

Law for Cervical Cancer Tests Proposed

► SCREENING for cancer of the cervix should be a state, and perhaps Federal, law, a New York pathologist said at the American Cancer Society's 1966 scientific session in San Francisco.

Dr. Leopold G. Koss, attending pathologist, Memorial Hospital for Cancer and Allied Diseases, New York, said a smear of the cervix should be mandatory for all women from the age of 20 on who have had at least one child.

"If this proposal appears too bold and too sweeping, it could perhaps be modified to encompass at least those women who are seeking antenatal care," Dr. Koss said.

If diagnosed early, cervical cancer is almost fully curable, he pointed out, but if allowed to become invasive, it could burden society with the cost of the patient's illness and the care of her family.

The failure of a physician to obtain a smear, especially on a patient who has requested it, should be subject to a malpractice suit if the woman later develops cancer of the cervix, the pathologist believes.

He emphasized the need for better technicians and pathologists and especially warned against the use of untrained personnel for cancer diagnosis.

"There are as yet no shortcuts to diagnosis of cancer," he said, referring to the method of acridine-orange fluorescence. "Not every fluorescing cell is a cancer cell."

This method, which is used in some doctors' offices, should be supplemented by additional smears and biopsies of the cervix.

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GEOPHYSICS

Metallic Ions Detected In Lower Ionosphere

► METALLIC ATOMS from meteors vaporizing high in earth's atmosphere change the composition of the lower ionosphere, a layer some 30 to 65 miles above the surface that reflects radio waves.

The metallic atoms are subsequently ionized by the normal processes of photochemical reactions and collisions. The addition of these ions to the ionosphere may be correlated with increased activity in what are known as "sporadic E" regions.

Measurements made during one series of rocket flights showed that the sporadic E layers were composed entirely of metallic ions, three U.S. scientists reported to the Seventh Annual Space Science Symposium in Vienna, Austria. The data were analyzed by R. S. Narcisi, A. D. Bailey and L. Della Lucca of the Air Force Cam-

bridge Research Laboratories, Bedford, Mass.

The rockets were flown last Nov. 16 and 17 during the annual Leonid meteor shower. The measuring instruments aboard showed that between 50 and 60 miles above the earth's surface, positive ions of sodium, magnesium, aluminum, calcium, iron, nickel and silicon were present.

These ions constituted from 30% to 50% of the total ionization, the remainder being ions of nitric oxide and oxygen. The Air Force scientists also found that metal ion concentrations were much lower at heights between 60 and 66 miles, the altitude just above that where meteors vaporize.

Sporadic E is a highly localized layer in the ionosphere having an increased electron and ion density. It is sometimes only a few hundred feet thick and occurs at times now unpredictable, and has a pronounced effect on communications.

Rocket sampling of two layers of sporadic E showed each composed of the positive ions of iron, magnesium, calcium and nickel, all metals found in meteorites.

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SOCIOLOGY

Fill Executive Positions With 45-50-Year Olds

► EXECUTIVE POSITIONS in American industry should be filled by persons no more than 45 to 50 years of age, C. P. Sparks, Humble Oil and Refining Company, Houston, Texas, advised the American Petroleum Institute's Division of Refining in Houston.

Although most organizations desire their executives to have had experience in various parts of the organization, Mr. Sparks explained, this requires employment for an inordinate span of time. Most of industry's executive members are newly out of college or are professionals with limited experience.

Many of the employees who are upgraded into executive positions are able to start off well because of experience, practical know how and willingness, but not all of them continue to be effective. Some of those who started off slowly with less practical know-how and experience gain success because of higher rating on intelligence, creativity, theory and inquisitiveness.

"Potential can be identified early and it can be nurtured without fear of developing 'golden boys' and disrupting the organization," he said.

The inquiry showed that boys with higher IQs and the best grades are taller, healthier and more vigorous than their less successful peers.

Beautiful blondes are more intelligent than their homelier counterparts, despite the "beautiful but dumb" canard, Mr. Sparks said.

