

U

I

II

A Few Thoughts
on
Creation.

William S. Forester
1889

Mic. 9/78

Introduction.	I - V
The Inspiration of the Bible.	V - X
To what extent does the Bible deal with Science.	X - XVI
The Limits of Natural Science	XVI - XXIV
Investigation of the Mosaic account of Creation.	XXIV - XXIX
The Exegesis of the Text.	XXIX - XLVIII
The six days of Creation.	XLVIII - LIX
<u>Reconciliation between</u> <u>the Bible and Science.</u>	<u>LIX - CXXII</u> LIX - LXXII
The Nebular Hypothesis	LXXII - LXXXII
Palaeontology.	LXXXII - LXL
The Strata of the Earth	LXL - LXLVIII
Reconciliation between Bible and Science according to the Literal Theory.	LXLVIII - CII
" " " Restitution "	CII - CVII
" " " Concordistic "	CVII - CXVI
" " " Ideal "	CXVI - CXX

Introduction.

Eminent natural philosophers have expressed their conviction in the strongest terms, that the account of the creation given in the Bible, finds a striking confirmation in the conclusions of natural science. Cuvier says "Moses has left us a cosmogony, the accuracy of which is being confirmed every day, in a striking manner. The books of Moses show that he perfectly understood all the most important questions of natural science. His cosmogony in particular, considered from a purely scientific point of view, is extremely remarkable, because the order in which he places the different epochs of creation is exactly the same as that which is deduced from geological investigations. A more recent French savant, Ampère, remarks "Either Moses possessed just as thorough a knowledge of natural science as we have in our century, or he was

inspired; and Marcel de Serres states,
 "The relations between the narrative of
 Genesis and the recent discoveries of
 natural science are most remarkable.
 They impart a new lustre to the genius
 of the Hebrew language lawgiver, and we
 cannot help recognizing that he possessed
 either a revelation from above, or at
 least that penetrating genius which for-
 sees the secrets of nature, pierces the
 darkness enveloping her, and constitutes
 the true imagination which conveys to
 man a gleam of the Eternal truth." On
 the other hand, it is boastfully pro-
 claimed by some "that astronomy takes
 the roof from over the head and
 geology the ground from under the feet
 of the old faith; that natural science
 in its recent discoveries sounds the
 'knell of the Mosaic Cosmogony,' and the
 opponents of the Bible insist that the
 'Genesis' account is 'senseless' and a 'lie'."

[Diffusion Urban in Montevideo mis.]

The theologian of to-day, if he find natural science opposed to the Bible, must either try to reconcile them, or show that the meaning of the first chapter of Genesis is misapprehended, or that the scientist has taken questionable hypotheses as facts.

The press seems opposed to the Biblical account of creation. Periodicals treat the subject as impossible of reconciliation. This half-Educated or supposedly Educated people are imposed upon. It is a great duty of ministers to study up this branch and fight against many charlatans of the age.

To discuss this question in its fullness, one must be an exegete and scientist. But scientists are rarely Biblical exegetes, and Biblical exegetes rarely scientists. Many scientists look upon the Bible as interesting only from an historical standpoint. While natural science

is ever changing, it is unwise to strive to reconcile it with the Bible, with Enthusiasm, as an after discovery may overthrow both interpretations. It is well to use much discretion.

The first chapter of Genesis is an inspired work, in fact the Bible in its entirety is such, wherein it quotes the words of God. Therefore the whole Bible, barring simple narratives of man and his poetical compositions, is inspired.

The first chapter of Genesis contains the divine truths revealed to a prophet, who felt himself impelled to write, and thus the divine aid precluded error. Such writing is to be considered differently from profane writing. The prophet wrote, not from his own choice, but from divine ordinance and therefore this writing must be attributed to a divine impulse to an inspiration. The Biblical writers generally, and the author of the account

of creation were guided by God, and Providence prevented error, for if Error would occur, the divinity of the writings would be annulled. This is the theory of inspiration.

H. Holland⁽¹⁾ affirms that Divine influence pertains to the religious truths of the Bible, but as regards other matters, - they are to be classed just as the works of other honest writers. From this position we would be justified in assuming that Biblical writers may have been mistaken on points of history, archaeology, and chronology etc. which have no immediate bearing on the religious contents of the Bible. H. Stace not discuss this point here, as it touches very lightly, if at all upon the subject. -

The Inspiration of the Bible.

The author of the first chapter of Genesis may have received

⁽¹⁾ [divinae fidei analysis Bonn 1844]

his knowledge from verbal tradition or from older writings. If this be accepted, we need no immediate divine revelation.

But no man could see the Events pictured therein. Where did we get the first chapter?

Some have thought that Moses may have gained this knowledge through study like other philosophers and scientists. This theory is theologically without objection, but scarcely as tenable or plausible as the one from divine revelation.

The composition of the Creation does not seem to come from one who has arrived at his conclusions after long research. The style is decided in its grandeur and power.

The sanctification of the 7th day in the ten Commandments shows that the 1st Chap. of Genesis was meant for a divine revelation.

כי יִשְׁעֶם-יָמִים עֲשֶׂה יְהוָה אֶת-
Exa. XX-11-

וַיְשַׁבֵּם וְאֶת-הָאָרֶץ אֶת-הַיָּם וְאֶת-כָּל-אֲשֶׁר
 בָּם וַיְנַח בַּיּוֹם הַשְּׁבִיעִי עַל-יַם
 יָקוֹב אֶת-יוֹם הַשַּׁבָּת וַיְקַדְּשֶׁהוּ:

"For in six days God made the
 heaven and the earth, the sea and all
 that is therein, and rested on the seventh
 day; therefore God blessed the seventh
 day and sanctified it.

The first Chapter may have been
 revealed to Moses or to ages before
 him, perhaps to the first man,
 and it was handed down to Moses.

Then it is questionable whether
 the Sabbath is a Mosaic institution.
 It is questionable whether Moses first
 prescribed it. ("Biblical archaeology
 supplies us with reasons which need not
 be enumerated here but which amount
 almost to proof for believing that Moses
 found that his people already kept
 the Sabbath and that it was only more
 decidedly regulated by his legislation.

(1) [Reusch Nature und Bibel]

8

But the hallowing of the seventh day
presupposes the *Hexameron*.

Then again there is a wonderful
agreement in the legends of all
other people, and we are forced to
trace them back to a common origin.

Many ancient races speak of the flood,
of the chaos and even of the six
day creation. Man is always held to be
the master stroke and end of creation.

This master piece of poetry is the creation
worthy of a God, clear, concise, full. It could
not be expressed in more eloquent or
dignified language. God also reveals him-
self to man through nature and in
a natural way. "The heavens declare
the glory of God and the firmament
showeth his handiwork. There is
no speech, nor language, whose
voice is not heard. Their line is
gone out through all the earth and
their words to the end of the world."

Ps. 19-1, 3, 4.

The bible and nature can not disagree if they both be the works of God. Aug⁹ says: The bible and nature in so far as they are both the word of God, must agree. When this appears not to be the case either the interpretation of the theologian or that of the natural philosopher is at fault. In our day geological science agrees as little as does hermeneutical interpretation.

A more advanced state may bring about reconciliations which we cannot see now. When science becomes more exact and when theologians cease to draw wrong conclusions from a dogma or passage in the bible, when scientists cease to draw wrong conclusions from correct theories or cease advancing wrong theories then only will there be complete and unanimous reconciliation. The human mind however will ever continue to argue differently. Religion has every thing to hope and nothing to fear from the advancement of philosophy. Where there is disagreement between science

(1) Bible & astronomy

10

and the bible, either the theologian or the natural philosopher is at fault.

To what extent does the bible deal with science?

The bible was never intended to teach science, but we must deal with science because quasi scientific facts are stated therein. The bible gives us a religious or moral revelation, not a scientific one. This statement has ever been held. One of the greatest english theologians says: Theology and physical science on the whole do most surely occupy distinct fields, in which may teach without expecting any interposition from the other. It might indeed have pleased the Almighty to have superseded physical inquiry by revealing the truths which are its object, but he has not done so. "The bible," says Kurz "preserves its religious character in that it in no case anticipates human science, in no case treats of problems, the solution of which

11) J. H. Newman "Lectures and Essays on University Subjects."

belongs to empirical inquiry. Therefore, none of the conclusions of the latter can contradict the bible, or come into conflict with revealed truth. Revelation gives carte blanche for its conclusions of natural science. It favours neither Plutonism or Neptunism, it only judges matters which concern religion. It no more decides between Neptunists and Plutonists, than between homoeopaths and allopaths." The bible teaches beliefs, morality. If you want to extract biology, zoology or geology, you must look to nature and use your brain to ferret out its problems. The biblical author only wanted to preach religious truths not profane or scientific facts in nature. The biblical authors were not ahead of the times in natural science. Moses knew no more about science than his time knew. We think the praise given him for anticipating the development and progress of creation unjust and undeserved. Still the little

science stated in the Bible, must be reconciled
 with the data of science, if the Bible be
 inspired. Let us bear in mind that
 geology is not a perfected science, and
 that the Bible does not go into details on
 science. It wants to be understood by the
 ordinary man. We must not read the text
 too closely, for it is filled with figurative
 writing. When we read that Joshua com-
 manded the sun to stand still upon Gibeon
 and the moon on the valley of Ajalon,
 what fair-minded man will attribute this
 phrase to a teaching of natural phenomena. The
 author prayed that the day might be length-
 ened, until the Enemy was routed. And
 even if Joshua did believe that the sun
 stood still, he might not and probably
 did not think of science, when he
 gave expression to that prayer. Moses mentions
 the sun and the moon as the two great
 luminaries. So they appear. Copernicus has
 not given his theory to the world. The

object is to teach the greatness of God, that He was the Creator. The Scriptures fashion themselves to the readers power of understanding.

Holy writings speak of physical phenomena as they appeared and now appear, and uses the ordinary methods of expression. We say to-day, the Sun 'rises and sets'. We know it does not, and still we say so.

If the Bible would narrate in scientific language, it would fall short of its object, and confuse the simple minded man. Kepler states:

Supposing that the founder of a faith like Moses possessed all the modern knowledge of astronomy and geology, what use would it have been or rather what harm would it not have done, if he had spoken in the language of Copernicus, Newton, Laplace, Werner, Lyell, or Sir Charles Lyell? He would certainly have been misunderstood and despised for 2000 years, and all this only to give some satisfaction in the 19th century;

for by the 20th much of the satisfaction of the 19th would have been lost.

