

## LINGUISTICS

**How Children's  
Vocabularies Grow**

➤ A FOUR-YEAR-OLD child is a talkative creature who plays with words as if they were toys. He utters about 12,000 words a day, although his active vocabulary is only about 920 words, said Thord Erasmie, a Swedish teacher and expert on pedagogical psychology.

Mr. Erasmie made a study of linguistic development in children of the ages four to six and a half years. For the purpose he sampled at random 156 children from Norrköping, a city which, from a socio-economic point of view, is representative of a major Swedish city.

While a one-year-old knows an average of three words, the figure has risen to 26 half a year later. The vocabulary then grows at an accelerated rate. From four to four and a half years it increases from 920 to 1,240 words. At the age of six and one-half, the child uses about 2,000 words, while his passive vocabulary—words that he knows—may be estimated at 6,000.

The study has shown, as might be expected, that there is no correlation between talkativeness on the one hand and good linguistic development or intelligence on the other. Factors positively influencing linguistic development are the child's general maturity and the educational level of his parents, particularly the mother.

Six year olds whose mothers have at least graduated from high school possess an active vocabulary of 1,810 words as against an average of 1,650 for all groups and 1,500 for those whose mothers have only basic schooling.

The influence from brothers and sisters or from mates in kindergarten or play school, on the other hand, seems to be less significant.

No major differences in linguistic development between the sexes were observed in the study. Strangely enough, the small girls knew better than the boys the meaning of such words as "fight" and "machine," while the boys proved to know more about table manners.

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## GEOLOGY

**Oil in Ancient Earth  
Allays Shortage Fears**

➤ GREAT UNTOUCHED stores of oil and gas buried deep in the oldest layers of the earth's crust are being sought. Explorations in progress promise to banish fear that petroleum may become scarce in the future.

Petroleum may be found in some of the most ancient rocks of the world, dating about three to five billion years old.

For the first time outside Russia, geologists are digging farther back in time and deeper into the earth to find valuable oil, gas and petroleum. Dr. Grover E. Murray of Louisiana State University at Baton Rouge surveyed this new development in the Bulletin of the American Association of Petroleum Geologists, 49:3, 1965.

In the Amadeus Basin, in the middle of Australia, a well was drilled through thick black, green and red shale to ancient salt rock at a depth of 6,105 feet.

These rocks date back to the Proterozoic Age, a time when the organic and chemical evolution of the earth was taking place and before animal life existed. At this early stage in the earth's history, the basic elements of organic life, oxygen, hydrogen, carbon and nitrogen, were present. These elements are also the basic constituents of petroleum.

Geologists outside of Russia have been hesitant to explore such ancient rocks in search of petroleum, partly because they have been uncertain about the existence of sufficient organic material to generate the hydrocarbons from which petroleum is formed, Dr. Murray surmised.

The flow of methane gas with minor amounts of propane found in the Australian drilling is the first irrefutable evidence of hydrocarbons in Proterozoic rocks. Hydrocarbons have been reportedly found in Precambrian rock deposits in Russia and Siberia.

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## MEDICINE

**Multiple Sclerosis Linked  
To Chicken Pox Virus**

➤ MULTIPLE SCLEROSIS, a chronic disease of the nervous system, has been linked to the virus causing chicken pox, or varicella.

Scottish university scientists reported in the British Medical Journal that examination of the blood of 96 multiple sclerosis patients and of 96 matched controls showed that a number of antibodies in virus-causing diseases had been greater in the MS patients, but that a "statistically significant difference was obtained only with varicella-zoster."

The relationship of varicella-zoster, which means chicken pox-shingles, is explained by the belief that there is a latent period after which the chicken pox virus, which has spread to nerves, is activated "to give the typical distribution of the lesions of zoster, or shingles.

If the chicken pox virus were confined to "posterior-root ganglia," or nerves near the spinal cord, the typical shingles would result, the researchers explain, but reactivation of the virus in the spinal cord itself could bring about a return of multiple sclerosis after remission, even if the initial cause were by some other unknown agent.

Other virus-caused diseases with possible links to multiple sclerosis in this and previous studies include measles, mumps, polio-virus types one and two and a type of pneumonia.

Dr. Constance A. C. Ross of the University of Glasgow, Dr. J. A. R. Lenman of Queen's College, Dundee, and Catherine Rutter, a laboratory technician, reported this study.

