SCIENCE NEWS

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LIFE ON THE PLANET VENUS

LIFE on the planet Venus, under the clouds that perpetually veil its surface, now seems impossible, as a result of studies by Dr. Rupert Wildt, of the Princeton University Observatory. Dr. Wildt, who showed that Jupiter and Saturn are surrounded by clouds of ammonia, and that the atmosphere of these planets also contains methane, now advances the theory that the clouds of Venus are solidified formaldehyde. This is a poisonous and extremely irritating gas often used as a disinfectant because of its germ-killing powers. His results are announced in a paper to appear in the *Astrophysical Journal.* In this he proposes a theory to explain the origin of the formaldehyde and why it is not present in the atmosphere of the earth.

According to a suggestion made in 1924 by a German, Gustav Tammann, oxygen in our atmosphere originated when the surface of earth was in a molten state. The high temperatures, it is believed, caused the water vapor to break up into hydrogen and oxygen. The molecules of the former are in such rapid motion that they would have escaped into space. Some of the oxygen would have united chemically with the still molten crustal material. When this cooled and hardened some of the oxygen was left in the air.

On Venus there was originally a considerably smaller quantity of water vapor than on earth. Then, according to Dr. Wildt, the oxygen would be used up as fast as it formed, and when the crust solidified, there would be a thin atmosphere of water vapor remaining. Without earth's protection by its oxygen, the ultra-violet light from the sun would be much more intense. This would cause a reaction betweeen the water vapor and the carbon dioxide which has actually been found in the atmosphere of Venus. Result would be the formation of formaldehyde and liberation of more oxygen. But this, like the earlier supply, might also be used up as it unites with the crust. When all water vapor had been used up, the process would stop.

Last spring, while visiting the McDonald Observatory in Texas, Dr. Wildt made observations of Venus, comparing it with the airless moon, in an attempt to detect by the spectroscope formaldehyde in its atmosphere. Though if it were about a third of one per cent. as dense as our atmosphere it would have produced an effect, none was found. This, he states, does not invalidate the theory.

Formaldehyde molecules very readily combine into larger molecules, called "polyoxymethylenes," which are white solids. Therefore, it is suggested that this was the fate of the gaseous formaldehyde. These polyoxymethylenes also combine with water, so that if any water vapor remained they would have taken up the last of it. He refers to an experiment in which a minute amount of water vapor is injected into a jar of absolutely dry formaldehyde gas, made of single molecules. The jar is immediately filled with a cloud of the solid material in finely divided form. This, Dr. Wildt suggests, is the composition of the clouds over Venus. If this is the case there would still, in all probability, be enough free formaldehyde on the surface of Venus to make it most unpleasant, while the complete lack of oxygen would preclude the possibility of life.

CUNNINGHAM'S COMET

THE new Cunningham comet will probably be faintly visible to the naked eye in time to decorate the sky on Christmas eve, according to Leland E. Cunningham, who discovered it on a photograph made at the Harvard College Observatory. He has made a preliminary computation of its movement, based on three observations made on August 25 and on September 5 and 9, which indicates that it will be nearest the Sun on January 19, 1941. Then it will be less than three fifths as far from the Sun as we are, or about 36,000,000 miles.

Because of the bright moonlight the Harvard astronomers had not been able to make additional observations, since the comet is still quite faint, around the thirteenth magnitude. By the end of September it should be possible to make additional photographs. From these a more accurate orbit can be calculated. Then it will be known more definitely whether or not it will reach naked eye visibility.

The discovery plate was made at Oak Ridge on September 15 when the comet was recorded. It was also found on the other two plates made on August 25 and on September 9. On the latter, it appeared not as a mere hazy blob of light, but showed a definite nucleus and a small tail, indicating that it was approaching.

The comet is in the constellation Cygnus, the swan, which is directly overhead in the evening and is sometimes called the northern cross. Deneb is the bright star at the top of the cross—to the northeast. The comet has been moving westerly, north of Deneb, but Mr. Cunningham's figures indicate that it is turning toward the south.

The last comet visible to the naked eye was Hassel's, seen in April, 1939. Though of the third magnitude, quite bright, it was hard to find, because it was so close to the sun. The previous year was a very poor one for comets, but 1937 brought Finsler's comet, which was not conspicuous, but could be seen without a telescope during July. The summer of 1936 brought Peltier's comet, the discovery of an Ohio amateur, which also achieved naked eye visibility.

A later report states that the comet has been photographed at the U. S. Naval Observatory. The first picture was made on the night of September 18 with a star camera equipped with a ten-inch lens, by George M. Raynsford, of the observatory staff.

The comet is still so faint that Mr. Raynsford was not able to see it, even through the auxiliary telescope used for guiding. Therefore it was necessary for him to photograph it by "dead reckoning." Using predictions made by Mr. Cunningham, he was able to point the camera to the right part of the sky, and to move it during the one-hour time exposure in such a way as to follow the comet as it moved in that time against the background of stars.

