LINE OF SIGHT

By Fred Truck

Most human beings experience stereoscopic vision. That is, the left eye and the right eye see the same object from slightly different points of view. The brain fuses the two images received into a single image with weight, shading and other distinguishing qualities.

The Renaissance architect Filippo Brunelleschi demonstrated the practicality of linear single point perspective about 1406-1413. Leon Battista Alberti, another architect, wrote the principles down in his book On Painting, 1436

The relevance of perspective to stereoscopy is that single point perspective is done with one eye only. Stereoscopy, which is done with two eyes still has single point perspective for each eye. The difference between the two perspectives is what gives the image its construction of depth.

Linear Perspective dominated representational art in the West from that time until the 20th century. Then Pablo Picasso, Juan Gris, and Georges Braque, among many others, abandoned linear perspective to Salvador Dali, Rene Magritte or the academics, and began painting in a completely different way: cubism. Picasso said—"I paint things as I think them, not as I see them."—p. 297, The Art Book

When photography became popular and affordable in the early 20th century, a challenge to Picasso's dictum was ready-made because cameras depend on lenses, true instruments of perspective, which was the cumulative machine result of the work of centuries of artists. Cameras in the early days were

film and paper print oriented. Few suspected at that time that by 1977, personal computers would be widely available. While cameras became more ubiquitous than ever, film and chemically coated papers for prints declined in market share rapidly.

My interests in computer imagery are focused on stereoscopy and the most recent development in 3D presentation, the head-mounted display as used in Virtual Reality.

My first memory of stereograms was in late 1956. My mom was in the hospital for an extended period of time due to the difficult delivery of my youngest brother. My dad dropped my brother and I off at the library, to do whatever. The Mt. Pleasant Public Library had huge collection of stereograms and viewers. I explored them to my heart's content.

I was very impressed by the depth and feeling of reality I could see, but at the same time, very disappointed in the pictures themselves. It looked to me like the photos had been taken just after the Civil War. All the women had huge long dresses, and all the men looked like Prince Albert. They were doing very polite stuff. Reading. Playing games. Smoking cigars.

Skipping ahead about a half century, in 1990, Carl Loeffler got a fellowship to the Banff Centre of the Arts in Banff, Alberta, Canada. Carl and I co-founded the Art Com Electronic Network, the first telecommunications network aimed at providing telecommunications services for artists. We ran it 24/7 for 13 years, before shutting it down in 1999.

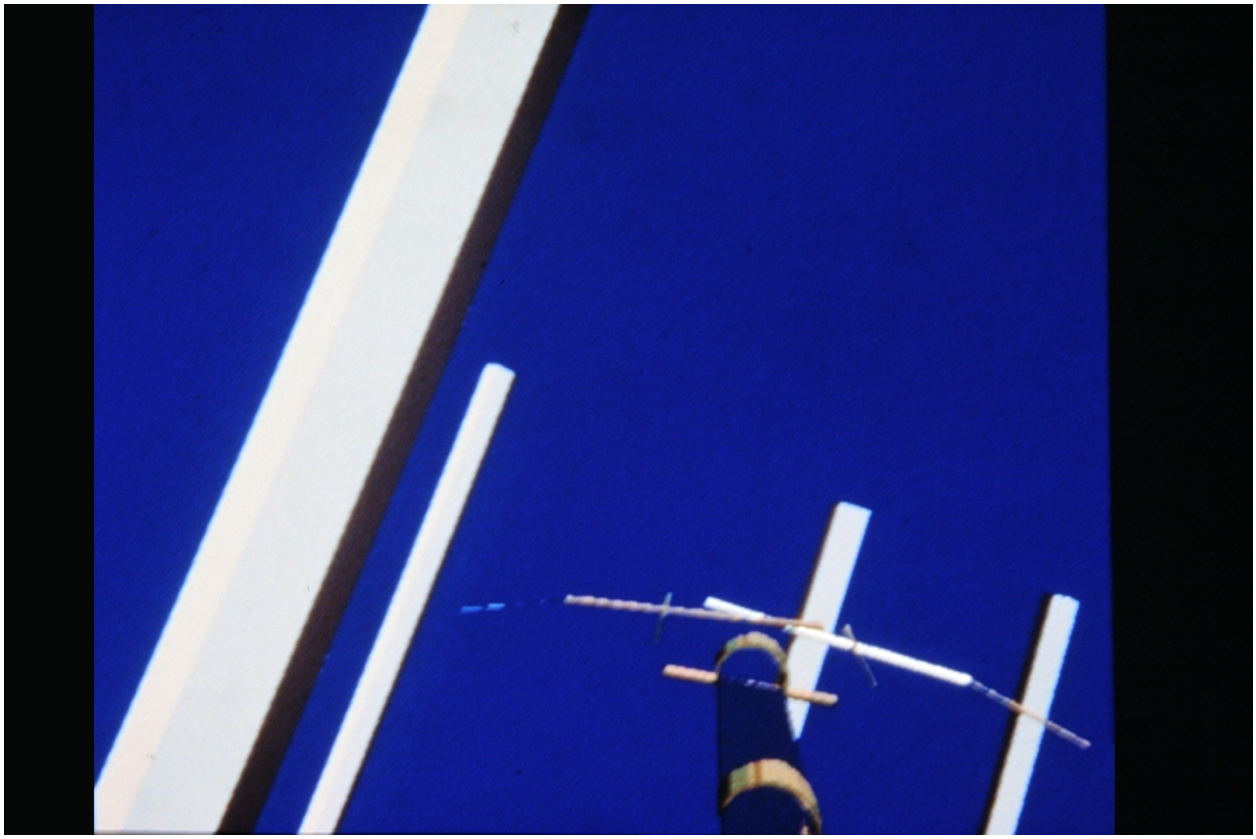
Because he had other obligations at the same time, Carl generously offered me half his fellowship, which I accepted immediately. Banff Centre for the Arts was the site of the Bioapaparatus Seminar. All the artists participating were mid-career. Banff supplied us with anything we wanted. Some people had ambitious plans for work, only one artist said he might never come out of his room because he had serious drinking to do.