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IN SCIENCE

MEDICINE

Tiny Disease Forms Shaped Like Teardrops

► SCIENTISTS are getting a closer look at one of man's smallest enemies—the disease-carrying microorganism called mycoplasma.

One variety, gallisepticum A 5969, is shaped like a teardrop, Drs. Jack Maniloff and Harold J. Morowitz of Yale University, New Haven, Conn., reported in New York.

Mycoplasmas are a group of tiny organisms smaller than bacteria but larger than viruses. They seem to be the cause of diseases in man and common domestic animals, especially in such areas as the joints, heart, brain, respiratory systems, mammary glands and genitourinary tracts.

These tiny organisms, unlike bacteria, have no thick, rigid wall to hold them in shape, the Yale scientists told a conference on mycoplasmas, sponsored by the New York Academy of Sciences.

Mycoplasmas are confined by a cell membrane made up of two monomolecular layers of protein separated by a layer of fat.

The cells owe their teardrop appearance to the presence of a "bleb," or granular material. When a cell gets ready to divide, a second "bleb" appears opposite the one already present, and the cell elongates. The nuclear material, containing the cell's supply of genetic material called deoxyribonucleic acid (DNA), segregates into two parts divided by a band of ribosomes. The central area constricts, and the single elongated cell splits into two daughter cells.

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TECHNOLOGY

Plastic Coating Process Fuses Wire in One Step

► A NEW PROCESS, called "Permafused" that permits polyvinylchloride, or other plastic coatings, to be fused to specially treated wire in one continuous operation, has been developed by Anchor Post Products, Inc., Baltimore, Md. With this technique a plastic coating of predetermined thickness can be fused to a predetermined gauge wire.

In addition to being a fast method of plastic coating wire, this process, by fusing the plastic to the wire, eliminates the present disadvantages of extruded coatings in which moisture can condense between the wire and the plastic causing cracking.

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E FIELDS

BIOLOGY

Life Forms Three Billion Years Old Discovered

➤ **MINUTE FORMS** of life existed on earth at least three billion years ago, indicating that life on earth must have originated earlier in our planet's history than previously supposed.

Tiny, bacterium-like rod-shaped organisms were found preserved in black chert rock in eastern Transvaal, South Africa, some 17 miles northeast of Barberton. Identification was made by Drs. Elso S. Barghoorn and J. William Schopf of the department of biology and Botanical Museum, Harvard University.

The oldest cellular microorganisms previously discovered are the two-billion-year-old fossils found on the Gunflint Iron formation in northern Ontario.

The South African microfossils are more than 3.1 billion years old, Drs. Barghoorn and Schopf reported in *Science*, 152:758, 1966. The fossils were identified by both optical and electron microscopy. Organic analysis showed that the black cherts also contain small concentrations of complex hydrocarbons, which are thought to be definitely biological in origin.

The South African discovery supports the view that widespread and abundant biological activity was going on at a much earlier time than many scientists thought possible.

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CONSERVATION

Grapes, Beans Developed To Resist Air Pollution

➤ **PLANTS** may be luckier than people; they are being cultivated to resist damage from our dirty, smoky air.

Certain varieties of grapes, beans and spinach are less sensitive to air pollution than other plants said Dr. Howard E. Heggstad of the Agricultural Research Service, U.S. Department of Agriculture.

Scientists may be able to isolate the resistant germ plasma and incorporate it into other plants so that they too can withstand pollution, he told the meeting of the Washington Academy of Sciences in College Park, Md.

Forest trees and ornamental plants such as petunias, galdiolas and azaleas are also being studied in relation to air pollution.

Air pollution causes \$150 million to \$500 million damage each year to U.S. forests, vegetables, fruits and other crops. By glazing, bronzing and spotting the leaves and stems, pollutants

suppress growth, delay maturity and sometimes kill the plants.

This kind of damage was first recognized about a century ago when acid fumes such as sulfur dioxide and fluorides from industries caused spectacular losses to vegetation near the source of pollution, Dr. Heggstad said.

In the past 20 years, expanding industry and increasing use of vehicles and fuel-burning agents have brought out a new class of air pollutants known as oxidants or photochemical air pollutants. These chemicals, issuing mainly from exhausts of automobiles, buses and airplanes, and from fuel-burning homes and power plants, are changed by sunlight into irritating agents that cause extensive damage to human health, buildings and all aspects of life. The worst irritants are ozone and peroxyacetyl nitrate, or PAN.

Each chemical attacks a different area of the plant, Dr. Heggstad said. For instance, the ozone attacks the upper surface of a plant's leaf, while the newly identified irritant PAN works first on the lower leaf surface.

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MEDICINE

New Surgery Substitute Relieves Obstinate Pain

➤ **A SIMPLE METHOD** of pain relief using a spinal needle is expected to replace the older and more drastic surgical chordotomy, three Pittsburgh neurosurgeons reported in the *Journal of the American Medical Association* 196:482, 1966.

One patient left the hospital the day following the new chordotomy and went bowling with the official sanction of the surgeons.

The entire operation is done in the radiology suite, with the patient premedicated and placed in a special head-holder on an X-ray table. The technique is called percutaneous cervical radiofrequency chordotomy, or percutaneous chordotomy.

Most of the 100 patients treated had cancer, but any intractable pain is suitable for the treatment, which interrupts spinal-pain pathways.

The age range was between 30 and 85 years, with men predominating.

There is little excuse now for any patient to suffer pain, the neurosurgeons said, calling it equal to a "medical misdemeanor" when such easy, efficient, low-risk relief is available.

Dr. Hubert L. Rosomoff, of the Albert Einstein College of Medicine, Yeshiva University, New York, reported the new technique with Drs. Peter Sheptak and Fred Carroll. They are in the division of neurological surgery, University of Pittsburgh School of Medicine, and the Veterans Administration Hospital, Pittsburgh.

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MEDICINE

Cancer Treatment Tested in Hamsters

➤ **TUCKED INSIDE** the cheek pouches of hamsters, tiny clumps of human cancer are being studied to evaluate treatment for the disease.

Drs. Joseph J. Kaufman and Peter Lichteau of the University of California at Los Angeles Medical School have devised a technique for transplanting human bladder cancer to the hamster's cheek pouch. The tiny clump of transplanted tumor is then used to test responsiveness of the cancer to treatment with various drugs or combinations of drugs and radiation therapy.

Kidney tumors have also been similarly transplanted.

Bladder cancer has been extremely difficult to treat, Dr. Kaufman pointed out. Malignancies that have infiltrated the bladder have not responded well to surgery or radiation therapy. Combinations of large doses of radiation given preoperatively, followed by surgery, have led to an inordinate number of surgical complications.

Preliminary results with treatment of bladder cancer with such drugs as 5-fluorouracil, thio-TEPA and mitomycin C and combinations of these drugs with radiation therapy have been promising. However, much more work with chemotherapy is needed, and effective evaluation with patients is a long and difficult process, requiring large numbers of patients.

The laboratory model of the human bladder cancer grown in the hamster appears to be a valuable tool in long-term testing of drugs. It does not spread in the animal but can be transplanted from one animal to another for repeated studies. Growing the tumor in large numbers of animals telescopes the time span.

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MEDICINE

Kidney Substance Lowers Rats' Blood Pressure

➤ **A SUSTAINED DROP** in blood pressure has been brought about in hypertensive rats by the injection of a purified substance from animal kidneys. The substance has not yet been used in humans.

Dr. Roger B. Hickler of Harvard Medical School and Peter Bent Brigham Hospital, Boston, reported purification and characterization of the material at the annual meeting of the Association of American Physicians in Atlantic City, N.J.

He identified the hormone-like lipid found in the inner portion of the kidney as Prostaglandin E2-217. Prostaglandin is a naturally occurring substance first found in the semen of man and sheep.

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