The resultant plate shows the comet with a faint tail and a definite nucleus. It is in the constellation Cygnus, the swan, overhead in the evening.

THE HURRICANE

THE recent hurricane that smashed across Nova Scotia and the famous 1938 hurricane that spread ruin in New England were storms off the beaten path of American weather. If meteorologists used such language they might describe these abnormal storms as "flukes."

Usually the immense masses of whirling air, born in the Atlantic near the Cape Verde Islands, come west to the Caribbean region and then rush up the Atlantic Coast. There they are forced out to the sea by masses of high pressure air over the mainland. They vent their fury on the ships at sea. Both Monday's storm and the New England hurricane were guided by two such masses of high pressure air, one inland and the other a stubborn high pressure area out to sea that channeled the storms toward land.

It is unfortunate that such a condition of the atmosphere forced the 1938 storm over New England and the storm over Nova Scotia with its teeming Halifax port so vital to British supply efforts.

Ordinarily, explained R. Hanson Weightman, of the U. S. Weather Bureau, high pressure over the northeastern section of the country pushes such a hurricane out to sea about the time it has traveled northwards along the coast as far as Cape Hatteras. Then it travels to the northeast and heads out to sea, where it is largely dissipated.

Once in a while, however, the high pressure area may move out to sea, and a channel is formed between it and one to the west. The air in a high tends to move counter-clockwise. At the western edge of the trough the winds are from the north while at the eastern edge they are from the south, thus guiding the storm on its way. The work of the Weather Bureau is to time and plot the movements of these areas, and the hurricane track that moves with them.

The famous New England hurricane, which occurred two years ago, was guided by a very slow-moving high which remained off the coast, and caused the storm to move northerly, over the regions where so much damage was done. The conditions this year made the Nova Scotia hurricane move to the north northeast instead of northeast.

This seems to be a normal hurricane season, so far as numbers are concerned. Usually this period, from June to October, brings about a half dozen such storms.

CONSERVATION

CONSERVATION in America requires a single viewpoint and a unified program, to put the support of all the people behind an understanding of all the problems and the rescue of all our resources, according to Professor Paul B. Sears, of Oberlin College, who spoke at the University of Pennsylvania Bicentennial Conference.

In the past, Professor Sears pointed out, separate groups have attacked small sectors of the conservation problem. Fishermen have tried to save and restore fish. Hunters have tried to save and restore game birds and animals. Foresters have tried to save the woods and plant new trees. And so on. However, each of these groups in turn has found itself forced to pass the narrow limits it set for itself: fisheries problems were found to step over into the fields of stream pollution and soil erosion; forests and wildlife were found to be inseparable. And over them all has impended the great weight of national and world changes.

Professor Sears continued: To meet the problem as a whole one must see it whole. He pointed out three ways in which a human community and its natural environment may be thrown out of balance: changing requirements of the community itself, depletion or disturbance wrought by its culture, and "natural" changes not caused by man.

Outstanding in the first class are changing habits of our civilization in food, housing, etc. Demands for more milk and vegetables, less heavy starches and meats, will cause shifts in place and type of farming, even in replacement of plowland by pasture. Rapid increase in the housing program can cause heavy drain on the surviving forests.

Highly developed civilizations, in all ages and lands, have tended to deplete resources, sometimes to the impoverishment or even the extinction of the culture itself. Thus, the ruinous floods of China, the desert and semi-desert condition of many Mediterranean lands, seem to be at least in part traceable to bad land management in the past, just as the dust storms of recent years in this country followed unwise plowing-up of grasslands in the West.

Gradual climatic changes have apparently played some part in the rise and fall of civilizations, though this is usually difficult to trace. As an example, Professor Sears cited evidence that the Mound-Builder culture moved into the upper Mississippi and Ohio valleys from the Southwest, along with an epoch of warmer, drier climate some centuries ago. Then, with the return of a cooler, moister climate the forest returned, and the Mound Builders were replaced by the Eastern, forest-dwelling tribes of Indians.—FRANK THONE and JANE STAFFORD.

MASTOIDITIS

THE greater prevalence of mastoiditis in the northern part of the United States is due to the cold climate which causes both lowered resistance to and greater virulence of the streptococcus, most commonly found germ in mastoiditis. This idea is advanced by Dr. Mercer G. Lynch, of New Orleans, in a report to the *Journal* of the American Medical Association.

Streptococci from different geographic regions and guinea pigs subjected to artificial climates typical of the North, the East and the South, were used in studies Dr. Lynch made to find why the number of cases of mastoiditis increases steadily from Texas and Florida to Massachusetts and Maine.