The Bible rarely treats of natural science but the first chapter of Genesis is a great exception. Of course this chapter wishes to impart religious instruction, but what shall we do with the particulars in it. By bearing in mind the idea outlined we shall understand each other more clearly.

Let us look upon the Hexameron from a popular view, from which it can be seen by the multitude and not from scientific side. There are certain dogmatic principles which the Bible lays down. First the world had a beginning and has been created by God. We are unfettered as regards explanations of the seven day creation, for we are not told things precisely. The Exegetes are at variance in their interpretation of the seven days. The Bible is exact in theology, but since it is not a scientific hand-book, the science

stated therein so vaguely, is open to
 hermeneutical discussion. Revelation does
 not lead us to speculate upon the dis-
 coveries of natural science, it concerns itself
 with the duties of religion. All the
 wonderful discoveries of science, can never
 overthrow the Bible, for they do not encroach
 upon its territory. The science contained in
 the Bible is stated to further its object,
 the teaching of religious truths. Natural
 phenomena is only taught ambiguously.
 The Bible cannot give us an exact history
 of creation. It has not attempted to do
 so, and we cannot force a meaning which
 is not expressed. We cannot then
 ought not strive to reconcile them as
 they stand. Further discovery in science
 may overthrow what we have endeavored to
 conciliate. Then we will have erred in
 science and scripture, which will in-
 validate our belief in the Bible. The
 theologian must keep the Bible away from

science, they are not kindred and he must not strive to form a blood relationship. The Bible does not support science, and the exegete ought to remain neutral to any positive reconciliation.

He should hold ground, only on points definitely stated. We believe that, the Science of the Bible and modern science will, ultimately, be separated from conflict.

The Limits of Natural Science.

Water covers three fifths of the Earth, and but two fifths is visible. Of the two fifths, geological investigation has been carried out in comparatively few places. The immense mass of Africa, the Continent of Asia, the greater part of North America, almost the whole of South America is unexamined. Höggerath says, we have dug 4000 feet; the deepest mines and borings, are only as stings

of agnat in comparison to the diameter of the Earth. Evidently, nature before us lies undiscovered. How can it give us exact data?

The science which concerns us most is geology. We wish to explain the past from the present. The same forces, philosophers assume, that are still at work, were always at work. This hypothesis, by no means faultless, is the only one we can work upon. The greater or further away we place the time of creation, the more must we rely on hypotheses. There are many rules and principles of science, to which all must subscribe. But how often have the very laws been questioned, disputed and changed. There are in Geology, especially many opinions, and the study is worked out differently by different geologists. The geological record is so far from universal agreement, on account of the limited knowledge of the subject. We can outline the old condition of the Earth with little certainty

"It is true that the natural sciences may boast that they know with certainty, some few superficial facts, but even this knowledge is only attained through a system of errors. For if one generation announces as an undoubted fact, what by the previous generation was declared to be superstition, the ordinary observer cannot fail to be persuaded that it is all a question of human convictions, which appear under different aspects, as soon as the further progress of science has opened up new points of view. We do not worry of inquiring, but we long for light of which however there seems but little chance in this life, even as regards the most ordinary course of earthly things. Whether we shall ever receive this light, the man of science cannot discover, but it would be hard for man to be forced to believe that this strong desire of the soul should never find satisfaction."⁽¹⁾ We

shall only accept what has been fully agreed upon, as the teachings of natural science. In the first place we must raise an old

(1) Duenstedt "Sinn und Geist" p. 281

objection to natural science. However wondrously we may admire the unfolding development of existence, however strikingly the development may meet us, we ever see that natural science never goes beyond the first substance, from which all has originated and developed by the inherent forces of the first substance.

Natural science never does and never can account for the origination of the first cause of all existence.

What brought the forces and laws of nature into existence? It cannot say, they originated from nothing, for from nothing, nothing comes.

We revert finally to the Eternity of matter, or that certain forces were created through some cause apart from them. Natural science cannot decide which of the two is true and right. The strictly scientific man starts upon one basis, to have nothing to do with things that are not the objects of his observation or experience, and can never become such. He must neither sanction or condemn them. The

strict scientist has nothing to do with freedom;
 God for them cannot be among their experiences
 and observations. As a man he may speak
 of them, as a Scientist never. When he says
 that matter must be caused by a being, he
 has left the department of Science, and
 enters that of religion. Whether the Earth and
 the world be Eternal, or that which has neither
 beginning nor End is Eternal, for matter is
 said to have neither beginning nor end, — or
 all matter is Eternal, — must not be set
 down as a teaching of Science. It does not
 follow that the present condition of things may
 not be changed or annihilated in time to
 come by an External force, and still less
 may we conclude that it could not have had
 a beginning. The laws of thought require that,
 that which cannot be destroyed in time, cannot
 either have originated in time; — but this is
 a philosophical not a scientific conclusion,
 and it is false from a philosophical standpoint.

But expressions which are philosophically false,
 and against the teaching of creation, have
 nothing to do with our treatment of this
 subject. The origin of creation does not belong
 to science. Science can only speak of the
 world as it is, and reason upon how it has
 been. Geology considers the Earth as existing,
 and does not inquire how it came into
 existence. As to the origin of creation, Science
 cannot improve upon the statement "In the
 beginning God created the heavens and the earth."
 It is erroneous to suppose that the study of
 modern science is leading towards materialism
 and atheism. A close investigation will show
 that it tends rather to point to a Father
 of all. From what has been said, it will not
 be necessary to argue with scientists concerning
 the origin of the world, but on its develop-
 ment only. We shall argue this subject
 from a theistic view - God created the world
 and guides its workings. Natural Science

and Theology cannot come into opposition. However much the Scientist may object to God and Creation, he is powerless to disprove them. However ~~deeply~~ he may go to the source of things, trace these wonderful transformation or development, explain intricate combinations, he cannot decide whether matter, the primary origin is eternal or has been created. It is not Science which makes materialists, but the false conclusions drawn from a slight acquaintance with it. When Science is superficially studied, only the natural causes are observed; deeper might tends to one cause for all causes.

Many great scientists were firm believers. Copernicus, Newton, Kepler may be mentioned among the greatest astronomers, and Ulrich Sennaeus, Galileo, Haller, Huber, Zürgen and Euler among philosophers and mathematicians, besides a host of others, - Cuvier, Binet, Gockler, Gustav Bischof, H. H. Martin, Ampère, Richard Owen, Newell, Sedgwick, Buckland, Prof. Wagner, J. Mädler, John Fleming, Faraday etc.

It is wrong to say that theology and science are opposed to each other, for this is equivalent to stating, that scientists are on one side and theologians on the other. After all it is the little scientists that make the greatest trouble, for the men of science are about divided. It is wrong for natural science to attack revelation on the ground of scientific argument, and it is just as wrong that Biblical exegeses cast suspicion on the scientists. Natural science is not an enemy of religion. In our next chapter we shall investigate the Mosaic account of creation. The Interpretation of Scripture is largely moulded by the philosophy of the time. Interpretations are now held by zealous advocates of the Bible, which would have been considered heretical a century ago. The recognized Scriptural interpretation will always accord with scientific teaching.

- Investigation of the Mosaic account of Creation. -

Why does the Bible mention the creation of the world? Why does it not entirely omit this? Does not the Bible teach only religious truths and not Scientific facts?

The first chapter of Genesis, wishes to impress upon man, the great truth, - that God created Everything. But it goes further and mentions Special creations. These however are moral truths and not Scientific ones. Moses wishes to tell us that God created the Heaven and the Earth, the light, day and night, the dry land, the fruit-bearing trees and herbs. He desires to impress upon us that God created the greater and lesser lights, the stars, the sun and moon, the fish, fowl and land animals. He blesses the animals and gives them the power of propagation. "Be fruitful and multiply." And finally man, the noblest work, was created by God. The idea of the 1st chapter of Genesis, is to impress the reader with the

greatness of God; wishing to amplify his subject, he details the account. Had he but said, "In the beginning God created the Heaven and the Earth," it would not have been so confirming as the detailed Enumeration. Natural Science with its "force," "power," "first substance," or "first matter" cannot contradict this statement.

A peculiar and striking expression meets us in the first chapter, in the words, 'And God saw that it was good.' This phrase occurs several times. On the first day God created the light and divided the light from the darkness, 'and God saw the light that it was good,' not the darkness also, for that is not created by God, it is no *Ens*, but only the negation of light." On the 2nd day, God created the expansion and divided between the waters, which were under the expansion and the waters which were above the expansion. It is not stated here, 'and God saw that it was good,' because the work of this day has not been completed. On the fourth day, when the luminaries are placed and

arranged in the expansion then 'God said that it was good.' When the distinction between water and dry land is made 'God saw that it was good.' Only after a complete single act does it thus read. After the whole of the divine creation had been realized, notice the last verse of the first chapter.

And God saw Everything that he had made, and behold it was very good.' We notice that man is the final triumph, the last stroke of creation. He is to rule over the animals, who are to feed on plants. The dry land is to be the abode of man and animals. The heaven is even for man's use. The stars, sun and moon are to light the planet, and to be the means of discerning days and years. The first chapter of Genesis plainly teaches religion;— man in his relation to God. We shall treat the six day creation in full, later on. The cause of it however, is to show man the necessity for rest; he should cease his work one day, as God did, ביום השביעי וי שבת he should give thanks to him, speak of his

greatness, rest from worldly work and cares,
and cultivate his mind.

The first chapter of Genesis is frequently spoken of
as a cosmogony, but it is rather a geogony.

Moses' description has especial reference to the
earth. The heaven is only mentioned in relation
to the earth. The stars, their arrangement, whether
they be inhabited or not, is undiscussed.

Moses tells us that God created everything and
specifically creations for man. The Mosiac account
must therefore be crude. He does not pretend
to tell of the interior of the earth, its composition,
the different phenomena of the earth, because
they have no direct bearing on man. Further,
the account of Genesis is not in scientific
language, because it does not wish to teach
science. It is for the ordinary man. The astro-
nomer, botanist and geologist may ridicule the
simple statements, but this plain language
aptly fits its purpose. For instance,
the vegetable world is separated into trees
and herbs (v. 12). This division is unscientific.

but it is enough to tell us that God created the great and small plants. The zoology of the 1st Chapter is on the same order, 1, water-animals; 2, air-animals; 3, land-animals. Water-animals are divided into large and small water animals. The air animals include everything that has wings. The land-animals are divided into (a) Behemah, domestic animals; (b) chayath haarey, wild animals; (c) haremes, little creeping things. This division is not scientifically enumerated according to genus, species, etc., but it answers the one great purpose, that God created all animals of the sea, air and land.

