

TECHNOLOGY

Machine Reads Articles, Writes Their Abstracts

► THIS STORY can be read in a shortened version of it written by an electronic machine.

Just such an electronic abstracter has been developed by engineers of the International Business Machines Corporation, scientists at the Institute of Radio Engineers meeting in New York learned.

The system is called "Auto-Abstract." It can read articles or scientific papers and then write an abstract or shortened version of what the text was all about. It promises to prove helpful in the current national problem of scanning and excerpting scientific articles, both in English and foreign languages.

According to H. P. Luhn of IBM, "Auto-Abstract" works this way:

The complete text of an article is transcribed onto magnetic or punched tape in a code that can be understood by an electronic "brain." The computer then analyzes the text word by word to "derive statistical information concerning the frequency and distribution of the words in the text."

From this, the electronic abstracter determines the relative degree of significance of the words and grades each sentence as to its importance. Those sentences scoring highest are extracted and printed out by the machine.

Mr. Luhn pointed out that the system can be used to speed up the translation of foreign scientific articles by turning out foreign language abstracts of the original paper.

If it were a Russian scientific report, for example, a translator would only need to translate a short version of the paper to find out what is being reported, rather than reading the entire paper.

Science News Letter, April 5, 1958

MEDICINE

Find Way Chromium May Cause Lung Cancer

► AN EXPLANATION of the way in which chromium may cause lung cancer among workers in the chromate-producing industry has been offered.

Dust particles from crude chromite ore and metallic chromium were suspended in various liquids to create an environment resembling the physiological conditions of the body. These crude ore dust particles then dissolved, Dr. Charles H. Grogan of the National Cancer Institute reported.

On the basis of further laboratory and animal investigations, he suggested that our own body fluids may have the ability to dissolve chromite ore, metallic chromium and other chromium-containing compounds when they are inhaled as dust.

"Reservoirs" of chromium dust could build up in the body, be dissolved and released throughout the body over long periods of time.

The cells which would form the wall of such a reservoir would be bathed in high concentrations of chromium. Eventually,

these cells would undergo physiologic changes and could become cancerous, he pointed out.

Animal studies revealed that when chromite-ore dust was introduced into the lungs, the chromium was carried into other body organs. Results of these animal studies were compared with those reported by investigators studying the chromium content of tissue, blood and urine of chromate industry workers. The results of both animal and chromate worker studies proved to be comparable.

Exposure to fine dusts of chromite ore and metallic chromium represents a potential health hazard of "chronic nature," Dr. Grogan concluded.

Science News Letter, April 5, 1958

PUBLIC HEALTH

Babies' Bones Have Up to 5% More Radiation

► BONES OF babies born in the last six years receive on the average up to five percent more radiation because of fallout from hydrogen bombs than from natural radiation alone.

This dosage was reported by U.S. Atomic Energy Commissioner Dr. Willard F. Libby in a speech prepared for delivery to the Swiss Academy of Medical Sciences symposium on radioactive fallout at Lausanne, Switzerland. He based his estimates on the most recent results for radioactive material found in rainfall collections, for the strontium-90 content of milk, for animal bone and for human bone.

The present level of radiostromtrium in the bones of young children, Dr. Libby reported, is about two milliroentgens per year, compared to an average natural dosage of 150 to 200 milliroentgens per year. A milliroentgen is a measure of X-ray activity.

Medical X-rays add about another 150 milliroentgens, Dr. Libby said. Another bomb by-product, radioactive cesium, and other penetrating radiations from radioactive fallout that are not taken up by the body contribute perhaps another three or four percent to the total dosage.

"Thus the total dosage to freshly formed human bone is at most five percent of the natural dosage," Dr. Libby concluded.

Variations in natural background dosages from place to place are enormous in magnitude compared to the average value.

Strontium-90 is produced at a level equivalent to about one millicurie per square mile of the earth's surface for every two megatons (million tons) of fission energy, Dr. Libby reported. This radioactive material, because of its chemical similarity to calcium, collects in human bone, where it is held for years and where its radiations might then cause leukemia or bone cancer.

Besides the effects of radioactive fallout, Dr. Libby also reported on the underground atomic bomb test from which no fallout escaped. This test, he said, made possible some non-military applications of nuclear explosions, including new information on the earth's internal structure and the excavation of artificial harbors. (See p. 217.)

