MEDICINE

Ultrasound for woman

The use of ultrasound (high-frequency sound) as a diagnostic tool has come of age in the 1970's with applications in cardiology, ophthalmology and obstetrics (SN: 12/25/71, p. 424). Sound pulses of varying intensities are sent deep into body tissue, and are reflected from various biological structures.

Now ultrasound diagnosis of breast cancer is being developed by Bruce Sollish, a biomedical engineer with the Weizmann Institute of Science in Rehovot, Israel. The technique should complement current screening tests for breast cancer—palpation by the doctor, soft X-ray of the breast and thermography (measurement of variations in skin temperature).

Doctors have found that ultrasound can pinpoint breast tumors not picked up by the other techniques. But instruments that now exist for ultrasound diagnosis of breast tumors take too long for mass screening. So Sollish is developing an instrument that scans more quickly and provides a three-dimensional picture, rather than a two-dimensional one.

Urinary diagnosis for men

Urinary tract infections, extremely common to sexually active men, are not always caused by the bacterium that causes the venereal disease gonorrhea. King K. Holmes and his team at the U.S. Public Health Service Hospital in Seattle decided to find out which bacteria or viruses are the culprits.

The researchers tested 116 men with urethral discharge but with no gonorrhea; 72 men with gonorrhea, and 178 men with neither problem. They report in the June 5 NEW ENGLAND JOURNAL OF MEDICINE that the bacterium *Chlamydia trachomatis* was recovered from 42 per cent of the men with urinary infection, but from only 19 percent of those with gonorrhea and from only seven percent of the men who were not infected. There was no evidence of herpes virus or some other bacteria and viruses in the men with the urinary infections. Thus, *C. trachomatis* is a major factor in non-gonorrhea-caused urinary infections in men.

This bacterium, Holmes and his co-workers also report, appears to be transmitted easily between sexual partners. They recovered it from 15 of 22 women having sexual relations with men who had it. The investigators advise antibiotic treatment for females whose sexual partners have the bacterium, as well as for men.

Waterbed for baby

Many young adults have taken to waterbeds with enthusiasm, claiming that they promote better rest and better lovemaking. Now Stanford University researchers have found that waterbeds can benefit newborn infants, too.

Anneliese F. Korner and her colleagues, using rat pups as subjects, found that movement stimulation is more crucial than touch and body contact in bringing about behavior and development changes. So Korner and her co-workers hypothesized that waterbeds might provide prematurely born infants with the crucial movement stimulation that their mothers cannot provide until they can leave the hospital.

Korner's group designed miniature waterbeds and placed premature infants on them for a week. The infants' pulse and respiration rates, temperature, weight changes and oxygen needs were similar to premature infants in ordinary incubators. There was no indication that the waterbeds made the infants "seasick." The investigators conclude that waterbeds can provide important movement stimulation to "preemies" without hurting them. They also found that the waterbeds can help preemies recover from mild breathing problems.

PHYSICAL SCIENCES

Where to find another psi

Physicists have discovered two and possibly three of the exotic, heavy new particles designated by the Greek letter psi. The two sure ones have masses of 3.1 and 3.7 billion electron-volts (GeV). The possible one is at 4.1 GeV.

In the June 2 PHYSICAL REVIEW LETTERS A. I. Sanda and H. Terazawa of the Rockefeller University predict that there is a fourth psi at a mass of 4.9 GeV. The suggestion results from their analysis of how quarks (the supposed elementary building blocks of particle physics) that possess the property called color can combine with one another. The permutations yield four new particles of the vector-meson class having the same quantum numbers (physically important properties) as the photon or light particle. The three psi's already known fit into this scheme, Sanda and Terazawa aver.

The fourth will be harder to find than the other three, they say, and they urge a careful examination of the debris from electron-positron collisions at 4.9 GeV for evidence of it.

A honeycomb galaxy

Our galaxy may be pervaded by a network of tunnels dug by supernovas, hot tunnels no less. This is a suggestion presented in the ASTROPHYSICAL JOURNAL (189:L105) by Donald P. Cox and Barham W. Smith of the University of Wisconsin.

A supernova explosion produces an expanding blob of hot matter that pushes outward against the cooler interstellar matter surrounding it and forms a kind of bubble in the interstellar medium. When the bubble gets big enough, the matter in it will be much thinner than in the surrounding medium. The cavity will persist for a long time (at least four million years).

During that time other supernovas are exploding. If a new supernova bubble breaks into an old cavity, the shock wave of the new explosion will be preferentially driven into the old cavity will persist for a long time (at least four million years). gives it a larger chance of being hit by a third explosion than a single one. Gradually, chains would form. Cox and Smith propose that a supernova rate of one in 50 years would be enough to interlace the galaxy with a network of tunnels. They speculate that evidence for such a network may be already observed in features of X-ray emission, ultraviolet absorption and hydrogen distribution in interstellar space.

Magnetic fields and you

Visitors to particle accelerators are repeatedly warned about the strong magnetic fields in the neighborhood of the bending, focusing and detecting equipment.

Instances of this kind of exposure multiply, and biophysicists are beginning to look into the possible deleterious effects of magnetic fields on the human body. Otto H. Schmitt, professor of electrical engineering and chairman of the Bio-Physics Group at the University of Minnesota, recently completed a two-year study designed to determine whether people can detect low frequency alternating magnetic fields. He reasoned that an ability to detect the presence of the field might be evidence of direct physiological or psychological effects.

The study was instigated by Navy plans for a large radar net in northern Wisconsin, which would produce such fields as do numerous household appliances. Schmitt reports that not one of 500 volunteers tested in an isolation booth could consistently tell when the field was on and off. He believes this result counters Russian claims that subjects in such fields experienced headaches and emotional disturbances. "It is very hard to prove that something is safe, but it seems that magnetic fields are safe—by default," he concludes.