The sentences are frequently anthropomorphic, because they are pictures of observation, the vivid descriptions of what man saw about him. This method of expression is necessarily unscientific, and therefore the language must be converted into our best expressions. 'God said let there be light.'

Is this sentence not an anthropomorphism?
 Man gives expression to his desires by commands,
 and he writes the wishes, behests and thoughts
 of others in the language of his own.

The Exegesis of the Text.

1st Chapter of Genesis verse 1. -

בראשית ברא אלהים את השמים ואת הארץ:

"In the beginning God created the heaven and the earth."
 Knobel asks 'How and from what did God
 create matter? according to the narrator, certainly,
 entirely through his own will, and therefore
 from nothing? I omit the answer contained
 in the first edition to Dunsen's assertion,
 "that the question of the Schoolmen, whether God
 created the world out of nothing, is left
 quite unnoticed in Gen. 1.1. and generally in
 the Bible," in order to leave room for more
 necessary discussions. The word ברא, to
 create following בראשית "in the beginning"
 would lead us to infer that Creation here

means creation from nothing. In fact the only real creation, is producing something the substance of which does not exist.

יצר to make is the ordinary word for producing. **יצר** has a more special meaning "to form". In Gen. 2-7, we read:

וַיִּצֶר יְהוָה אֱלֹהִים אֶת-אָדָם מִן-הָאֲדָמָה

"And the Lord, God, formed man of the dust of the ground."

יצר means to create, certainly, "and although it may be occasionally found where there is no suggestion of actual creation, it is only employed for divine actions, and for those divine actions which are marvellous, so that they are to a certain degree equal to creation. You will find proofs of this use of the word in every Hebrew Dictionary, and in every thorough Commentary of this passage. And here the addition 'in the beginning' excludes every other idea." God created the world; we are not told whether God created the world as it is now, or from simple matter,

and gave to it the force and law of development. The text will suit either case. Whether the narrator meant the material world, by "Earth", and the invisible, immaterial world (the angels) by heaven, we shall not discuss. Judaism is divided upon the belief in angels. After the first verse, we notice that the description is confined to the earth, the heaven is just touched upon. This bears us out further in the statement, that the account of creation is a *glogony* and not a *cosmogony*. "And the earth was without form and void" shows that the earth as it is now was not so always. Before man came upon the scene the land and sea were not divided, neither was there vegetation or animals or stars. There was **מחל ומלחמה**. This shows that God formed the earth from chaos or our present earth is a development from chaos. Here the domain of the exegete is bounded. The exegete from his sphere is not at liberty to state that the present earth arose from a chaos, the ruins of a preceding earth and that there were many chaotic

conditions of our planet from which creations spring. We
 do not know how long ^{הוּא} lasted. We only know it ceased
 by the creation of the first day, light. Science can pile up
 its millions. We have no objections. It does not dispute
 the account given in the first chapter of Genesis. Chaos
 or ^{הוּא} is "and the earth was without form and void
 and darkness was upon the face of the deep; and the spirit
 of God was moving over the face of the waters." This simple
 description of chaos is negative, "without form and void,"
 it is a description without description. It tells us nothing
 of chaos, its composition or whether the mass was in
 a fiery or fluid condition, we only know of darkness
 and God hovering over the face of the waters. Nothing
 is mentioned of volcanoes or eruptions. There seems nothing
 in these statements that can bring the Bible and science
 into discord. "and the spirit of God moved over the face
 of the waters" gives a majestic touch to the picture. Some
 translate ^{מרחפת} 'brooded'. This translation is pointed,
 it wishes to picture chaos as the egg in which is contained
 the potential elements of actual creation. ^{רוח אלהים}
 has been translated wind of God, but this is hardly admissible

-ible, especially when we consider מחפז word
 or hoaxed or brooded which never is used in connection with
 a storm. In fine the first two verses state; first, that
 God has created all things; or all things except God have
 their source in the creative activity of God; 2nd, "the earth
 has not always existed in the condition of order in which
 it was when man first appeared upon it. on the contrary
 a condition of formlessness and desolation preceded the
 state of order". 3rd, in this time there was no light on the
 earth and the surface presented the appearance of a mass
 of water. 4th But even in this state the earth, or the
 substance of form which the earth developed was under the
 influence of a divine power destined to be formed by the
 action of God. The succeeding verses continue with the
 forming of the earth. Kurz, "Bibel und Astronomie,"
 says "The theory that a devastation of the earth took place
 between the primary creation of heaven and earth
 and the fashioning of the earth during the six days, which
 devastation made a restitution and new creation
 necessary cannot be proved from Gen. I, but
 neither does the whole chapter contain anything which
 would exclude it." Genesis III - XXXI chapt.

beginning with the 3rd verse we come to the creation
after the chaotic mass. The language immediately im-
presses the reader with its simplicity and sublimity.
Rising above the chaotic mass comes the edict "and
God said let there be light and there was light." verse
4, "and God saw the light that it was good and God divided
between the light and the darkness." The 5th verse states
"and God called the light day and the darkness he called night
and it was evening and it was morning, the first day."
Here there appears a contradiction pointed out by some with
scornful pride, that the light was created before the sun
which was created on the 4th day. We will leave this point
until the discussion of the creation of the 4th day. We
will now simply state that Genesis tells nothing about the
nature and essence of light. It does not state whether
light is matter or only a condition or motion of matter.
The Bible states that God said "let there be light" so
that darkness should not reign supreme. There was a
division between light and darkness which we call
day and night, the decree of God. These periods follow
successively. The evening is mentioned before the
morning. Some say the Hebrews began their civil

day in the evening and give this as explanation. But a quite natural one is that the first day commenced with the appearance of light with the morning, the natural day ends with the disappearance of light and the appearance of night, the evening. The 2nd day begins again with the morning, the night which lies between the evening of the 1st day and the morning of the 2nd natural day constitutes with the first natural day a single alternation of day and night i.e. a civil day a *rosh yom* or. "The 2nd day is the division of waters" and God said let there be an expanse in the midst of the waters and let it divide between waters and waters. Verse 7, "and God made the expanse and divided between the waters which were under the expanse and the waters which were above the expanse, and it was so. V. 8. and God called the expanse heaven and it was evening and it was morning the 2nd day." The Vulgate translates רָקִיעַ *firmanentum*, I think *expansion* better because רָקִיעַ means something spread out and nothing solid, like a fixed vault, Ps. 104 "Who stretched out the heavens like a curtain". It is asked, whether the author means the *coelum siderum*, the starry sky, or the *coelum aeris*, the atmosphere. Moses did not make this distinction.

He simply expresses what is sketched over the earth and what we call Heaven, which in turn tells us nothing definite. A division is made between the mass of waters, the heavenly and the Earthly. What are the waters above the expanse? Some¹⁾ believe that the waters of the chaotic state were so divided, that on the third day, the Earth was formed from the lower waters, so that the upper waters afforded the substance for the formations of the heavenly bodies, which appeared on the fourth day. The other theory is more plausible. The waters above the Expanse formed the clouds; that is the atmosphere. The water of the chaotic mass rose in mists and formed clouds. Moses or the author did not deal with the stars; they are introduced in connection with the Earth on the fourth day. At the close of the second day, we do not find the words 'And God saw that it was good', for although the atmosphere was created, the stars did not appear, and the earth was not separated into dry-land.

¹⁾ Delitzsch, Balzer "Bibel Schöpfungsgesch.; Joemann ^{Bibel und Natur.}

and water. The creation of this day was not entire. The narrator had to mention the atmosphere, because the people thought the rain fell from the clouds, aided vegetation and thus benefited man.

verse nine treats of the separation of land and water. "And God said, Let the waters under the heaven be gathered together into one place, and let the dry land be visible: and it was so.

verse ten 'And God called the dry land, Earth; and the gathering together of the waters, he called seas; (יָם) and God saw that it was good.' The plural יָם is used, 'Seas' in contrast to land. The rivers and lakes are not mentioned separately, for being portions of the seas, they are included in יָם. Delitzsch explains

יָם in an intensive and not numerical sense. He calls יָם the ocean.

The second part of the third day's work is the production of vegetation. Verse 11. "And God said, Let the earth bring forth grass, herbs, yielding

seed, fruit-trees, yielding fruit after their kind; in which its seed is upon the earth and it was so." Verse 12. "And the Earth brought forth grass, herbs yielding seed after their kind: and God saw that it was good." Some Commentators, believe the bringing forth of vegetation is part of the formation of the earth, since vegetation is fixed in the soil. They say that the vegetable world has no separate existence, being seated in the earth it belong to it, and to the work of the third day. Notwithstanding, it seems that there were two creations on the 3rd day, the separation of water and land, and the bringing forth of vegetation, because after each it is stated "And God saw that it was good." The phrase "after their kind" *כפי מינה* signifies that God created not one kind of herb and tree, but different genera and species. The Expression "herbs yielding seed" shows that the plants had the power of reproduction. We are not told that God planted the seeds to cause the herbs and trees

to sprout, or whether they sprouted by His word alone. The reader can choose for himself.

The first half of creation is finished. Many commentators make the second half of creation, the last three days, - correspond with the first half or first three days. The light of the first day corresponds to the light-giving bodies of the fourth day. The second day, the separation of heaven and earth, corresponds to the work of the 5th day the peopling of heaven with birds and the earth with fish. On the 3rd day the dry land (vegetation), receives on the 6th day its inhabitants, animals and man.

The 4th day - verses 14-19. "And God said Let there be lights in the expansion of the heaven to divide between the day and the night; and let them be for signs and for seasons and for days and years. 15. - And let them be for lights in the Expansion of the heaven, to give light upon the earth: And it was so. 16. And God made the two great lights; the greater light to rule the day; and the lesser light to rule

¹¹ Dillmann, Delitzsch, J. Thomas Aquinas.

the night; and the stars: 17- And God set them in the
 expanse of the heaven to give light upon the earth,
 18- And to rule by day And by night, And to
 divide between the light and the darkness: And
 God saw that it was good. And it was evening And
 it was morning the 4th day.