Science News Letter, April 5, 1958

IN SCIENCE

ENGINEERING

Automatic Postal System Being Tested in Canada

► AN AUTOMATIC postal system promising faster and more accurate delivery of mail than hand methods is now being tested in actual operation in Ottawa, Canada.

Details of the world's first automated post office were made public for the first time in this country at the Institute of Radio Engineers meeting in New York by Dr. Maurice Levy, technical adviser to the Canadian Post Office.

Mail to be processed by the automatic system is separated from other letters by using stamps impregnated with fluorescent material. Letters so stamped are sent to an electronic printer, where an operator codes on the back of each envelope the address information in fluorescent ink.

The coded mail is sorted automatically on a conveyor system controlled by an electronic computer, which detects the coded information and conveys the letters to the proper containers. Once letters reach local delivery areas, the mailman takes over.

Science News Letter, April 5, 1958

AGRICULTURE

Frost Damage in Citrus Can Be Detected by X-ray

► THE FIRST potentially practical method for detecting frost damage in citrus fruit mechanically has been developed by engineers at the University of California at Los Angeles.

The detector measures frost damage by beaming X-rays through fruit rotating on a platform. The resistance encountered by the X-rays is registered as a voltage reading. As the damage done by frost increases, the voltage reading increases due to the non-uniformity encountered by the X-ray. Non-uniformity of fruit sections is characteristic of frost damage.

The frost damage detector was designed by William T. Kyle, assistant research engineer, and Joseph E. McAteer.

Mr. Kyle believes a commercial model could be built to handle ten fruits per second. Rate of the experimental prototype is three or four per minute.

Cost of a commercial model would be \$10,000 to \$20,000, Mr. Kyle estimates. In addition to an X-ray source and an electronic device for measuring resistance variations, a commercial machine would include devices for channeling fruit from a conveyor belt into the damage detector. Bad fruit would be ejected automatically.

There is no radiation hazard in an X-ray detector because it is well-shielded, Mr. Kyle notes. Its operating voltage is comparatively low, functioning from ordinary 110-volt wiring.

Science News Letter, April 5, 1958

CE FIELDS

VETERINARY MEDICINE

Chemicals Cure "Sore Head" in Sheep

► "SORE HEAD," a disease of sheep caused by a relative of the nematodes that cause elephantiasis in man, can be cured, the U.S. Department of Agriculture has reported.

This is good news for sheep raisers since there is evidence this rare skin malady is spreading. Until recently it has been found in the mountain areas of New Mexico, Arizona, Utah and Colorado where sheep graze above 6,000 feet. Now California, Oregon, Idaho, Montana and Vancouver Island, British Columbia, have reported infected sheep.

USDA scientist Dr. H. O. Peterson of the Agricultural Research Service's New Mexico laboratory, reports two new chemicals can completely cure even advanced stages of the disease. Tiny worms living in some of the main blood vessels cause sore head or filarial dermatosis.

Skin lesions may cover the entire side of the head, sometimes leading to partial or total blindness. Sores may also occur on the sheep's abdomen and feet. In tests, a single injection of Dow ET-57 directly into the rumen or first stomach of the affected animal cured it.

(Dow ET-57 is an organic phosphate chemical that has also been used successfully to combat cattle grubs.)

Equally good results were obtained by adding piperazine hexahydrate to the sheep's drinking water. Two ounces of an anthelmintic, a remedy for getting rid of intestinal worms, containing the compound were added to each half-gallon of water for three days.

Scientists believe both drugs can be used under range and field conditions. Even though "little or nothing is known about the life history of the parasite worm or how it is transmitted," the disease can now be controlled.

Science News Letter, April 5, 1958

GEOLOGY

Underground Test Shows Man Can Move Mountains

► MAN MAY soon be using atomic bombs to move mountains.

This is suggested in an evaluation reporting results of a deep underground detonation of an atomic device on Sept. 19, 1957, released by the Atomic Energy Commission.

It has been calculated, the AEC said, that the underground shot produced at least 50,000 tons of permeable broken rock and an additional 400,000 tons of crushed, but relatively impermeable rock.

"The large masses of broken rock," the AEC notes, "suggest such applications as use in mining to break up ore bodies for removal or leaching, and in oil strata to

free crude oil trapped in relatively non-porous rock formations. It also is considered possible that heat resulting from an underground detonation in oil strata might increase the production of oil in certain situations by making it flow more freely through the rock formation."

