ASTRONOMY

Vegetation on Mars?

By James Stokley

"Is there life on Mars?" Probably no other question is so often asked the astronomer as this, and to it his answer always is, "We don't know." But if you ask him for his personal opinion, he may concur in the belief expressed the other day by Dr. Henry Norris Russell, professor of astronomy at Princeton, that there is probably vegetable life there at least.

In fact, so far as we know, Mars is the only heavenly body of which even this can be said.

There are hundreds of millions of stars, but as these are all shining by their own light, they are far too hot to support life in any form remotely resembling any in human experience. As the sun is a star, differing from the others in the sky merely by the fact that it much closer, some of these hundred million may also have planets revolving around them, but even if they did, we have no means of detecting them.

"Alpha Centauri, the nearest star, is so far away that its light takes more than four years to reach us," said Prof. Russell. "If the earth were to be suddenly removed from the neighborhood of the sun to the region of Alpha Centauri, we wouldn't notice a very great difference, because it is very much like the sun. And then, if we were to look back towards our present sun, we would only see a bright star, and could not see Jupiter, Mars, or any of the other planets."

This leaves only the bodies that revolve around the sun as possible abodes of life, he stated, but most of these are also excluded, for at least three of the four elements of the ancients—earth, fire, air and water—are necessary for living organisms. Water is required, as moisture, air, as oxygen, and fire in the form of an equable temperature, something between the freezing and boiling points of water. Earth, or a solid surface, is not necessary, but it is doubtful whether life could originate in the sea.

The moon, then, cannot have life, because it has no moisture or air, the thousand asteroids or tiny planets are all so small that they could not hold on to any air if they ever had it. The great outer planets, Jupiter, Saturn, Uranus and Neptune are not suitable, neither is Mercury, the closest to the sun, because it always keeps the same face to the sun, making that side intensely hot, and the other extremely cold. Venus has been shown by means of the spectroscope to have no oxygen. This leaves Mars which now shines brilliantly with its reddish light in the evening eastern sky.

In 1924, when Mars was closer to the earth than it had been for many years, elaborate studies were made of it, so that now it is possible to state that it has the necessary conditions for life as we know it. As large green areas on the planet can be seen to change with the Martian seasons, Dr. Russell thinks it probable that there is vegetable life in the planet.

As for the so-called canals, Prof. Russell disagrees with opinion that the marks are mere optical illusions, for he declared that actual photographs had been made of them at the Lowell Observatory in Arizona. The marks are there," he said, "but they may not be thin straight lines as they have sometimes been represented."

Sounding a warning that discussions of life on other planets were speculations, Prof. Russell quoted from what he termed "an otherwise rather poor paper" of one of his students, who said "The earth is inhabited and it is the only planet of which we can say this with certainty."

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EUGENICS

Future Men and Heredity

Is a time coming when scientists will be able to tell prospective parents what kind of children they will have? If they can, it will only be after expenditure of large sums, not only to collect the necessary data about the physical and mental traits of each individual citizen and his ancestors, but to keep the information recorded where it can be used.

"It is a reproach to science that studies on the laws of heredity in man have been so long neglected," declares Dr. C. B. Davenport of the Genetics Laboratory of the Carnegie Institution of Washington, in a report to the American Medical Association on the probabilities of inheritance of disease.

"The reason for this neglect is, however, obvious. It is the great expense involved in making these studies on human beings where control of matings is impossible. The method of study, under these limitations, is clear. One must go to the families in which the traits that we are studying are found and see of what kind are the matings that have brought them about. This study involves much travel on the part of many collaborators and careful analysis of the results."

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CHEMISTRY

Sugar From Wood

A process for manufacturing sugar out of wood, which Prof. Friedrich Bergius of Heidelberg University has worked out in the laboratory, has now reached a state where it may be utilized in industrial production on a large scale. Already a large factory to carry out the process is being erected near Geneva, Switzerland, by the International Sugar and Alcohol Company of London. It is estimated that an acre of forest land can be made to yield as much sugar as an acre of ground planted to sugar beets, and the new process has the advantage in that it can be carried out completely and continuously by machinery without the employment of the manual labor and the length of time necessary for crop production.

The synthetic sugar, however, is not the same as the sucrose made from beets or cane, but is rather like the glucose now made in America by the action of hydrochloric acid on corn starch. Glucose is not so sweet as sugar but is equally nutritious. The product of the Bergius process comes out in the form of a greyish powder, containing ninety-five per cent sugar. This can be used directly for cattle food or be purified for human use.

The process consists essentially in adding a molecule of water to each molecule of the cellulose of the wood pulp, which converts it to glucose. This is accomplished by treating sawdust with forty per cent hydrochloric acid in containers specially constructed of acid-proof and heat-proof materials. Earlier efforts to effect this transformation economically were frustrated because the acid was used in dilute solution, and afterwards, in driving off the excess of water, much of the sugar decomposed. In the present process the acid is recovered in concentrated form ready for renewed use without the expense of distillation. The necessary heat to evaporate the water from the mixture is introduced by the injection of hot vapors of mineral oil. This does not absorb the volatile acids and does not mix with the sugary solution, but floats as a layer on top and so can be easily separated. The oil is reheated and run in with more of the sugar cellulose solution.

The Bergius process for synthetic sugar was patented in the United States on July 28, 1926.

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