The stars are described as the light-giving bodies
 of heaven and earth. But we are told that light
 was created on the first day. The verse only
 desires to state that the light of the first day
 shall hereafter be connected with the stars. In
 verses 14 and 18 the stars are set to divide day and
 night. Has not this been accomplished on the first
 day? The work is now finished and we are
 told something of the means by which day and
 night are effected, — by the sun, which rules the
 day and the moon the night.

The lights of the expanse says verse 14, are to be
 "for signs and for seasons, and for days, and
 years." The lights are given to man to predict
 physical phenomena, for signs of the weather, for
 seasons, for the calculation of time, for the

four periods of the year, for computing days and years, and time in general. The stars are not mentioned in reference to astronomical importance, except as regards the Earth. Moses or the author of the chapter, does not say that the stars were first created on the 4th day, but that on the 4th day their relation to the Earth was experienced by man. "Some limit the stars to the planets. But is hardly plausible that Moses made a distinction between planets and fixed stars.

The fifth and sixth days produce the creatures. On the 5th day, the water and air animals were created, parallel to vegetation and the first appearance of dry land. the work of the second day, the formation of the atmosphere and the separation of the waters. The land animals and man were created on the sixth day parallel to vegetation and the first appearance of dry land.

The Classification of animals which is described in verses 20-23 is superficial,

(1) Keenl (Schöpfungsgeschichte) Ebrud der Glaube an die Heilige Schrift.

but Enough is told for the ordinary man's purposes. The word ~~872~~ in v. 21, ^{thus far} only occurs in v. 1. This latter creation is explained as the former one. In verse 21, there is also a creation from nothing, the creation of life. The text does not explain how God created the animals of land or water. It simply reads "Let the waters bring forth abundantly the moving creature that hath life and let the fowl fly above the Earth in the open Expanse of the heaven". We read that God formed every beast of the field and every fowl of the heaven from the ground; II. cap. v. 19 in a process we infer, similar to that of the formation of man, giving them the desire for self-preservation and propagation.

(11) Moses does not say that all the animals sprang from one common local centre of creation, nor does he say that one pair of each species was created, which multiplying afterwards spread over their present range of habitation. Older men of science, as Linnaeus, and modern ones also, hold this theory which is not in the least favored by the Bible. What

"delitzsch"

the Bible says about man may not be applied to the animal world. Any one may imagine, if he pleases, that in the beginning only two ants, bees, buffaloes, and antelopes were created, but the Bible must not be taken as authority for this. The unity of mankind and the unity of a genus or race of animals are two totally different things. The unity of the latter remains, although it may have begun with many forms. Evidently this is the idea of the author of Genesis; the animals would be called forth by the word of God began to exist everywhere simultaneously, on the 5th day in the air and water, on the 6th day on land.

The creation of man also occurs on the 6th day, "as he is one of the living beings that dwell upon the earth. The animal world is sealed with satisfaction" "And God saw that it was good." Then man follows. Notice the introduction which precedes him. Before creating him, God tells us of his intention to create him. This plainly shows the consideration with which he is treated, and his superiority to other living beings. "The world and its parts are as it were created at once by the divine might in that at the mere command of God, 'Let there be' they come into existence: but the creation of man is preceded by reflection; the Creator first describes

⁽¹⁾ Balzer (Bibl. Schöpfungsgeschichte) places man as the work of the 7th day.

⁽²⁾ S. Gregory of Nyssa (see op. cit. hom.)

in words what is to exist. The divine words decide how man shall exist, to what end he shall be made, what he shall govern after he has been made; so that man partakes of his high honors even before his creation, and ere he has come into being he has obtained the Dominion of the world."

26-31. "And God said, Let us make man in our image, after our likeness; and they shall have dominion over the fish of the sea, and over the fowl of the heaven, and over the cattle, and over all the Earth, and over every creeping thing that creepeth upon the Earth. And God created man in his image, in the image of God created he him; male and female created he them. And God blessed them and God said unto them, Be fruitful and multiply, and fill the Earth and subdue it; and have dominion over the fish of the sea, and over the fowl of the heaven, and over every living thing that moveth upon the Earth. And God said, Behold I have given unto ^{you} every herb bearing seed, which is upon all the face of the Earth, and every tree on which is the fruit of a tree yielding seed; to you it shall be for food. And to every beast of the Earth, and to every fowl of the heaven, and to everything that creepeth upon the Earth, wherein there is life, (I have given) every green herb for food. And it was so.

And God saw everything that he had made, and behold it was very good. And it was evening, and it was morning, the 6th day.²
 The creation of man, is to be distinguished from all other animals, he is to have the likeness of God.
 The phrase "Let us make man" has been differently expounded. Some say it is a pluralis communications, and picture God as if addressing the angels, others, attribute the plural form, as a reference to the Trinity. But the generally accepted explanation is that the phrase is a pluralis majestatis.
 How far is man the likeness of God? The twenty-sixth verse partially answers, he shall have dominion over the fish of the sea etc. Man is like God in dominion. God has universal dominion, man has dominion 'over all the Earth'. Man is like God in as much as he has an immortal soul and a reasoning mind. The expression 'over all the Earth' is sometimes¹ amended to 'over all the beasts of the Earth'. Man is created last, not on account of insignificance, but dignity. The greatest is mentioned last. The Hexameron is a development from the lower to the

(1) Midrash and ^{some} Christian commentators

(2) Delitzsch & Dillmann

higher. The animals and plants are given to man. They had to exist before him, for they were his support. The plants existed before the animals for their support. Although Carnivorous animals probably existed then as now, "we may suppose that God gave the plants and herbs for meat to the animal world in general, but not to each kind of animal. It is unreasonable to think that the beasts lived on plants and herbs alone. The verse 'And God created man in his image, in the image of God created He him; male and female created He them,' has given rise to some dispute. 'Man' refers to the genus certainly, for the next verse says 'And God blessed them.' Some ancient and modern interpreters hold that the first man was created androgynous. Some Jewish sources state the same opinion which is evidently contradicted in the same verse (27) by the statement, 'male and female created He them'. ¹⁷⁴ This would have been correct in this sentence, for the word **אִדָּם** may have the collective meaning; and the pronoun of a collective noun, may be singular or plural.

Chenoch

(2) Baden; Hamburger, Böhme etc

However the plural **אתם** is used, consequently there can be no question of androgynous.

On the 7th day, God ceased from creative work; all creating and creation was finished. **שבת** does not mean 'rest', the actual translation, here is ceased.

There is a grand religious teaching in the Hexameron. God created everything in six days, and ceased on the seventh. We should work six days, and rest on the seventh.

The first portion of Genesis, ends with God's blessing of the seventh day. (1st Cap. 3 verse)

The second portion contains a summary of the animals, their reference to Paradise, their naming by man, and particulars about man and woman. The second chapter of Genesis enlarges upon simple references, in the first chapter, although it is a continuation of the first.

The six days of Creation.

The first question to be determined upon is, whether the Bible interpreter may allow that the six days be taken, not for periods of twenty four hours each, but for an uncertain and very long period of time. We shall strive to show that the latter theory is just as admissible as the former.

If there were no natural science, might not an Exegete believe that the six days meant a period of uncertain duration? And before there was any thought of a science of geology, as it exists to-day, and without in the least anticipating any of the religious objections to the Hexameron, no less a person than S. Augustine propounded a theory concerning the six days, very different from the literal interpretation.

The question itself has no bearing upon faith and morality. Before touching the scientific teaching of creation, let us examine the Exegetical interpretation of the six days.

The interpretation of the day, as used in the first Chapter of Genesis, was first considered, by both ancient and modern writers to be limited to a period of twenty four hours. This is the natural impression.

But we read that on the 4th day, God created the greater light to rule the day, and the lesser light to rule the night, and the stars. Consequently the regular alteration of day and night, when connected with the Sun and moon, took place only with the 4th day. What days were those before the 4th day? The first three days may be accounted for not by the rising and setting of the sun, but by other causes; and they perhaps consisted of an uncertain length of time. Old Exegesis says, that the first three days were artificial days. When the Earth was $\text{וַיְהיֶה עֶרֶב וַיְהיֶה בוקר}$, the first day had not yet begun. We do not know how long a time elapsed before the $\text{וַיְהיֶה עֶרֶב וַיְהיֶה בוקר}$ was changed. It may have taken a very long time or may have taken place immediately after. On the side of Exegesis, we may assume, either that the creation from the beginning to man, took place in six days of twenty four hours, or of an uncertain period of time; or that there were six days, three of which are uncertain, and that three

consisted of twenty four hours each. Another theory describes *the* days as uncertain in duration.

"The word יום, which is used in the Hebrew text, denotes rather an uncertain, than a certain limited period of time. The Arabs call a period of time, *Yau mun*, which word is evidently related to the Hebrew יום. The Expression ערב and בקר no doubt mean in Hebrew, Evening and morning, but ערב also means Confusion, disorder and change, and בקר order and arrangement. And as every act of creation must have begun with a mighty upheaval of the forces of nature, and ended with the perfecting of the step in creation, which was contemplated in the act, what can be more natural than the Expression Confusion — order. We should therefore not translate: 'And the evening and the morning were the first day', but 'And the confusion and the order were the first period.' This explanation is more ingenious than correct. Etymology does not teach that יום is an uncertain period, neither do ערב and בקר mean "Confusion" and "order" but evening and morning.

(1) Mutal (die Urgeschichte der Erde) p. 5.

יום means firstly day, and other meanings are Secondary. "At the End of days" means "after a long time"; "In that day" means "in that time"; "The day of destruction" etc, means "a time of destruction"; כל היום means not only "all the day", but also "Always, for ever." יום we see, is used for time, and for uncertain periods. However none of these cases is analogous to the one under discussion.

