

18 amino acids found

Meteorites may point to life's origin

Scientific research by the National Aeronautics and Space Administration has led to the discovery of a coincidence which may show a basic pattern for the process of chemical evolution believed to lead to the origin of life.

The discovery was made by a team of scientists headed by Dr. Cyril Ponnampneruma of the NASA's Ames Research Center, Mountain View, Calif., who described the new find at a meeting of the New York Academy of Sciences.

The research team has found in a second meteorite exactly the same 18 amino acids, plus two pyrimidines, that were discovered last December in the Murchison meteorite. The newly analyzed meteorite, known as Murray, fell in Kentucky in 1950. The Murchison meteorite fell near Murchison, Victoria, Australia in September 1969.

In describing the new findings, Ponnampneruma said: "We can only speculate at this stage, but the findings of this identical complex pater of amino acids and pyrimidines in two meteorites could mean that this is a basic phase in the chemical process leading to life. This basic sequence in the formation of organic molecules could be determined by the inherent chemical characteristics of the material of our universe.

"Starting with these 18 amino acids, it would be theoretically possible to build up a living organism," he concluded.

The recent discovery of amino acids (building blocks of living cells) in the Murchison meteorite appears to be the first conclusive proof of extraterrestrial (non-Earthly) chemical evolution, the chemical process most scientists believe led to the origin of life on Earth.

Finding these life materials in a second meteorite strengthens

the case for the chemical evolution theory, and increases the likelihood of life elsewhere in the universe—created by chemical evolution.

Scientists believe that the planets of the solar system, including the Earth, formed 4.5 billion years ago from a circumsolar gas cloud. Finding of amino acids and other organic molecules in a meteorite of this probable age also reinforces the conclusion that these complex life materials have been present from the time of formation of the Earth.

Both the Murchison meteorite and the Murray are Class II carbonaceous chondrites (two to three per cent carbon). Both are believed to be about 4.5 billion years old, and are of a type of meteorite thought by scientists to have originated in the asteroid belt, between the orbits of Mars and Jupiter.

The theory of chemical evolution states that, starting with the basic elements of the primordial universe, various types of energy discharges caused ever-more-complex chemical molecules to evolve. After hundreds of millions of years of chemical evolution, very complex molecules appeared which could reproduce themselves, and thus be considered the first forms of life.

Six of the amino acids found in both meteorites are of the kind normally found in living cells; 12 are similar to these but do not play a functional role in living material. Both meteorites also contained two non-biological pyrimidines, very similar to pyrimidines of biological origin.

Two of the four building blocks of the DNA chain are pyrimidines. The DNA chain is the blueprint molecule within every living cell (human and other-

wise), which provides all specifications of the complete organism.

Findings with the Murchison and Murray meteorites are not the first reports of life materials in meteorites. But other reports have been seriously criticized because of the likelihood of biological materials getting into the meteorites after their impact with the Earth.

The cases of the Murchison and the Murray meteorites differ from these because of several proofs of nonbiological and non-Earthly origin, and because of the precise identifications made.

The researchers found in good quantity six amino acids normally found in living cells, mixed in with 12 other amino acids similar to protein forming amino acids but having no functional role in living organisms, and rarely found on Earth.

The amino acids found also were an almost equal mixture of both D and L types (right and left-handed molecule structures). Amino acids of biological origin, like those found on Earth, are all of the left handed variety because Earth organisms produce only left-handed amino acids.

Right-handed amino acids are rarely found on Earth. Biologists can imagine that life on another planet could be based on right-handed amino acids instead. But they agree that a mixture of both types virtually rules out biological origin, and certainly Earthly origin.

The identification of the materials in the Murchison and Murray meteorites was made by gas chromatography combined with mass spectrometry, among the most precise methods known for exact identifications of complex chemicals.

Read Battalion Classifieds

ATTENTION SUMMER SCHOOL STUDENTS

July 12 - August 20

7-DAY SUMMER BOARD	\$104.25
5-DAY SUMMER BOARD	\$ 94.00

YOU CANNOT EAT FOR LESS ANYWHERE ELSE

"QUALITY FIRST"

DPC offers basic course in FORTRAN

An introductory course in FORTRAN language computer programming will be offered for Texas A&M faculty-staff members this summer by the Data Processing Center.

