DOUBLE VISION by Peter Campus (1971, 18 min., b/w, sound)

By John Minkowsky

The following was originally issued as a Program Note to accompany the touring showcase, "The Moving Image State-wide: 13 Tapes by 8 Videomakers," sponsored by the University-wide Committee on the Arts of the State University of New York system in September 1978, and curated by John Minkowsky, Video/Electronic Arts Programmer at Media Study/Buffalo.

To human beings, the most familiar two-eyed or binocular visual system is that of human eyesight. As we observe a scene – a set of entities arranged in space – each eye acts like a camera, focusing a two-dimensional image on its retina or innermost surface. The difference in location of the eyes results in each retina perceiving a slightly different aspect of the same scene. In the processing of both retinal images at higher levels of the visual system – ultimately, the visual cortex of the brain – there emerges a single view of the scene, including the perception of depth or distance relationships. Tri-dimensional or stereoscopic vision is a distinctive characteristic of human binocularity.

To refer to the human visual system as the most "familiar" binocular model, as I have done, is an understatement, for it is the system through which we directly experience the world and to which all our considerations of binocular vision must refer. It is also an overstatement because very few are aware of its workings. There are other two-eyed systems that exist in nature or can be imagined as conceptual constructs that do not necessarily result in the stereoscopic perception of depth. In *Double Vision*, Peter Campus has used video to make seven alternative models of binocular vision "accessible to the intuitive, experiential being."

In each section of *Double Vision*, the images from two cameras, recording simultaneously, are combined into a single, two-dimensional monitor image, most often through superimposition. The two cameras are located within a large, nondescript loft, and their relationships to each other consistently provide new ways of viewing that space.

The binocular models that Campus constructs vary widely, ranging from those which ‘imitate’ animal vision (“Copilia”) to more radical forms possible only through video (“Impulse” and “Within the Radius”).

If video is not the only, it is the ideal medium with which to present alternative binocular models. Video is a ‘real-time’ visual monitoring system, real-time defined by a human sense of simultaneity between an event and the perception of it. Television is the first moving image technology that has allowed for ‘live’ or virtually contemporaneous display of an event and the event itself, and is the closest analogue to organic visual perception. Much as organic binocular systems integrate the information from both eyes, two video camera signals can also be combined live in a variety of ways.

Regarding his video installations, Peter Campus has written:

> The video camera makes possible an exterior point of view simultaneous with one’s own. This advance over the film camera is due to the videcon (sic) tube, similar to the retina of the eye, continuously transposing light (photon) energy to electrical energy.[1]

In the retina, light sensitive receptors (rods and cones) act as transducers, sending electrical signals corresponding to specific light intensities along neural paths to the brain where ‘perception’ of an image occurs. Within the video camera, an electron beam scans the face of the vidicon tube, converting light intensities into a time series of varying voltages. These voltages are reconverted into light/images on the surface of a television screen.

Three of the sections of *Double Vision* – “Copilia,” “Fovea,” and “Impulse” – need further explanation because their understanding depends on specific biological or technical information. In general, the sequence of all seven models can be said to progress from less to more complex relationships between the two ‘eyes’ and from those which simulate physiologically possible models to more extreme perceptual constructs.

In each, Campus demonstrates that the video camera, as the closest technological analogue to the human eye, may alter our relationships to a preconceived reality by offering new juxtapositions creating 'alternative realities' – new modes of binocular or double vision.