The central theme of the seminar was the new field of Virtual Reality. To that end, the Centre for the Arts had acquired the Sense8 Virtual Reality system. The system included one or two 386 IBM computers, software, and a stereoscopic headset. A powerful magnet was attached to the top of the headset. There was a defined area for movement, and there was a boom with another powerful magnet suspended. The user stood under the boom magnet, and the positions transmitted back to the computers sufficed for head tracking.

Some people from Sense8 came up to Banff and helped us set the system up, and then explained some of its strengths and weaknesses.

For one thing, some people had a strong reaction to the magnets. The magnets got hot and by the end of the session it could really be uncomfortable. A much more common problem was the video updating cued by the head-tracking system, which was often a beat or two behind the user's movements. This can cause motion sickness and nausea in the viewer.

Finally, for the artists involved, the biggest problem was the size the models they could make was very limited. Just prior to the Banff fellowship offer from Carl, I had purchased Swivel 3-D for my SE-30 Macintosh. I built a model of Leonardo da Vinci's Flying Machine, and had successfully animated it with slowly flapping wings. Unfortunately, my model wouldn't fit in the Sense8 System. Consequently, I spent a lot of time reducing, reducing, reducing. Of course, what was left was barely a splinter. But it fit in the system and when I went under, and viewed my model in the headset, and walked around looking up, down and everywhere, I was enthralled. It was a way to make my visual reality accessible to any person with stereoscopic vision.



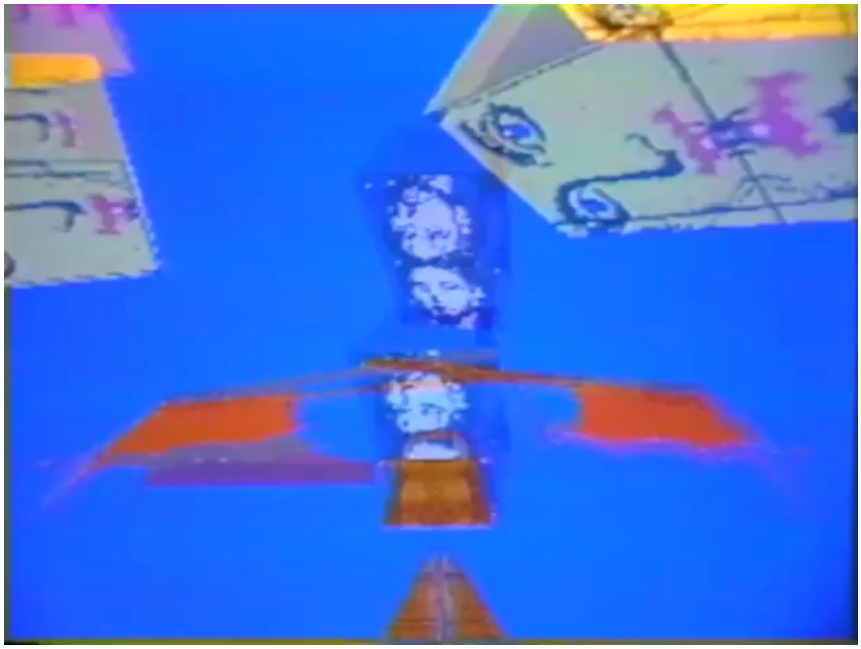
Later on, in 1992-93, my ornithopter design was worked further by programmers, under the direction of Carl Loeffler at Carnegie Melon so that it became a flight simulator. “Pilots” could power Leonardo’s Flying Machine through an obstacle course. The entire assemblage, called The Labyrinth, was sponsored by SONY at the 1993 SIGGRAPH art show, called Machine Culture. My conception of Leonardo’s Flying Machine was a very popular exhibit.

--from Leonardo Magazine

I began to realize at some point, that there was more to virtual reality than just sticking a digital model into a defined space and moving it around. I thought I should spend more time considering it, but how to do this was not an easy question to answer.

The Sense8 System, which was the only one I had experience with in 1993, cost $10,000. Institutions could afford the Sense8 System, maybe, but institutional requirements would limit who did what. An advanced student, or even a faculty member would have to get permission to do a project. More fingers would be in the pie. I didn't see how I could make such a situation work. I am not comfortable in an institutional setting. I had decided already I was not going to teach, and I wanted no

part of academics. The foregoing permission levels just reinforced my decision.



I decided to wait. But while I was waiting, I planned to improve my 3D modeling skills. I launched a long series of cartoon-like works based on a 3D cartoon character I invented named Mr. Milk Bottle.

As I was working along on Mr. Milk Bottle, I began to develop a better understanding of panoramas, specifically spherical panoramas, and what they meant.

The way I began understanding spherical panoramas was to make a few. I used a MC 3.5/8A fisheye lens. It's an import, made in Belarus. It worked well with my Nikon D72 and later with my Nikon D90.