DPC Director Robert Bower Jr. announced that the non-credit course will acquaint participants with FORTRAN language so the computer can be utilized in research projects or course offerings.

Class will meet Mondays, Wednesdays and Fridays from 3 to 5 p.m. for four weeks. Sessions beginning July 19 will meet in Room 121 of the Civil Engineering Building. Enrollment fees will not be charged.

Registration forms are available through departmental distribution or DPC.

Bower said content will cover basic computer concepts, flow charting and FORTRAN programming. Participants will write several programs to be processed by DPC's IBM 360/65 computer.

Personnel chief gets assistant

Kenneth B. Livingston has been named assistant personnel director at Texas A&M, announced H. Ray Smith, personnel director.

Livingston, 37, has been associated with Jet Research Center, Inc. since 1963. He has served as both personnel manager and marketing manager for the Arlington firm.

The 1956 Texas A&M graduate previously served five years as safety inspector and safety engineer for Thiokol Chemical Corp. in Marshall and Brigham City, Utah.

Smith said Livingston will assist in various Personnel Department activities, including wage and salary administration, employment, new employee processing, training, insurance, retirement, safety, equal opportunity and related personnel programs.

Livingston resides at 1209 S. Ridgefield Circle with his wife and son.

FOR BEST RESULTS TRY BATTALION CLASSIFIED

WE GIVE GREEN STAMPS

DILL PICKLES	AMERICAN WHOLE	ST. PKG.	39¢
NAPKINS	NORTHERN PAPER	60CT. PKG.	10¢
PLATES	9" WHITE PAPER	100CT. PKG.	49¢
PEPPER	FRENCH'S BLACK	4OZ. CAN.	39¢
B-B-Q SAUCE	HEINZ	16 Oz. Btl.	39¢
MUSTARD	FRENCH'S	24OZ. JAR.	39¢
POTATO CHIPS	BONNIE BAKER	10OZ. PKG.	39¢
LIGHTER FLUID	GULF CHARCOAL	QT.	39¢
KING KOOLER JR.		10 12OZ. CANS	88¢
VIENNA SAUSAGE	VAN CAMP	4 4OZ. CANS	88¢
CATSUP	HUNT'S SPECIAL DECANTER PACK	2OZ. BTL.	29¢

DOG FOOD	DELIGHT	4 16OZ. CAN.	37¢
PINE OIL	PINE O PINE	8OZ. BTL.	45¢
CRACKERS	NABISCO PREMIUM	1B.	41¢
OREOS	NABISCO CREM SANDWICH	15 Oz. PKG.	53¢

Shop PIGGLY WIGGLY

POLAR KING
ICE CREAM
1/2 GAL. CTN
59¢

**PLAY...
UNBEATABLE BONUS**
for
EXTRA S&H GREEN STAMPS!

KING KOOLER DRINKS 10 12 Oz. Cans 88¢

*THESE PRICES EFFECTIVE THURS.-FRI.-SAT.-SUN. JULY 1-2-3-4

KRAFT

MIRACLE WHIP

QT. JAR

49¢

ARROW

CHARCOAL BRIQUETS

20 LB. BAG

89¢

TOP QUALITY FARM FRESH PRODUCE

CALIFORNIA PEACHES	4B. 29¢
CALIFORNIA STRAWBERRIES	3 PINTS \$1.
CELLO RADISHES	2 PKGS. 25¢
WASH. (EXTRA FANCY) RED APPLES	4B. 29¢
FANCY FULL CORN	6 EARS 49¢
SUNKIST LEMONS	6 FOR 39¢
SANTA ROSA PLUMS	4B. 39¢
COLORADO GREEN ONIONS	2 BU. 25¢
TEMPTING CANTALOUPE	3 FOR 89¢
RED SWEET CALIF. ONIONS	2 LBS. 29¢

WE GIVE DOUBLE S&H GREEN STAMPS EVERY TUES. WITH \$2.50 OR MORE PURCHASE

STORE HOURS
 Monday thru Saturday 8 a.m. to 8 p.m.
 Sunday 9 a.m. to 6 p.m.

BONNIE BAKER BUNS	3 PKGS	89¢
BONNIE BAKER HOMO MILK	1 GAL CTN.	\$1.12