Prions hit the press. In 1996, "prion," short for "proteinaceous infectious particle," became a household word that commanded respect and fear from Blackpool to Bavaria. Earlier blamed for 160,000 cases of bovine spongiform encephalopathy (BSE) in British cows, prions this year were suspected of jumping the species barrier to cause a new variant of Creutzfeld-Jakob disease (CJD), a crippling neurodegenerative disease of humans.

As a result, despite a continuing ban on infected animals entering the food chain, public confidence in British beef crashed. Other nations banned British beef imports and refused to reconsider, especially when scientists in November revealed chemical similarities between prions from BSE-infected cows and people with the new CJD variant. The European Union finally launched a $63.5 million research program in these diseases.

Meanwhile, debate continues on whether proteins alone, without any nucleic acids, can exist in different strains, as argued on page 2079, and whether they can really transmit disease. This year's results showing that a protein can pass a trait between mother and daughter yeast cells may help. But there is plenty of work to be done before reaching final answers about the hazards of these sturdy bits of protein.

Cyber crush. In 1996, almost every scientific publisher sought an identity in cyberspace, joining the ever-expanding circle of online databases, usenet groups, and Web pages. Although some merely showed images of their pages online, others—spurred by competition from independent journals and tempted by the chance to go beyond the printed page—experimented with new ways to exchange information.

No one knows yet just how often researchers will reach into cyberspace rather than to their shelves, and growing pains still sometimes turn the Web into the World Wide Wait. But the experiments serve scientists in new ways. Physicists can download data sets too large to publish, thanks to a service of the American Institute of Physics. Medical scientists can watch three-dimensional (3D) videos on the electronic Journal of Image Guided Surgery, and GeneCOMBIS readers, like users of Science's Next Wave, can debate each other in forums. Behind the scenes, library and database experts are designing searchable electronic repositories, bringing several fields closer to "online maturity," which is defined by one journal editor as the point at which a researcher can write a credible review article—without leaving the office.

Lasers in the limelight. Lasers long ago went from wunderkinds to workhorses of the modern world, useful in everything from surgery to surveying. In 1996, new materials and designs lit up the field on several fronts, and could make lasers even more versatile in applications ranging from home electronics to ultraprecise research measurements. Early this year, lasermakers reached one long-sought milestone, developing blue-light lasers from semiconductor chips made from gallium-nitride; these devices are rapidly improving in longevity and may prove more durable than previous blue-light emitters. The shorter wavelength of these lasers may one day help audio compact discs and computer CD-ROMs store up to four times as much data as do current devices.

Also this year, researchers developed the first arrays of semiconductor "quantum dot" lasers, in which light is emitted by a multitude of tiny semiconductor grains. Others managed to coax the first laserlike light emission from plastics. And 1996 also saw the first critical steps toward a brand-new kind of laser, as researchers began to transform last year's breakthrough winner—a cloud of supercooled atoms called a Bose-Einstein condensate—into a laser that fires beams of coherent atoms instead of light. For lasers, 1996 was a bright year indeed.

T-cell tales. T lymphocytes are one of the immune system's most potent weapons, directly triggering attacks on virus-infected cells. This year, a Nobel Prize went to the researchers who first began to describe how T cells recognize foreign antigens, and in a fitting complement, T cells also gave up their last great structural secret. In 1996, two independent groups managed to coax recalcitrant T cell receptor molecules to form crystals, allowing the first x-ray analysis of their 3D structure. And the teams captured the receptors in action—bound to their target molecules—offering new insight into how T cells learn to recognize their prey.

T cells depend on other cells to process foreign antigens into small peptides, which are then returned to the cell surface and displayed by proteins encoded by the major histocompatibility
Research Funding: Haves and Have-Nots

Science 274 (5295), 1990.
DOI: 10.1126/science.274.5295.1990