

ZOOLOGY

Why Microorganisms Send Out Streamers

TWO ZOOLOGISTS have offered an explanation for the mysterious force behind tiny streams of protoplasm which certain microscopic organisms send out in quest of food.

The discovery, by Dr. Theodore L. Jahn and Robert A. Rinaldi of the University of California at Los Angeles, may lead to a reclassification of an important segment of the world of one-celled creatures.

In the microscopic world vast numbers of tiny creatures which are little more than blobs of protoplasm maneuver around in quest of food, as most living things must. Some of them send out tiny streamers in all directions.

The forces that propel such streams of protoplasm have never been precisely understood by scientists. One proposed mechanism is a pressure system involving contraction of plasmagel tubes. This seems to fit movement of amoebae and has been generally accepted for all similar organisms.

The UCLA zoologists have found that some of these creatures, a type of microscopic marine organisms known as *Foraminifera*, which live in shells and send out protoplasmic streamers through holes in the shells, apparently do not have gel tube systems.

Their observations have suggested that a longitudinal shearing or parallel displacement force located between adjacent surfaces of two gel threads may propel protoplasmic streams of these organisms and several other types.

They suggest that the entire world of "flowing blobs of protoplasm" be reclassified in two types, those that move by pressure systems, and those that move by shear forces between gel threads.

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ASTRONOMY

Influence of Sun On Weather Found

EVIDENCE of a link between unusual activity on the sun and large-scale weather patterns is reported by two scientists from the High Altitude Observatory of the University of Colorado.

They said that certain low pressure areas in the earth's atmosphere some 30,000 feet above the surface change shape a few days after the earth is bombarded by very intense solar particles. Drs. Norman J. McDonald and Walter Orr Roberts, director of the High Altitude Observatory, found evidence for this link through statistical studies of weather patterns for three winter half-years.

Many scientists have for many years tried to show a link between solar activity and some aspect of the weather, such as rainfall or pressure changes. Most such attempts have been unsuccessful.

The low pressure areas affected by the solar activity, Drs. McDonald and Roberts

reported, enter or are formed in the Gulf of Alaska-Aleutian Islands area on the second, third or fourth days after the start of particle emission from the sun. The changes in the low pressure areas occur from a few to several days later and in different locations.

The probability that these changes occur by chance for the three half-years grouped together is less than one in a million, Drs. McDonald and Roberts told the American Astronomical Society meeting at Case Institute of Technology, Cleveland, Ohio.

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ENGINEERING

Untiring Miner Works 1,000 Feet Underground

A COAL MINER that never tires and can work alone 1,000 feet deep in a small shaft has been bred by American technology.

J. W. Heimaster of Union Carbide Olefins Co., South Charlestown, W. Va., told the American Mining Congress meeting in Cleveland, Ohio, that the machine will bore a roughly oval hole 38 inches by 116 inches to a depth of 1,000 feet. It will pull out an 800-foot train of loaded coal conveyors, enabling two men to load more than 400 tons of coal per shift into trucks for delivery.

The remotely controlled miner requires only one operator, above ground. It has proved so reliable that it is now being used 24 hours a day all week. It has to "rest" only to be fitted with a fresh, sharp bit, or to be moved to a new bore-site.

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ARCHITECTURE

Academy of Science Opens in Canberra

THE AUSTRALIAN Academy of Science might be called the most controversial building in the Australian capital.

The building is basically a dome, the second largest in the world, and no paint was used on the inside or outside of it.

It is the first shell to have archways cut into its edges.

The scientific shell will become the Australian center for disseminating and storing scientific knowledge and the place where Australia's scientific achievements are displayed and conferences held.

The Canberra dome is 40 feet at the hemisphere with a diameter of 156 feet, but one built for the Rome Olympics in 1960 with a retractable steel section spans 415 feet in diameter.

Over the dome a burnished copper skin has been fitted. It is expected to take ten years in Canberra's smog-free atmosphere to oxidize the copper into a natural soft-green color.

The Great Pantheon in Rome which was begun in 27 B.C. and rebuilt in circular fashion by Emperor Hadrian between A.D. 110 and 125 was formerly the world's biggest dome, with a diameter of 144 feet.

