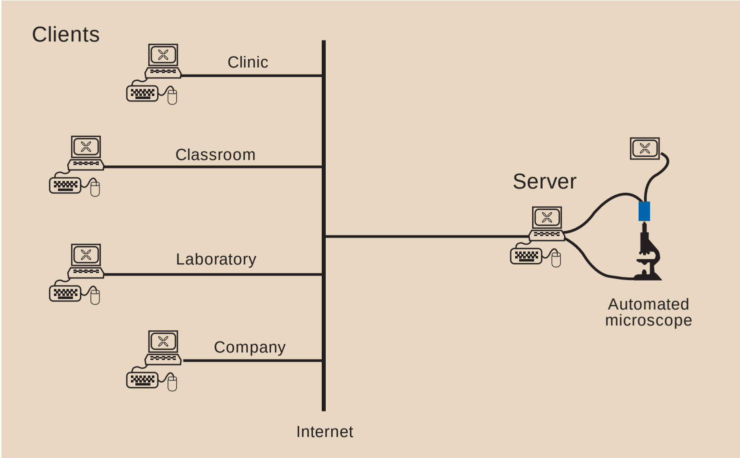

Figure 1 **Microscopic connections — an Internet-based system of remote viewing and control as implemented by Wolf *et al.*[1].**

large images. Delays result from both the Internet transfer itself, and the process of image compression that precedes transmission[1,2]. Wolf *et al.* speed things up by providing options for reduced-size images, autofocus to eliminate the transfer of multiple images otherwise required during manual focusing[2,3,8], and generally reducing Internet traffic between client and server using Java applets running on the client machine.

Another advantage of Internet-based systems is that many clients can simultaneously view, and confer over, a single specimen[2–4,8]; the use of common Web-browser software increases this potential enormously[1,3]. To aid communication between clients, Wolf *et al.* provide a neat Java-based interactive pointer overlaying the image; movements of the pointer by any one client can be seen by all. Further developments would be a facility to annotate images with text or drawings, and provision of video/audio conferencing[3,4].

One of the disadvantages of not being at the microscope can be difficulty in getting, and staying, orientated — that is, keeping track of where the current image lies within the entire specimen. Solutions include acquiring a reference image at low magnification, graphically indicating which portion of the specimen is currently being viewed, or building up a montage of contiguous high-magnification images[3,4,8].

The uses of telemicroscopy span research, education, medicine and manufacturing[1–4,8,9]. For centralized research facilities, distant collaborations will benefit by allowing collaborators to stay put yet look in on their specimens during an experiment[8]. Likewise, travelling professors could check in on experiments being carried out at their home laboratory.

Telepathology is a further application[1,3,4], consultation around case specimens being aided by moving around the specimen, changing magnification and otherwise examining it for diagnostic features (although image resolution and time response are limitations). In education, large numbers of students or colleagues, on-site or farther afield, could view precious specimens without having to crowd around microscopes or video monitors. The separation between server and client can also take the form of a protective barrier, for example when high-power lasers are used for illumination, or clean-rooms are required for manufacturing processes or for the examination of infectious specimens[2]. Many servers could also be accessed by a single client, allowing modifications in server software or hardware to be tested from a single site. Finally, other types of instrument are being connected to the Internet, atomic force microscopes being a recent example[10].

Assembling a telemicroscopy system, however, is not yet as easy as downloading the latest Web browser. One consideration is the expense of automated hardware. Another is the compatibility of Java applets with the Web-browser/operating system/computer-platform of the client. Also, more and more systems incorporate some level of telemicroscopy[1–4,8,9], but each has distinct features and accessibility that are often affected by regulatory and intellectual property issues. So anyone considering setting up a server has to weigh the various options. Nonetheless, these are still early days. Given the ubiquitous use of microscopes, it seems inevitable that many will become linked into an interactive network of researchers, educators, clinicians and companies through the World Wide Web. □

Kevin Burton and Daniel L. Farkas are in the Center for Light Microscope Imaging and Biotechnology, Carnegie Mellon University, Pittsburgh, Pennsylvania 15213, USA.
e-mail: Burton@a.cfr.cmu.edu

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Daedalus

The seeing ear

Sunlight makes us cheerful. The pineal gland in the brain is responsible; in bright light it releases hormones such as melatonin more strongly. Melatonin is a mood enhancer and sexual stimulant. One consequence is seasonal affective disorder, or SAD, whose sufferers are peculiarly depressed and unsexy during the winter. The short, dull days fail to stimulate their pineal glands. Brief daily exposure to intense light reduces the SADness.

In this connection, Daedalus recalls the theory that the pineal gland is the relic of a third eye possessed by our distant reptilian ancestors. Presumably it still retains a vestigial sensitivity to light. Indeed, it must be amazingly light-sensitive. It is stuck almost in the middle of the brain — how can light reach it? Through the ears, says Daedalus. The pineal gland is almost exactly on the right level, and the ear hole is a excellent entry point for light. It is formed of soft, translucent tissue, and is close to the carotid canal and several nerve pathways into the brain. Light could diffuse along these paths quite well, without being blocked by opaque bone.

This notion has many implications. It explains the sexual allure of the world's tropics and sunlit regions, despite the dark glasses which are *de rigueur* for their devotees. It explains the ear-concealing headgear of monks and subservient groups in some traditional societies: the garb must serve to damp dangerous feelings, and encourage a grave and humble mien. It also suggests a simple method of countering SAD and depression. Daedalus's 'Earlight' is a headband carrying two well-focused lamps to beam light into the wearer's ears. Human tissue is most translucent to red light, so small red lasers or LEDs are the lamps of choice. Accurately aimed, they will illuminate the pineal gland far more effectively than the fiercest daylight. The Earlight should bring cheer and erotic interest to the saddest of SAD sufferers.

More cunning still, the Earlight could illuminate one ear more than the other, thus biasing pineal output into the more illuminated hemisphere. Left-brain-dominated rationalists could boost their emotional awareness, and right-brained dreamers could get a grip on reality. And combined with a personal stereo system, the Earlight could cure the glum truculence of so many teenagers, whose melatonin level is clearly lowered by their permanent wearing of ear-blocking audio equipment.

David Jones