ENTOMOLOGY

Death-Causing Heredity New Insect Control

➤ INSECTS with inherited lethal or death-causing genes may some day be used to control their own populations. A report by Dr. Leo E. LaChance and Dr. E. F. Knipling of the entomology research division, U.S. Department of Agriculture, proposes laboratory rearing by which insects would be induced to form mutant strains that would carry genes lethal to their descendants.

Introducing large numbers of laboratory-bred males with these genes into the field at carefully predetermined intervals would reduce the number of their offspring in each succeeding generation.

Calculations by Drs. LaChance and Knipling show that the numbers of adult boll weevils can be theoretically lowered to levels below those required to maintain field populations.

A similar technique, using irradiated, sterile males of the screwworm fly, has been successfully developed by Department of Agriculture scientists headed by Dr. Knipling.

The new method would bypass the danger of reducing the vigor of males of certain insect species by irradiation to render them unable to compete with normal males in mating.

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LINGUISTICS

Language Understanding Could Be Hereditary

➤ THE BASIC ABILITY to understand languages may be inherited rather than acquired.

If so, we may be providing foreign language instruction at "a completely wrong age," says Prof. Noam A. Chomsky of the department of modern languages at Massachusetts Institute of Technology.

"If the little evidence we have is correct, a child could best learn languages between perhaps two years of age and puberty when an instinctive basis exists for such understanding," Prof. Chomsky told SCIENCE SERVICE.

He and a colleague, Morris Halle, have developed a "logical basis of linguistic theory" which holds than children are endowed at birth with a built-in, genetically transmitted mechanism to master the rules of various tongues. What language the child speaks still would depend on the language he hears.

Other linguists, Prof. Chomsky notes, generally believe that language understanding primarily is determined by the particular environment. Yet, he and others have found universals that exist in all languages. For example, regardless of the language spoken, particular features of speech invariably turn up everywhere, he says.

The generally accepted theory holds that the child builds and sorts his vocabulary and sentence structure by starting with nonsense syllables and working up into more complex forms as he comes into further contact with other language patterns. But Prof. Chomsky says that many of the sentences we speak and hear every day are those we have neither spoken nor heard before.

Prof. Chomsky views language as a set of rules enabling speakers to produce and understand an infinite number of sentences and to know when the rules have been been broken. He believes this very complex set of rules is mastered by children subconsciously as an internal mechism takes care of their compilation and computation.

Should such a "trigger" or "computer" be found in the body, Prof. Chomsky says it is likely that it would be a major step in determining basic intellectual capacities of human beings.

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TECHNOLOGY

X-Ray System Allows Faster Bone Setting

➤ WAITING for X-ray plate processing has been eliminated entirely by new electronic techniques reported in Lexington, Mass., by Dr. George Berci of the University of Melbourne, Australia. This will allow surgeons to set broken bones in one-fourth the usual time.

During hip operations, for example, it is necessary to take several X-rays, in front, behind and from the side at key points during the manipulation. Each time X-rays are taken they must be removed to a dark room and developed before they can be read.

Using Dr. Berci's "stored telexray" system, a surgeon can consult a large TV monitor on which the X-ray taken less than a second before is displayed.

The image on the TV monitor looks like an ordinary X-ray plate displayed on a lighted viewing box. A photograph can be taken of the TV monitor for permanent filing.

Under present systems, Dr. Berci said, a picture can be seen only while it is illuminated by X-ray energy and the patient and surgical team must be exposed to X-rays continuously.

On a visit to the Raytheon Company, which developed a storage tube that is the key to Dr. Berci's unique system, the surgeon explained how his team had worked two years on the "stored telexray" system.

The storage tube receives the picture of the broken bone from the TV camera and in one twenty-fifth of a second "freezes" it on a fine mesh screen within the tube. The picture is then displayed on several TV monitors in the operating room near the surgeon and others who need immediate progress reports.

Although production has not yet begun, it is expected that the new system can eventually be offered to metropolitan hospitals at nominal cost.