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IN SCIEN

ROENTGENOLOGY

X-Ray Movies Spot Speech Problem Causes

HIDDEN physical defects that contribute to speech problems are being detected by X-ray movies.

A movie technique, technically known as cinefluorography, is being used by the Cleft Palate Rehabilitation Team at the University of California Medical Center, Los Angeles, Calif.

The team consists of Dr. Franklin L. Ashley, Robert F. Sloan, Dr. Elise Hahn and Dr. William Hanafec.

The tongue of the patient is coated with barium, and the X-ray movies are made while he pronounces certain key vowel sounds—"ah," "ee," and "oo." Simultaneous tape recordings of the sounds are also made.

From movements of the tongue, pharynx, uvula and other components of the speech mechanism during formation of these sounds, clues to anatomical defects contributing to speech difficulty may be obtained.

Slight anatomical defects of the speech mechanism, such as excessive adenoidal tissue or subtle malfunctioning of the soft palate, are often difficult to detect by conventional diagnostic techniques, the UCLA group pointed out. Study of the movies will, however, often reveal such defects.

Thus the cinefluorographic techniques have enabled the speech therapist to observe the progress of the patient and aid the surgeon and orthodontist in deciding whether surgical and dental reconstructive procedures may help the patient to attain a more normal speech development.

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EDUCATION

Some Children Learning To Read Before Age of 6

SOME CHILDREN can learn to read before they enter first grade, and schools that do not encourage earlier reading instruction, sometimes by older children, are overlooking opportunities.

Prof. Dolores Durkin of Teachers College, Columbia University, in a study has found that today's four- and five-year-olds are becoming more and more sophisticated in their understanding of words and reading. Some children should be given reading instruction at the kindergarten level, she suggested.

Children could teach each other, she has concluded. In more than half the homes where a child learned to read prior to the first grade, an older brother or sister acted as tutor.

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CE FIELDS

ASTRONOMY

Astronomers Find New Class of Meteor Streams

A NEW CLASS of meteor streams, which are older than the well known groups of "shooting stars," has been reported.

Drs. G. S. Hawkins and R. B. Southworth of Harvard College Observatory said they had discovered 32 minor streams by studying photographs of 260 random meteors taken with the Baker Super-Schmidt cameras. Only six of the 32 belong to those previously recognized among photographic meteors.

The minor meteor streams appear to come from a very broad area and have very low hourly rates. Drs. Hawkins and Southworth told the American Astronomical Society meeting in Cleveland, Ohio, the streams had undergone more aging than the well-known streams.

Dr. Luigi G. Jacchia of the Smithsonian Astrophysical Observatory reported to the astronomers that the brightest meteors appear at a greater height than fainter ones. He said an analysis of the first visibility of 392 meteors also showed that meteors with long-period orbits appear systematically at greater heights than meteors of the Jupiter family.

Dr. Ernest J. Opik of the University of Maryland, on leave from Armagh Observatory, North Ireland, reported that the frequency of stray objects in the neighborhood of the earth's orbit has not varied greatly since the formation of the solar system, some four and a half billion years ago. He reached this conclusion by comparing the number of craters of a given diameter in the lunar area known as Western Mare Imbrium with the number to be expected theoretically if the impact velocity was 12 miles per second.

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PHARMACOLOGY

New Antibiotic Drug Acts Where Penicillin Fails

A NEW DRUG, which appears to wipe out many of the infections resisting penicillin, has been discovered. It is called cephalosporin C.

Its isolation by doctors working at Oxford, England, and in Somerset marks an advance in the antibiotic field. In laboratory tests it has killed many of the organisms, notably staphylococci, which have recently developed immunity to penicillin. The rapid build-up of this resistance has been alarming doctors everywhere and has led to a sharp rise in hospital infections.

The drug is closely related to the penicillin family but has a different chemical structure. It was first discovered in sewage effluent in Sardinia, the Italian island in the

Mediterranean, but is now being produced synthetically in England.

The basic work on the new drug has been done by scientists under Prof. Sir Howard Florey and Dr. E. P. Abraham, of the pathology and bacteriology department of Oxford University, and by the Medical Research Council's research station at Clevedon, Somerset, under B. K. Kelly. Additional work on it was done by the Oxford X-ray crystallography unit under Mrs. Dorothy Hodgkin.

