lates, but his newly appointed assistant, John Sawhill, told SCIENCE NEWS that some sort of controls on these products were likely in the near future.

Controlling fuel oil and gasoline so that the average person can continue his lifestyle relatively unaltered has clearly been the Administration aim thus far in energy planning. Now the policy makers must clearly turn their attention to the more complex issues of petroleum shortages, for no political gain can be gathered by assuring everyone enough gasoline if they have no jobs to drive to. Telling the real necessities from waste will be a tough job. □

Double, double, redshift trouble

The war of the quasar (QSO) redshifts has suddenly escalated. The question at issue is whether the quasars are indeed as far away as the redshifts in their light would indicate. If the redshifts are entirely due to recession velocities—and therefore by the expanding-universe hypothesis, distance—the quasars are at cosmologically interesting distances.

The large majority of astronomers has accepted the idea of cosmological distance, but as E. Margaret Burbidge, director of the Royal Greenwich Observatory points out in the Nov. 23 NATURE, "A small minority of workers have maintained a skeptical attitude toward the hypothesis that the QSO redshifts are cosmological in origin, produced by the expansion of the universe." In the same issue of NATURE appear two pieces of evidence supporting the noncosmological side. In one case quasars are found in apparent spatial relationship with groups of galaxies, but have redshifts very different from the redshifts of the galaxies. In the second case a pair of quasars is found apparently related to each other but with highly discrepant redshifts. Associated objects should be at the same distance and have the same redshift if all redshifts are due to distance.

Burbidge points out that with these results "astronomers seem at last to be within shooting distance of making some crucial tests." She attributes this ability to improvements in the accuracy of determining the positions of radio sources which enables closer comparison with the locations of optical sources.

Previous workers have found some quasars related to galaxies, but the work according to Burbidge either was concerned with bright galaxies and bright quasars or suffered from a bias in favor of the cosmological hypothesis since the redshifts of the quasars chosen for study were known and the galaxies that were looked for were chosen to be faint enough to be at the same distance as the quasars' redshifts would indicate.

The current work, a collaboration of radio astronomers (C. Hazard of Cambridge University and D. L. Jauncey of Cornell University) and optical astronomers (W. L. W. Sargent of the Hale Observatories and J. A. Baldwin and E. J. Wampler of the Lick Observatory) is more general in that it looked at fairly faint objects and avoided bias. The group searched for faint galaxies in the neighborhood of a number of blue starlike objects. It was not known in advance whether the blue objects were actually quasars nor what their redshifts were. Starting with 280 radio sources the observers looked for blue objects that could be associated with the radio sources and then looked for nearby galaxies. They come up with four cases in which strong arguments can be made for association of quasars and galaxies with discrepant redshifts: the radio sources listed in the fourth Cambridge catalog as 4C24.23, 4C11.45, 4C11.50 and 4C26.48.

Even more telling perhaps is the discovery of a pair of quasars that are only five seconds of arc apart. (This was done by Hazard, Wampler and Baldwin, and W. L. Burke, and L. B. Robinson of the Lick Observatory.) The redshift of one of the pair is 0.4359; the other's is 1.901. "Our observation of a close pair of QSO's with discordant redshifts is unlikely under the cosmological hypothesis," the observers conclude.

A very curious point is that the apparent wavelength of a given line in the spectrum of one of the quasars is almost exactly twice the wavelength of the same line in the other quasar. "This difference . . . is either an unfortunate coincidence or a profound mystery." The mystery may be, says Wampler, some unknown mechanism that splits photons. If photons can be split, the principle of conservation of energy would require doubling the wavelength. Thus the lower redshift could be due to distance. The difference between it and the larger one would come from photon splitting. But Wampler characterizes the idea as very far out, and cautions against making too much of it. "It's just that two is a number that makes people sit up and take notice," he says, whereas 1.69 or 2.5 would not.

Counterattack on infectious cancer

In June 1971 Nicholas J. Vianna of the Center for Disease Control in Atlanta and Peter Greenwald and J. N. P. Davies of the New York State Health Department reported that Hodgkin's disease—a form of cancer that attacks the body's lymphatic system—may be an infectious disease condition with a carrier state and a long incubation period. They noted a cluster of 31 cases of Hodgkin's among the 1954 graduating class of an Albany, N.Y. high school (SN: 6/19/71, p. 421).

Earlier this year other investigators found there were 18 times as many cases of Hodgkin's in Darby, Ohio, as are present in other areas of the United States (SN: 2/10/73, p. 85). Then in September Vianna and Adele K. Polan found another apparent cluster of Hodgkin's disease among teachers and students on Long Island (SN: 9/29/73, p. 206).

All this evidence is disturbing for several reasons. For one, it has had a tragic impact on some patients with Hodgkin's disease. As a result of the 1971 report, many Hodgkin's disease patients were ostracized by friends and relatives; some even lost their jobs. One patient at the National Cancer Institute in Bethesda killed himself, an institute official said, because "he couldn't bear the idea of infecting his family." The evidence is also disturbing in that it is epidemiologic. Epidemiology deals with the incidence, distribution and control of disease in a population; it is one of the shakier modes of medical science. So epidemiologic evidence that Hodgkin's disease is infectious may not be correct.

In fact, M. C. Pike of the University of Southern California School of Medicine in Los Angeles is convinced that the evidence is not correct, and he said so last week at an American Cancer Society—National Cancer Institute conference on virology and immunology.

In his look at the Albany study, Pike checked 91 Hodgkin's disease patients in Oxford, England, and found that 54 of them had the same types of links to each other that the Albany patients did. But he went a step further than the Albany researchers. He took as controls 66 patients with other diseases that are known not to be contagious. Those people were also found to be linked to each other.

"There is no evidence," Pike concludes, "that Hodgkin's disease patients know each other more than anyone else knows each other. The trouble is we all know too many people. I don't think that we have any feeling about how many people we know." □