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IN SCIENC

CHEMISTRY

Atomic Radiation Used in Ethyl Bromide Production

➤ NUCLEAR RADIATION is an economic energy source for bulk processing of chemicals, the Dow Chemical Company has determined. The chemical plant, at Midland, Mich., using ionizing radiation, will go into operation after the first of the year.

The plant will produce ethyl bromide, an organic intermediate in the manufacture of a number of chemical and pharmaceutical compounds. A cobalt-60 gamma radiation source will be used, under an Atomic Energy Commission license, in a new production process developed by Dow research scientists. It will act as a source of energy and cause the raw materials to combine to form ethyl bromide.

Dow scientists examined methods of producing ethyl bromide by chemical means, by ultraviolet irradiation, and by gamma radiation. For economy and for chemical purity, they decided to use ionizing radiation from a cobalt-60 source.

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MEDICINE

Tuberculosis Bacteria Affected by Anesthetics

➤ RESEARCHERS have been fooled by the absence of tuberculosis germs in the bronchial tubes of TB patients. The bacteria temporarily disappear because of the local anesthetics used before the bronchial excretions are examined.

Local anesthetics used in bronchoscopy (examination by an instrument inserted into the bronchial tubes) made tuberculosis bacteria negative in ten patients whose sputum was positive for *Mycobacterium tuberculosis* at the Boston City Hospital.

Previous investigations had shown that sputum was a more fruitful source of positive TB secretions than those coughed up during bronchoscope examination, Drs. Biagio A. Conte and Eugene A. Laforet reported in the New England Journal of Medicine, 267:957, 1962. Tetracaine, which is chemically related to para-aminosalicylic acid (PAS), was particularly singled out as an inhibitor of the TB bacteria.

Both tetracaine and lidocaine, local anesthetics commonly used in bronchoscopy, are derivatives of para-aminobenzoic acid (PABA), but lidocaine is less powerful as an inhibitor of these bacteria.

Both of these anesthetics had formerly shown significant inhibitory effect on the cultural growth of fungi and non-tuberculous bacteria, but only recently have they been suspected of affecting *M. tuberculosis*.

In the light of this discovery, the researchers suggest that previous "bronchoscopic studies indicating the sterility of the tracheobronchial tree should be reassessed."

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E FIELDS

MEDICINE

Treatment of Stiffened Spine Adds Inch Height

➤ PATIENTS with certain types of back problems are made as much as one inch taller by a new therapeutic device at the University of California, Los Angeles, Medical School.

The catch, however, is that the extra height is only temporary.

Dr. Ralph E. Worden, who is evaluating the device, believes the machine may be useful in treating taut, stiffened spines of patients with many types of neurological and musculoskeletal disabilities.

Measurements of five normal subjects revealed that four had gained up to an inch in height during treatment with the device. All returned to normal height within 24 hours.

The patient is, in effect, suspended like a hammock between a sling holding his head and a mechanism gripping his ankles. Then he is gently stretched. It is essential that the patient remain comfortable throughout treatment.

The patient is suspended over a sponge-rubber table cushion. Mechanisms under the cushion, regulated by dials, can then apply thrust against the back, and heat, vibrations and a massaging action the length of the spine.

The massaging action is done by soft rubber rollers. Spring-loaded, the rollers exert an even force no matter what the contour of the patient. The force of the posterior thrust can be as great as 60 pounds, but the most comfortable thrust appears to be from 20 to 40 pounds.

Dr. Worden cautioned that the physician must be certain that the back pains of patients to be treated with the device are not the result of serious pathology such as cancer, kidney or bone disease, which would demand different treatment.

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PHYSIOLOGY

Height Is Inherited From Mama Rather Than Papa

➤ YOUNG CHILDREN are more likely to be short or tall according to Mama's height rather than Papa's, report scientists at the University of California.

Four years after the growth spurt has begun in both girls and boys there is a significant relation between the height of the child and that of the mother. For a girl from age eight onward there is a close correlation between her height and the mother's. For the final stature reached in a boy the mother's and father's contributions do not differ greatly.

It has been found that children whose parents are both tall show more growth and early maturity during the first adolescent growth spurt.

Height is one of the more inheritable body characteristics. Inherited traits are thought to be expressed gradually throughout the growth period.

