

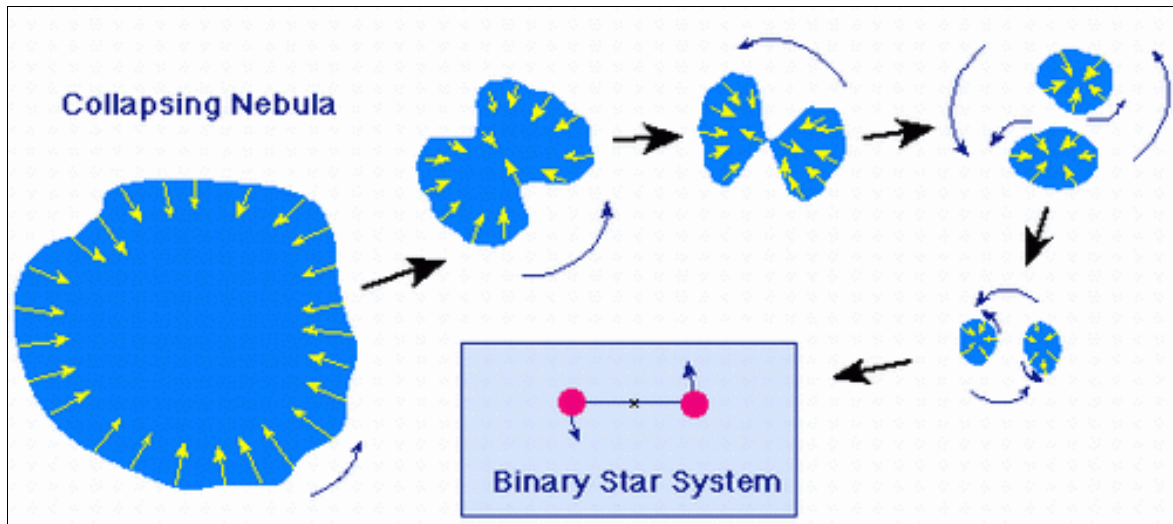
**Topic 3- Binary Star Hypothesis Of Russell**

H.N. Russell, an American astronomer, propounded his Binary Star Hypothesis in the year 1937 to remove the shortcomings of tidal hypothesis of sir James Jeans.

Russell opined that there were two stars near the primitive sun in the universe. In the beginning the 'Companion Star' was revolving around the primitive sun. Later on one giant star named as 'approaching star' came near the companion star but, the direction of revolution of the approaching star was opposite to that of the companion star. It means that the approaching star might have been at a far greater distance from the primitive sun. Thus, there would have been no effect of tidal force of the giant approaching star on the primitive sun but large amount of matter of the companion star was attracted towards the giant approaching star because of its massive tidal force.

Russel's suggestion that the primitive sun was a binary star cannot be regarded figment of imagination. This suggestion seems to be true because at least 10% of the stars in the universe are found to be binary stars. In the opinion of some astronomers the number of binary stars in all probability happens to be about 30% of the total.

The above fact alone is able to explain the great distances of the planets from the sun as well as their high angular momentum.



**Source-** <https://smoothknowledge.com/2017/08/26/binary-star-hypothesis-of-russell/>

As the great approaching star came nearer to the companion star, the gravitational and tidal force continued to increase and hence the bulge on the outer surface of the companion star started growing towards the giant approaching star.

When the giant approaching star came nearest to the companion star, large amount of matter was ejected from the companion star due to maximum gravitational force exerted by the giant approaching star.

The ejected matter started revolving in the direction of the giant approaching star and thus opposite to the direction of revolution of companion star. Later on planets were formed from the ejected matter. In the beginning the planets might have been nearer to each other and thus matter might have been ejected from these planets due to their mutual attraction and thus satellites might have been formed from these matter.

**Criticism:**

It is true that Russel's assumption of a binary star, i.e. the sun and its companion, and an intruding star that was far more massive than the

twin stars could solve the problem regarding the distance between the planets and the sun, and also explained the high angular momentum of the planetary system. But there are certain objections to his hypothesis on the following grounds:

(i) Russel could not explain the disappearance of the residual part of the companion star of the sun after all the planets of the solar system were formed from the ejected matter of the sun's companion.

(ii) Russel did not throw light on the problem of the removal of the sun's companion from the gravitational control of the sun.

(iii) It was not made clear as to how was the companion star driven away and how could the filament (out of which the planets were born) ejected from the sun's companion remain within the gravitational control of the sun.

(iv) The present spacing of the planets remained unanswered.

(v) Why a filament in the intruding star could not be produced by the tidal attraction of the sun's companion?