They said it appears either that patients with multiple sclerosis may be particularly susceptible to infection with varicella-zoster, or that infection with this virus may be related to the cause of MS.

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**IN SCIEN**

## AGRICULTURE

**Satellites While Orbiting  
Could Aid Agriculture**

➤ ALL CORN FIELDS, wheat fields, orchards and forests in the world could be counted in only a few hours from a number of satellites, set into near-polar orbits and spaced in an east-west direction.

Two scientists at the third Goddard Memorial Symposium of the American Astronautical Society in Washington, D.C., suggested that such a count would be an invaluable aid to agriculture.

Traveling at ground speeds of nearly 20,000 miles per hour, the satellites could record images of earth strips about 50 to 100 miles wide, reported Drs. Robert N. Colwell, University of California, and J. R. Shay, Purdue University.

These future satellites could check how and where crops and trees are growing, and if they are being attacked by insects, weeds or diseases.

By a system of catching and recording the energy waves that radiate or reflect from plants and soil around the world, sensory devices on satellites may well serve to keep constant tabs on vital farms and forests in a world seriously committed to provide adequate diet and materials for growing populations.

The scientists pointed out certain difficulties to be surmounted before such an earth orbital system would be effective. For instance, at altitudes of about 142 miles, all land features less than 50 to 100 feet high are likely to appear flat. Also at that height, atmospheric haze particles could scatter the radiant energy from the fields and prevent accurate observations.

Light-sensitive instruments have been used on airplanes to gain large-scale information on crops, forests and land, the scientists explained. The information is produced in photographic images that indicate what crops or trees are growing in particular areas, how vigorous the plants are, and how much certain crops could be expected to yield.

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## OCEANOGRAPHY

**Glass Tube to Carry  
Instruments Under Sea**

➤ STRONG, BUOYANT and made of glass, a transparent tube nearly five feet long and 16 inches in diameter will carry valuable instruments four miles under the sea this spring in a U.S. Navy research program.

The borosilicate glass capsule, made by Corning Glass Works, will carry magnetic digital tape recorders beneath the sea to record temperatures, depths and other facts off the Puerto Rican coast.

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# CE FIELDS

## ARCHAEOLOGY

### Indian Ate Indian 30 Centuries Ago

► **FIRST EVIDENCE** that the Indian of the Southeast ate his fellowman 3,000 years ago has been found by Dr. David Sutton Phelps, Florida State University, who is preparing to return to the cannibalistic site near Augusta, Ga., this summer.

Dr. Phelps hopes to find more bones, pottery and other ancient Indian materials by excavating a crescent-shaped "mound" that stretches 200 by 700 feet along an old channel of the Savannah River, 11 miles south-southeast of Augusta.

Upon analysis, Dr. Phelps found that the human bone fragments he had discovered in 1963 showed evidence of being cut and then cooked, perhaps boiled. Two adult mandibles or jaw bones were found, as well as large sections of human leg bones, a forearm bone, and a knee bone of a young person.

More than four humans of different ages were consumed during a ritual ceremony in this area, after being "prepared" in another spot, Dr. Phelps believes. No evidence of fire was found in the four-by-three-foot pit where the bones were found.

This seems to be the earliest evidence of cannibalism among the American Indians, he said. Cannibalism was known to be practiced among Indians much later at the time of the European explorations, from the Iroquois tribes and others down the Atlantic Coast and in Mexico, across the Gulf Coast.

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## MEDICINE

### Pump Sustains Life In Liver Cancer Patients

► **A POCKET-SIZED PUMP** that continuously drips drugs through a catheter into cancerous livers has kept at least 41 patients alive in the past two years since it was developed, Lahey Clinic Foundation scientists in Boston reported.

The American Cancer Society, which helped support the work, said that two out of three patients healthy enough to take the treatment were helped.

Because patients with liver cancer are considered without cure, Dr. Robert D. Sullivan conceived the pump treatment; Dr. Elton Watkins Jr., developed the pump and Drs. Wladyslaw Z. Zurek and Amir M. Khazei collaborated in the work.

Walking patients can use the 12-ounce pump, which fits into a coat pocket, thus receiving constant medication at work or play. The pump is wound like a clock every eight hours. A plastic disposable container holds five-sixths of a fluid ounce of the drug, which is pumped slowly a drop at a

time, day and night for five days.

