

physical sciences

Lasing in the vacuum ultraviolet

Lasers were first built in the infrared and later progressed into the visible range of the spectrum. The shorter the wavelength, the more energetic are the individual photons, and the more difficult it is to produce the stimulated emission that is the basis for the construction of a laser.

In the Feb. 28 *PHYSICAL REVIEW LETTERS* two reports record the first stimulated emission of photons with more than 10 electron-volts energy. In both cases the emissions are in the so-called Werner bands of molecular hydrogen in a part of the spectrum called vacuum ultraviolet. Ronald W. Waynant of the Naval Research Laboratory in Washington, D.C., reports stimulated emission of two Werner-band lines, 1,161 and 1,230 angstroms. R. T. Hodson and R. W. Dreyfus of IBM report several lines between 1,161 and 1,240 angstroms. Availability of intense light at these wavelengths will be useful in photochemistry, photofragment spectroscopy and photoionization studies.

Waynant used a traveling-wave system to energize the hydrogen. Hodson and Dreyfus used a beam of electrons.

A possible superheavy element in meteorites

In primitive meteorites rich in volatile elements, the carbonaceous and unequilibrated chondrites, there appears fission-produced xenon that does not seem to come from the common familiar source, fission of plutonium 244.

It was suggested in 1969 that this nonplutonic xenon might come from fission of some volatile superheavy element, of which none remained in the meteorites at the time they fell. Since then further data have accumulated. Eric Anders of the University of Chicago and John W. Larimer of Arizona State University report in the March 3 *SCIENCE* that the new information enables them to characterize the hypothetical parent superheavy element more closely. They say it had a heat of vaporization of 54 ± 3 kilocalories per mole and a normal boiling point of $2,500 \pm 400$ degrees K. Elements 111 and 115 are the prime candidates, followed by 113, 114, 112 and 116. Elements 105 to 110 are not volatile enough to fit the properties cited and so may be excluded.

A failure to find the cosmic X-ray line

X-ray astronomers have discovered that the galaxy is pervaded by a diffuse background of X-radiation. Several observations have indicated that superimposed on the broad diffuse background spectrum is a bright line at about 7,000 electron-volts energy.

The brightness of the line appeared virtually the same whether observers looked along the galactic plane, where the matter of the galaxy is concentrated, or away from it, where galactic matter is thin. This tends to indicate that some of the line emission probably comes from an extragalactic source.

But A. Toor, R. E. Price and F. D. Seward of the Lawrence Livermore Laboratory report in the March 1 *ASTROPHYSICAL JOURNAL LETTERS* that their observations of an extended region in the galactic plane and of an area near the south galactic pole failed to detect the line, and so it may not exist.

behavioral sciences

Behavioral traits of smokers

Jacob Yerushalmy (SN: 1/29/72, p. 74) says behavioral traits rather than cigarettes may be responsible for the high incidence of low-birth-weight babies among smokers. Martin A. Jacobs of Boston University has a theory about the behavioral traits associated with heavy smoking (more than one pack per day). Briefly, the theory considers compulsive smoking consistent with an exaggeratedly self-reliant, defensive posture that may originate from perceived rejection in childhood. "There is, consequently, a tendency to rely on substances (food, alcohol, stimulants, tranquilizers and cigarettes), because they provide self-induced immediate gratification," says Jacobs in the January-February *PSYCHOSOMATIC MEDICINE*. This gratification reduces the need to reach out to and to rely on other persons.

The theory is based on self-report data from 500 men, and applies only to those who smoke beyond moderation and are unable to give up the habit. The theory was tested on 104 men participating in a 10-week program to break the smoking habit. The results of psychological tests were used to predict each man's ability to quit smoking. Jacobs' predictions were accurate 69 percent of the time.

Genetics and alcoholics

Twins and siblings have been used in psychological studies to test the relative importance of genetic and environmental factors involved in such things as schizophrenia, homosexuality and I.Q. (SN: 3/4/72, p. 152). Marc A. Schuckit, Donald A. Goodwin and George Winokur at Washington University in St. Louis used the technique to study the fact that alcoholism sometimes runs in families. They studied the incidence of alcoholism in subjects who had an alcoholic biologic parent but who were raised by nonalcoholic parent figures, and in subjects who did not have an alcoholic biologic parent but who were raised by alcoholic parent figures. Also, persons with and without alcoholic biologic parents who shared their childhood homes with alcoholic subjects were compared. Results in the March *AMERICAN JOURNAL OF PSYCHIATRY* indicate that genetic factors are more closely associated with the development of alcoholism than are environmental factors—though both are probably involved.

Methadone addiction in babies

At one time methadone treatment was considered to be a good answer to the problem of heroin addiction. But as the drug's use continues, its drawbacks become more and more apparent. Methadone is less expensive but just as addictive as heroin. Withdrawal from it is just as painful. And an increasing number of deaths due to methadone overdose are being reported. Now it appears that babies are being born addicted to methadone.

It was not known 15 months ago that methadone, like heroin, could affect the unborn child of an addicted mother. Vartolome Javate at Washington, D.C., General Hospital studied 23 babies born to methadone-addicted mothers. He found that 17 of them were suffering from methadone withdrawal symptoms. They were irritable, twitched violently and had cold sweats. Hospital treatment to free them from the effects of methadone lasted up to 90 days.