"In what way was the the Creation revealed to the first man? Just as the prophets were taught what was to come. Human history has its source in personal observation and experience. That history which a man can write unaided can only begin with the beginning of the human race, and it must end with the time at which the historian is writing. But there is a history beyond both the boundaries of human experience - on the side of the past and on the side of the future. Both these histories that of the pre-human age and that of the future, lie outside the limits of human knowledge. Only God who is Exterior and Superior to time and space, can see the past and the future; for Him

(*) Kurz (Bibel und Astronomie)

there is no past and no future but an eternal present. Man can only attain to any authentic knowledge of the pre-human time, and of the future by divine revelation. How is this divine revelation conveyed to man? There is only one instance of a divine revelation of the pre-human history in the Bible, that given in the Hexameron. On the other hand there are countless instances of a divine revelation of the future to the prophets. But how is the revelation of the future given to the prophets? The spirit of God for whom there are no limits of time, no past and no future, but only eternally present, who therefore sees the future in time as the present, raises the spirit of the prophet momentarily and partially above the bounds of time and space, and enables him to share the divine power of beholding the future as the present. Every reader of their prophecies knows that the prophets foresaw the future by means of the present a supernatural spiritual vision. What is more natural than to assume that the same kind of divine revelation existed in the opposite but analogous case, when the pre-human

past and not the future was the object of divine revelation, and to suppose that God instructed man concerning the course of the creation by lifting his spirit momentarily and in part above the bounds of space and time, so that he beheld the past as the present. - The account of creation on account of its vividness seems to have been taken down by an eye witness. I may receive the account of creation through a vision, the six days, are but six scenes unfolded before the eye of the prophet, six great pictures of the Earth's existence, six divine acts.

Another view of Creation. Six days of creation and one day of rest are the six days of divine labor and a divine Sabbath, corresponding to our week of six working days and our Sabbath. There is exemplified the divine original, of which we have the human copy. From a religious point of view it is immaterial how long it took, as long as we remember that God made the world. The analogy may not correspond in time, that is the day of creation may not match the day of our week, but

the fact to be emphasized is the number seven. If the six days were long periods or periods of uncertain duration. And Moses wanted to speak figuratively, he would have undoubtedly called them days, on account of the analogy between the divine week and the human week. He was as clear as necessary, for all could understand the relation of the sabbath to creation. Since he did not wish to teach geology or biology, he used the most convenient words, the name they have in the human week. We are, however, unable to decide the length of the day in the divine week, and if you say that the day is limited in Genesis, to evening and morning, why we then say, that this is but a continuation of the figure of speech i.e. the beginning and ending of the figurative day, is the figurative evening and morning. The truth to be emphasized is the celebration of the Sabbath in honor of the Creator, and it is of small import whether the day consist of twenty four hours or thousands of years. The analogy is evident at any rate. The day may be taken for a longer

period of time and the six days for six successive long periods of time in creation, each of which corresponds to the periods of the Earth's history, that science has revealed. Whether this correspondence is sanctioned by science, we shall consider when treating our subject from a scientific standpoint. All that we now strive to show, is that there is no objection from the exegetical side. This theory is called the Concordistic:—the Earth, according to Geology is divided into six periods which correspond in their formation to that is laid down in the Hexameron.

Another theory held by many is the Ideal Theory. The different advocates disagree in particulars but we think they will subscribe to the broad outline here appended. The Concordistic Theory takes the six days to be six consecutive periods during which the creative activity of God is at work. The Ideal Theory takes the seven days of the divine week as prototypes of the human week, but the six days are six divine thoughts, six divine

ideas, six single moments, that realized in the creation, may be logically distinguished from one another. "This can easily be proved. The Hexameron naturally falls into two parts, which are parallel to each other. S. Thomas Aquinas calls the works of the first three days "opera distinctionis"; of the last three days "opera ornatus"; the first three acts of the Creator are the separation of light from darkness, of the Earthly from the heavenly waters, and of the land from the sea; the three following are the formation of the light giving heavenly bodies, and the creation of the animals of the water, air and land; and as the creation of the plants was added to the work of the 3rd day, so the creation of man is added to that of the 6th. The truth which Moses must have specially wished to bring out in his description of the creative activity of God is this, that the visible creation as it exists at present is a realization of divine ideas brought about by the divine will. If then, he wished to include the creative activity of God within the limits of a week, he might perfectly represent the realization of the single divine thoughts, or the principal

(1) Pausan

moments of the creative activity of God as the
 work of six days. The succession of these single
 acts need not be looked upon as chronological
 in the sense that one moment of creative activity
 was completely closed, and one period was thus
 ended, before the realization of a new moment,
 and with it a new period had begun. It would
 be quite possible to suppose that historically
 or chronologically the realization of the separate
 moments took place simultaneously; for instance,
 the separation of the waters and land might have
 actually extended over the time of the creation
 of the first plants and the first animals, and
 the creation of vegetation over the creation of the
 first animals. Every part of the creation is
 said to be complete, only in so far as it forms a
 moment in the divine creative activity. The succession is log-
 ical and every creation is dependent upon the preceding one. The
 phrase "the Evening and the Morning" cannot be
 offered as antagonistic to this theory. The acts
 are spoken of as days, the 'Evening and the
 Morning' is a continuation of the figure.

The Theories mentioned in this chapter are all acceptable from an Exegetical Stand-point. In succeeding chapters, we shall endeavor to show which agree with Natural Science.

Reconciliation of the Bible and Science

In this part of my work I shall not gather together all of the theories of the creation of the world as taught by scientific men. I shall take the theory most generally agreed upon by science and strive to show that there is no point of actual disagreement with the statements of the Bible. I do not intend to trace the scientific account of the development of the earth. I shall only treat it in so far as it is said to contradict the teaching of the Bible. It will be found that recognised men of science differ widely from each other on some vital points. In such cases no comparison will be attempted. The 1000 little scientists and their hobbies will find no place in this treatment. Where recognised scientists are in harmony and their statement in apparent contradiction to the Bible we will strive to show that the Bible is at fault.

Astronomy. — "Modern astronomy thought it wrong that the earth, the planet, should not only have been created before its central body, the sun, but also that besides the alternation of day and night, the separation of the elements and the bringing forth of vegetation should have taken place on the earth without the

(1) Dr. Hauss "Glaubenslehre".

sun; that 5 whole days should have been spent in the
 creation and development of the earth while one single day
 was sufficient for the creation of the sun, besides all
 the fixed stars, planets and moon; and that the heavenly
 bodies which have been shown by modern discovery
 to be spheres in many instances far surpassing the
 earth in magnitude, should be here represented, ac-
 cording to the belief of the old world and of ignorant
 men nowadays only as accessories to serve as
 lights and signs of the seasons to the earth. After
 this objection we must repeat that the account given
 in Genesis is a geocosmy and not a cosmogony
 and therefore the earth is spoken of as the greatest
 part of God's creation activity. To the narrator the earth
 was of more importance than the sun, fixed stars, planets
 and moon, for scientists the earth is a minor planet.
 But Moses wished to teach religion and not astronomy
 and he speaks as the common man would. Moses
 expressed "In the beginning God created the heavens
 and the earth," i.e. all the fixed stars, planets &c., —
 the universe. Then he reverts to the earth because
 he is writing for man and the earth is the only place

61
where he knew men. He mentions the sun, moon
and stars only in their relation to the earth. Moses' 1st
chapter is only an introduction to a book which
is to follow a book on the history of man upon the
earth and is not a treatise on astronomical phenomena
and the earth's relation to them. The Bible is a book for
the religion of man, not a text-book of science. To
the ordinary man the sun and moon are the largest
heavenly bodies and the stars are accessories, although
we know that there are many suns and moons still our
earthly sun and moon are all important. The sun's rays
delight him in cold climates, the moon guides him in
dark nights and in trackless wastes, the stars smile
on him in encouragement, and through them all he
should see the hand of God. The Bible does not say
that 5 whole days were consumed for the creation
of the earth while one single day sufficed for the sun,
moon, fixed stars and planets. It only says that on
the 4th day they began to exist for the earth. It does
not say how long a time was consumed in their creation
or when they were created, on the 5th day they existed
for the earth, the stars may have been created before

the Earth, or at the same time; they are here only mentioned in so far as they affect the Earth. Scientists affirm that the stars could not have been visible on the 4th day, that light travels (42000) 210,000 geographical ^{English} miles a second, and it would require $3\frac{1}{2}$ years before the nearest fixed star would be visible, before the Earth. This objection only meets those who adhere to the literal interpretation of the 6 days. They maintain that God created the stars in such a manner that even the farthest were at once connected with the Earth, through their rays of light, while for the later diffusion of light those laws were given which astronomy has discovered by observation. However such objections do not meet him who takes the liberal interpretation of the six days. Even if all the so-called nebulae are masses of stars crowded together and if it took thousands of years before the formation of the stars, no contradiction is offered to the liberal interpreter. — But how could light appear or exist on the Earth on the first day, when the Sun and Moon were created only on the 4th, and Moses states that the Sun and Moon were

to give light to the Earth. He knew there were the luminaries for the Earth, and nevertheless he places light on the 1st day, before them. The Hexameron teaches that since the 4th day, the heavenly light, shone upon the Earth. But the light of the 1st day — what shall we do with it?

'God said Let there be light and there was light.' It became light through God's will. According to the Ideal Theory the six days are not successive chronologic periods, but six moments of God's creative activity. The division of light and darkness is one moment of creative activity, the separation of land and water another, the connection between the Sun and Earth another etc. These creative moments need not follow one another in time, but may have been existing at the same time. What light is, is doubtful. The recognized theory is the undulatory, — that light as sound is transmitted through ether, through the air. Schitzel says, that light and the so-called imponderables, warmth, magnetism, Electricity are related to one another, and intimately connected. Genesis does not explain how light

Existed and does not contradict modern theories. Nor can modern science interfere with the text that light came into existence before the Earth's relation with the Sun was fixed, and that God could not have created light by another process.

The plants were created on the third day, the sun on the fourth. The light and warmth of the sun are now necessary for the growth of the plants, but if before the fourth day, light and warmth were not for the earth connected with the sun in the same way as at present, vegetation was not dependent on the sun in the same way as at present. The sun follows the production of plants. The plants may have been created and existed in their first state without the sun which appeared for them shortly afterwards.

Geology. In turning to this branch of science which investigates the structure of the earth, we find a large portion bearing upon our present work. Palaeontology is that portion of geology which treats of fossils, the petrified remains of animals imbedded in the earth.

(1) Pfaff (Schöpfungsgeschichte.)

We shall endeavor to discuss the ancient conditions of the Earth, and the changes which it has undergone and still undergoes. The present changes of the Earth assure us that similar effects have always taken place.

