

first step is to shake the bottom of the box to break the van der Waals force. When this is done, the laser beam, entering through the bottom of the box, lifts the sphere until it reaches a point where light pressure balances its weight. "The particle is extremely stable and can remain aloft for hours," Ashkin and Dziedzic report.

A laser beam shone in from the side can then be used as a probe to study the forces exerted on the ball as it floats in the first laser beam. Levitation has been accomplished in air and in partial vacuums down to pressures of one torr. At that point the particles were lost, in part because of a reduction of viscous damping by the air, which had aided stability, and in part because of a downward force on the balls that arises because their tops are slightly hotter than their bottoms.

Optical levitation is expected to provide a way of manipulating small particles without mechanical support. It could be useful in communications research to study scattering loss caused by small particles either in the atmosphere or other transmission media. It could also be useful in the construction of gyroscopes and accelerometers. □

### Dropping out of school: Problem or symptom?

Campaigns aimed at keeping kids in high school or getting dropouts to go back to school have made the diploma an all-important factor in future success and have equated dropping out with failure and delinquency. Scientists at the University of Michigan's Institute for Social Research in Ann Arbor feel that these campaigns are deceptive and may be doing more harm than good.

Their conclusions are based on a five-year study designed to investigate the causes and effects of dropping out. The results of the study, by Jerald Bachman, Swayzer Green and Ilona Wirtanen, will be published later this fall by ISR. Speaking this week in Ann Arbor, Bachman explained the design and results of the research.

A national sample of 2,313 10th-grade boys was selected. They were interviewed in the fall of 1966, the spring of 1968, the spring of 1969 and again in the summer of 1970 (one year after they were scheduled to complete high school). The researchers found, as they expected, that there is a substantial difference between those who dropped out and those who stayed in school, particularly those who went on to college. The researchers found, for example, that family background is an important factor. The lower a family's socioeconomic status, the more likely the boy is to become a dropout.

### Giving reason to rhythm: Inducing ovulation

Executive control over the body's hormones lies in the hypothalamus, an area of the brain that is particularly reluctant to give up its secrets to science. Nonetheless Andrew Schally and his team of endocrinologists at the Veterans Administration Hospital in New Orleans recently succeeded not only in isolating and characterizing but also in synthesizing the hypothalamic hormone that, via several pituitary hormone mediators, turns the body's sex hormones on and off (SN: 7/17/71, p. 37). The synthetic hormone, Schally prophesied, holds potential for providing several new approaches to birth control. One would make the rhythm method work with certainty by inducing ovulation. This way a woman would know exactly when she ovulated, and could time intercourse accordingly.

It now looks as if this boost for the rhythm method might be closer to clinical application than was previously believed. Schally and his team report in the Oct. 29 SCIENCE that they used the LH/RH portion of the synthetic hormone LH/RH-FSH/RH to induce ovulation in hamsters that had been previously treated with a drug (phenobarbital) to prevent spontaneous ovulation. Control hamsters were placed on phenobarbital and a salt solution, and none of them ovulated. The results, the New Orleans investigators conclude, indicate complete blockage of spontaneous ovula-

tion by phenobarbital, and hence proof that LH/RH did indeed induce ovulation in those animals receiving it. Injection of the synthetic LH/RH did not induce ovulation in hamsters whose pituitaries had been removed, excluding the possibility that the synthetic LH/RH might stimulate the ovaries directly, without being first mediated by the pituitary luteinizing hormone (LH).

Schally and his colleagues have also induced ovulation in rats using the purified, natural LH-RH. In these animals spontaneous ovulation was again blocked with phenobarbital. The natural hormone did not alter the blood pressure and heartbeats of the rats, which indicated the hormone did not trigger undesirable side effects on the cardiovascular system. More animal tests, of course, are needed to see whether the synthetic LH-RH is free of serious toxic effects, not just on the cardiovascular system but on other systems in the body. Other questions also need answering, such as whether synthetic LH-RH can induce ovulation when spontaneous ovulation is not suppressed.

If and when LH-RH induction of ovulation becomes clinically available to women, it could have profound effects on world population control, especially in Roman Catholic countries. Rhythm is the only form of birth control permitted by the Roman Catholic Church.

Intelligence and academic ability are also factors in dropping out. But a more important predictor of dropping out is past school failure. The report says the dropout rate among boys who failed a grade is 40 percent. It is only 10 percent among those who never failed.

These aspects of the findings, however, are neither new nor surprising. What is different about the study is that the students were all contacted while they were still in school. And the researchers were able to compare the dropouts to those who completed high school and those who entered college. "Because ours was a before-and-after design," the researchers say, "we were able to show that in nearly every case a difference which turned up at the end of the study was present equally strong at the start—before dropping out occurred."

Tests given during the four-year period measured more than 20 personality and behavior characteristics. The authors found that "there are very

few changes of any consequence and virtually none that would support the argument that dropping out damages a young man's mental health and his commitment to society's values." And the argument that dropping out leads to higher unemployment, the report finds misleading. The unemployment rate for dropouts may often be twice that of graduates but there is no evidence that this is a direct result of dropping out. It is more likely, Bachman says, that unemployment is a result of pre-existing factors such as low intelligence or low socioeconomic level.

The conclusion ISR scientists draw from the study is that dropping out is an end result or symptom of other problems that have their origins much earlier in life. The kids had their problems before they quit, therefore time and effort should be spent on correcting the problems. Bachman suggests the money being spent on antidropout campaigns could be better used in making the schools more palatable and valuable to the potential dropout. □