, transmission and display — with respect to their application for HD-PRO. He provides a primer on the theory of motion — as it applies to vision in general and to HD in particular — and offers comparisons for spatial relationships, field rates and 16x9 aspect ratio (for the optimum resolution and picture quality) with the inclusion of digital sound tracks.

In the previous edition I touched on one of the alternate production standards that was being proposed as NTSC Compatible called 3X NTSC. That is precisely what it is — three times the NTSC horizontal scanning rate.

Wayne E. Bretl's article on this topic appears in the March 1989 issue of the *Journal* of the SMPTE, pages 173-178. Entitled *3X NTSC—A "Leapfrog" Production Standard For HDTV*, the paper discusses how a high-quality HD picture can be obtained within the technical parameters set out by the current NTSC operating criteria.

Bertl describes in some detail the relationship of 3X NTSC to the other HD systems, compares production techniques, aspect ratios, special effects, motion rendition, resolution and standards conversion to other formats. He also makes a case for the economic viability of such a system in both production, post production and system design.

Bertl advances the theory based on the perceived urgency to accept a North American, if not an American, standard to halt the incursion of foreign manufacturers into the domestic U.S. market. 3X NTSC utilizes available technology to achieve a production standard similar to true HD.

The article is interesting to read, particularly when placed in context with the articles by Flaherty and Schreiber. Together these articles provide some insight into the wrangling that has gone on in attempts to introduce a world standard for HD production, transmission and display.

As the saying goes, there's more than one way to skin a cat.

That's the type of thinking that has characterized the search for an NTSC compatible HD production format. It is generally recognized that the wide bandwidth of the HD signal is the main impediment to its widespread acceptance as a broadcasting medium which, as we know it today, makes a plethora of channels available to the home viewer over the air and via cable television.

In efforts to bridge the gap between NTSC and HD a two-tiered approach has been proposed that would facilitate eventual abandonment of NTSC for broadcasting in favor of an HD production format. The means for this move away from NTSC is outlined in a paper by W.F. Schreiber, A.E. Lippman, A.N. Netravali, E.H. Adelson and D.H. Staelin. It appeared in the January 1989 issue of the *Journal* of the SMPTE, pages 5-13, and is entitled *Channel Compatible 6 Mhz HDTV Distribution System*.

In this paper the authors give us some of the history of the decision-making process that went into the proposal to eventually move away from NTSC as a broadcast format. They refer to the FCC Notice of Inquiry 87-268 of August 20, 1987 *In the Matter of Advanced Television Systems and Their Impact on the Existing Television Service*.

They speak to the issue of non-compatible television systems and better utilization of the available signal spectrum. Signal architecture, transmission and distribution are talked about at length. The thesis of their work is that vastly improved pictures can be attained within the available 6 Mhz analog channel bandwidth by utilizing well-established signal processing techniques and adhering to well-known and understood visual principles.

The system they propose would be an intermediate stage on the way to an eventual full conversion to an HD imaging system.

Earlier I referred to the phrase "more than one way to skin a cat". I meant it in the context that the authors propose a different method of handling the increased bandwidth of the HD signal.

Instead of relatively complex systems such as the MUSE or MUSE E, they propose the construction of a smart receiver that is able to receive and decode an array of signals, whatever their origination, be it HD, computer graphics, digital or analog. The technology necessary to construct a so-called "smart" receiver is in the offing and perhaps provides a logical and relatively inexpensive solution to the multiple proprietary formats that will no doubt be a feature of the HD domain.

The body of the text presents some interesting theories that have present day applications. But, as is often the case, the notes at the end of the article and the bibliography provide some of the most interesting reading.

In the notes the authors make some personal observations that aren't contained within the body of the text. These comments are less technical and more anecdotal. In compiling this paper, the authors used 24 documented references. The reference materials are diverse and extensive, featuring topics such as *Motion Estimation For Frame Rate Conversion, Orthogonal Pyramid Transforms For Image Coding* and many others.

This article is good reading even for the technically uninclined.

In their paper in the *Journal* of the SMPTE January 1989, pages 14-19, entitled *Single Channel Backward-Compatible EDTV Systems*, A.B. Lippman, A.N. Netravali, E.H. Adelson, W.R. Neuman and W.F. Schreiber illustrate some of the technical means of creating an EDTV signal within the current NTSC spectrum.

EDTV, or Extended Definition Television, was explored as a means of bridging the gap between current NTSC receivers and future HD imaging systems. The goal was to generate a broadcast signal that would produce a marginal loss of quality on current home receivers while at the same time providing enhanced television receivers with a signal that would feature the possibility of the wider 16x9 aspect ratio, improved resolution and, perhaps, high quality sound.

In their concluding notes the authors' state that this type of system, while not ideal, could be utilized to bridge the gap between the obsolescent NTSC technology and the HD systems which exist today and those that are on the horizon.

That last two articles we will review in this column deal with the subjects of the political and financial implications that have arisen out of the development of HD imaging systems.

The first article is by Charles A. Pantuso, one of the principals at the November ATV seminar in Ottawa. He also was the technical engineer for the premier HD production of *Chasing Rainbows*, co-produced by the CBC and John Galt's Northern Light and Picture Corp. An article co-authored by Charlie and John —*Chasing Rainbows; A Technical Overview* — appeared in the March 1989 issue of the *Journal* of the SMPTE, pages 179-183. The paper I would like to touch on is *Reducing Financial Aliasing In HDTV Production*, which appeared in the *Journal* of the SMPTE, November 1989, pages 823-829.

The most accurate way to describe financial aliasing is to use the author's own words; financial aliasing refers to the product of any new technology