Geology is a very young science, authorities differ, and we must be careful in accepting theories. However it must be recognized that the forces now at work, and the laws which now exist, always acted. Some think that the laws were erratic, that in ancient times the forces were more powerful than now, that the Earth was subject to great convulsions. Such are called Convulsionists. Others affirm that the development of the Earth is regular, and takes long periods before formations are completed.

Such are called by their opponents, Quietists. The Neptunists hold that water was the chief element in the formation of the Earth, the Plutonists think fire played the most prominent part.

The Neptunists are strong in their belief because the operations of water are manifested chemically and mechanically. Silicious smelter,

tufaceous limestone, precipitations, stalactites etc,
 are formed from substances chemically dissolved in
 water. The delta of the Mississippi, Nile, Ganges etc,
 are the formations of substances carried by the water and
 deposited. Volcanoes which cause the formation of islands
 and mountains and earthquakes with their attendant
 consequences are due to the action of fire; and generally
 speaking, without reference to the division between
 Neptunists and Plutonists, fire and water are active
 agents in moulding the surface of the earth. We infer
 from this, that they always performed a like function.
 Stratifications just below the surface of the earth are
 supposed to have been caused by water. Many
 strata contain petrifications, and since the remains of
 organic bodies could never have existed in the fiery
 mass, geologists of both classes, Neptunists and
 Plutonists believe petrifications to have a Neptunian
 origin. Besides stratified rocks, there exist
 the unstratified, which mingle on all sides and
 among the stratified. These have no petrifications,
 but contain crystallized minerals. True basalt
 is acknowledged to have a Volcanic origin, but

granite, gneiss, mica, slate, serpentine marble
 And much of the unstratified are claimed by both
 Neptunists and Plutonists. Plutonists affirm
 that the interior of the earth is a fiery mass and
 that Volcanoes, hot springs and other phenomena
 prove this. That the whole Earth was at one
 time a fiery ball, which cooled by degrees, is
 shown by the fact, that the warmer it becomes
 the deeper we dig. The outermost layer
 hardened first, admitted water, and thus the
 different stratifications formed. Crystallized
 rocks are the remnants of upheaved masses. The
 rising of the fiery mass, brought about by
 vapors, changed the stratified formations.
 The last faint sounds of a great fiery power
 which must have once reigned is heard in the
 volcanic outbreaks. This geological theory, i.e.
 that fire was the first great agent and
 water formed and shaped the crust of the
 Earth is generally accepted.

The Neptunian theory treats volcanoes
 as local phenomena nourished by fires, at no

great depth in the Earth, which are caused by chemical relations. They assume that the Earth "was never in a condition of igneous fusion, but was dissolved in water or was partly just solid, partly fluid or dissolved, which condition was produced by water." Then, the Earth solidified through chemical and mechanical forces and gradually mountains were formed. Crystallizations of granite were watery deposits, which attained this state through chemical changes.

Earthquakes are the effects of the removal of lower strata of rocks, caused by the infiltration of subterranean waters, which wash limestone and other strata away. The upper strata thus without support, fall in, shake the rocks and radiate the motion. Thus Neptunists explain earthquakes, and are confident of the truth of their theory because by it eruptions are accounted for, in whose vicinity there are no mountains.

Eminent geologists are divided upon these two theories and neither has yet proven the other false. The

Plutonists, however, have the advantage on their side, and it is not improbable that victory will soon be theirs.

Some Commentators maintain that the Bible teaches that the Earth was formed by the action of water. Although the contest between Plutonists and Neptunists is undecided, and a third theory may arise and overthrow both, are we not in danger? Certainly not. We have stated before that the Bible wishes to impart religious truths and not scientific knowledge, and although the general wording may seem to substantiate one theory over another, it surely does not intend to decide.

"And the Earth was without form and void and darkness was upon the face of the deep; and the Spirit of God moved upon the face of the waters." The Neptunists say that God created the light, and then separated the waters, the upper waters, i. e. the atmosphere from the earthly waters. They maintain that Genesis treats the Earth as a

mass of waters, which hardened on the third day. Genesis in fact treats of the Earth in a more developed state, differing from the first state. The author does not deal with the gradual development of the Earth and its crust; he has reference to it as an abode for man. The interior is not hunted at, and no theory can be derived from from its superficial statements. 'The Earth was without form and void, without organic beings, without the separation of water and land, without light. In what better language could the Early man, whom God is telling this wonderful creation, express himself than "darkness was upon the face of the waters." This Early misfired being, was perhaps in childish ignorance of the great transformations which had been wrought deep beneath the ground upon which he was standing, to him listening to this wonderful tale of chemical and mechanical forces, Eruptions and glowing fire, would have been a jarring discord in

71.
divine melody.

However, in contradistinction to the Neptunian hypothesis, may not the Earth have been a glowing ball of fire, cooling gradually, prior to its appearance as a mass of waters.

Some affirm that this Earth rose from the destruction of another Earth. The Biblical writer does not mention past phenomena, he only knows the Earth when water was upon it; and how it was then made the abode of creatures. He knows nothing, at any rate states nothing of the cause of mountains.

Neptunian or Plutonian theory finds no substantiation or condemnation from the verses of Genesis.

Water was the covering of the Earth. Neptunists surely hold this view, and Plutonists maintain it. Both agree that stratified rocks are the results of watery deposits. This is all the Bible needs. If geologists are at variance on other questions, surely there can be no conflict between science and the Bible.

The Nebular Hypothesis.

The Nebular Hypothesis was first introduced by Kant and quickly obtained many followers. Many scientists hold that the Earth existed originally as a fiery mass, and that a nebulous or gaseous state preceded the fiery condition, and that the whole solar system originated from a nebulous or gaseous vapor. The Solar system, was a mass of gas, in which was formed a hardened nucleus. Motion was given in some way, to the central nucleus and gradually the whole gaseous ball participated in a rotating motion. The mass diminished and the motion increased. The centrifugal force grew greater with the rapid motion, and the ball became more and more spheroidal. The becoming smaller and more dense, the outside parts having a tendency to fly from the centre — the centrifugal force grew greater than the centripetal and a ring shaped part necessarily formed. The ring was torn off by forces in it and revolved itself ^{into} many rings.

which maintained an individual existence. The result of this was either to form one new large spheroid with a double motion, a revolution round its own axis and a revolution around the original gaseous ball, or a number of small spheroids, which rolled on with the same double movement at about an equal distance from the centre. In the first way were formed the larger planets, and in the second the asteroids. This process, by which rings were thrown off, and were formed into separate balls was repeated several times, till the central body had become so small, that it could throw off no more rings. And so, at last, the relation between the central sun and the surrounding planets was established forever, and the solar system was in this sense complete. But meanwhile the planets had gone through new stages of development. They also showed a tendency to throw off rings. Separate rings were formed, which shaped themselves into balls and became, and became

the moons revolving round the planets. The smaller planets did not form rings, and the larger threw off several, of which perhaps some have not yet rolled themselves up into balls, as the double ring of Saturn seems to show. The heaviest substances separated first from the vapor, and attracting other Elements grew larger and larger forming either solids or fluids. Then the Earth became a rounded mass of fiery fluid, enveloped by an atmosphere. The steam, rising from the Earth, cooled, descended upon the earth, steamed again. After repeated steamings, the body of the Earth cooled, and steam became water upon the crust of the Earth. The crust hardened more and more and as the ball contracted, the covering of the Earth became too large for its contents, and overlapped. The Stones and Metals rose one above another and sinking through the crust, broke into the igneous mass, which by pressure, was forced to the surface. Thus

the first mountains appeared, which very probably were low ranges.

In the foregoing process, there were many outbreaks from the fiery core, but the Earth hardened and the discharges decreased. The steam was able to remain upon the earth in the form of water, and almost the whole earth was immersed. The water contained different ingredients than ours, for its composition had a destructive influence upon the Earth. This composition, consisting of slate and greywacke was deposited and became the ~~1st~~ ^{1st} Neptunian formation. The Earth, by degrees, became fit for vegetable and animal life. We do not intend to trace its development down to the present time. We can readily see, it required many thousands of years for the Earth to reach its present form. Some scientists believe that the Earth solidified 40 million years ago, others place the time at 50 millions of years.

There is nothing in this theory, against which

the Bible must defend itself. If sub-
 stantiated, it does not contradict the Bible.
 If we ask, whence comes the original matter,
 what gave impetus to the revolving motion, where
 did the forces of combining and separating
 arise, - we answer from God. Science in
 its own province, cannot go beyond primordial
 matter. It has no answer to give. The
 theory, which we have briefly outlined has been
 accepted by many believers. The Deist
 accepts God as the cause and author of the
 first substance and that he gave nature its phys-
 ical laws, but then let nature take care
 of itself. The Deist thereby denies revel-
 ation. The Pantheist says a passive God is
 ridiculous. Matter and physical laws are inter-
 dependent. These annexations, however, have
 nothing to do with science. We state them
 because they are frequently mentioned in
 scientific works and by scientists who
 do not believe in a God who lives and
 rules. However, it is not in their domain,

to find a God.

Gideon Mantell "says: You will at once perceive that this theory (Nebular Hyp.) can in no wise affect the inference that the universe is the work of God, an allwise and omnipotent Creator. Let it be assured that the point to which this hypothesis guides us is the ultimate boundary of physical science—that the nearest glimpse we can attain of the material universe displays it to us occupied by a boundless abyss of brilliant matter; still we are left to inquire how space became thus occupied, when matter thus luminous?— And if— our planetary system was gradually evolved from a primæval condition of matter, and contained within itself the elements of each subsequent change, still we must believe, that every physical phenomenon, which has taken place from first to last has emanated from the will of the Deity."

The Nebular Hypothesis is theologically admissible. If you ask, why did God consume so many years in creating

© Wonders of geology

the world, why did he not fit it immediately for man would it not have been better? In asking such questions, we are gauging our power by God's. We are not able with our limited knowledge, to decide what the Universal Knower does best. Genesis does not teach how long it took, before the earth maintained water. If geological science eventually verifies the nebular hypothesis, this hypothesis I can willingly accept it, for there is no point of disagreement with the Bible.

Now, however, consider that only six days of twenty four hours intervened between the beginning of the creative activity and the appearance of man, certainly the nebular hypothesis contradicts the Biblical account. We may place the nebular hypothesis prior to the first three days¹⁾ of the Hexameron.