When the five-day supply is exhausted, the patient discards the container and inserts a full one into the pump. Average length of time the pump technique is used is 40 days.

In 21 patients, cancer signs disappeared for from two to 17 months after the treatment had ended, and 15 at this time still are without evident regrowth of their disease. No patient is considered cured, however.

The most satisfactory drugs used appear to be 5-FU, or 5-fluorouracil and 5-FUDR, or 5-fluoro-2'-deoxyuridine.

The procedure begins with surgery that takes out whatever cancer is removable. Next the surgeons insert the nozzle of a long stringy Teflon catheter into the liver artery and sew it firmly into the artery wall. When the abdominal wall is closed, a one-and-a-half-foot length of the catheter is left outside the body, and the pump is attached to the catheter, pumping the drugs into the liver artery. The blood stream carries the medication into countless branches through the diseased liver, and because the liver absorbs and detoxifies it, very little of the strong drug gets back into the general circulation.

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## ENGINEERING

### Atomic Locomotives Seen For High-Speed Freight

► **THE NEXT 10 YEARS** may see the nation's railroads with freight trains of atomic powered locomotives pulling giant boxcars over modernized systems at up to 100 miles per hour.

This forecast was made by R. R. Manion, vice president, operations and maintenance department, Association of American Railroads, Washington, D.C., to the American Railway Engineering Association meeting in Chicago.

Railroad technology, Mr. Manion said, is reaching a turning point that will make possible a "great competitive breakthrough."

The freight car of the 1970s will be in the 100- to 150-ton range, he predicted, compared with the 76-ton capacity of today's cars. Also envisioned are duplex units described as "really big cars."

To pull these cars, Mr. Manion sees locomotives with ever increasing horsepower. The average unit today is 2,500 HP, replacing older 1,500 HP models. A series of 5,000 HP diesels have been developed and it is possible that once safe and efficient atomic units are developed, we will see locomotives of 10,000 to 15,000 HP size.

A corresponding increase in speed was also predicted with 75 mph likely and 100 mph technologically possible.

Coupled with improvements in rolling stock will come advances in rails, track maintenance, train control and signaling.

Radio and microwave have combined to eliminate pole lines and in the future may be adapted to transmit signal circuits now handled by wire. Moreover, railroads have installed 44 major electronic classification yards since 1949 to cut terminal delays.

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## PUBLIC HEALTH

### Venereal Disease International Problem

► **VENEREAL INFECTION** is taking its place as an "international" disease.

With the unprecedented movement of civilian and military travelers all over the globe, syphilis has increased and gained notoriety as a disease contracted on one side of the globe and quickly spread to the other.

A report in World Health indicates that as many as 50% of the syphilis cases diagnosed in some countries originated abroad.

During one year a special sample of overseas merchant ships from a large maritime nation found 20% of the crews infected.

Other "changes of environment" have either contributed to the increase of syphilis or held back efforts to control it.

Syphilis is primarily an urban disease. Therefore, the population movement from rural to urban areas, and the expansion of cities and towns are of special importance.

The "new standard for a new age," the freer association of the sexes, has added to the spread of venereal disease.

In many countries where legalized prostitution has been recently abolished, controversy is brewing over the effects on venereal disease control.

"It has been noted that the increase in venereal disease in recent years is similar in developed countries where licensed brothels were abolished many decades ago (Scandinavian countries) and in those where they were more recently suppressed (France, Italy)," the report said.

Clandestine promiscuity, migration of labor and consumption of alcohol have also aided the spread of infection.

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## METEOROLOGY

### South Pole Plain Drier Than Sahara Desert

► **THE VAST DESOLATE** plain of two-mile-deep ice on Antarctica's farthest inland point is drier than the Sahara Desert, report scientists from the University of Wisconsin, Ohio State University and the U.S. Coast and Geodetic Survey.

The men shivered in temperatures averaging 15 degrees below zero Fahrenheit and panted in the thin air of the 10,000 feet elevation on the expedition financed by the National Science Foundation in Washington, D. C.

The scientists had traveled a zig-zag route of 900 miles across the southernmost portion of Antarctica to collect information on the earth's magnetic field, the icecap and the underlying mountain range believed buried near the South Pole. An abandoned Soviet research station is located at the far point, perhaps the most isolated place on earth. As winter approached the Southern Hemisphere, the men worked 20 hours each day in order to complete their investigations before the decreasing temperatures made work impossible.

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