

ASTRONOMY

# Jupiter and Saturn Have Atmosphere of Deadly Gas

## Life Would be Impossible There as On Outer Planets, Mars is Only Hope, Arizona Astronomers Conclude

**L**IFE on the other planets, with the possible exception of Mars, is absolutely impossible. This has been shown by observations at Lowell Observatory on Jupiter and Saturn which show their atmospheres to consist largely of methane and ammonia, deadly gases not widely found in nature here on earth.

Dr. V. M. Slipher and Arthur Adel of the Lowell Observatory, Flagstaff, Ariz., have clinched the argument by use of evidence gathered by planetary spectrum photographs taken through telescopes and laboratory spectra of the gases.

Ammonia is the familiar stifling, strongly odorous gas, and methane is the deadly hydrocarbon gas often called firedamp or marsh gas. Violent explosions in coal mines result from methane. Ammonia is used in artificial ice machines. The atmospheres of Jupiter and Saturn may be visualized as like the interior of a gassy mine mixed with an exploded ice factory, all at the immensely low temperature of some 220 degrees below zero Fahrenheit.

If an earth creature could take an impossible Jules Verne trip to ringed Saturn or enormous Jupiter, the great cold and the deadly gases would snuff out his life. And if oxygen were taken along for breathing purposes, there would be a terrific explosion as soon as it arrived. This fact is proof that no oxygen exists upon the two planets.

Although Uranus and Neptune, the two planets next beyond, are too distant and small to allow as detailed telescopic inspection, their light makes the astronomers feel sure that they too have methane-ammonia atmospheres, with no possibility of life. This eliminates four out of nine planets as abodes of life.

Pluto, most distant and most recently discovered planet, is without atmosphere because like the earth's moon, and Mercury, the sun's nearest neighbor, it is too small and has too little gravity to hold onto gases.

Venus, with much atmosphere, can

not have life unless it is an extremely strange sort that would exist without water or oxygen and thrive upon carbon dioxide, the waste product of respiration here on earth.

Mars is the best bet for life elsewhere in the solar system because it has visible clouds somewhat similar to those on the earth. The question of the existence of life-supporting oxygen is in dispute. It has water, but less than on earth. There seem to be seasonal changes. The temperatures vary from about 65 to 70 degrees Fahrenheit at midday to far below zero at night. Man could not live under such conditions, but some sort of odd lichens or fungi or strange Martian germs might.

The ammonia-methane composition of the atmosphere of the giant and distant

planets was first hinted over two years ago by computations of Dr. Rupert Wildt of Goettingen, Germany, using Lowell Observatory spectrographic observations. More recently, Dr. Theodore Dunham, Jr., of Mt. Wilson Observatory demonstrated conclusively the existence of ammonia.

Dr. Slipher used the rich photographic data of Lowell Observatory, which specializes on observations of the planets. These he compared with laboratory work at the University of Michigan on the way light is affected by high concentrations of methane. This gas was compressed so greatly that the light has a path equivalent to over a mile in length.

It is possible that Jupiter and Saturn may not have solid surfaces. Because of the great cold upon them the ammonia gas may freeze out in beautiful white crystals. One theory is that the different light-colored markings upon the two planets are due to great geyser-like wellings of the sub-frigid ammonia crystals.

The idea that the gigantic disturbances on the surfaces of Jupiter and Saturn are periodic and are in some way set off by the same unknown cause that influences the sunspots and the aurorae of the earth is advanced by Dr. E. C. Slipher, of Lowell Observatory,



### IN A MUSEUM NOW

*The horse, or a statue of one, has already found its way to the museum. The sculpture by Herbert Hazeltine, made one-fourth life size in bronze plated with gold and ornamented with lapis lazuli, ivory, and oryx, is one of a group of British champion domestic animals recently placed on exhibit at the Field Museum of Natural History. It is the portrait of Sudbourne Premier, a Suffolk Punch stallion.*

the other of a pair of brother astronomers. Studying intensively the markings on Jupiter, he finds that they have a periodicity of about eight years and that they correspond somewhat to variations in the sunspots and the prevalence of earthly northern lights.

The great spot on Saturn that appeared Aug. 3 of last year and subsided

by November was the second such immense storm on the planet so far discovered. Only a similar spot in 1876 was as large. The earth could have been swallowed up in the 1933 Saturn spot, for it was fifty thousand miles long and some twelve or fifteen thousand miles wide.

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#### PHYSIOLOGY

## Many More Gland Secretions Still Awaiting Discovery

A VAST number of gland secretions capable of influencing the human body in a multitude of ways will be discovered in the future, Prof. Vincent du Vigneaud, George Washington Medical School, Washington, D. C., predicted in a report to the American Association for the Advancement of Science.

Already more than a dozen of these hormones are known. Six have been isolated in pure crystal form and two of them, epinephrine and thyroxine, have been manufactured in the chemical laboratory with entire satisfaction. Like vitamins, only very small amounts of hormones are required to produce large effects.

In tearing the hormones apart chemically in hope of discovering their composition, remarkable relationships among substances in the body have been found, Prof. du Vigneaud explained, for example, that the female sex hormone shows relationship to the male sex hormone, to a bile acid, to cholesterol, to ergosterol, to the sunshine vitamin D, to strophanthin (a drug used as a heart tonic), and even to the substance in coal tar which causes certain types of cancer through chronic irritation of the skin.

### May Be Proteins

It may turn out, Prof. du Vigneaud hinted, that certain of the hormones may actually be proteins. The idea has been held by some that the peculiar properties of certain of these gland secretions are due to chemical groups attached to the foundation molecule of the protein, but Dr. du Vigneaud's suggestion is that certain protein-like hormones have their powerful effects because of the nature of the whole chemical substance itself and that this sub-

stance is really what is called a protein. Thus, insulin promotes the use of sugar in the blood because it is a protein and not due to a foreign group attached to it. Typical proteins are the substances in pollen that cause hay fever and the enzymes in plants and animals that speed up reactions in the body. Proteins, in turn, are known to consist of combinations of some twenty-one amino acids, some of which are necessary to life. Protein has been best known as one of the old triumvirate of food factors, being a dietary triplet with fats and carbohydrates.

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#### SEISMOLOGY

## Two Earthquakes Shock Mexico and Chile

THE WEEK-END of June 23-24 was marked by a pair of earthquakes, both apparently in the Latin-Pacific area.

Data gathered telegraphically by Science Service and interpreted by the Jesuit Seismological Association and the U. S. Coast and Geodetic Survey indicated that a shock of moderate severity occurred at 1:33.8 on Saturday morning off the west coast of Mexico, near the State of Colima, in latitude 18.5 degrees north, longitude 105 degrees west.

Similar data, interpreted by the U. S. Coast and Geodetic Survey, suggested that the second quake, which occurred at one o'clock on Sunday morning, had its epicenter somewhere in the Chilean region; but whether on or off shore the information received was insufficient to indicate with certainty. It was a deep-focus earthquake, that is, the rock-slip that started the tremor was located far beneath the surface of the earth.

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#### GENERAL SCIENCE

## Pressing Problems of Science Listed by SAB Chairman

PRAISING the scientific spirit in which President Roosevelt and his new deal is tackling its problems, Dr. Karl T. Compton, chairman of the U. S. Science Advisory Board and president of the Massachusetts Institute of Technology, in a recent address to the American Association for the Advancement of Science said that a return to the old regime desired by conservatives would be "as silly as for a scientist to repeat an experiment which proved unsuccessful."

The proven path of progress is the scientific method intelligently applied, Dr. Compton said, "whether in the hands of Democrats or Republicans, Kings or Soviets, scientists or laymen."

He held that President Hoover, like a good engineer, started out to ascertain the facts through a group of fact-finding commissions, but that political conditions and the breakdown of our unstable economic system, caused by years of unintelligent enjoyment of a fools' paradise, prevented progress of the Hoover program.

Five pressing problems that challenge science were cited by Dr. Compton: 1. Unemployment, which can be remedied by science by creating new industries. 2. Wise use of natural resources, including land and minerals. 3. Hereditary weaknesses, both mental and physical, that constitute a tremendous drain on happiness and finances. 4. Sicknes, which despite the advances of medicine still takes enormous toll. 5. Crime.

"It is too much to hope that the Devil will be banished from the face of the earth, but science can certainly help to reduce the number of his followers," Dr. Compton said.

To allow science to continue to do its part for national welfare, Dr. Compton said that a general tax to support scientific research would be preferable to a special tax on industries. The cost of great achievements, such as the eradication of yellow fever, has been only the equivalent of a few battleships, and Dr. Compton raised the question "as to whether such examples do not suggest a more beneficial distribution of government expenditure."

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Parsons, West Virginia, is trying to get all home owners to plant flame azaleas, as the floral badge of the town.