



Goldberg and Lawrence H. Aller, have illustrated this in a striking way in their excellent book, "Atoms, Stars and Nebulae." They ask you to imagine an ordinary tumbler filled with hydrogen at room temperature and pressure, to which is added a thimbleful of air and a few dust particles. If the glass were sealed, and then enlarged until it was as high as Mt. Everest and some two miles in diameter, the expanded contents would then represent a fairly accurate sample of a piece of a planetary nebula. Thus such a nebula is really a very high vacuum, better, in fact, than the best that can be secured in our terrestrial laboratories. The fact that they are so vast, averaging in diameter around a million million miles—more than 10,000 times the distance from earth to sun—means that they still contain enough atoms excited to luminescence that they can be observed.

At the center of the "ring" nebula, as with many of the planetaries, there is a star which cannot be seen even with large telescopes but which shows up plainly on the photographs. Such stars are very hot, with a surface temperature about 10 times that of the sun and shining mainly with invisible ultraviolet rays. When these rays strike the atoms of gas, they cause temporary changes in the positions of the electrons of these atoms. As these displaced electrons fall back into place, they give off energy in the form of light. This is the same as the familiar effect on earth known as fluorescence so these nebulae are actually shining by the same sort of process as that of the fluorescent electric lights which have become so popular in recent years.

Time Table for September

Sept.	EST	
2	5:00 a. m.	Saturn in line with sun
	11:29 p. m.	Moon passes Jupiter
7	4:59 a. m.	Full moon
	6:00 p. m.	Mercury farthest east of sun
10	6:00 a. m.	Moon farthest, distance 252,200 miles

15	9:29 a. m.	Moon in last quarter
18	4:56 p. m.	Moon passes Mars
22	7:21 a. m.	New moon
	11:00 p. m.	Moon nearest, distance 222,400 miles
23	4:06 a. m.	Sun over equator, autumn commences in northern hemisphere, spring in southern
25	5:17 a. m.	Moon passes Venus
28	11:18 p. m.	Moon in first quarter
30	4:46 a. m.	Moon passes Jupiter

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, August 27, 1949

AERONAUTICS

Gadget Prevents Swaying Of Plane's Tail in Flight

➤ A GADGET to take the "Dutch Roll" out of speedy airplanes in flight was revealed by the Boeing Airplane Company. It holds the tail of the plane from swaying to right or left when side-swiped by sudden gusts of air. Its "brain" is a gyroscope out of an E-6 automatic pilot. Experimentally, it is in use on a Boeing speedy Stratojet, a plane with sweep-back wings in the 600-miles-per-hour class.

So-called Dutch Roll is not a very common occurrence, and seldom shows up until a plane is undergoing flight tests. It can be corrected by a design change, but such alteration might affect the speed. The term was applied because a plane going through the Dutch Roll looks like a Dutchman ice-skating on a Holland canal.

The gyroscope is supplemented by a turbosupercharger amplifier and a turbo waste-gate motor. The first two are on the frame of the plane, the motor is on the push rod that is used to move the plane's rudder to the right or left. When a side gust strikes the tail of the plane, the automatic gyroscopic device senses it immediately and pushes or pulls the rudder to right or left before the gust causes the plane to swerve.

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