

ASTRONOMY

Mars Coming "Very Close"

The red planet, long a favorite object for study and speculation, is coming closer to earth. Astronomers await "very close" approach to earth on Sept. 7.

By ANN EWING

► MARS, the bright ruddy planet long studied by man, will make its closest approach to the earth since 1924 next Sept. 7, when it will be a mere 35,120,000 miles away.

Around the world astronomers will aim their telescopes at Mars in the hope of learning some of its secrets, for not until 1971 will the planet again be in as favorable a position for observation. In 1924, it was 34,700,000 miles away, its closest approach of this century.

Far reaching consequences are foreseen if conclusive evidence of life in even such low forms as moss and lichens is discovered. Although many astronomers now believe the changes seen on the Martian surface are due to vegetation, this is not yet proved.

If the markings are shown without doubt to be vegetation, it would mean that life is not unique to the earth and that there is a good chance of finding life of some form on other planets circling other suns.

Satellites Found in 1877

Relatively favorable close approaches of Mars occur every 15 or 17 years, but there is also a much more nearly exact repetition of close approaches every 79 years. The 1956 event will thus closely match the historic one of September, 1877, when Asaph Hall of the U. S. Naval Observatory discovered the two satellites of Mars, Phobos (panic) and Deimos (fear).

It was also at this time that the Italian astronomer G. Schiaparelli started observing the curious and still controversial surface markings he labeled "canali," and now called canals.

No photograph of Mars ever taken shows these fine lines and most astronomers do not detect them when they study the planet visually. Some observers, however, report that the "canals" form a complex network covering the Martian surface. One explanation of these discrepancies is the personal element involved in seeing and judging detail of any small object at a distance.

When close, Mars shows a face about one-seventieth as broad as the full moon. A telescope of moderate power would magnify Mars to about the moon's size to the unaided eye. Some idea of the difficulties involved in studying the Martian surface can be obtained by trying to picture details of the lunar surface at full moon without even binoculars.

The problem of life on Mars will probably not be solved until astronomers can

mount a telescope on a platform in space, then recover the photographs taken, or actually ride it themselves to get a view of the solar system and the rest of the heavens unhindered by the earth's shimmering atmosphere. Such possibilities are still far in the future, however, and the first astronomical observations to be made from the man-made satellites to be launched during the International Geophysical Year will be of the kind from which results can be radioed back to earth.

Dress Rehearsal in 1954

A full dress rehearsal of observations of Mars to be made this year occurred two years ago, when the planet was 39,800,000 miles away.

The world-wide photographic patrol, set up by the International Mars Committee in 1954, will be continued this year from at least 20 observatories. Dr. E. C. Slipher of Lowell Observatory, Flagstaff, Ariz., has reported. Dr. Slipher is now in South Africa, where he and Dr. Paul Wild of Berne, Switzerland, will study Mars as it crosses the night sky almost directly overhead at Bloemfontein in South Africa. The expedition is sponsored by the National Geographic Society and Lowell Observatory.

Mars can be seen low in the southeast, rising about 11:00 p.m. standard time, but each day it comes up earlier so that, by the end of July, it will rise about two hours

after the sun has set. Its magnitude on July 1 is minus 1.0 on the astronomical scale, so it is one of the brightest objects in the sky. This, combined with its ruddy color, makes it easy to spot.

By Sept. 1, Mars will have brightened to magnitude minus 2.6. An object whose magnitude differs by 1.0 from another object is either about two and a half times brighter or dimmer.

