PHYSICS

Elusive Aurora is Duplicated In Evacuated Glass Tube

THE AURORA borealis, elusive will-o'-the-wisp of the high heavens, has been reproduced in the laboratory. Recent experiments of Dr. Joseph Kaplan, physicist of the University of California at Los Angeles, have shown that the same peculiar light emanations which glow in polar atmospheric heights can be made by electric discharge in a glass tube. This discharge is passed through extremely rarefied nitrogen.

Heretofore a number of shades of light emanation, represented by specific lines of the red and green spectrum have been observed only in the aurora. Their source has been unknown, although the influence of nitrogen has been suspected.

Dr. Kaplan exhausts a borosilicate glass tube until it retains only one millionth of its normal air content. At such a high degree of exhaustion an electric potential of 25,000 volts is barely able to force through a luminous discharge. Such evacuation of itself is not novel; but in the recent experiments the process of discharge was continued intermittently for weeks, during which much of the scanty gas content of nitrogen and oxygen disappeared and was replaced from the outside. Finally the residual gas, largely nitrogen, gave forth the ruddy aurora glow. The exhibition improved with each day of operation.

It is suspected in the Los Angeles laboratory that some chemical change, as yet unknown, has occurred on the inside walls of the tube. This change, strangely enough, makes the discharge act as though the tube were not there. This is exactly what Dr. Kaplan wishes, inasmuch as he suspects that it is the presence of the unnatural glass wall that has interfered with artificial aurora phenomena in past experiments. This would favor the present plausible theory that the aurora results from natural electric discharge at great altitudes, perhaps one hundred miles or more. At such elevations the atmospheric pressure is much like that in the experimental tube, but of course minus the glass walls.

Science News Letter, July 4, 1931

OCEANOGRAPHY

New Science Ship Will Work Across Ocean

A NEW SHIP, the *Atlantis,* built especially for scientific work at sea, is now on the way to America, but since she will go to work even on her maiden voyage she will not arrive at her destination until about the first of September.

The *Atlantis* was built at Copenhagen for the Woods Hole Oceanographic Institution. She is a steel boat of approximately 380 tons displacement, 142 feet long, 29 feet beam and 16 feet extreme draft. She carries a 250 horsepower Diesel engine, and can cruise under power alone for 3,000 miles at eight knots; with sail she can extend her radius indefinitely. She carries two laboratories, and living accommodations for twelve or sixteen persons.

She left Copenhagen for Plymouth, England, a few days ago, and will set sail from the latter port about July 10 for Woods Hole, Massachusetts.

On the way over she will turn from her course for two north-south profiles across the North Atlantic Drift, one on the longitude of the Azores, the other about fifty degrees west longitude. Another profile will be run off the coast of Nova Scotia. On these scientific runs special attention will be paid to the distribution of the smaller life of the sea in its relation to light penetration into the water and also to the capture of fish that swim at great depths. Chemical studies will also be made of sea water at stations between Europe and America.

The physical studies will be in charge of the commander of the *Atlantis,* C. O. Iselin, the biological work will be conducted under Dr. George L. Clarke, and the chemical researches will be made by Dr. F. Zorell of the Deutsche Seewarte.

Science News Letter, July 4, 1931

METALLURGY

Magnetism Reveals Differences in Steel

MAGNETISM will detect differences in hardness of otherwise similar bars of steel, it was revealed in a report by Haakon Styri of Philadelphia to the American Society for Testing Materials.

Steel bars that test magnetically the same before heat treatment will test magnetically the same afterwards, Mr. Styri said, provided no differences in hardness or impact strength are brought about during the heating and quenching processes. Mr. Styri's method of testing is to place the steel bars in a magnetic field and note whether the steel would make a good core for an electromagnet.

Former methods of testing uniformity in steel hardness, according to the report, have required mechanical means which involve partial destruction of the steel, whereas the testing of the steel's magnetic properties does not have this disadvantage.

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