

ASTRONOMY

Astronomer Finds Neptune's Day to be 15.8 Hours Long

Discovery By Dr. Moore, Who Also Measured Uranus' Rotation, Leaves Pluto and Venus To Be Studied

WITH THE discovery by Dr. J. H. Moore, Lick Observatory astronomer, that the planet Neptune turns once on its axis in about 16 hours, there remain only two of the larger members of the solar system for which the day is still unknown. Venus, which becomes brighter than any of the other planets, and which has been so conspicuous in the western evening twilight in recent months is one. The other is the newly-discovered Pluto, which represents the main contribution of 1930 to the history of astronomy, and which can only be discerned with the aid of a large observatory telescope.

It was the spectroscope, which analyzes the light of a star to tell what it is made of and how it is moving, that revealed to Dr. Moore the secret of Neptune's rotation. The light from the planets is reflected sunlight. Therefore the spectrum shows the dark lines crossing it that are characteristic of the spectrum of sunlight, the lines being caused by vapors of certain elements absorbing certain colors in the sun's light as it passes through the outer layer of that body. If light from a star, or planet, that is approaching the earth, is analyzed through the spectroscope, it is found that the lines are slightly displaced, towards the violet end of the colored spectrum. If the star is receding, on the other hand, they are shifted to the red end. This is because the waves are squeezed together and made shorter in the first case, while in the latter instance they are spread out and made longer. It is the length of the wave that determines color of light, so light from a rapidly approaching source is bluer and from a rapidly receding source redder than one that is standing still.

Secret of Spectrum Photographs

Dr. Moore photographed the spectrum of light from Neptune along a line crossing the planet's disc from east to west. The spectrum photographs showed the lines tilted, rather than

displaced in their entirety to one end or the other. This indicates, of course, that one side of the planet is approaching the earth and the other side receding, in other words that it is rotating. As the side of the lines made of light from the eastern edge tilted to the violet, it showed that the eastern side of the planet is approaching us. That is, the planet turns from west to east, like the earth, and all of the known planets except Uranus.

The faster the planet turned, the greater would be the tilt, so from a determination of the angles of the lines, Dr. Moore was able to measure the period of rotation, or "day" of Neptune. This came out as 15.8 hours, though he admits that there is a possible error in this figure of as much as an hour, either too fast or too slow.

Uranus Turns From East to West

Dr. Moore also has measured the day of Uranus. In 1911 Drs. Percival Lowell and V. M. Slipher, at the Lowell Observatory in Arizona, found by a similar spectroscopic method that Uranus rotates one in $10\frac{3}{4}$ hours, and that the planet turns from east to west, unlike all the other members of the solar



DR. J. H. MOORE

Of the Lick Observatory who has measured the length of a day on the planet Neptune

system. Dr. Moore has confirmed the direction of the planet's rotation, but gets slightly different values for the rotation with different sets of spectrum photographs. One set, made with a smaller spectrograph, gives values like those of Lowell's but another set, made with a more powerful instrument, gives about 11.5 hours. The latter photographs, however, are not fully exposed, and were difficult to measure. Dr. Moore said that the discrepancy is probably due to the small images of the planets, as a result of which such determinations are at best only approximations.

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SOCIOLOGY

Mice Crowded In Boxes Show How Slums Affect People

SLUM conditions in great crowded cities like London and New York are duplicated in colonies of mice raised in the laboratories of Prof. F. A. E. Crew of Edinburgh University. As a result Prof. Crew, the scientist who several years ago had a hen who turned into a rooster, has reported to the British Association for the Advancement of Science what happens eugenically when living conditions become overcrowded.

His mice were forced to live in very

crowded boxes, an experiment no more inhumane than everyday human life in city slums. Side by side with the slum mice, were other mice colonies in less crowded boxes which corresponded to the well-to-do sections of a great city. Such laboratory control is not possible with human beings and this is why Prof. Crew made his mice experiments.

The overcrowded mice showed a decline in birth rate and an increase in death rate. The baby mice born in the

slum boxes were weak and malnourished as compared with the more fortunate mice babies born in happier surroundings.