The streptococci were subjected to various temperatures of heat and cold such as are found throughout the country and also to sudden changes in temperatures characteristic of certain regions. Those germs from regions having such changes were more resistant than the germs taken from more uniform climates. The germs themselves, therefore,

Dr. Lynch concludes, lose some of their virulence and living powers when accustomed to a more uniform climate. In time, however, those germs that survived the sudden changes became as virulent as the germs accustomed to such changes.

When the germs were injected into guinea pigs living in various types of artificial climates, it was found that the animals living in warmth and sunshine with plenty of calories and vitamins withstood even the most virulent germs from the North and East better than those living in cold climates with little sunlight and limited space for exercise, although this group of guinea pigs were injected with the less virulent germs from the Middle and Southern states.

From these experiments Dr. Lynch concludes that "those areas of the country where the climate varies markedly, where extremes of cold are encountered and where open air exercise is thus limited, over a period of time the resistance is lowered and the population is thus more susceptible to infection—this, coupled with the fact that the infection gains virulence because there is less in the natural elements to combat and decrease the virulence. By these factors are meant fresh air, sunlight and exercise."

DOUBLE MICROPHONE EFFECTS

BY combining two types of microphones, engineers of the Bell Telephone Laboratories have produced a new "mike" in which the direction of its sensitivity can quickly be changed. Already it has proved of value installed as part of the public address system in the House of Representatives in Washington. It has eliminated difficulties introduced by echoes from the marble walls.

Six different patterns of sensitivity are available. In one it hears equally well in all directions, in another in one direction only, in another in front and back, but not to the sides. The intermediate settings enable it to hear mostly in front, but a little in back.

The secret of this achievement was in the combination of a moving coil sensitive element with one using a ribbon. With the former, the all-around distribution is obtained; with the latter, the front and back. Connecting the two in series, when sounds come from the front, the moving coil and ribbon reinforce each other. Sounds from the rear, on the other hand, cause one to cancel the other, and the system is deaf in that direction, according to W. R. Harry, of the laboratories' staff, who worked on its development.

By introducing a resistance into the circuit of the moving coil, its sensitivity relative to the ribbon is reduced, and this gives the variety of patterns.

The new microphone has been tried in radio studios, where it permits the control of reverberation. When it is wanted to give the effect of space and distance, the reverberation can be increased, while at other times it may be reduced or eliminated.—JAMES STOKLEY.

ITEMS

BLUE prints or drawings may be invisibly mended with a film applied by an electrically heated instrument. The patch can be used on other papers as well. It does not become sticky even if heated.

A FILM of barium, a metal in the same chemical group as calcium, has been found to work as a lubricant in a vacuum where ordinary oil is useless. It has been tried inside an x-ray tube equipped with a rotating anode in order to give higher efficiency.

CARRIER Indians of Canada wear white man's rubber overshoes on their moccasins when it rains, and their dugout canoes are rigged with outboard motors. How civilization is coming to these Indians in British Columbia was observed this summer by Dr. Julian Steward, of the Smithsonian Institution. The chief object of his study was to probe the cultural borrowings of Carrier Indians long ago, when they got ideas of culture from more advanced Indians of the Pacific coast. Mingling with affluent fishing tribes, the primitive Carrier hunters took on the "potlatch system" whereby a chief must use resources of his estate to make feasts and give presents. Too poor to give away blankets by the dozen, a Carrier would cut up one blanket into small pieces to distribute. Carrier Indians are members of the great Athapascan Indian family.

BLOCKADE, and the absorption of medical men into military occupations, are seriously cutting down the number of foreign medical publications received in the United States, it is noted in the *Journal* of the American Medical Association. A check-up has been made in the library of the American Medical Association and in the publication office of the "Quarterly Cumulative Index Medicus." The last big shipment of Continental medical journals was received on May 27. Since that date only ten stray copies have come in, out of a list of some 1,400 different periodicals on the association's library subscription list. No Austrian or Italian publications have been received since June, and Polish and Czecho-Slovakian journals stopped coming many months ago. British publications continue to arrive, though usually somewhat delayed.

THAT deaf people are more acceptable to employers than any other job-seekers with a handicap, is the opinion of Mrs. Iris W. Booth, executive secretary of the Bureau for the Handicapped at Providence, R. I. Exceptions are the deaf who depend entirely on sign language, and who are therefore rarely able to fit into business or industrial niches, Mrs. Booth told the American Association to Promote the Teaching of Speech to the Deaf. In ten more years, she predicted, people who can not hear will be taught so universally to use their voices and read lips of speakers that there will be no problem of a sign language group, at all. The deaf, said Mrs. Booth, are no longer considered hard to get along with. Modern school training has stressed importance for deaf people of having pleasant and normal relationships with people who can hear. The deaf worker can almost always concentrate better than a worker with good hearing, and deaf workers can do heavy or light work, standing or sitting, unlike some types of handicapped job-seekers. Urging the value of vocational training, she said: "The employer, we have found through experience, will choose the properly trained handicapped person more quickly than the untrained able-bodied."