EDUCATION

$3,000 Thomas A. Edison Fellowship Being Offered

➤ APPLICATIONS for the Thomas Alva Edison Fellowship which is granted annually for graduate study of the patent and related systems are now being accepted.

A fund of $3,000 is made available annually to the Patent, Trademark, and Copyright Foundation by the Thomas Alva Edison Foundation for award to a candidate for a graduate degree in one of the schools of the George Washington University, Washington, D. C.

The fellowship offers men and women of unusual capacity for productive scholarship an opportunity to learn by actually doing. The recipient follows an approved program of research under the supervision of a member of the research staff of the Patent, Trademark, and Copyright Foundation assigned as counselor to the fellow. He must satisfactorily complete the degree requirements, including a thesis on a subject in the field of the foundation's interest.

This fellowship should be particularly helpful to students and teachers specializing in law, science, engineering, business administration, political and social sciences, who seek graduate experience in the industrial or intellectual property systems.

Applications should be submitted by May 1, 1963, and directed to the Patent, Trademark, and Copyright Foundation of the George Washington University. Applications should include the scholastic record and other evidence of intellectual and personal qualification for productive scholarship; if possible, a proposed outline of thesis; letters of recommendation from two professors with whom the applicant has studied or worked.

• Science News Letter, 83:184 March 23, 1963

MEDICINE

Theory Explains Drug Combination Therapy

➤ THE EXTRA effectiveness obtained by administering certain drugs in combination, instead of separately, can be explained in terms of the chemistry of living cells.

This result, called "synergism," is produced because the drugs interfere with different steps in a biochemical process, Dr. Martin L. Black reported in the Journal of Medicinal Chemistry. Such interference is known as "sequential blocking," Dr. Black, senior research scientist at the Parke, Davis & Company Research Laboratories, Ann Arbor, Mich., said.

Further investigations of cell chemistry and synergism may lead to drug combinations that are less toxic and to techniques for delaying bacterial resistance to drugs, Dr. Black indicates. The implications may be especially important to the future of cancer chemotherapy, he says.

A tumor and its host are biochemically very similar, and it is difficult to find drugs that can discriminate between them. If two drugs show synergism with respect to the tumor and only simple additivity in their toxic effect on the host, a decisive beneficial effect may be produced, Dr. Black said.

Delay in the appearance of bacterial resistance as a result of dual drug therapy is well established in the treatment of tuberculosis.

The practical consequences of synergism have long been apparent, but their realization has lagged behind expectations. The establishment of a theoretical basis for synergism now provides a rationale for the practical future use of drug combination therapy, Dr. Black reports.

• Science News Letter, 83:184 March 23, 1963

ANIMAL HUSBANDRY

Pigs Produce More Ham When They Stand To Eat

➤ HOGS made to stand on their hind legs while they were eating produced more ham per pound than those fed conventionally on all fours. The high ham-producing hogs were fed from elevated troughs at the University of California, Davis, in tests made in cooperation with the U. S. Department of Agriculture.

The standing position is thought to exercise the high meat value muscles of the ham and loin. The tests were made on 24 Duroc barrows, half of which were used as controls and fed in the normal manner from low troughs. The research is reported in California Agriculture, 16:8, 1962.

• Science News Letter, 83:184 March 23, 1963

MEDICINE

X-Ray Studies of Breast Can Detect Early Cancer

➤ A WOMAN who waits to discover for herself a lump in her breast may be too late, a Montreal radiologist warned in Quebec City. X-rays show breast cancer before it has spread too far for successful surgery or radiation.

The X-ray method, called mammography, does not take the place of other methods of diagnosis, but is valuable before possible removal of tissue for microscopic study, or biopsy.

Traces of calcium on the X-ray film are taken as a sign of cancer, and in cases reported at the meeting of the Canadian Association of Radiologists, further examination by pathologists confirmed the calcium findings of cancer.

Dr. G. B. Skinner of the Royal Victoria Hospital reported 143 cases in which X-rays indicated breast cancer that was confirmed by further examination.

In a study of 260 women, Dr. Skinner's conclusions were wrong only for 15. For eight, he diagnosed as cancerous a lump that proved not to be malignant, and for seven, he called tumors harmless that were shown to be cancerous when the pathologist examined them.

X-ray examination is psychologically attractive to women because it offers an easy method not involving biopsy unless this further test appears necessary.

