

First light at an Irish tomb

When the sun rises on the day of the winter solstice (Dec. 21), a narrow shaft of light slips through a carefully positioned slit in the roof near the entrance of a prehistoric underground Irish tomb. Shooting down a narrow passageway about 60 feet long, the sun's light illuminates the floor of the tomb's main chamber. Such a scenario more often fits the stuff of legend than the result of a precise survey, but astrophysicist Tom P. Ray of the Dublin Institute for Advanced Studies in Ireland contends his measurements show that an ancient tomb at Newgrange, about 30 miles from Dublin, may have been deliberately designed to catch the sun's rays at the solstice.

"The evidence . . . supports the theory that the orientation of Newgrange was deliberate, which would make it . . . the oldest megalithic structure known for certain to have an astronomical function," Ray reports in the Jan. 26 *NATURE*. The tomb, erected about 5,150 years ago, is centuries older than Stonehenge and the Egyptian pyramids.

Ray's calculations indicate someone designed the gap in the roof to catch the first rays of the midwinter sun, as it appeared 5,150 years ago. As seen from the main chamber, the gap would frame the rising sun, almost perfectly matching the sun's apparent width. The first beam of sunlight would create a patch of light, initially about 6 feet long and a few inches wide, on the inner chamber's floor, bisecting the chamber and illuminating designs carved in the rock. Then the beam would broaden before narrowing again and finally disappearing.

Ray's results lend credence to a longstanding local belief that the sun illuminates the tomb chamber at certain times of the year. Although earlier scholars suggested the possibility of astronomical alignments, it took Ray's careful measurements and calculations to show the tomb's alignment with the midwinter rising sun was much more likely deliberate than an accident, as some skeptics argue.

The hidden lives of massive stars

The formation of massive, hot stars takes place in the warm, dense cores of thick molecular clouds. Such hot, bright stars generally remain hidden until they move out of their clouds or disrupt the clouds sufficiently to thin out the obscuring dust and gas. But even the hidden stars signal their presence. They ionize the surrounding gas (mainly hydrogen) to form compact regions visible at radio wavelengths and heat up circumstellar dust, which eventually radiates light at infrared wavelengths. Now astronomers are combining the results of radio-telescope surveys and data from the Infrared Astronomical Satellite to obtain a more complete picture of how these short-lived stars form and evolve.

Using these techniques, Edward B. Churchwell of the University of Wisconsin-Madison and Douglas O.S. Wood, now at the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass., obtained a direct measure of the population and distribution of embedded massive stars in the Milky Way galaxy. Their results, scheduled to appear in the May 1 *ASTROPHYSICAL JOURNAL*, show that 10 to 20 percent of all massive stars are surrounded by clouds. This implies that a typical massive star spends a like fraction of its lifetime inside a molecular cloud.

Using the Very Large Array radio telescope near Socorro, N.M., the researchers observed cloud-enshrouded stars, some only a few tens of thousands of years old. Such stars survive just a few million years before they explode as supernovas. Churchwell and Wood estimate the Milky Way galaxy contains about 20,000 of these hot, bright, massive stars. Molecular clouds within the galaxy spawn at least two such stars every thousand years or so, and one explodes into a supernova roughly every 25 years.

Medication concerns in rest homes

Rest homes, originally intended as room-and-board facilities for relatively healthy elderly residents, are increasingly taking in patients released from state mental hospitals. One consequence of this trend, according to a report in the Jan. 26 *NEW ENGLAND JOURNAL OF MEDICINE*, is the widespread use of psychiatric drugs in rest homes, with little medical supervision or understanding by staff members of the potential side-effects of these drugs.

Jerry Avorn and his colleagues of Harvard Medical School in Boston surveyed a random sample of 55 rest homes in Massachusetts. They find 55 percent of the 1,201 residents took at least one psychiatric medication. Thirty-nine percent got antipsychotic drugs; the rest received antidepressants, tranquilizers or lithium (commonly prescribed for manic depression). Most prescriptions "had been written in the remote past and were refilled automatically," the researchers note.

They then looked at 837 residents of 44 rest homes with particularly high levels of antipsychotic drug use. More than two-thirds of these individuals had spent time in some type of psychiatric facility. Although 82 percent of them were taking one or more antipsychotic drug, medical records showed nearly half had no evidence of physician participation in decisions regarding their mental health care during the previous year.

About 6 percent of the follow-up sample had moderate or severe symptoms of a movement disorder, known as tardive dyskinesia, caused by antipsychotic drugs (*SN*:7/20/85, p.45). Another 17 percent had mild signs of tardive dyskinesia.

Interviews with rest home staff responsible for patient care revealed that about half were unfamiliar with the purpose and side-effects of commonly used psychiatric drugs.

One approach to the problem, the researchers say, is to require better training for rest home workers and vigorous monitoring of care by state officials.

Promising drug for children with AIDS

Ongoing analysis of the treatment of AIDS-infected children with the drug zidovudine (AZT), described at a National Institute of Mental Health seminar last week, brings encouraging news to a tragic situation.

Investigators recently reported substantial IQ gains for 21 youngsters infected with the AIDS virus given AZT for six months through a continuous transfusion pump strapped to their backs (*SN*:10/8/88, p.231). Now one of the scientists, Pim Brouwers of the National Cancer Institute, says IQ increased at the same rate for children with and without evidence of brain disease, although the latter group had higher scores. Furthermore, while children infected with AIDS *in utero* had lower IQs than those infected through blood transfusions, intelligence scores increased proportionally in these two groups over the six months.

Among children older than 6 years, Brouwers says, the biggest improvement was on performance IQ (picture completion and other tests of perception and motor ability).

Parental reports of the children's ability to function independently and communicate with others also revealed significant improvement over the study period.

"Whatever way we split the data, we see robust positive effects of continuous infusion AZT therapy," Brouwers says.

It appears AIDS interferes with children's ability to retrieve and express much of what they learn on a day-to-day basis, he adds.

Infants and children account for 2 percent of the U.S. AIDS cases reported to the Centers for Disease Control in Atlanta. The incidence of childhood AIDS is rising, Brouwers points out, with at least 3,000 new cases expected by 1991.