Sleeping pills and apnea linked in elderly

A commonly prescribed sleeping pill may exacerbate a life-threatening sleeping disorder in the elderly, according to research reported this week at the meeting of the Association for Psychophysiological Study of Sleep. Furthermore, the disorder —called sleep apnea—often goes undiagnosed by physicians, increasing the likelihood of untoward effects, according to independent research also reported at the San Antonio conference.

Apnea is characterized by frequent respiratory failure during sleep. People who suffer from apnea stop breathing and are awakened hundreds of times during the night, though they do not remember waking; when they do not wake up, they die. According to research reported by Stephen C. Coburn of the Stanford (University) Sleep Disorders Center, presumably normal elderly subjects who were given the sleeping pill "flurazepam" before bed experienced three times the respiratory distress of controls. None of the subjects had reported problems sleeping, nor had any been diagnosed as suffering from apnea.

It is unlikely that the drug induced sleep apnea in a single night, Coburn says, but it is possible that it exacerbates an undetected condition. This finding is even more interesting in light of other research that indicates that there is a high incidence of undetected apnea in the general population. According to psychiatrist Daniel F. Kripke of the University of California at San Diego, a study of 28 hospital patients, none of whom had been diagnosed as having apnea, revealed that 27 percent were suffering at least 30 apneic episodes a night (each lasting at least 10 seconds); three suffered in excess of 200 episodes a night. In addition, an ongoing random survey of the elderly population — also conducted by Kripke and his colleagues — indicates that more than 30 percent of all people over 65 suffer from apnea of comparable seriousness, most of it undiagnosed and unaccompanied by complaints about sleep.

In light of such data, Coburn argues, the prescription of any central nervous system depressant should await testing for apnea. It is impossible to know how often such drugs lead to apnea-related death, he says, but it may be that a significant death rate is masked by society's attitude toward death during sleep. "Death during sleep," he says, "is taken far too lightly."

—W. Herbert

NAS panel says 'Go' to ISEE-3 comet mission

A proposed plan to send a U.S. satellite, already in space, on a mission to a comet has received the endorsement of a National Academy of Sciences panel. The satellite, ISEE-3 (the third International Sun-Earth Explorer), has been monitoring the solar wind from the sunward side of the earth since 1978, but on June 10 its engine was fired to redirect it far down the planet's magnetic tail, with an option to then fly past comet Giacobini-Zinner in 1985 (SN: 6/19/82, p. 407). Last week, an ad hoc panel of the Academy's Space Science Board voted its approval both of letting the spacecraft continue down the geotail (some factions have wanted it returned to its sun-watching post) and sending it afterward to fly through the comet's tail.

Pending approval by the full Space Science Board and the Academy itself, the panel's recommendations will then be sent to the National Aeronautics and Space Administration, which will make the actual decision. The U.S. has no present plans to visit comet Halley (though Soviet, European and Japanese Halley missions are all in the works), so the Giacobini-Zinner flyby would become the first U.S. comet mission by a spacecraft.

ISEE-3 carries no cameras or dust-measuring instruments, but it would be able to make detailed measurements of the comet's interactions with the solar wind. Because most of the Halley-bound spacecraft are designed to take pictures, they will be targeted to fly on Halley's sunward side, away from its tail. ISEE-3 will be free to fly directly through Giacobini-Zinner's tail, sampling a part of the cometary environment that will be missed by most of the Halley armada.

The Space Science Board panel was composed of members from three of its regular physical-science groups: the committees on Astronomy and Astrophysics, Solar and Space Physics and Planetary and Lunar Exploration. The scientists were unanimous, says an official, in advocating the trip down earth's magnetotail, after which ISEE-3 could, if desired, be returned to its former station. The subsequent comet journey, however, posed a more difficult decision, since the spacecraft would be forever lost as a monitor of earthbound solar outpourings (some cosmic-ray and gamma-ray measurements would also be lost). In fact, says the official, the panel deemed ISEE-3's earth-oriented role just as scientifically valuable as probing a comet's tail, but the comet mission had the advantage of representing a previously unstudied environment. One straw vote came out 5 to 2 for the comet (the recommendations of such panels are presented as consensus views), and the panel also included a recommendation that NASA send up another satellite to take over the solar-wind monitoring job. Even so, the official adds, the comet option was still a clear winner: If a replacement sun-watcher could not be provided, the panel concluded, Giacobini-Zinner should still be ISEE-3's goal.

Since ISEE-3 is already aloft and paid for, the cost of the comet visit is estimated to be only about $5 million for tracking, spread over three years. NASA's money is tight, however, so even though the decision to head for the comet could technically wait as long as another year and a half, budget-planning may require the space agency to commit itself within the next few months.

— J. Eberhart

Mapping sounds deep in the brain

Sounds of different frequencies appear to be processed in different parts of the auditory cortex in the human brain. Researchers, measuring the minute magnetic fields evoked by the brain's response to pulsed pure tones, recently showed that as a tone's frequency increases, the magnetic field source systematically goes deeper beneath the scalp.

Gian Luca Romani, Samuel J. Williamson and Lloyd Kaufman, working at New York University, report in the June 18 SCIENCE that the change in depth is a logarithmic function of frequency. They say this implies that "the same number of neurons in the cortex is dedicated to each octave in frequency span." The maximum sensitivity of the inner ear's cochlea also shows a similar displacement with the logarithm of the frequency. The researchers note, "This suggests a direct mapping of the cochlea on the cortex."

The sources of the magnetic fields, only one billionth of the earth's magnetic field strength, are currents within brain cells. Kaufman estimates that the technique (SN: 4/9/77, p. 234) is precise enough to isolate a patch of 5,000 brain cells at a time.

Previous experiments with cats, squirrels and monkeys, done by placing micro-electrodes on the exposed surface of the auditory cortex, have shown that these animals have more than one auditory area in the brain, although a similar frequency-position mapping occurs. In the human brain, "so far, we've seen signs of only one auditory area," Kaufman says. "Maybe we're looking at the summed effect of several, or the others aren't responding strongly enough." The researchers need to refine the method to get better resolution, he says.

More recent experiments show that from the time a sound arrives at the ear to the time current flows in the auditory cortex is about 50 milliseconds. Sleep seems to affect the strength of the magnetic field response but not the source's location.

Kaufman speculates that for people with particular hearing disorders, magnetic field measurements may be helpful in identifying or verifying the sites of lesions within the cortex.

— I. Peterson