• Science News Letter, 83:184 March 23, 1963

IN SCIEN

PUBLIC HEALTH

Prescription Required for Anemia Drug Booster

➤ DRUGS that contain a substance called intrinsic factor, which increases vitamin B-12 absorption in humans, must be labeled for prescription only, the Food and Drug Administration has ruled.

Vitamin B-12 is used to treat pernicious anemia, a dangerous form of the disease.

FDA's final policy regulating preparations to treat pernicious anemia, published in the Federal Register, becomes effective in August.

Orally administered preparations of vitamin B-12 and intrinsic factor, which is prepared from the intestines of animals used for food, "may sometimes mask symptoms and interfere with the diagnosis of pernicious anemia," FDA said.

Only vitamin B-12 by injection is generally recognized as a wholly reliable treatment of this condition, FDA said. It requires that "any orally administered drug for the treatment or prevention of pernicious anemia bear a warning to physicians stating that some pernicious anemia patients may not respond to such products." The labeling must state that periodic examinations and laboratory studies of such patients are essential and recommended.

The policy statement also calls attention to the prohibition against adding intrinsic factor to foods, including "health" foods, because there is no covering food additive regulation.

• Science News Letter, 83:184 March 23, 1963

TECHNOLOGY

Road Bump Study May Change Car Designs

➤ THAT BUMP in the highway may change the design of your future car.

Tiny irregularities in the surface finish of a road, as well as the "waves" created by the contour of the land, can cause cars and trucks to hit the road with great force. This punishment, aided by damage caused by climate changes, contributes to highway and automobile deterioration.

A change in the design of the automobile and in the highway may soften the blow.

Purdue University engineers, directed by Prof. Bayard E. Quinn, are making measurements on highways and determining relationships between car speeds and the waves in the road.

An indoor laboratory also is equipped with a vibrating platform upon which a car jounces up and down in differing tempos and patterns to simulate highway conditions. From these measurements they can estimate how much force the car will exert on the road at varying speeds.

• Science News Letter, 83:184 March 23, 1963

CE FIELDS

BIOLOGY

Three Chemicals Make Life Possible on Earth

➤ SMALL AMOUNTS of three chemical compounds in the atmosphere—ozone, water vapor and carbon dioxide—make life on earth possible.

These chemicals shield the earth from much of the sun's radiation that would otherwise destroy life, Dr. David M. Gates of the National Bureau of Standards, Boulder, Colo., is reporting to chapters and clubs of the Society of the Sigma Xi, national organization for the encouragement of scientific research, on a national lecture tour.

Ozone, water vapor and carbon dioxide are responsible for the temperate climate at earth's surface because they absorb sunlight and reradiate it as infrared heat. The earth itself is actually bathed in the very rarefied, hot outer edges of the sun's atmosphere.

It is flooded not only with visible ultraviolet and infrared radiation but is bombarded with high energy electrons and protons, gamma rays and X-rays, Dr. Gates reported in the first lecture of the series at the University of Nevada at Reno.

• Science News Letter, 83:185 March 23, 1963

SPACE

S-6 Satellite Will Probe Upper Atmosphere

➤ THE S-6, a satellite to probe the structure of earth's upper atmosphere, is scheduled to be launched for the first time by the National Aeronautics and Space Administration in late March.

The S-6, with eight primary detectors, will measure eight vital characteristics of the earth's atmosphere: atmospheric pressures, densities, temperatures, composition of neutral particles, electron temperatures and densities, ion temperatures and densities.

The 400-pound satellite will be launched by a NASA-Douglas Thor Delta booster from the Atlantic Missile Range at Cape Canaveral, Fla. The S-6 is scheduled to have an apogee of 555 miles and a perigee of 155 miles, making a 58-degree angle with earth's equator.

The S-6 is the first satellite to be made of stainless steel. It will have a 35-inch diameter.

The satellite has unusual features for returning its data to earth. Minitrack ground stations can command the package to relay data from any one, or any combination, of the experiments.

Dr. Homer E. Newell, NASA's director of space sciences, states that there is much information yet to be gained from probing temperature variations in the upper atmosphere. With increasing temperature, the height of the atmosphere also increases, raising the atmospheric density at the higher altitudes.

This thickening of the earth's atmosphere increases the atmospheric drag on artificial satellites, both decreasing their lifetime in orbit and markedly affecting their velocity below about 620 miles. These effects would be felt by any object falling through these regions, like manned spacecraft, reentry vehicles and winged vehicles.

An active life of 90 to 100 days is anticipated. Power is being provided by silver-zinc chemical batteries.

• Science News Letter, 83:185 March 23, 1963

MEDICINE

New Test to Measure Female Hormone in Blood

➤ A NEW TEST can measure the amount of female hormones in the blood and identify them.

The procedure developed by scientists at Roswell Park Memorial Institute, Buffalo, N. Y., will be applied to research aimed at determining the role of hormones in human breast cancer.

This was disclosed in an American Cancer Society report on the research by Drs. W. R. Slaunwhite, Jr., and Lavalle Neely.

The scientists discovered that the natural forms of the female hormone, estrogen, took up bromine. When they mixed radioactive bromine with extracts of blood or urine, the hormones in those fluids took up the bromine and became radioactive. Bromine-82, with a half-life of 36 hours, sends out gamma rays which are picked up readily by counters.

The method, which enabled the scientists to detect the estrogen-bound bromine with ordinary counters, will show, from a sample of blood or urine, how much estrogen is present. Its margin for measurement error is only 3%.

• Science News Letter, 83:185 March 23, 1963

ANIMAL HUSBANDRY

Hens Fed Algae Lay Eggs With Darker Egg Yolks

➤ FOR DARKER YOLK in eggs, feed dried algae or lake weeds to hens, agronomists M. L. Sunde and Gonzalo Madiedo of the University of Wisconsin, Madison, advise.

Tests were conducted with rations containing varying amounts of dried algae, dried lake weeds, alfalfa meal and a chemical called ethoxyquin. Algae, weeds and alfalfa contain a yellow pigment known as xanthophyll, and cause darker egg yolks, with the amount of darkening depending on the amount of the material fed. Ethoxyquin had the same effect and in the same way, with larger amounts giving darker yolks. The chemical is an antioxidant added to rations to stabilize the vitamins in the feed.

A dark yolk is desirable for some uses.

• Science News Letter, 83:185 March 23, 1963

TECHNOLOGY

Tiny Electron Light Shines Without Heat

➤ THE FIREFLY is having competition.

Man now can get a tiny, cool, green light from a crystal with no burning filament or ignited mercury vapor.

This is how it works: A piece of phosphor material is coated with an aluminum oxide film, and attached to a gold film electrode. This is mounted on a slide and hooked up to a small battery.

Result: Glow little crystal, glimmer, glimmer . . .

The process is called injection electroluminescence by thin films, according to physicists at the Ford Motor Company. The scientists were trying to prove some theories about the movement of electrons in materials when they came up with the cool, steady light.

The man-made devices to get light from electron movement are still so very complex, they defy analysis, explained Dr. John Lambe of the Ford laboratories. Many different chemical elements and crystal structures are used. Most common method is to apply a high voltage electrical current directly to a complex chemical compound that has been found by trial and error to emit light.

Man, with all his knowledge and research tools, cannot explain or even reproduce that tiny bit of light that winks on a summer night, without wires, filaments, batteries or vapor.

• Science News Letter, 83:185 March 23, 1963

MEDICINE

Deadly Food Poisoning Affects Spinal Region

➤ THE MOST DEADLY kind of food poisoning, botulism, can cause trouble to the central nervous system like that resulting from lockjaw, or tetanus.

This is indicated by studies of a 61-year-old man severely poisoned after eating home-canned mushrooms. He was hospitalized 48 hours later in Peter Bent Brigham Hospital, Boston.

There, Dr. H. Richard Tyler of Harvard Medical School tested the patient's nerve response by electrical charges applied to elbow and wrist.

Dr. Tyler found the so-called "H" reflex, not usually present in normal persons. This reflex is found mainly in patients with brain and spinal injuries as well as those with tetanus.

Previous knowledge of botulism poisoning came from laboratory animals, Dr. Tyler reported in Science, 139:847, 1963. The poison is believed to act on nerve endings, blocking the nerve impulse before it reaches the muscle.

Botulism and tetanus are caused by poisons released by similar bacteria, *Clostridium botulinum* and *Clostridium tetani*, which may explain why they have similar actions on the nervous system.

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