Some scientists attribute the flattened poles and spheroidal shape of the earth to its original fluid condition. It is not necessary to believe this. The shape of the earth may have been due

¹⁾ 30 cap 322. In - Moseh Nebuchim says that the first three days are called days because there were three creations and the regular day commenced on 4th day. ²⁾ See advocates this in "Principles of Geology".

to other causes, or it may have had this shape always. The central fire of the earth is considered by Neptunists as a myth, an unproved hypothesis. They attribute the heat of the earth to mechanical and chemical causes.

But even if the centre is an igneous fluid, why could God not have created the Earth as a fluid nucleus enveloped by a crust?

Many scientists ridicule the idea of the Earth having been in a gaseous condition. They say that the geologist cannot commence investigations before the deposit of strata. The history of a people, the real history, only begins with chronological information. Before this everything is legend. When records are wanting, we have myth. Geology furnishes no documents, no facts to the Solar system. Since it is an exact science, it cannot be satisfied with brilliant fancies.

Geology ought not go too far back, back beyond facts. That the earth was in a fluid state is also hypothetical, that it

(1) Hubert, Ulrichi, Karl Vogt etc.

was in a gaseous condition is against the laws of chemistry". From these statements we see that those who adhere to the literal interpretation of the six days, are still within the realms of science. That God created the world in its present form cannot be disproved, and that slate and granite were in a fluid condition and prior to this in a gaseous state is an hypothesis impossible of verification. Human inquiry rests on analogy. If we accept the Eternity of matter, we need no God, - otherwise matter came into existence through the power of God. It matters not how long we defer developments, and trace them back farther and farther, to the Nebulae and back still farther, we only delay the acceptance of their creation by the will of God. They who think that the time, which intervened between God's creative activity and the appearance of man, need not be limited to six days of twenty four hours each, but is an uncertain length of time, however

¹⁰ Karl Vogt - Lehrb. der chem. und phys. Geologie.

little they may affiliate themselves with any particular theory, can easily show that none contradict the Bible, but may be reconciled with the Genesis account. The work herein mentioned will be taken up in a later portion of our discussion. In our next chapter, we shall discuss those formations which have organic remains, namely the stratified rocks, and which therefore we conclude were deposited after the creation of life. We need not infer that the stratified formations are new productions, in the sense that they were added from outside to the Earth. They always existed as portions of the Earth, but were moved about and transformed by water. Lime, sand and clay are now carried about from place to place as they probably always were.

The Earth's ^{crust} has therefore, not necessarily increased in size, but parts were carried to different places and taken up from other places, deposited and transformed. These few remarks lead us to Palaeontology.

Palaeontology.

Palaeontology is one of the most certain branches of geology, because we have tangible data to work upon. It is the science of the investigation of organic beings of the ancient periods of the earth. The remains of animals and plants, imbedded in the strata of the earth, when partially or wholly preserved, are called Fossils. The remains are very rarely found entire. The harder parts, such as the bones, scales, teeth, horns and shells of animals, and the stems, branches and hard fruit of plants are very frequently in good condition but the softer parts decay, or are dissolved or destroyed. The solid parts, being porous, are filled with minerals and chemically changed, though the original form remains.

Sometimes the whole substance of the organic body is washed away, and the impression remains upon the rocks.

An animal walked over a soft bed and left its footprints. The bed hardened

and in the course of time a layer formed over it, covering the foot-prints of the animal. Such fossil impressions are called 'Ichmites' or 'Ichmolites'.

Then again, we have remains of plants, carbonized, changed to coal. The so-called fossil rain drops, supposed to have been caused by rain falling in primeval times which made rounded impressions in sandstone strata have been explained by the action of the atmosphere on the cement of the sandstone, or by air bubbles left on the surface of the sand, which was covered by the waves.

This superficial change takes place sooner or later in most sandstones, according to the quality of the cement.

Even the ancients believed that fossils were the remains of organic beings. They thought the sea-shells were cast up by the Flood.

However, in the 15th, 16th and 17th centuries a reaction is noticed. Many scientific men of those times, believed that fossils were mineral

forms, like crystals and stalactites. The similarity to animals and plants, was attributed to accident. Just as the rocks exposed to wind and rain are shaped curiously, so also were these stones. They were called, lucus naturae, sports of nature. Those giving their imagination further play, said that the shapes of fossils were due to the stars, or to a demon working strange forms in the centre of the earth, or to an aura seminalis. The clergy, in some instances, strove to establish the view, that Fossils were created just as we find them. They imagined any other view contradicted the Bible. Some maintained that the coal was created just as we find it. These points will be considered later. In the 18th century Fossils were again recognized as the remains of organic life. Then followed the question, how were they sunk in the earth? They were formed in watery deposits, and Scientists concluded that the Flood solved the mystery.

The Flood, they thought killed all of the animals and plants, and when the water subsided, its deposits covered the organic remains. This Fossil Theory quickly received the support of many theologians. But when paleontological research progressed, it weakened and had many opponents. "Voltaire" was one of its greatest and most ridiculous enemies. He maintained that Fossils were not petrifications, but *lusus naturae*, and remains of existing animals. The many oddly shaped stones and shells found on the mountains, were left there by travelers and pilgrims. — As Paleontology became more thoroughly known, the Deluge-fossil theory passed away, although some theologians of the 19th c. hold the same view. The chief objections are; that Fossils are found at a depth which the flood of Noah lasting one year, could not possibly have touched. In the destruction of animals by the Flood, we would expect to find their

W. Hugh Miller, *Geol. of Rocks*.

remains mixed indiscriminately in the strata. There is however a discrimination of classes. Certain strata deposited one above the other, after long periods, contain certain animals; namely in one strata are found sea plants and sea animals, in another land plants and land animals. Scientists and theologians, the latter without fear of any opposition on the part of science, generally hold that fossils are organic remains deposited in strata, at various times, prior to the Deluge and even prior to man. When the above theory was accepted, paleontology became the guide that showed the age and order of strata. It gave information of pre-historic plants and animals. Scientists gathered together the known fossil remains, and built up the kingdom of flora and fauna of the primeval world. This knowledge uprooted a popular fallacy - the belief that the plants and animals of the primeval world were of gigantic stature, and

and greatly different from those of the present world. It is true that large and curious petrifications have been found, but strange forms also occur among our animals. The ant-eater, flying dragon etc. belong to this class. The mammoth of the primeval world was no larger than the Asiatic Elephant, or gigantic whale. The petrifications of plants, show nothing equal to our oaks, palms etc., in size. The Nature exhibited on all sides in our day, was not poorer than Nature of the primeval world. The primeval world had large animals and very small animals, and we can produce at least the same in size and variety.

A skeleton of a man was found deposited in a limestone strata on the coast of Madagascare. But limestone strata are still forming, so this does not prove it to be of ancient origin, before the existence of the Biblical man.

The above ^{mentioned} skeleton or fossil to use the word in its unrestricted meaning has been shown to be at most a few centuries old. Fossil, is a

(1) Giebel, Cuvier, H. von Meyer etc. and Wagner, Spall, Vogt.

word, generally applied to the primeval world's remains, because it had been supposed that a vast distinction obtained between the present and past fauna and flora. It had been thought that all the past fauna and flora were eradicated. Later scientists, however, have shown, that some of the fauna and flora of the primeval world are found in the present world, and that no annihilation occurred. 'Fossil' may therefore be used of animals lately imbedded in the earth.

We shall close this chapter, requesting the reader to note the different phases of science. Generally ignorant and prejudiced people claim that every statement of science is correct. They do not consider the changes that science undergoes. They forget the truth of to-day, may be the fallacy of to-morrow; just as what was a *luxus naturae* is an organic remnant. Human knowledge is finite, and although apparently conclusive theories are propounded, they are liable to have their day of absurdity at any time. The Theologians were

hasty in striving to prove that science verified the biblical deluge. Religion's truth is the only object of the teaching of the Bible. The Theologian should be cautious of the interpretation of a scientific hint in the Bible, and become satisfied with showing that modern science does not contradict it.

The Strata of the Earth.

In the crust of the Earth, rocks are readily seen to be divided into two natural divisions, stratified and unstratified. The unstratified lie beneath the stratified, and are supposed to have been formed earlier. They are called the primitive rocks. The stratified rocks are supposed to have been deposited by water, for they are formed in layers. The alluvial soil is always found above them.

The stratified rocks, containing fossils are called sedimentary. Between the unstratified and stratified rocks, we have what is called the transition. The sedimentary rocks, barring the transition, are divided into older, middle and recent formations. Another division calls the transition, and rocks lying nearest them, the primary, the larger portion of sedimentary rocks, secondary, and those nearest the surface of the earth, tertiary. These three principal divisions contain many smaller divisions which will be mentioned later on. The object of geology was then to find out which strata

("Hemer")

are parallel to each other in the different regions, and belong to the same period, — and to set their boundaries and their age. Two ways are open to position strata, Either by investigating their material and their order, or by examining fossils. The position of strata was thus determined upon: — In several places there have been found different layers one above the other, without ever having been disturbed. In such cases the lowest layer was determined upon as the oldest. The age of layers is more definitely discovered by the fossils. Sometimes layers are missing in a series, for they do not always follow successively, but one or two are left out. For instance we sometimes find 123 or 1234 and 234 or 456 or 134 or 1356, but never 132 or 342. Fossils gradually, however, became the main guide that determined the age of formations. It is frequently very difficult to find the exact boundary of strata. At times they appear to belong to an upper formation, at other times

to a lower, and geologists differ in placing them. Trouble is also caused in the

them. Trouble is also caused in de-
ciding which strata are parallel to each other,

Said therefore belong to the same period. In the older formations there is a very striking resemblance in the fossils, but the latter deposits show them dissimilar, and the order of strata is fre-

(1)
I. *Arctic Period* Mica Schist, Gneiss A. Amistad Park
(1, 2) (Laurentian System) (1-4)
2. *Clinton Schist*
(Huronian System)
(Cambrian)

- II Palaeozoic
Period (3-6)
3. Silurian System
4. Devonian " "
(Old Red Sandstone)
5. Carboniferous System
6. Permian System
- B. Sedimentary
Rocks (5-9)
- III Mesozoic
Period (7-9)
7. Triassic System
(Bunter sandstone, muschelkalk, keuper)
8. Oolitic System.
(Jura Limestone,
oolite Lias)
9. Cretaceous System.
- IV Cenozoic
Period (10-13)
10. Eocene System
11. Miocene Series
12. Pliocene " "
13. Pleistocene " "
- C. Tertiary
Rocks (10-12)
- D. Diluvium
Quaternary Formations.
E. Alluvium.
- V Recent Period

From the fossils of the formations, we arrive at some idea of the fauna and flora that once existed. The idea can only be general, because we do not know all of the discovered fossils, and furthermore if all have been discovered. Life on the Earth seems to have differed greatly. In late

formations, we have no vestige of some organisms of the Earlier formations. Many geologists even assume that every period had a different animal and vegetable kingdom. Others say that different species passed away and others filled their places, - still others maintain that all the organisms never passed away, or belonged to different periods, but the present plants and animals are descended from those of the Earliest period. The last theory is very popular. It has been found that the Earliest periods have the least developed animals, and that they are very dissimilar. Examining the periods one after another, down to the Recent age, a continual development is noticeable. The older formations have classes of fauna and flora which have entirely passed away. In later periods, they differ in genus only, and later still only in species. Science works on hypotheses in outlining particulars of the early animal and vegetable kingdom. Many fossils have not been explained,

many probably not found, and many organisms incapable of petrification. (fungi, slugs etc.) "The animals attached to the ground, banks of shells, for instance - were destroyed by the gradual deposit of the surrounding strata. In other cases sudden events, such as changes in the sea-level, escapes of gases etc., seem to have killed masses of animals. A volcanic outburst in the middle of the sea, which was recently observed near Sicily, killed an immense number of sea animals all around it. Similar events, no doubt caused the destruction of the animals, which we find petrified in masses, although they were easily able to move away and thus escape."

