Lunar formation—collision theory fails

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A recent study of moon rocks[1,2] calls into question the present lunar formation theory and may bring us back full circle to one of the earliest theories—that of George Darwin's 'fission hypothesis'. Other early theories included the lunar capture theory and the condensation hypothesis.[3] The fission hypothesis claims that the early earth rotated faster, as more dense elements sunk to its core. When the earth exceeded breakup velocity, the material that would become the moon tore from Pacific Ocean Basin, leaving a scar (Ridges). The problem with this is that the initial spin or angular momentum is not conserved in the present earth–moon system (50% loss). Also, the orbit of the moon and the obliquity of the ecliptic (likewise the inclination of the earth) should coincide, and they do not. The earth's inclination is about 23.5° to the orbital plane (the ecliptic) and the moon's orbit is inclined by some 5°.

Another theory is that the moon was captured by the earth as it passed by in an earth-crossing orbit. One major problem with this idea is that capture is an extremely rare event. Even if this unlikely event took place, the moon would likely have swung by in a parabolic or an elliptical trajectory, which is a higher-velocity orbit than that of the near-circular orbit of the present day moon. The big question is *what caused the moon to slow down?* Also, we would expect the present moon to have a larger eccentricity and inclination. The resulting fantastic tidal dissipation would have also resulted in major distortions and destructiveness of the earth. Finally, if a near-collision brought the object within the Roche limit, the moon could have been shredded into rings encircling the earth.

The third lunar formation hypothesis is an extension of the Laplace nebular hypotheses: the moon formed from the solar nebula. As the sun's nebula condensed, conservation of angular momentum caused a disk to form, and within the disk, eddies or whirlpools developed. At the centre of these, the planets formed. Secondary eddies led to satellites or moons of the planets. The earth and the moon supposedly formed in an eddy and a secondary eddy. Again, the strange earth-moon orbital inclination would not result—the moon's orbital plane and the earth's equator should coincide.

A fourth lunar formation theory is more recent.[4] It involves an earth collision with a two Mars-mass planet. This seems to solve all of the aforementioned problems except for the low probability of such an event. In fact, it is much more improbable than a near collision of a lunar mass dwarf planet as in the capture hypothesis. However, the odd orbit of the moon is easily explained by the initial orbit of the planet since it does not have to follow a particular path (except that it should be near the ecliptic). However, Zhang *et al.*[2] and Meier[1] have now cast doubt over even this model. Zhang *et al.* confined their study to a rare form of titanium (using the $^{50}Ti/^{47}Ti$ ratio) which is known to occur in widely varying amounts throughout the solar system. After correcting for the difference caused by the continued exposure of the lunar surface solar radiation, the scientists found that the abundance in moon rocks was identical to that of earth. This implies that the moon came only from the same materials as the earth and not a once-distant alien planet that collided with the earth. There is therefore no evidence of the Mars-mass object in these data. So the collision theory has apparently failed.[5]

Why should the moon and the earth be so alike? A clue to this is supplied by the following verses:

> "Let the earth bring forth grass …" (Genesis 1:11).
>
> "Let the waters bring forth abundantly the moving creature …" (Genesis 1:20).
>
> "Let the earth bring forth the living creature …" (Genesis 1:24).
>
> "And the Lord God formed man of the dust of the ground …" (Genesis 2:7).
>
> "And out of the ground the LORD God formed every beast of the field, and every fowl of the air …" (Genesis 2:19).
>
> "And the rib, which the LORD God had taken from man, made he a woman, and brought her unto the man" (Genesis 2:22).

It is possible that God formed the first living creatures, and possibly other complex objects like the first stars and planets, from already created locally available elements. Thus, sea creatures were formed from materials found in the oceans, land animals and men were formed from elements found in the earth's crust. Probably even the earth, the planets, and the stars were formed from local condensations of gasses and dust found in the immediate area of their formation. In the beginning, there was a 'creation' of elementary materials followed by in-place formation of

Figure 1. Stars in this cluster appear to be formed out of the surrounding nebula, illustrating the author's 'In-place formation' hypothesis.

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complex forms. Today, stars found in groups called clusters are found to be of similar 'age' and chemical content. This could be offered as evidence for this idea. It appears that God made products from previously created basic 'building blocks'. I call this the 'in-place formation' hypothesis (figure 1). It may be an important piece to the creation puzzle.

Regardless, the real explanation of the moon's existence and orbital configuration is that God designed and created the moon and set it in place, with a number of important purposes. These include the gyrostabilization of the earth, cleaning of its shorelines by tidal forces, giving light in the evening, and the revealing of the Sun's corona and chromosphere to scientists during solar eclipses. Helium was discovered because of the last listed design feature. We read in Genesis 1:16–18 (KJV):

> "And God made two great lights; the greater light to rule the day, and the lesser light to rule the night: he made the stars also.
>
> "And God set them in the firmament of the heaven to give light upon the earth,
>
> "And to rule over the day and over the night, and to divide the light from the darkness: and God saw that it was good."

References

1. Meier, M.M.M., Moon formation: earth's titanium twin, *Nature Geoscience* **5**(4):240–241, 2012.
2. Zhang, J., Dauphas, N., Davis, A.M., Leya, I. and Fedkin, A., The proto-earth as a significant source of lunar material, *Nature Geoscience* **5**(4):251–255, 2012.
3. Whitcomb, J.C. and DeYoung, D.B., *The Moon: Its Creation, Form and Significance*, Baker Book House, Grand Rapids, MI, 1978.
4. Canup, R.M., Dynamics of lunar formation, *Annu. Rev. Astron. Astrophys.* **42**:441–475, 2004.
5. Zhang *et al.*, ref. 2 suggest that the twin nature of lunar rocks and the earth could be explained by an "efficient impact ejection" by "exchange of material between the earth's magma ocean and the protolunar disk". However, it is very hard to imagine such a thorough mixing of an alien planet and the earth's crust.

Photo: NASA