Then Prof. Crew acted like a thoughtful social worker. He tried the experiment of taking the expectant mouse mothers out of their slums into better conditions where they had plenty of air, light and food. Then the baby mice were healthy and normal in spite of the

fact that their mothers had lived in the slums.

Prof. Crew found that the slum conditions affected some mice individuals much less than others. He declared that by his eugenical box experiments it is possible through artificial selection to produce a "cockney" race of mice that do not mind being overcrowded by slum life.

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METEOROLOGY

Air Pressure Varies With Sun Spots in Monsoon Regions

Observations of Polish Scientist Indicate That Solar Radiation Influences Earth Through Area of Monsoons

DISCOVERY by Dr. S. Hanzlík, of the Meteorological Institute at the Charles University, Prague, that atmospheric pressure in the monsoon regions of the earth varies directly with the number of spots on the sun, may bring a step nearer the complete understanding of the relation between solar conditions and terrestrial weather.

In a report to the British scientific weekly *Nature*, Dr. Hanzlík announces that his studies have revealed the fact that for a large area in central Asia, south of latitude 55 degrees North, east of Caspian Sea, Mesopotamia, Persia, Afghanistan, Baluchistan, east Turkestan and the plains of the Indus the air pressure and sunspots increase together. A second such area lies north of latitude 10 degrees and extends from the Arabian Sea across southeast India, and the Bay of Bengal to Burma and Siam. Still a third such area, he finds, covers most of Australia and Java and extends eastward across the Indian Ocean to southern Madagascar and Natal.

Also Negative Relation

"These three fields," states Dr. Hanzlík, "cover approximately the greater part of the Indian monsoon area within the tropics. The fact that the sunspot period manifests itself always in the same way within this area suggests that sunspots affect the general circulation of the atmosphere through pressure conditions in the monsoon regions." The monsoons are the periodic winds that blow steadily for part of the year from one direction, reversing their

direction during the other part of the year.

Dr. Hanzlík has also sought for a region where there is a negative relation between sunspots and pressure, that is, where the pressure goes down as the number of spots increases. This is not so well defined, he says, but if there is any such area, it is probably a long strip stretching across the Pacific south of Hawaii and north of the equator.

If his theory is correct, and the influence of solar radiation on the earth is through the monsoon regions, the reason why other parts of the earth are not similarly affected might be due to a lag in the effects reaching them.

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MEDICINE

Maggot Treatment Success Due to Unknown Reaction

SOMETHING more than a scavenger reaction is behind the successful healing of wounds by the new maggot treatment, its discoverer, Dr. William S. Baer of the Johns Hopkins University, told a group of scientists gathered for studying bone diseases and cancer of the bone.

A specific reaction between the serum of the body and the maggot itself probably causes the healing of wounds to which maggots are applied. Just what this reaction is has not yet been discovered, he said.

Dr. Baer told how his experiences as an army surgeon during the World War



SUN SPOTS

New evidence of their effect on the earth's weather has been found. This picture was taken in the light of a single wave length with the spectroheliograph and shows details invisible to the eye.

started him on the investigations leading to the new treatment. Two men were brought in who had been lying in the field for seven days without food. They suffered from abdominal wounds and from compound fracture of the thigh bone. The wounds were covered with maggots, the tiny larvae of flies. The men were hungry, but otherwise their condition was good.

In the hands of the best surgeons, the mortality for compound fracture of the thigh bone was 80 per cent., Dr. Baer knew. In other words, four-fifths of the persons who suffered from that condition died. In the hands of the maggots, the mortality for those two men was nothing, he found. Instead of the bad infections commonly found in such injuries, Dr. Baer found only a few harmless organisms.

For ten years he puzzled over these cases, particularly when treating children suffering from osteomyelitis. This disease of the bone is the result of an infection, is more common in children than in adults, and is extremely difficult to cure. If it reaches the chronic stage, recovery is often delayed for years. Finally he tried the effect of maggots on some of these cases. In six weeks the children were entirely well. Dr. Baer has used this method on 300 patients during the last two years. All the children have recovered entirely. With adults the treatment has been successful in four-fifths of the cases.

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