cell growth is staunchly reduced and during a latent period forced to increase gradually.

But when a critical tumor cell mass is reached, if the cancer-holding antibodies find themselves mopped up by an excess of tumor antigen, then tumor cells grow rapidly, producing more antigen. (Tumor antigen, or protein, has been found in animal cells transformed by cancer-causing viruses, but not yet in human cells.) As this excess builds, circulating antibodies become undetectable, and the antigen has scored over the antibody, unless the tumors are removed by surgery. And once the antigen has the upper hand over the antibody, antigen-antibody complexes may be formed, confusing the lymphocytes.

Several pressing questions, of course, will probably have to be answered before this scheme might be used to detect cancer or assess the success of cancer therapy. One question is how cancer-holding antibodies might be detected in human blood. The cancer-holding antibodies Ambrose and her colleagues identified and studied have not yet been isolated in pure form. Another nettling question is, how blood antibodies (humoral immunity) and lymphocytes (cell mediated immunity) might interact—if they do—in warding off cancer. □

When you wish upon a Jupiter

Any theory of the origin and development of the solar system has to explain logically the extreme apparent differences between the Jovian planets (Jupiter, Saturn, Uranus and Neptune) and the terrestrial planets (Mars, earth, Venus and Mercury). One theory is that Jupiter, with a diameter 11 times that of the earth, is more starlike than planetlike.

Observations made by a University of Texas team seem consistent with this theory. The group led by William B. Hubbard, David S. Evans and R. E. Nather went to Australia, South Africa and India to observe the occultation of the star Beta Scorpii by Jupiter on May 13 (SN: 4/17/71, p. 267). Of the results, Evans says, "We knew it would be a rare event, but the real rarity we didn't realize; we will not see anything like this again in 1,000 years." What they saw was occultation of more than one component of Beta Scorpii, which is a multiple star.

The atmospheric temperature profile above the cloud layer of Jupiter turned out to be more complex than originally thought. The temperature does not remain a constant 110 degrees K. above the layer of heavy clouds, but rises and falls and rises again with distance above the surface. For example, Hubbard estimates the temperature at the level where the density is 10^{12} molecules per cubic centimeter to be 300 degrees K., but at a lower level, where the density is 10^{14}, the temperature comes to 150 degrees K.

The temperature figures are drawn from measurements of the scale height of the Jovian atmosphere. The scale height is the distance over which the density changes by a factor of 2.7 (the base of the natural logarithms), and it depends on the ratio of temperature to mean molecular weight. The occultation observations measured the scale height to be 24 kilometers instead of the previous estimate of 8. The temperatures cited are high compared with earlier estimates, but they are the lowest allowed by the new scale height measurements. They require an atmosphere made largely of hydrogen instead of helium. (Previous estimates had given the hydrogen-helium ratio as 1:2). "Jupiter is apparently more starlike than we had thought," says Hubbard.

The oblateness, or flatness at the poles, of Jupiter had been measured as either 6.1 or 6.5 percent. The UT team found an oblateness of 6.0 percent.

The more oblate a planet is, the more uniform is the distribution of matter in the interior. The smaller oblateness indicates that the density near the surface of the planet is lower than previously thought, says Hubbard. The equatorial radius at the stratosphere was measured as 71,880 kilometers.

Io, one of Jupiter's 12 moons, occulted the component of Beta Scorpii, called C. Scientists had previously assumed the diameter of Io to be 3,000 kilometers. The occultation observations produced a diameter of 3,660 kilometers, plus or minus 5 kilometers. The occultation also showed no evidence of an atmosphere on Io. Hubbard places the upper limit of any atmosphere at 10^{-4} millibars of nitrogen or methane, or 10^{-3} millibars of molecular hydrogen.

The Jupiter occultation, observed by numerous groups in addition to the Texas one, also produced two unexpected bonuses. A phenomenon noticed in 1968 during an occultation by Neptune reoccurred with Jupiter, Evans reports. It is the phenomenon of flashing, when the occulted star disappears and then reappears as bright as the unobscured value. An amateur astronomer counted as many as 31 flashes for the occultation of Beta Scorpii. These flashes are believed produced by the layering in Jupiter's atmosphere.

In addition, Beta Scorpii had been thought to be a quadruple system. The group discovered a fifth component, a companion to Beta Sco C. □

Polluting the atmosphere with asbestos

A new substance has been added to the list of atmospheric pollutants that may threaten human health—asbestos. In a report prepared for the Environmental Protection Agency and released last week, a panel of the National Research Council's Committee on Biological Effects of Atmospheric Pollutants recommended that controls be placed on asbestos emissions into the atmosphere. The panel was chaired by W. Clark Cooper of the University of California School of Public Health at Berkeley.

It has been known for half a century that workers employed in the production of asbestos sometimes develop disabling or even fatal fibrosis of the lungs, and recently an association between prolonged exposure to asbestos and bronchogenic cancer has been established. Now there is increasing evidence that the population at large may be affected. Examination of lung tissues has shown that a much larger proportion of the general public has inhaled and retained asbestos fibers than had formerly been realized. Most urban dwellers have some such fibers in their lungs.

To date, says the panel, there is not enough data to tell if the concentrations of asbestos to which most people are exposed could cause malignancies. At present it appears that people with indirect occupational contacts, or those living in the vicinity of an asbestos source suffer the greatest risk; "there is no evidence that the small number of fibers found in most members of the general population affect health or longevity." But it adds, "It would be highly imprudent to permit additional contamination of the public environment with asbestos."

Asbestos fibers may enter the air in many ways: erosion or disturbance of natural rock formations; mining and milling of asbestos; transportation of asbestos ore and materials containing asbestos; manufacture and use of products containing asbestos. The major sources of asbestos emission, says the panel, must be defined and controlled; if they are not, concentrations of asbestos in the air of some localities might at times approach those encountered by workers in the asbestos industry.