

NO EXTRA-TERRESTRIAL LIFE FOUND IN METEORITES

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How and whence came life on earth? This problem has kindled man's imagination for generations, but due to lack of precise facts it has remained unsolved. Many noted investigators of physical and biological phenomena have studied the question. Richter speculated on the possibility that micro-organisms pervaded all space. Following the same line of thought, Arrhenius reasoned that under certain favorable conditions the pressure of light could drive spores from outer space to our planet and thus seed it with life. Von Helmholtz and Lord Kelvin suggested that meteorites might have been responsible for bringing the original forms of life to the earth.

This last suggestion has been raised to the dignity of a theory by Professor Charles B. Lipman, of the University of California, who, in 1932, reported the finding of living bacteria in stony meteorites and interpreted the organisms to be of extra-terrestrial origin. This alleged discovery was received by laymen with philosophical interest, and by geologists and bacteriologists with skepticism, but because of its spectacular nature it was accorded wide publicity.

Without either accepting or denying the plausibility of Professor Lipman's theory, Field Museum, along with other scientific institutions, made available to him material from its meteorite collection upon which to conduct experiments. An account of the results reported by Professor Lipman was written for FIELD MUSEUM NEWS by the late Dr. Oliver C. Farrington, former Curator of the Department of Geology, and appeared in the March, 1933, issue. Dr. Farrington therein commented that "far more investigation is necessary before satisfactory conclusions can be drawn."

The interpretation proposed by Lipman is of such fundamental significance that before its acceptance, it should be shown to rest on indisputable evidence. For this reason, the present writer undertook to repeat Lipman's experiments, closely following his technique and culture media so that the two results might be directly comparable. Four stony meteorites, (1) Holbrook, (2) Mocs, (3) Pultusk, and (4) Forest City, were used for the purpose, the first three of which belong to the same falls as three of the five falls used by Lipman in his final experiments.

The method of investigation was as follows: The exterior of each meteorite was first sterilized, then dropped in a flask containing sterile culture media and incubated aerobically (i. e., in the presence of air) for twelve weeks, and anaerobically (in a vacuum) for sixteen weeks. Under these conditions, if the surfaces of the meteorites were not sterilized, growth would appear. But in all cases no growth appeared. Inside a sterile chamber, each specimen was then crushed separately in an especially devised sterile mortar, and the powder from each was distributed with a thoroughly flame-sterilized spoon into three tubes, each containing a different kind of culture medium. The tubes (twelve in all) were then incubated aerobically for four weeks and anaerobically for eight weeks. To provide for checking the results, three control plates were exposed by passing them through the atmosphere of the inoculating chamber several times.

In the foregoing experiments bacterial growth appeared in a total of three of the twelve tubes of media inoculated with

meteorite powder. The systematic position of the organisms (a rod and a coccus) isolated from these growths was then determined by observing their morphology, as well as their cultural, staining and fermentation reactions. These tests established the rod to be *Bacillus subtilis*, and the coccus, *Staphylococcus albus*.

Of the three control plates exposed in the inoculating chamber, two developed two distinct types of colonies. The organisms from these colonies were subjected to an appropriate series of tests and were found to be also *Bacillus subtilis* and *Staphylococcus albus*.

The logical conclusion, therefore, is that the growth found in the three tubes inoculated with meteorite powder was the result of contamination with *Bacillus subtilis* and *Staphylococcus albus*, and not of meteoritic bacteria.

It would seem to this writer that Lipman could hardly have chosen a more unlikely

substance, namely, meteorite, as the basis of his investigations. The composition and structure of meteorites point directly to their igneous origin. Fires must have glowed in cosmic furnaces of some sort in order to impart to meteorites the structure which they present to us. Further, stony meteorites commonly exhibit signs of partial refusion of certain of their constituents—an appearance comparable with the metamorphism produced in terrestrial rocks by intense heat. Obviously then, meteorites, unlike sedimentary rocks, cannot harbor bacteria while they are being formed or being reconstituted, for neither molten magma nor the heat of metamorphism is inviting to living bodies.

These arguments, together with the experimental results obtained by the writer, strongly indicate that the alleged living bacteria found in meteorites by Lipman were probably contaminants, and not of extra-terrestrial origin as he claimed.

ETHIOPIAN TYPES INCLUDED AMONG SCULPTURES OF RACES

Types of three of the races which compose the population of Ethiopia are exemplified by sculptures in the Races of Mankind series by Malvina Hoffman on exhibition in Chauncey Keep Memorial

tory waves in a remote period long before the dawn of history. Intermixture with Negroes gradually produced many new racial divisions of varying degrees of difference from their ancestors on both sides. In general it may be said that the Hamites possess dark brown or black hair, curly or wavy in form; skin varying in color from reddish to dark brown; and average stature of about five and one-half feet, with slender build. The typical Hamite has a long head, oval elongated face without forward protrusion, thin lips, pointed chin, and a prominent well-shaped narrow nose.

The sculptures of the Somali and Hamite men are in bronze; that of the Abyssinian girl is in black



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Ethiopian Types Shown in Chauncey Keep Hall

Left to right: a Hamite, an Abyssinian girl, and a Somali. Three sculptures by Malvina Hoffman in the Races of Mankind series.

Hall (Hall 3). They are a Hamite man, an Abyssinian (or Ethiopian) girl, and a Somali man.

The physiognomy of the Hamite shows features far removed from those typical of the Negroes. Especially is this evident in the refinement of the nose and mouth. Further testimony to this man's Caucasian derivation is found in the hair which, while frizzly, is not woolly like that of Negroes.

A high type of African beauty is reflected in the carved portrait of an Abyssinian girl. Here again we find features which show the influence left on the racial strains of Ethiopia by the Hamitic invaders. An interesting mode in hairdressing may be observed here—one which obviously must require considerable time and skill for its preparation.

The Somalis, who inhabit parts of Ethiopia, as well as other regions of north-east Africa (British, Italian, French Somaliland, etc.) are of Hamitic extraction. Unlike true Negroes, the Somali are characterized by wavy hair and oval faces. Their facial features are a little more delicately formed; the brown color of their skin is lighter. They rank among the taller tribes.

The Hamitic invasion of northeastern Africa is believed to have occurred in migra-

Belgian marble. Original photographs, and photogravure post card views of these and most of the other Races of Mankind sculptures may be purchased at the Museum. Mail orders are given prompt attention. Reproductions in bronze may be purchased by special arrangement.

ETHIOPIAN PLANTS IN HERBARIUM

Field Museum possesses a collection of plants having special interest because of current world events. The collection was made in the mountains and plains of Ethiopia one hundred years ago by Wilhelm Schimper, an Alsatian botanist who spent several years there. He collected thousands of plant specimens, and was probably the first European to become acquainted with the rich Abyssinian (or Ethiopian) flora.

Schimper was the discoverer, so far as science is concerned, of many of the most curious East African plants. Among them may be mentioned especially the giant lobelias. In America the lobelias, one of which is the brilliant cardinal flower, are low herbs, but those of the African mountains attain the size of small trees, and are of striking and almost fantastic appearance.

—P. C. S.



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