How many impact craters should there be on the earth?

I would like to comment on the excellent article by Michael Oard in issue **23**(3)61–69, 2009.

If Michael's intent was to present a new model for Flood geology integrating the solar system bombardment record uncovered in astronomy, he has done the job. The author does raise the question about 36,000 or so impacts during the Flood year and the destruction the earth could experience. I did a rough calculation here. Using an asteroid of 1 km diameter, spherical shape, mean density of 2 g cm^{-3}, we have a mass of about 1.05 x 10^{15} g. Hitting the earth at 20 km s^{-1} the asteroid contains about 2.09 x 10^{27} ergs s^{-1} of kinetic energy using c.g.s. units.

A one megaton nuclear warhead delivers about 4 x 10^{22} ergs s^{-1} of energy. Using my example as an average asteroid for the 36,000 or more hits during the Flood, we have an enormous amount of kinetic energy striking the earth during the Flood, perhaps $\geq$ 7.5 x 10^{31} ergs. Asteroids that could form 1,000–5,000 km diameter craters on earth would carry much more energy (perhaps > 1 x 10^{30} $ergs^{-1}$).

I believe the creationists community should look at this new model seriously. It could challenge CPT theory in Flood geology but raises questions. If the duration of the 36,000 impacts is restricted to 40 days (Genesis 7:11–12) or 150 days (Genesis 7:23–24), how does the earth avoid becoming a large, magma ocean over much of its surface? Another concern, how does the Ark with Noah and all on board, avoid asteroid generated tidal waves? 36,000 or more asteroid impacts with an average size and kinetic energy as I used may generate hundreds, even thousands of tidal waves.

Are creationists attempting to place too much astronomical bombardment in too short a time scale here?

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Michael Oard replies:

I am in total sympathy with the concerns of Mr. Bernitt. I simply performed an extrapolation of the size-frequency distribution of impact craters from the moon to the earth, taking into consideration the earth's stronger gravity and larger cross-sectional area. I had to gulp hard after the calculations, and although I had not yet done the energy calculations, I knew that the impacts provided way too much energy. I had already seen a rough calculation of the energy for the Late Heavy Bombardment, which is tremendous.

Some may question the extrapolation from the size frequency diagram of a few craters with a diameter as large as 4,000 to 5,000 km, but this extrapolation is supported by the crater Utopia on Mars which is 3,800 km in diameter.[1]

My intent was indeed to present a new model for the early Flood, the Inundatory Stage,[2] with the first step being the calculation of the number of impacts and the timing of impacts in biblical earth history. I have already done a lot of work on the later half of the Flood, the Retreating Stage.[3] I hope to join impacts early in the Flood with differential vertical tectonics late in the Flood.

How can we explain this huge amount of energy and the expected consequences? I do not think we can explain it by suggesting that the earth was missed by many of these 36,000 impacts. This is because all the solid bodies of the solar system, including asteroids and the moons of the outer planets, show evidence of numerous impacts—with the exception of those bodies resurfaced by volcanics and debris, or Venus with fewer impacts due to a thick atmosphere. All these bodies are extremely tiny points in interstellar space. If they were all blasted, then the earth would not have been missed, especially with the moon so close to the earth and being covered with impacts.

When did the impacts occur? The impacts certainly did not occur after the Flood, or we would not be here to discuss the number of impacts. It is possible that many of the impacts are pre-Flood. However, too many large impacts would wipe out the biosphere, and there would not be anything left to be destroyed in the Flood. There is the possibility that the impacts could have occurred at creation. But this does not seem likely since the moon was created on Day 4, meaning that a lot of plants would have been destroyed on the earth if all the impacts were on Day 4. Of course, impacts after Day 4 would have destroyed a lot of animals in God's "very good" creation.

Only one possibility seems likely, that all the impacts occurred during the Flood apart from a few small post-Flood impacts. I would lean to the conclusion that the impacts occurred quickly very early in the Flood and actually started the Flood—based on the large craters mostly on the near side of the moon—and then the impacts tailed off after that. Wayne Spencer and I estimated that at least some, such as the Chesapeake Bay impact crater, occurred late in the Flood.[4]

Meteor Crater, Arizona (USGS). The crater is 1.3 km in diameter and 170 m deep.