The research was reported in Science, 138:818, 1962, by Dr. Norman Livson, David McNeill and Karla Thomas.

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MEDICINE

Construction Gun Shoots Bank Clerk Across Street

➤ A 31-YEAR-OLD bank clerk working at his desk near a window on the 11th floor could not imagine what had hit him but there was no doubt that he had been shot.

Taken in shock and acute pain to the Beekman-Downtown Hospital in New York, from which the case was reported by Drs. Sigmund Mage and Kenneth Chiache Sze in the New England Journal of Medicine, 267:1020, 1962, he was shortly relieved of a bullet-shaped metallic object in his chest from a "stud" gun.

The doctors reported a second case, that of a 54-year-old laborer brought to the hospital after being hit in the abdomen by a fastening device that had gone through a wall of plaster and gypsum block, striking him about seven yards away.

Fearing repetitions of such accidents with powder-actuated tools for shooting metal fasteners to concrete, wood and steel studs, the doctors said they strongly supported proposals of a uniform standard safety code by all appropriate state agencies.

Six fatal cases of stud-gun accidents were reported to them by a New York ballistic expert, and they told of 18 cases reported in German medical literature.

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SOCIOLOGY

Capitalism, Democracy Blamed for Slavery

➤ LAISSEZ-FAIRE capitalism and democratic self-rule in the North American colonies brought about one of the most rigid slave systems the world had ever known, Dr. Stanley M. Elkins, associate professor of history, Smith College, told the American Philosophical Society in Philadelphia.

Contrasting the way in which the Negro was given far more humane and generous treatment in Spanish and Portuguese colonies than in those of the English, Dr. Elkins explained that once a Negro received his freedom in Latin America he was accepted as a full member of the community. His race carried no automatic disabilities as it did in Virginia and the West Indies.

The English common law, he explained, had no experience with slavery and therefore offered no precedents that might protect the slave. The slave codes of Virginia were evolved purely in the interest of the master. In Latin America the slave laws had to conform to the Roman law which limited the rights of the master and protected those of the slave.

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GEOPHYSICS

Rock Glacier Clue to Ancient Climate Changes

➤ A ROCK GLACIER discovered in eastern Nevada may give information about climate changes more than 70 million years ago in North America.

The only one of its type in the 600,000 square mile area between the Rocky Mountains and the Sierra Nevada, the glacier appears to be moving. An expedition is planned by Fritz L. Kramer, Colorado College professor, to determine the extent of the rock movement each year.

Ice beneath the rocks may be the remnants of an ancient glacier. It stays frozen in the same manner that ice in an old-fashioned icehouse is kept frozen by a covering of sawdust during the summer.

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BOTANY

"Blood Tests" Made On Bloodless Plants

➤ "BLOOD TESTS" are being used to determine family relationships in plants that have no blood. Plant protein patterns can now be distinguished with tests using the circulatory systems of laboratory animals.

The new method may provide a simple means of studying any plant life found on other planets, Dr. Marion A. Johnson, Rutgers University botanist, said. He and Dr. David E. Fairbrothers developed the technique studying plants in the magnolia family.

The scientific trick involved is the injection of plant proteins into the circulatory system of an animal such as a rabbit.

The proteins, mainly plant globulins that are smaller in molecular structure than animal globulins, produce antibodies in the animal bloodstream. The antibodies produced by one plant can be chemically compared to those produced by other plants.

Antiserum, or antibodies plus the blood, produced by one plant can be placed in contact with proteins from other plants. Precipitates of these combinations are used to determine family relationships. The work with magnolias indicates that plant families have similar patterns of proteins.

Similar experiments in space could be done to show the relationships of any plants found on other planets to those on earth. Antiserum prepared from lower plant forms such as ferns, club mosses and algae could be taken into space by astronauts. By merely adding preparations from outer space vegetation to the antiserum, a white precipitate would be formed. The information could be telemetered to earth for complete analysis.

Research using the method has shown relationships between northeastern U. S. magnolias and those found in Asia. Magnolias and poplars once thought closely related have been shown to have very distant connections.

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