a second look for that very reason. People are looking at how to preserve the high definition quality of their masters. In their case their high definition masters are 35mm film, but they want all of the tricks and techniques and speed of video post production. That means that they have to drop down to a 525 resolution; and in many cases it means that you can't go back to a film negative. So you've basically frozen the quality of your production into that quality standard. And these are difficult issues to deal with."

Milton Fruchtman, in Banff, posed the question: How does the quality of the picture on a projection screen compare to the monitor you are watching? This was prompted by the break-dancing demo from Ottawa, which involved a number of dancers performing under various colored washes of light, predominantly red and blue — in fact mostly blue. The picture was astonishingly good in terms of resolution of color and detail, although artistically it left a lot to be desired. If this scene had been shot with a 525 NTSC camera, the result would have been a very poorly resolved, fuzzy picture.

I'm sure of this because I did many a rock concert where blue was the predominant color chosen for a band's performance, and the pictures were lifeless, dull, uninteresting and poorly resolved. Blue is nice as an accent, but not all that suitable for a key light source. I wouldn't necessarily want to use it for HD imaging, even thought it would be possible to get a technically acceptable picture. But if you were to make a creative decision to use shades and tones of blue to create a particular mood or genre, that might very well work with good effect.

Charlie Pantuso: "As we said, at a basic level that — this is my opinion — this is the primordial problem of high definition. There is no display of comparable brightness to a CRT that you can view these things on. And that's a secondary consideration when you are shooting high definition today. I believe you are using the Sony projector, which is very dim; Sony projectors are optimized for measurement devices so they are very linear, and they are very dim when compared to normal monitors. I think that the whole of high definition technology hinges on the development of a really reliable bright, large-screen display. And everyone in the world is working feverishly to achieve it. Maybe John could give us some insight into when. But it's the major problem. I think that when you shoot for HD you not only have to concern yourself with aspect ratio shooting angle, and these other things, but you have to concern yourself with the brightness of the display device that is the primary release format. When you produce something in HD you must be concerned with the market that is going to pay for the production.

(* In the November 1989 issue of the *Journal* of the Society of Motion Picture and Television Engineers, pages 823-829, Charlie outlines some of the financial issues related to HD production and manufacturing.)

Bert Young, Telesat Canada senior engineer in Banff, commented on the video levels seen during the dance sequence.

Young: "Just a comment about the light levels. The satellite white levels at peak white for the projection was about 10 footlamberts, considerably less than a monitor. However, our ambient light in this room is extremely dark, so your images now are coming in quite bright, quite acceptable levels, brighter than the breakdancing was. Depending on the program material, the light level inside here has a definite impact. Color bars or some of the tapes are quite bright and quite easy to watch; some scenes, like yesterday's couch scene and today's breakdancing, we found a bit dark. (He was referring to a scene from *Cold Comfort* enacted before the cameras the previous day as part of the workshop process.)

Pantuso: "Maybe we could ask the control room where the peak whites were running when we were doing the breakdancing. There were a lot of scenes in the breakdancing where there were no white lights at all in the foreground, just blue. Blue is about 11 per cent of white light, so even if we had a scene that was very brightly blue it would only be about 11 per cent screen brightness. And our monitors are at about 30 footlamberts. So you can find out what kind of levels you'd be getting from a projector."

"If you want to make pictures which are always bright and look good, then you are going to be locked with TV-style pictures."

Langer: "I just heard from the control room that the lowest level was about 25 units IRE."

Pantuso: "That's pretty low! So that is a problem. If you want to make pictures which are always bright and look good, then you are going to be locked with TV-style pictures. I mean people think that there was some sinister god engineer who decided that TV pictures would always be boring and bright, but it wasn't that way at all. They decided that they wanted to see the pictures in the home, so that's what they did. So when you make compromises for more dynamic range in a shot, you have to live with them.

"The same thing happens with compact disks. When you listen to a classical recording made today there is no compression or limiting going on. So if you are listening in your car to a classical recording with a very wide dynamic range, you either have to turn the volume up very loud so that when something loud comes along it blasts you out, or you have to suffer with the fact that half the time you won't hear anything. The same thing is true with pictures; if you want a picture that always gets through and looks like the evening news, you're going to have to make it look like the evening news. There's no free lunch with HD or anything else. The viewing environment is the different gauging factor."

Fruchtman: "The consensus of the people here (in Banff) reviewing it is that they wouldn't pay their money to come and see a theatre with these pictures. You have to know that."

Langer: "Well, obviously if you can't see the picture you're not going to pay money to go to the theatre."

"People don't watch technology ... they watch programs."

Pantuso: "I would like to ask how many people in Banff and here in Ottawa saw the movie *Batman*? Did you find that to be a particularly bright TV-like picture? Weren't there a lot of times in that movie that you couldn't see what was going on? Wasn't the theatre packed with people? So I really don't believe that there is a connection ... there needs to be a very great understanding of the fact that people don't go to theatres to watch technology and they don't watch television to watch technology. They watch programs, and if the director feels that he has to have a dark picture, even if the engineers won't come to watch it, then you're going to have a dark picture and there's nothing that you can do about it! I mean I thought that *Batman* was very, very dark. And there was a scene in *Tucker* yesterday that I alluded to ... the fact that the opening scene is a beautiful successful mix of radically different color temperatures, very blue exteriors and very yellow and warm interiors. And there are scenes at the end of *Tucker* where you can't even see who's talking because the smoke is just totally out of control. Yet people went to see that movie! I don't think anyone told their friends not to go see it because in the