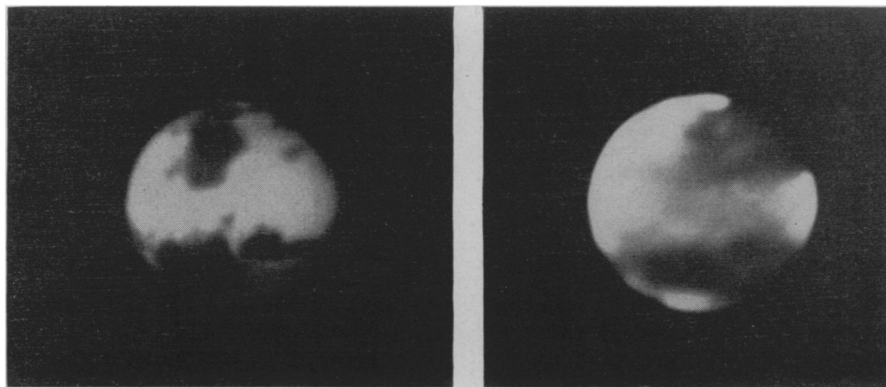
Martian Weather Maps

One important project scheduled for this year's close approach is the plan to draw weather maps of Mars. Some 30 observers scattered around the world will keep the planet under continuous scrutiny, watching and mapping any changes in its faint atmospheric belts.

In 1954, Dr. Slipher and his co-workers discovered an entirely new blue-green region, covering approximately 200,000 square miles, or a little less than the size of Texas, on the planet's surface. Variations in the size, color or position of this new region will be searched for carefully, since it represents the greatest change in Martian geography yet observed.

Changes that are well known are the growth and shrinkage of the polar caps, the most conspicuous features of the Martian surface. The southern cap reaches a maximum diameter of about 3,700 miles, the northern one, 3,100 miles. The south polar cap sometimes disappears entirely, but the northern one never shrinks to less than about 200 miles in diameter.

The caps, once thought to be composed of solid carbon dioxide, are now believed to be made of a thin layer of ordinary ice



MARS IN VIEW—These photographs taken with the 200-inch Hale telescope atop Mt. Palomar in California show two views of Mars, one on plates particularly sensitive to blue light, the other, to red light. The blue-light photograph, left, records variable atmospheric conditions, and clouds or haze. At top and bottom are the polar caps which appear in the Martian fall season and almost disappear in the spring. The red-light photograph, right, shows the permanent surface features of Mars. The large dark areas were mapped by the earliest visual observers and are well known.

or snow that has been condensed at a low pressure and very low temperature. Dr. Gerard P. Kuiper of Yerkes Observatory, Williams Bay, Wis., calculates the layer may be less than one inch thick.

From the polar caps, huge dark areas extend toward the planet's equator. These are well known, having been mapped by the earliest visual observers.

Although motion picture studies of Mars were tried with the 100-inch Mt. Wilson telescope in 1954, in the hope of making at least a few photographs at an instant when the earth's atmosphere stopped shimmering so that Martian surface details would show, they probably will not be attempted this year because the method was not too successful.

The 20,000 photographs taken by Dr. Slipher in South Africa showed more detail.

No TV-like Instruments

Instruments that combine television-like devices with the telescope to step up seeing ability are not expected to be sufficiently perfected to use in viewing Mars this year.

The red planet is next in order from earth out from the sun. It takes 687 days to revolve once around the sun, compared to the earth's 365. Every 780 days, the earth catches up with Mars and passes it.

If the orbits of the two planets were circles, the earth would always pass Mars at the same distance from it. The paths are elliptical, however, so the distances can vary from about 63,000,000 miles to 34,500,000.

Like the earth but unlike the moon, Mars spins rapidly on its axis, and a Martian "day" is only 37 minutes longer than a day on earth.

The Martian atmosphere, 99% composed of nitrogen and argon, is much less dense than the earth's. Its pressure at ground level has been estimated as equal to about

2.5 inches of mercury, compared with 30 inches for the earth. Judging from photographs taken through violet and infrared color filters, height of the red planet's atmosphere is thought to be about 60 miles.

In contrast to the earth, clouds are rare on Mars, but have been observed many times. In 1954, an enormous W-shaped cloud lasted for about a month, evaporating every morning and re-forming every afternoon.

Search for Blue Clearings

Although the Martian atmosphere usually does not allow blue or violet light to penetrate it, on occasions the atmosphere suddenly becomes transparent to these shorter light waves. Such events, known as blue clearings, are seen at some, but not all, close approaches of Mars to the earth. The cause of blue clearings is not known.

One puzzle observations this year may settle is that of the planet's composition. What is needed is an exact, direct measurement of its diameter, now believed to be a little more than 4,200 miles, or slightly more than half earth's. Knowing the diameter, scientists could use a well-known formula to deduce its composition, possibly resulting in a revision of theories on the origin of the planets and the solar system.

The Martian temperature rises to as high as 50 degrees Fahrenheit during the day at the equator, and drops to 80 to 100 degrees below zero Fahrenheit by night.

The satellite Phobos is unusual in that it is the only one known with a period of rotation shorter than its primary. Therefore, as seen from the Martian surface, it rises in the west and sets in the east, completing its strange backward daily revolution in about 11 hours. Deimos takes nearly 132 hours in its daily circuit, rising in the east and setting in the west as seen from Mars.

Science News Letter, June 30, 1956

BIOPHYSICS

Test Red Blood Cell Survival in Cirrhosis

► A SENSITIVE TEST for red blood cell destruction in patients with cirrhosis of the liver has resulted from atomic age medicine.

In a significant proportion of patients, the red blood cells do not live as long as in normal patients, Drs. Frances Ann Allen and Arthur P. Klotz of Kansas City, Mo., found from the new test.

The test is made with red blood cells tagged with radioactive chromate so their survival time can be determined.

In advanced cases of cirrhosis of the liver, hemoglobin separates from the red blood cells and appears in the fluid part of the blood.

Scientists have known this for some time. Previously, however, they have not been able to tell whether this hemoglobin leakage from the red cells occurred in less severe cases of cirrhosis.

Results of the new test suggest that this does happen. The test was described at the meeting of the Society of Nuclear Medicine in Salt Lake City.

Science News Letter, June 30, 1956

PSYCHOLOGY

Iron Lung Patients Affected Mentally

► LIFE in an iron lung can temporarily affect the mental functioning of patients, Drs. J. H. Mendelson and J. M. Foley of Boston reported at the American Neurological Association meeting in Atlantic City.

They discovered this during last summer's polio epidemic in Massachusetts. After patients had been in the iron lung, or tank-type respirator, for two to seven days, they lost their bearings and were confused as to who they were, where they were and what time it was.

They thought they were moving about the hospital in the respirator or, more often, thought they were riding in a car, train or airplane. Sometimes the patients took all this calmly, but at times they were agitated.

Most of them during lucid intervals recognized that these experiences were not real, but some of them were confused about what was real and what was unreal. After they had recovered, they remembered the experiences with "most remarkable vividness."

Changing the physical environment could reduce or relieve these delusional symptoms to some extent.

The condition lasted 10 to 15 days and was not related to fever, drugs, location or degree of paralysis, lack of oxygen or other physiologic conditions.

The Boston doctors consider it a disorder of perception secondary to the restriction of environment in the tank-type respirator. Other polio patients treated outside the iron lung did not develop it.

Science News Letter, June 30, 1956

BIOCHEMISTRY

Gas Gangrene Remedy

► DISCOVERY of a chemical that may become a remedy for gas gangrene, dangerous and often deadly result of dirty, infected wounds, is announced by Drs. Merwin Moskowitz, Merwyn W. Deverell and Ramon McKinney of Purdue University, Lafayette, Ind., in *Science* (June 15).

The chemical is EDTA, short for ethylene-diamine tetra-acetic acid. It is known to chemists as a chelating agent with the power to bind calcium and other metals.

Gas gangrene is caused by the toxin or poison of the organism, *Clostridium perfringens*. The alpha toxin, or poison, believed the most important lethal factor of this organism or germ, is an enzyme, a lecithinase.

This enzyme is activated by calcium. So the Purdue scientists decided to try EDTA as an antidote to the gas gangrene poison,

with the idea it would bind calcium in the body and thus prevent the enzyme from being activated and poisonous.

When given to mice with the gas gangrene poison, it "consistently protected" them against a fatal dose. It was also able to protect the animals against a lethal dose of the toxin-producing germs, but the results were not so consistent. The variability may be due to variation in the virulence of the germs used in the tests. Further tests on this point are being made.

EDTA is not poisonous to animals or humans unless given in amounts binding so much calcium that tetany and convulsions result. It has been used in cases of lead poisoning. Its possible use in treatment of gas gangrene, the scientists state, "is obvious."

Science News Letter, June 30, 1956