“Copilia” (Section 1)

Copilia, a rare marine crustacean, is distinguished for its unusual scanning eye:

> The eye of the tiny arthropod Copilia possesses a large and beautiful lens but only one light receptor attached to a thin strand or muscle. It is said that the muscle moves the receptor rapidly back and forth in the focal plane of the lens, scanning the image in much the same way as it is scanned by the light-sensitive tube of a television camera.[2]
>
> With what we now know about transmitting spatial information by conversion into a time-series by scanning, as in television, it seemed possible that Exner was describing an organism the eye of which works on a principle now very familiar to the engineer.[3]

The scanning of the electron beam across the face of the vidicon tube is far more rapid, regular and precise than the movement of the Copilia's single receptor or posterior lens. The electron beam makes 525 horizontal passes, right to left and top to bottom, across the vidicon target every 1/30th of a second, converting light intensities into a linear electronic signal comprising one video frame. By comparison, the oscillatory movement of the Copilia's posterior lens across the plane of its large anterior lens is sawtooth in form, subject to “frequent spontaneous variations in amplitude and frequency,”[4] and has a maximum frequency of five scans per second. Furthermore, the two eyes move simultaneously in horizontal opposition, fast inward and slowly back.

It is this opposing, irregular movement of the Copilia's scanning eyes that Campus has chosen to imitate, as though the entire loft was the image plane of the anterior lens, and each of the two cameras was the Copilia's single receptor or posterior lens. Campus presents an extremely disorienting visual analogue to Copilia vision, for the erratic, opposing camera movements rarely allow the two superimposed images to coalesce into an intelligible representation of the loft.

"Fovea" (Section 4)

The fovea of the human eye is a minute depression near the center of the retina in which is found the greatest concentration of cones, the bright light visual receptors. While subtending only 1.7 degrees of the 240-degree visual angle of the entire retina, the pinhead-sized fovea attains a hierarchical distinction as the area in which the most detailed human vision occurs.

"Fovea" compositionally emulates the actual structure of the human retina. The 'fovea' seen on the screen is a hazy oval in the center that contains the distant image of a subject slowly pivoting with a camera at waist height. The peripheries of the screen – that which surrounds the superimposed 'fovea' – are the literal peripheries of the loft in close-up, as recorded by the rotating subject's camera. The foveal image in the tape is also hierarchically eminent in a different sense, as it depicts the center that gathers visual information about all that surrounds it; it is the source of that which we view on the peripheries of the screen.

"Impulse" (Section 5)

Both the human and the electronic eye transform light energy into electrical energy. Each stimulated retinal receptor in the human eye triggers a signal corresponding to the intensity of light on a minute area of the retinal surface; with more than 10 million rods and cones, an enormous number of electrical impulses are simultaneously issued. The electron beam in a video camera tube scans the entire vidicon face with extreme precision 30 times a second, and the light intensity of 100,000 or more points on the tube's surface are converted into an electronic signal – a continuous sequence of voltages which vary in correspondence to the intensity of light at each point. Rather than simultaneous signaling of stimulated receptor points as in the eye, each point on each scanline of each video frame has a specific position in a temporal sequence corresponding to its spatial location on the vidicon face. The video image signal, as a time-series of distinct voltages, can be graphically displayed as a pulsating line or waveform on an oscilloscope. Oscilloscope time is plotted along the horizontal axis and voltage along the vertical axis. An increased intensity of light at a given portion of the image-signal will render an increased voltage reading on the oscilloscope at the corresponding position in time.

"Impulse" superimposes the image from an impulsively wandering camera and its representation as a signal waveform on an oscilloscope. The viewer is able to see changes in the abstract waveform corresponding to the changing intensities of light in the image of the loft, especially as the camera passes sources of extreme illumination, such as windows. While the dual depiction of a space as representational and abstract image information simultaneously is possible only through electronic vision, "Impulse" also refers to the transformations of energy in organic visual systems – the conversion of light into electricity.

---

[1] "Video as a function of reality," from *Peter Campus*, exhibition folder for the Everson Museum of Art, Syracuse, N.Y., 1974.
[2] George Wald, "Eye and Camera," *Perception: Mechanisms and Models (Readings from Scientific American)*, Richard Held and Whitman Richards, eds. (San Francisco: W.H. Freeman and Co., 1972), pps. 94-103.
[3] R.L. Gregory, Helen E. Ross, and Dr. N. Moray, "The Curious Eye of *Copilia*," *Nature*, Vol. 201, No. 4952 (March 21, 1964), p. 1166.
[4] Ibid, p. 1168.