In regard to the questions that Mr. Bernitt raises, I would say that God was in charge of the Flood and likely orchestrated the catastrophe so as to avoid the crust turning into a magma ocean, the ocean boiling away, and a direct hit on the ark by an asteroid or by a huge tsunami in shallow water. He did this only for the earth because of His creation, while he allowed the full assault on the other solid bodies of the solar system because there was no life on those bodies. Direct supernatural control of the Flood is indicated by Psalm 104:6–9, where God describes how He covered the mountains with the deep, and that at His rebuke and the sound of His thunder the waters fled. This praise psalm refers to the Flood because in verse 6 God "covers" the mountains. On Day 3, God "uncovered" the mountains. In verse 9, God set a bound so that the ocean will not return to cover the earth.

Yes, I believe the impact model challenges the CPT model, which really only begins in the middle of the Flood according to Baumgardner because of the Mesozoic dates of the ocean floor basalts (which means that CPT is not a Flood mechanism but a Flood consequence, if CPT really occurred). The impact model also challenges the hydroplate model. Such a huge number of impacts during the Flood must mean that many geological and geophysical features have been caused by impacts.

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References

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2 Walker, T., A biblical geological model; in: Walsh, R.E. (Ed.), *Proceedings of the Third International Conference on Creationism*, technical symposium sessions, Creation Science Fellowship, Pittsburgh, PA, pp. 581–592, 1994.

3 Oard, M.J., *Flood by Design: Receding Water Shapes the Earth's Surface*, Master Books, Green Forest, AR, 2008.

4 Spencer, W.R. and Oard, M.J., The Chesapeake Bay impact and Noah's Flood, *Creation Research Society Quarterly* **41**(3):206–215, 2004.

Christ as the last Adam

I was pleased to read Lita Cosner's paper "Christ as the last Adam..." in *Journal of Creation* **23**(3), 2009. I hope it is the forerunner of more theological work on matters related to creation.

She quoted Barrett's consideration of the unimportance of the historicity of Adam, and rightly, to my mind, disagreed with it.

I fear that Barrett's sentiments are widely held by Christians, if without clear articulation; that is, I think they are held unconsciously by many people, lead by those theologians who do make their case clearly.

There is a thread running through much of Western theology that seemingly rests on a view of the world that is perversely not biblical. Why I say this is that I read the Bible itself seems to have "concrete realist" regard for the world and relations within it. Much theology is in debt to some form or other of philosophical idealism: the upshot of idealism is that one can hold one set of axioms applying to the real world where we live and shop (try being an idealist in the supermarket), and refer to another set with application only to a world (the "ideal" world) whose intersection with this world is purely verbal, or ideal, to allow the idealists to be consistent.

Idealists can believe any number of contradictory things before breakfast, and particularly in theology can believe that the Bible at once has God creating, and at the same time the cosmos bringing itself into being, but argued from differing premises.

I don't think that this stands up to biblical scrutiny, let alone logical analysis.

So, Barrett's view fails: while it is true that "sin and death" are empirically established as part of human experience, this is not Paul's point. His point in tracing it back to Adam is to do two things (if not three!).

1. He refers us to the Genesian creation account to remind us that death and sin were not part of the creation, they are the result of a breach in the relationship between God and his image-bearing creation, man and therefore as not inherent in the creation are theoretically correctable! In Christ, of course, they are actually corrected and will be shown to be corrected in the new creation. If they were inherent, then we are stuck with them (and stuck with death, contradictorily from him in whom is life: John 1:4 and on whose creation death is an intruder: Gen 2:17 in the light of Gen 1:26a and 1 Cor. 15:26!).

2. He reminds us that Adam's history, including the fall and thus sin, Christ, and our experience today (his day ... our day by induction) are ontologically contiguous. There is no idealist breach in the coordinates of their contiguity; to suggest that there may be ontological discontinuity between them would suggest that reality is other than revealed in the Bible, that there are elements to it that are either not revealed to us, or might be also "given" and independent of God. Such elements might introduce something between God and man other than Christ (some "principle" such as may be required by theistic evolution), or tell us that there is more to creation (that which will have an influence on us) than is shown between God and his creation as explained in the Bible ... but how would or could we know ... it takes us to the endless and fruitless speculation that has often dogged Christian theology with mysticism, for example.

2a (or maybe 3). He must needs reference the creation as from God's hand by God's will and done by his Word as also sharing time and space coordinates that place it in the same structured reality as that we occupy, and in the same terms as our experience: