

**GENESIS vs. SCIENCE:
AN AMAZING AGREEMENT**

BY
MARGARET E. ISSIGONI - MICHAEL ISSIGONIS

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Abstract

If the word «water» as it appears in verses 2,6, and 7 of Genesis is replaced with the word «hydrogen» (nuclei or atoms) and the generally accepted recent interpretation of verses 1 - 4 is followed, an astonishing coincidence between Cosmology and Genesis is observed. If the meaning of the word «*light*» is taken to be that of a «photon», then Verse 3, «*let there be light*» is the precise moment of the Big Bang. Verse 2, «. . . *the spirit of God swept over the waters*» refers to the early stages of the universe in which hydrogen nuclei were produced. The action of «*the spirit of God*» on water can be considered the prevalence of protons over antiprotons. Verse 4. «*And God divided the light from darkness*» is the «last scattering» that took place 500,000 years after the Big Bang. Verse 7, «*And God made the firmament and divided the waters which were under the firmament from the waters which were above the firmament*» describes the formation of a star and thus of a planet according to Astronomy, leading ultimately to the creation of the Earth. Verses 9 to 25 are in agreement with modern Earth Science theories, including verse 11 «here the paradox of the appearance of the Sun follows the appearance of vegetation on Earth.

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Previous opinions

The question of whether the Big Bang theory supports Genesis has not yet been fully answered. The argument between theologians and physicists continues (ref. 1-6) and concerns mainly a disagreement in the order of events.

The astronomer J. Heidmann (2) generally sees an agreement between Genesis and Cosmology concerning the «first moment» that the universe was created, but notes, paradoxically, that light in Genesis appears to postdate the creation of the Earth.

The astronomer R. Jastrow (3) generally supports similar views, and agrees with the «first moment», but he disagrees with the rest.

The physicist P. Davies (4) believes that the Creation theory is quite different from that which appears in the Bible, apart from an apparent agreement concerning the «first moment». In the Annual Oxford International Symposium on Sciences and Theology in the 20th Century, E. McMullin (5) denies there is an agreement on the «first moment» based on current thoughts of that time (1979) and argues that the majority of theologians in the west believe that the Bible is not a scientific text as contained in the Principle of Galileo. In contrast, according to the Principle of Augustine, Genesis is a scientific text but in places, the events are stated allegorically, or indirectly.

Finally, the physicist G. Gounaris (6) argues that Verse 2 of Genesis «*The earth was invisible and unformed*» refers to the formation of the first matter, photons, electrons, few light nuclei and neutrinos. «*Darkness covered the abyss*» refers to the 500,000 years after the Big Bang during which the universe was opaque and dark, while the verse «*let there be light*» refers to the last scattering.

Our Interpretation – General Statement

An amazing coincidence between Genesis and Cosmology may be demonstrated provided the word «*water*» as it appears in verses 2,6. and 7 is interpreted as «hydrogen», the latter being one of the two components of water. The fact that a word can be interpreted differently is not new in Genesis. The word «*day*» in verse 5 is interpreted as light, then as stage, and in verse 14 as the usual period of time (24 hours). A recent interpretation of Genesis (7) is not yet generally known to scientists. We believe that the main reason of the disagreement is found in the order of events, in that the first two verses are introductory and must be considered separate from the rest. Verse 1 represents a summary of the events

described in verses 3 to 31 in detail, while verse 2 describes the early universe and the 500,000 years after the explosion, before the appearance of stars, planets and galaxies.

Detailed Interpretation

Verses 1 & 2

According to the Septuagint Translation of the Bible, the first 2 verses are:

1. *«In the beginning God created the heaven and earth».*
2. *«And the earth was invisible and unformed, and darkness covered the abyss, and a spirit of God swept over the waters».*

Heaven represents Space in science (6). The «*unformed*» earth is the early matter in its primitive form (6), mainly protons, photons, also, electrons, and neutrons. These were formed during the half a million years after the Big Bang.

During these early stages of the universe, photons were trapped within the ionized matter, hindering their freedom to travel. Therefore, matter was opaque with the result that the universe appeared dark, explaining the phrase «*darkness covered the abyss*».

The term «*waters*» refers to the «*unformed*» state, consisting of its basic substance which is hydrogen nuclei, or protons, the main constituent of the universe**. The «*abyss*» is the darkness of a sea of these protons.

As for the enigmatic phrase «*a spirit of God swept over the waters*», we can follow Basil the Great's interpretation, the belief that the action of the «*spirit of God*» on this early «*unformed*» matter was an animation of the water. Could this be the solution to the great mystery in Cosmology, the question of the existence of this World the unexpected prevalence of matter over antimatter (protons over antiprotons, electrons over positrons)?

Therefore, these two introductory verses inform the reader that the universe had a beginning and was created by God from nothing (*ex nihilo*), but the Earth, being the obvious center of interest, was not created from the beginning, matter «*unformed*», but at a later stage. The above was first proposed by Basil the Great in his treatise of «Hexameron».

We disagree with the old interpretation that these two verses are part of the

** An idea already accepted by Professor G. Gounaris (G. Gounaris, *I Mera Mia stis Glosses tis Agias Grafis kai stis Epistimes*, International Scientific Symposium «Science, Technology, Orthodoxy» October 2000, Dimocritos, Athens).

first day of creation (2-5,8). The early matter implied in verse 2 was created on the first day together with the first light. Moreover, this is not mentioned in verse 3, but is assumed.

Verse 3

«And God said, Let there be light. And there was light»

This verse marks the beginning of the first day, or first stage, and coincides with the precise moment of the Big Bang, the emission of thermal energy in the form of photons following the immense temperatures and explosive expansion. «Light» is interpreted as photons, as in ref. 2,3 & 6.

Verses 4 & 5

«And God divided the light from darkness»

«And God called the light day, and the darkness He called night. And there was evening and there was morning, one day»

We interpret the above as the «last scattering» that took place some 500,000 years after the explosion. At that time the cosmic material becomes transparent to light and electrons unite with protons, or ionized matter. Photons are now free to move. With their movement, photons emit light along their path of travel, but darkness reigns elsewhere. Formed stellar objects will later block their path and darkness appears.

We disagree with Prof. Gounaris that verse 3 corresponds to the last scattering. This explanation would have been correct only if verse 2 was considered as the beginning of the detailed description, and not as an introductory one.

Verses 6 to 8

«...let there be a firmament in the midst of the waters, and let it divide the waters from the waters»

«And God made the firmament and divided the waters which were under the firmament from the waters which were above the firmament»

«And there was evening and there was morning, a second day».

These events took place during the second stage, and describe the formation of the stars and planets, which were possible only after the last scattering. The «waters under the firmament» correspond with the cosmic material, mostly hydrogen, which randomly condenses and separates from the rest, the «waters above the firmament» also mostly hydrogen. The «waters under the firmament» will eventually form the Earth by collapsing due to gravity, whereas the «waters above the firmament» fill Space, or Heaven. [See Psalm 23' 2 «On seas You found it»]

Therefore, verses 6 to 8 describe the creation of the Earth in detail. This also possibly includes the formation of the entire Solar System or even all other stars and galaxies.

Our belief is that this description does not apply to the formation of the Earth's atmosphere, clouds, and oceans, as it appears to be.

Verses 9 & 10

«...let the waters under the heaven be gathered together unto one place, and let the dry land appear»

«And God called the dry land Earth, and the gathering together of the waters He called the Seas...»

This verse introduces the third stage and describes the Earth during a later stage in its evolution, in which hydrogen had already united with oxygen to form water. Therefore, «water» here actually means liquid water as we know it.

This interpretation is in agreement with modern theories in Earth Sciences.

Verses 11 to 19

11. *«... let the earth bring forth vegetation: every kind of plant that bears seed and every kind of fruit tree that bears fruit with its seed in it...»*

16. *«...And God made the two great lights: the greater to rule the day, and the lesser to rule the night, and the stars».*

The major disagreement between Genesis and Cosmology in these verses, i.e. the paradox of the appearance of the Sun later than the Earth, can be explained in the generally accepted notion of thick atmospheric clouds blocking out the sunlight. The word «*Asah*», or to create, is used in the original Hebrew Scriptures instead of «*Bara*» or to create from zero, showing that the sun already existed. Therefore, verse 16 refers to the stage when the sky clears from the thick clouds and the sun appears. The actual time of the creation from zero of the sun is not mentioned in the Scriptures because of its secondary importance, and perhaps is implied in verses 6 & 7.

The other paradox, in verse 11, describes the appearance of vegetation earlier than sunlight and can be explained by the first known life form that existed on earth prior to the appearance of sunlight. This form of life is thought (9) to be bacteria on the ocean floor metabolizing sulphur gases as early as 3.8 billion years ago. These bacteria were the basis of the plant world. The exact time that the sunlight offers its energy on earth to give rise to the first plants created by photosynthesis, however, is of great importance. This time is currently (9) taken to be around 3.0 billion years ago. The first plants on earth to develop by

photosynthesis were the blue-green algae, or cyanobacteria, that lived in the ocean.

Since the earth is the main interest of the author of Genesis, the formation of other stars is of secondary interest. This is the reason that the stars are mentioned after the sun.

Finally, verses 20 to 31 are in agreement with modern Science as in the Table that follows. The creation of man will be examined in detail at a future article.

TABLE

<i>day</i> or stage	verse	Events in Genesis	Events in Science	Radiometric dates (in million/billion years)
	1 2	summary of events Unformed matter (water=protons)		
First	3 4,5	<i>Light</i> <i>Light divided from darkness</i>	Big Bang First photons, protons Formation of atoms Last scattering	12-15 b.y. ago ½ m.y. after Big Bang
Second	6-8	<i>firmament separating waters</i> Creation of the Earth	Formation of stars/earth	4.6 b.y. ago
Third	9,10 11-13	<i>seas, land</i> <i>green plants, trees, seeds</i>	Formation of ocean, land First plants on ocean floor	4.0 b.y. ago 3.8 b.y. ago
Fourth	14 - 19	sun, moon, stars	The sun is visible First photosynthesis	3.0 b.y. ago
Fifth	20-23	<i>living things in water</i> <i>flying creatures, etc.</i>	First insects, fish	~ 400 m.y. ago
Sixth	24 - 25 26-31	<i>all kinds of living creatures,</i> <i>reptiles</i> <i>humans</i>	First land animals First humans	~ 300 m.y. ago ~ 5 m.y. ago (?)

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