SPACE BIOLOGY

Earth Life Not From Space

➤ THE FIRST SEEDS of life did not travel through outer space to reach the earth from some distant world, according to Dr. Carl Sagan of the University of California, Berkeley.

In a report to the annual meeting of the American Association for the Advancement of Science in Denver, Colo., Dr. Sagan said that the old theory has been "robbed of any reasonable plausibility" by modern knowledge about the size of microorganisms, their ability to withstand the effects of radiation, the birth and death of stars, and the vast immensity of space.

The so-called "panspermia hypothesis" was first advanced about 1900 by the Swedish scientist Svante Arrhenius. He proposed that germs of life might have escaped from one world and been "pushed" by stellar radiation across interstellar space to seed life in other worlds.

On this basis, the theory arose that life might have germinated first at a single site in the universe and then spread to other locations, including the earth, through the "panspermia" mechanism.

Scientists today no longer need this theory, Dr. Sagan pointed out, since they have good evidence that life could have evolved on earth and elsewhere through known chemical processes.

Examining the panspermia hypothesis, Dr. Sagan found that only very bright but low-mass stars—those that emit high radiation but exert little gravitational pull—would be suitable for "pushing" microorganisms into interstellar space. Yet stars of this type exist only for brief periods and would allow little chance for life to evolve on their planets.

Most other stars are too "cool" and lack the radiation intensity to eject anything larger than a single molecule from their gravitational fields.

A few stars, about the size and temperature of our sun, might be capable of boosting virus or bacteria particles into space if all conditions were right, Dr. Sagan reasoned.

He calculated that a particle leaving the earth could reach Mars within a few weeks and might travel to the distance of the nearest star in a few tens of thousands of years. But here the theory runs into more trouble: the ability of viruses and bacteria to survive extreme cold, complete vacuum and intense radiation.

Even with a generous allowance for the improbable, Dr. Sagan said, current knowledge of radiation tolerances indicates that ultraviolet light would kill every known type of microorganism within less than a day in interplanetary space.

If some unknown hardy organism could survive the ultraviolet light, he added, it would still be killed by protons and X-rays from the sun before it reached the distance of the nearest star.

And even though all these "ifs" were overcome, the California scientist concluded, the vast emptiness of space would still place astronomical odds against the chance that space-traveling organisms could hit a target on another stellar system.

• Science News Letter, 81:4 January 6, 1962

Solve Riddle of Iron Rust

➤ SCIENTISTS ARE on the trail of solving the problem of corrosion of iron, Dr. J. A. Hutcheson, vice president for engineering, Westinghouse Electric Corporation, Pittsburgh, told the American Association for the Advancement of Science in Denver, Colo.

Dr. Hutcheson predicted this is likely to result from basic research such as that being conducted by Dr. Earl Gulbransen at the Westinghouse Research Laboratories.

The answer to iron rust is expected to come from studying what happens in the simplest possible terms. Dr. Gulbransen is approaching the problem by devising new techniques for reacting the metal with oxygen in miniscule quantities, new weighing apparatus sensitive enough to detect a single layer of atoms on a surface no larger than a postage stamp, and new high-temperature electron diffraction apparatus.

It has been found that in dry oxygen, iron forms a protective oxide coating from which grow tiny oxide whiskers, less than one-millionth of an inch in diameter and 30-millionths of an inch high. Under the electron microscope, nearly one billion per square inch are seen to sprout from single specific growth sites on the metal surface, much as individual plant seeds sprout from the ground.

But when traces of water vapor are added to the dry oxygen, these individual growth sites erupt into thin, broad, blade-shaped platelets of iron oxide up to 3,000-millionths of an inch high. As they grow in size they spread over 50 times more area and 250 times more volume than do the whiskers formed in dry oxygen.

Dr. Gulbransen has a theory which, tentatively at least, seems to explain it. Hydrogen ions from the water enlarge the corrosion sites, destroy the protective coating of oxide, and set in motion the rust reaction.

The importance of iron corrosion, Dr. Hutcheson emphasized, is shown by the fact that simply to replace automobile mufflers in the U.S. $75 million to $80 million is spent annually.

• Science News Letter, 81:4 January 6, 1962

California Population

➤ CALIFORNIA, which is about to become the most populous state in the nation, has a dangerous imbalance between population and rainfall, with over half the population in southern California, driest part of the state.

Prof. Howard F. Gregor of the University of California at Davis told the American Association for the Advancement of Science in Denver, Colo., that the importation of water and the flexibility of California's water resource does not eliminate the growing economic, political, and technological complications.

Among other California problems is the fact that most of the population is concentrated in three coastal areas. Air pollution in these regions causes difficulties.

Another California difficulty is impending loss of most prime agricultural land along the California coast in the not-too-distant future.

• Science News Letter, 81:4 January 6, 1962

SCIENCE NEWS LETTER

VOL. 81 JANUARY 6, 1962 NO. 1

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N.W., Washington 6, D. C., NOrth 7-2255. Cable Address: SCIENSERVC.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is addressed. Your new address should include postal zone number if you have one.

Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineerng Index. Member of Audit Bureau of Circulation.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: William W. Rubey, University of California at Los Angeles; Wallace R. Brode; Douglas Whitaker, Rockefeller Institute for Medical Research. Nominated by the National Academy of Sciences: Harlow Shapley, Harvard College Observatory; Philip Bard, Johns Hopkins University; Henry Allen Moe, John Simon Guggenheim Memorial Foundation. Nominated by the National Research Council: Leonard Carmichael, Smithsonian Institution; John R. Dunning, Columbia University; Benjamin H. Willier, Johns Hopkins University. Nominated by the Journalistic Profession: Michael J. Ogden, Providence Journal-Bulletin; O. W. Riegel, Washington and Lee University; Ralph B. Curry, Flint Journal. Nominated by the Scripps Estate: Edward J. Meeman, Memphis Press-Scimitar; Frank Ford, Washington, D. C.; Charles E. Scripps, Cincinnati, Ohio.

Officers—President, Leonard Carmichael; Vice President and Chairman of Executive Committee, Charles E. Scripps; Treasurer: Wallace R. Brode; Secretary: Watson Davis.

Staff—Director: Watson Davis, Assistant Director: Dorothy Schriver. Writers: Ann Ewing, Faye Marley, Vincent Marteka, Tove Neville, Marjorie Van de Water, Judy Viorst. Science Youth Division: Joseph H. Kraus, Leslie Watkins. Photography: Fremont Davis. Production: Priscilla Howe, Marcia Nelson. Syndicate Sales: Hallie Jenkins. Conferences: Jane Marye. Librarian: Margit Friedrich. Interlingua Division in New York: Alexander Gode, 80 E. 11th St., GRamercy 3-5410. Advertising Manager: Fred A. Moulton, MEtropolitan 8-2562.