Volume rendering and stereoscopic imaging

Many CAM-8 experiments lend themselves to real-time observation through direct volume rendering. Light is shined on the simulated system; the interaction of light with the system—absorption, scattering, etc.—is programmed as part of the dynamics of the system itself. By deciding what shall interact with light, we decide what will be visible.

In a similar way, we collect the scattered or reflected light that comes back toward the observer and we send it verbatim to the monitor. The entire rendering process entails little overhead with respect to the simulation of a three-dimensional dynamics, and so can be performed in real-time on CAM-8.

The process of collecting light can be executed for two distinct observer angles, yielding a *stereoscopic pair*. True stereopsis is invaluable in the interpretation of complex images, and in delicate manipulation tasks such as surgery.

The left and right images can be sent to the corresponding eyes by a variety of devices: two separate monitors or monitor windows, viewed through a mirror-and-lens arrangement (see illustration below); time-multiplexed monitor, viewed through synchronously shuttered glasses; complementarily polarized images, viewed through polarizing glasses; anaglyphic pair (red and blue images), viewed through complementary color filters (see illustration on opposite page). CAM-8 easily supports any of these display techniques.