ASTRONOMY

Astronomers Push Study Of Atmosphere on Planets

Other Atmospheres Do Not Reveal Oxygen, Important And Common on Earth; Carbon Dioxide Abounds on Venus

TO THE PERENNIAL discussion of the possibility of life on the planets other than the earth, recent researches at Mt. Wilson Observatory are presenting new data. As yet the astronomers are not considering the "life" question, but with telescopes and thermocouples they are attempting to discover the nature of the atmospheres of the planets.

Whether a planet can hold an atmosphere or not depends very critically on its size and its temperature. For example, an atmosphere which might remain practically unchanged on a planet at 100 degrees absolute (-173°C.) would escape in a few months if the temperature were increased to 300 degrees absolute, which is about the surface temperature of the earth.

Temperature measurements of the planets have been made by Dr. S. Nicholson of the Mt. Wilson Observatory so that we have a good idea which planets have an atmosphere and which have none. Thus, excepting Mercury and Mars, all the planets might well have a gaseous envelope which we call an atmosphere.

Moon in Vacuum

Incidentally our own satellite, the moon, is too small and becomes too warm to retain an atmosphere. The surface of the moon is therefore in a vacuum and not even liquids can exist there unless they be of extremely high molecular weight.

Even those planets which have atmospheres will differ greatly from the earth. Drs. W. S. Adams and T. Dunham, Jr., of the Mt. Wilson staff are investigating the composition of the various atmospheres. One of the most striking conclusions of their observations is that oxygen, which plays such a vital role in the earth's atmosphere, does not show itself in the other atmospheres. Elements like nitrogen, hydrogen, helium and argon are much more difficult to observe, so it is not surprising that they do not appear in the planetary atmospheres.

Venus has an extraordinary amount of carbon dioxide. This gas, which occurs to the extent of less than one tenth of one per cent. at sea level on earh and which because of its weight must be practically absent at high levels of the earth's air, gives an intense spectrum in the atmcsphere above the clouds which hide the surface of Venus from our view. Only recently has Dr. Dunham succeeded in getting enough carbon dioxide into a tube to get a trace of those bands which come out so strongly in Venus. He estimates it would take a tube at least a mile long filled with CO_2 at atmospheric pressure to duplicate the spectrum of Venus.

Gases Unknown Here

The outer planets are much colder than Venus. Carbon dioxide would scarcely be a gas on them, but it would mostly condense to a solid. The analysis of the atmospheres of the outer planets is difficult. These planets are so much farther out that they reflect at least fifty times less of the sun's light into the powerful telescopes. Astronomers are forced to be satisfied at present with mere indications. The chemical compounds which would be gaseous at the temperatures of Jupiter (-135°C), Saturn (-150°C), Uranus (-180°C) and Neptune (*Turn to Page* 108)

CHEMISTRY

Three Rare Earth Elements Proved to be Radioactive

THREE NEW rare earth elements can now be listed among the radioactive substances of the earth as the result of experiments by W. F. Libby, University of California teaching fellow, and Prof. W. M. Latimer, also of the University of California faculty.

They are lanthanum, neodymium and samarium. Except for samarium which was proved radioactive by independent European research a few months ago, this is the first time that these elements were known to spontaneously disintegrate in a manner similar to radium and uranium.

Transmutation occurs when lanthanum, neodymium and samarium disintegrate, some of their substance flying off and leaving as a residue other elements, cerium, illinum and neodymium, respectively.

The radioactivity was detected by putting the elements into a container filled with low pressure helium and recording through a radio amplifier the clicks of atomic collisions that occurred. The radioactivity of the elements increased the normal number of collisions.

Science News Letter, February 18, 1933

ARCHAEOLOGY

Girl Explorer Adds Ancient City to Map

RUINS of one of the remote, prehistoric cities of Mexico, familiar to its Indian neighbors for many centuries, but never located on the official map of Mexico's 1,200 archaeological sites, have been explored by Emma Reh, correspondent of Science Service in Mexico. Miss Reh earlier explored the ruins of another ancient city, Teposcolula, 18 miles away.

The city bears the Aztec-sounding name of Hualmelulpan. It lies in the mountainous mazes of the region known as the Mixteca (*Turn Page*)

THIRTEEN STONE KNIFE

The squared stone is believed by Miss Reh to be the first dated monument reported in the Mixtec region of Oaxaca. It bears the date "Thirteen Stone Knife." Beside it stands a six-foot figure with grotesquely heavy mouth and curling fangs.