Other possible peacetime uses of underground detonations with nuclear devices, the AEC says, include:

1. Piping water into a rock formation heated by a contained nuclear detonation to form steam for producing power or for other uses.

2. Placing various materials around a device so as to effect changes in the materials through nuclear reaction.

3. Further investigations of the makeup of the earth's crust through seismic studies of earth waves.

4. Moving earth in quantity, such as in digging a large canal.

The underground atomic test was made with an atomic device with a known yield of 1.7 kilotons. It took place 1,900 feet deep into the side of a tufa (volcanic) rock mesa near the northwest corner of the Nevada test site.

Radiological surveys after the shot, "showed that no radioactivity was released into the atmosphere."

Science News Letter, April 5, 1958

AGRICULTURE

"Bugs" and New Corn Combat Borer Invasion

► MICROSCOPIC "bugs" to combat a big bug, the European corn borer, are a new weapon against this pest that cost American farmers nearly \$160,000,000 in 1957 alone.

George T. York, U.S. Department of Agriculture entomologist, told scientists at the Entomological Society of America meeting in St. Louis, Mo., that two microorganisms have been used successfully to control the corn borer. One is a bacterium, the other a fungus.

In recent tests made by Federal-state scientists at Ankeny, Iowa, the bacterium gave a 77% kill. This is comparable, Mr. York said, to the best control obtained by two applications of DDT. In another test 84% kill of the corn borers was obtained.

Both the bacterium, *Bacillus thuringiensis*, and the fungus, a species of *Beauveria*, produce their lethal effects without leaving any residues harmful to man or animals.

The fungus spores germinate on the borer's skin, killing as they grow and penetrate the skin. Like the bacterium, the fungus can be applied by a crop duster or fertilizer spreader.

W. D. Guthrie, also an USDA entomologist, reported on current research involving borer-resistant corn. So far one experimental inbred has been found that is highly resistant to some larval stages of the pest.

There is a great deal of variation among different kinds of corn, however. One line will resist stalk invasion but is very susceptible to infection by early larval stages, only to show resistance to later stages.

Science News Letter, April 5, 1958

PUBLIC HEALTH

Urge Lowering Limit For Body's Radium Level

► THE CONCENTRATION of radium presently permitted for persons being treated with this radioactive chemical should be lowered, a British scientist urges.

His finding implies that the levels for radioactive strontium, the lethal fallout product of hydrogen bombs, should also be lowered.

"Appreciable bodily injury" may result from radium concentrations below that now considered the highest permissible, Dr. William B. Looney of the department of radiotherapeutics, University of Cambridge, Cambridge, England, has found.

The present maximum permissible concentration, or MPC, of radium in the body is one-tenth of a millionth of a gram. Dr. Looney's conclusion is based on information accumulated during the past 34 years, then estimated to cover a period equivalent to a normal lifetime.

The three reasons Dr. Looney concludes the present MPC should be lowered until information is available on the effects of radium in man for at least a lifetime are:

1. Available information on the reliability of the presently accepted MPC is not conclusive.

2. No information on the effects of radium in man at concentrations at or near the present MPC for a period longer than 40 years is available.

3. The roentgenograph, which is the most sensitive clinical means for detecting skeletal damage, is an inadequate method for detecting changes in tissue structure, a more definite indication of cell damage.

Presently available evidence, Dr. Looney reports in *Science* (March 21), suggests that cancer induced by radiation results from severe changes in tissue environment.

Science News Letter, April 5, 1958

GEOGRAPHY

India Drifted Northward For 100,000,000 Years

► INDIA DRIFTED northward with respect to the equator from 150,000,000 until 50,000,000 years ago.

This is the tentative conclusion of one British and two Indian scientists, reported in *Nature* (March 22), from their studies of rock magnetization.

They suggest that the Indian land mass occupied a position south of the equator at the time the rocks became magnetized. The corresponding ancient position of the north geographical pole would then be in the southern Caribbean Sea, at a latitude of 13 degrees north and a longitude of 70 degrees west.

The rock samples were taken from eastern Bihar. They were analyzed in Bombay and London, England, by Drs. J. A. Clegg of Imperial College, London, and C. Radakrishnamurthy and P. W. Sahasrabudhe of Tata Institute of Fundamental Research, Bombay.

Science News Letter, April 5, 1958