"The cephalosporins have been known for several years," said J. C. Duckworth, who recently succeeded Lord Halsbury as managing director of the British Government's National Research Development Corporation.

"Many antibiotics have been isolated from the general group and the C one is believed to have the most possibilities. The development of the new drug will not be held up by any shortage of cash," Mr. Duckworth promised.

Tests on animals have proved completely successful and similar tests on human beings are to start almost at once, Mr. Duckworth said. Already two companies, Glaxo Limited and the Distiller Company, are investigating the possibilities of large-scale commercial production of it.

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ASTRONOMY

Astronomers Use Rockets To Probe Sun's Behavior

ROCKETS soaring high into earth's atmosphere, instruments that make man-made solar eclipses, and pencil and paper to interpret the information so gained, are helping astronomers learn about the sun's behavior.

At the American Astronomical Society meeting in Cleveland, Ohio, scientists reported results of their instrumental and theoretical probings of the star nearest earth, the sun. Drs. John G. Wolbach and Donald H. Menzel, who is director of Harvard College Observatory, suggested that solar prominences are not uniform clouds of luminous gas, as many have thought. For example, a hazy thread, curving gracefully from the upper corona toward the solar surface, is not continuously luminous.

Observations with the solar coronagraph, a device to view the sun as if it were in eclipse, "clearly show" that prominences possess a string-like structure, sometimes appearing like tangled skeins of thread. In prominences associated with sunspots, the filaments assume distinctive forms of which loops are the simplest and most characteristic, Drs. Menzel and Wolbach reported, and the filaments themselves show internal structure.

Drs. R. Tousey, J. D. Purcell and P. Mange of the U. S. Naval Research Laboratory said photographs of the sun taken in the far ultraviolet of solar Lyman alpha showed that there is hydrogen in the space between the earth and the sun. The rocket flights during which the sun was examined in the Lyman alpha hydrogen line were made July 21, 1959.

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PSYCHOLOGY

Sight and Hearing Tie Aged to World of Reality

TOO MUCH "peace and quiet" may be the worst possible treatment for elderly persons.

Sounds in particular are a bridge between the older person and reality, Dr. Ewald W. Busse of Duke University Medical Center, Durham, N. C., reported in Chicago to a symposium sponsored by the American Association for the Advancement of Science.

The person whose hearing gradually decreases is often unaware that he has lost these bridging background sounds. He has a feeling of loss and a sensation that the world is dead, explained Dr. Busse, who is a professor of psychiatry and director of the Center for the Study of Aging. An increase in the level of background noises to help elderly individuals maintain contact with reality may be advisable, Dr. Busse suggested.

He also reported that results of a study of the effects of visual and hearing losses on the Rorschach performance of elderly persons shows intactness of hearing is more important than perfect vision in maintaining normal psychic function. Severe impairment of either can have serious impact on the personality, however. It is not generally recognized, for example, that the elderly person needs greater illumination to see adequately and more time to adapt to darkness when he leaves a well-lighted area. The proportion of persons over 65 in mental institutions is increasing rapidly, Dr. Busse said. This may not reflect an actual increase in mental illness.

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DEMOGRAPHY

Puerto Ricans Go Home In "Surprising" Numbers

ABOUT 85,000 PERSONS migrated from Puerto Rico to the United States in 1958, but about 59,000 left the U.S. for Puerto Rico.

Robert O. Carleton, a member of the Puerto Rican planning board, told the American Statistical Association meeting in Washington that net migration between Puerto Rico and the U.S. is the result of a substantial two-way movement "to a much greater extent than anyone supposed."

The number of Puerto Ricans migrating to the U.S. appears to be falling, his statistical study showed. In the period of 1950 to 1956, net out-migration averaged 50,000. In 1957 it dropped to 30,000.

Mr. Carleton predicted more from the U.S. will migrate to Puerto Rico in the 1960's as the island's economic development program attracts skilled and semi-skilled labor. But he said pressure to migrate from Puerto Rico should continue and "maybe even increase" among the unskilled.

Future trends depend upon "population pressure," he said, and the 1960 Census will reveal present trends in Puerto Rican fertility. There is evidence that fertility is declining. In 1950, about 85,000 Puerto Ricans were born. But in 1958, only 75,000 births were recorded.

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