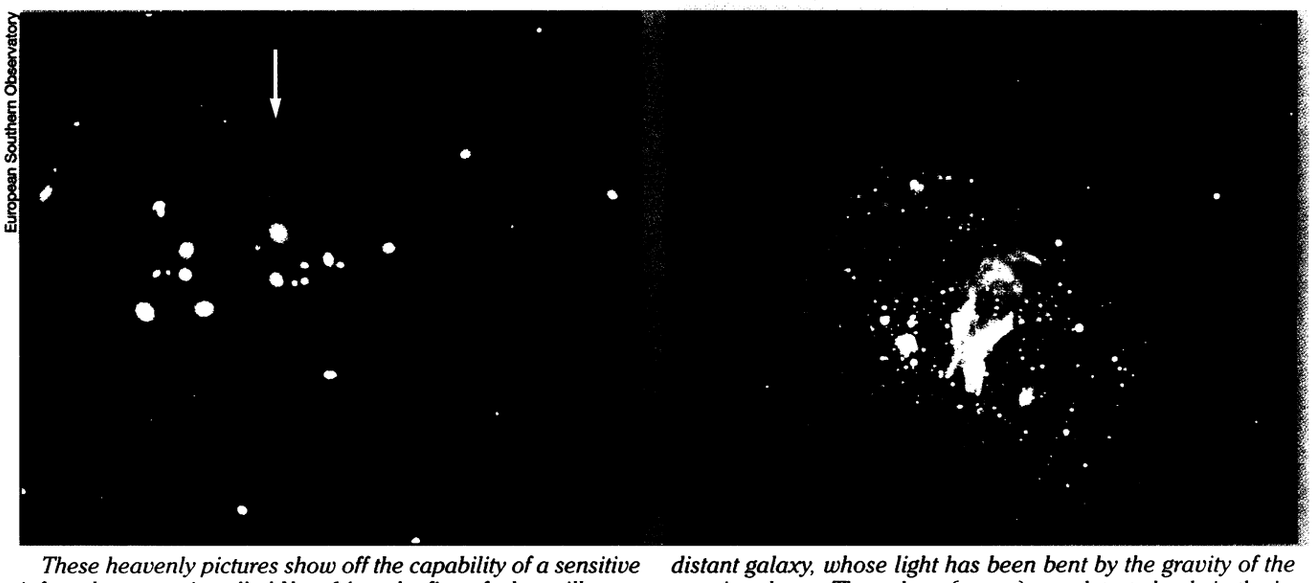
Very Large Telescope: New infrared camera struts its stuff



These heavenly pictures show off the capability of a sensitive infrared camera, installed Nov. 14 on the first of what will eventually be a quartet of 8.2-meter telescopes on Cerro Paranal mountain in Chile. The first of four instruments, collectively known as the Very Large Telescope, began operation in May. The last is scheduled to be completed in 2001. The telescopes will be able to work independently and as one large instrument.

The image on the left homes in on the galaxy cluster CL2244-02, a few billion light-years from Earth. In this near-infrared and visible-light composite, the central, blue-green arc represents a more distant galaxy, whose light has been bent by the gravity of the massive cluster. The red arc (arrow) was detected only in the infrared and probably indicates bent light from an even more distant galaxy.

The other image, a composite of three near-infrared pictures, shows the Milky Way star-forming region RCW38, some 5,000 light-years from Earth. In visible light, these young stars are hidden from view by the clouds of gas and dust in which they were born. The European Southern Observatory released the images Nov. 26. —R. Cowen

Scientists harvest antibodies from plants

People may never look at a field of corn quite the same way again. Several research groups and biotech firms have genetically engineered corn and other plants to manufacture valuable human proteins called monoclonal antibodies. The scientists hope to cheaply mass-produce antibodies that can treat cancers, stem the spread of infectious diseases, act as contraceptives, and even stop tooth decay.

Strengthening that prospect, two recent reports indicate that antibodies synthesized by plants function normally in people and animals.

"Twenty years ago, monoclonal antibodies were supposed to be the magic bullets. We think now is the time they're going to be those magic bullets," says Kevin J. Whaley of Johns Hopkins University in Baltimore, Md., an author of one of the studies.

To combat infectious organisms, the human immune system makes a wide range of antibodies, each one a protein that binds to a specific molecular target. About 2 decades ago, researchers learned how to transfer immune genes into microbes and animal cells, allowing them to make limited amounts of a single desired antibody. Scientists envisioned many uses for these monoclonal antibodies, such as homing in on cancer cells.

Yet the promise of monoclonal antibodies faded over the years. When scientists first used mice to make monoclonal antibodies, for example, the human body rejected the molecules. With further genetic engineering, immunologists have of late created more humanized antibodies in mice, but the animals still can't synthesize adequate amounts. Monoclonal antibodies, therefore, can cost hundreds of dollars per microgram.

In search of more prolific methods, several companies have genetically engineered cows and goats to secrete antibodies into their milk. While that approach should lower costs, there is concern that it may be difficult to separate the antibodies from any bacteria or viruses in the milk.

"If we're going to begin using antibodies as either therapeutics or preventatives, we're going to need massive amounts. From a cost-effectiveness standpoint, and safety of production, plants look like the superior opportunity," says Charles J. Arntzen of Cornell University.

Scientists calculate that plant-made antibodies will cost less than $10 a gram. Moreover, plants don't have many pathogens that infect people, says Mich B. Hein of EPIcyte Pharmaceuticals in San Diego.

When plants make antibodies within their cells, however, they decorate them with sugar molecules—a process called glycosylation—in a manner different from that of human cells. That had raised concerns that these "plantibodies" wouldn't work as effectively as normal ones or that a mammalian immune system would perceive them as foreign.

In the December NATURE BIOTECHNOLOGY, Whaley and his colleagues report that when an antibody made in soy plants was applied to the vaginas of mice, it prevented infection by the genital herpes virus.

Earlier this year, in the May NATURE MEDICINE, Julian K-C. Ma of Guy's Hospital in London and his colleagues described the first use of a plantibody in people. Made in tobacco and applied to the teeth of volunteers, it prevented one of the bacterial infections that leads to tooth decay.

Whaley and Hein are now working to make corn produce the antiherpes plantibodies, as well as antibodies that prevent sperm from reaching an egg. The antibodies could lace gels or other substances applied topically. Whaley argues that plants may be the only way to produce antibodies inexpensively enough that they can be employed worldwide, even in developing countries.

"The rest of the issues are not scientific. They're economic," agrees Hein. "We have to demonstrate the cost-effectiveness of this method." —*J. Travis*