Our coal measures are tree-like ferns and trees petrified. Geologists agree that many years must have elapsed before the strata of several thousand feet thick, could have formed. The Carboniferous age is only one of the periods of the Palaeozoic and DeLanskdt estimates that 3 million years are required to produce the Saarbrück coal beds, and though the growth of the prim-

aeval flora was much more rapid than now, still we have not taken into consideration the intermediate strata. Vogt says: It would not be too much to suppose that millions of years must have been required to form the different series of strata which we find in the mountains containing coal. But we must remember that the data on which these calculations are founded are taken from our climate, and that with unusually luxuriant vegetation, such as must necessarily have existed during the coal period, the production of carbon by means of the carbonic acid in the atmosphere must have been very much greater. No one can calculate approximately in how long a period all these formations took place. I have seen vegetable matter changed into peat in a year, and three fourths by immersing in water which was nearly boiling, and cloth which was exposed to steam changed into shiny black coal in six years; and I venture to remind those who think to lend a greater interest to their geological

(1) Lehr. der Geol.

(2) Göppert

statements by talking of millions and billions of years, of these long since acknowledged facts."

It is scarcely possible to reckon even approximately the number of years for the formation of strata.

At any rate, unless geologists err immensely, long periods have elapsed, since the first appearance of animals and plants upon the earth.

So much of palaeontology has been given, so that the Bible might be compared with modern science.

Reconciliations between the Bible and Science

Literary
Theory.

The first reconciliation between the Bible and Science, which we shall treat, is that which interprets the six days literally - namely that six days intervened between the first act of creation and the appearance of man, that plants were created on the third day, and animals on the fifth and sixth days. The fossil remains are those of the historical period and were caused by catastrophes, one of which was the Deluge. The fossil plants and animals are not different in species from the present, and although none of the fauna and flora of the present world have been found as fossils, this is due to superficial knowledge and accident. Scientists have not yet determined how much change goes on among plants and animals, and it is possible that the fossil remains of plants and animals are the ancestors of the present fauna and flora. Heil accepts Darwin's theory of non-creation of species, and their changeability. Fossil remains of men have

not been found on account of the little research made. Asia, the first dwelling place of man, has not been examined. Further, it is highly probable, that as geologists have but recently found fossil apes in the Cainozoic period, fossil men may be found in the Mesozoic and Palaeozoic periods, and thus prove that these strata were formed after the existence of man. — There can be no objection to this theory from a Biblical standpoint.

The other catastrophes were not mentioned, as is the flood, because they had no bearing upon man.

But can this theory be reconciled with science?

According to what has been explained in the last chapter, we must answer — no.

Furthermore, in accordance with the latest results of palaeontology, the literal interpretation of the six days is impossible of reconciliation. We must therefore look to another theory. Our object is not to inquire, whether the interpretation of the Bible the palaeontological results are correct

but whether our interpretation of the Bible is consistent with the approved theory of Eminent geologists. The only hope left for those who advance the literal interpretation of the six days, is that further knowledge will prove modern science untrue, and confirm their view of the Biblical account, or proceed as Bosignio⁽¹⁾ to show that the recognized teaching of science is arbitrary and false, and Genesis gives the exact idea when literally expounded. But Heil and Bosignio have few supporters. In fairness, we are bound to admit, that the palaeontological theories of scientists agree in one main idea, that thousands upon thousands of years, not to speak of periods, were required to form the strata. The investigation, and discoveries following therefrom, are sufficient to destroy Bosignio's attempted reconciliation. According to the plain calculation of the Bible, man has existed upon the earth about 6000 years. The time that elapsed between his creation and the deluge, during which they place the for

(1) Das Heilsgeschichte.

matian of the strata, was about 2000 years.
 Unless geologists are immensely wrong, there
 can be no reconciliation with the six day literal
 interpretation of Genesis. Theologians, in the
 mean, are trying to prove that the Hexameron
 does not contradict the long periods assumed by
 geology. In some places in England,
 coal-beds have been found on the surface 15-20
 geographical miles in length and 5-10 in breadth,
 while underground, they are longer and deeper,
 probably 50 geographical miles. Even larger
 coal-beds are formed in North America. The
 immense mountains of trees and masses of wood that
 were required to grow and petrify to form coal
 beds will make up columns of figures too large
 to be called off. In addition to this, inter-
 mediate masses lie between the coal formations,
 masses of sand and clay washed down, deposited
 and hardened, - and imagine the time required
 to form the strata above the coal beds. It
 is highly improbable that this was formed in
 3000 years, with all the favorable conditions.

The coal formation is but one of the stratified formations of the Palaeozoic, which is 4000 feet thick. All attempts, then, to reconcile geology with the literal interpretation, i.e. that is that the stratified formations took place after the completion of the six days of creation, face to the ground. Let us consider one of the theories, which places these formations in the pre-historic age.

The Theory of Reconstitution

The Theory of Reconstitution differs in its essentials from the Literal Theory. It assumes that the Earth was inhabited long before the account of the Hexaemeron. The first creation was destroyed by a catastrophe, mentioned in verse 2, and only in the 3rd verse does the description of the present world, with its plants and animals, commence. A long period of time passed between the 1st and 2nd verse. "In the beginning God created the Heaven and the Earth". This act of creation entailed a whole world, which was annihilated, as shown by verse 2. "And

the Earth was without form and void, and darkness was upon the face of the deep, And the Spirit of God was waiving upon the face of the waters."

This theory can meet no obstacle from geology, since the formations preceded the account given in the Hexameron. The Hexameron begins, where palaeontology ends. The present fauna and flora were created, after the palaeontological fauna and flora had been destroyed.

The theory of Restoration makes the Literal Theory possible. After the catastrophe, the new creation of the Hexameron, light, atmosphere, dry land, plants and animals followed, in six days of twenty four hours.

This interpretation does not come in contact with science and is exegetically admissable. You may ask, if a destruction occurred, and after the וַיִּבְרָא the re-creation of the Hexameron commenced, why is it not mentioned? Why are we not told that there was another world of fauna and flora? The author of Genesis treats the Earth as a preparation for man,

(H. Kung, Buchland Wagner held this view.)

and he mentions in general and vague terms only, extraneous matter. The fauna and flora of the primaeval world are not mentioned in the Hexameron, any more than the minerals of the present world. The fauna and flora of the present world are stated, because they have been created for man's enjoyment and use.

The objection is easily met. The author says "God created the heaven and the Earth" or everything. He particularizes when the creations affect man.

Another objection offers. Stratifications contain animals with eyes, trees with rings, showing that light and probably seasons existed. The Hexameron mentions that the luminaries existed only on the 4th day and from that time on. Do animals and plants live without sunlight?

But Genesis mentions nothing about a first creation, and those that adhere to the Restoration Theory may assume much. They have great liberty.

Before the תהו ובהו, there may have been light and atmosphere. The first creation

may have resembled the *Hexameron* in particulars. The Bible is very explicit on religious truths, its object, but scientific data are left for human investigation.

The *תהו ובהו* is considered by some, to have been caused by the fall of the angels, who, it has been thought, were inhabitants of the Earth. Judaism is much divided on the question of angels and in their belief. Having no grounds, on which to base principles, we shall omit the discussion of their influence in destroying the first creation.

Let us look upon the Theory of Restitution from a scientific position, since it is theologically admissible. Is the present world divided from the *primaeval*, by a distinct line, by a destruction during which all the *primaeval* fauna and flora perished, and a new fauna and flora were created? Was the Earth again covered with darkness and water, so much so that a new separation between water and land was required, and a new

arrangement between the earth and the heavenly bodies? To reconcile this theory with the Bible, its supporters must answer that the 1771 formed the division. Some geologists affirm that a catastrophe occurred, but others are decidedly opposed to it. The latter hold that there can be recognized no such great break, that some of the fauna and flora of the present world existed in prehistoric ages. Hugh Miller⁽¹⁾ says: From the present time up to the times representing the Eocene formations of the tertiary division, day has succeeded day and season has followed season, and no chasm or hiatus — no age of general chaos, darkness and death — has occurred to break the time of succession or check the course of life. All the evidence runs counter to the supposition, that immediately before the appearance of man upon the Earth, there existed a chaotic period which separated the previous from the present creation." It may require some years before science will hand

(1) Testimony of the Rocks.

in its decision upon this hiatus, when it does, if it decides inadmissibility, although exegetically admissible, the Theory of Reconstitution must be abandoned in the scheme of reconciliation. Several modifications of the theory have appeared. John Pye Smith among others desired to prove that the first and second creations of the world were local and limited to Asia. But the grand description of Genesis cannot be forced into such narrow confines. There are numerous other theories ^{of Reconstitution}, which we shall not mention. They are more ingenious than scientific. We now close the treatment of the Reconstitution Theory. It will be mentioned later on.

Reconciliation, as effected by the Concordistic Theory.

The Concordistic Theory treats the six days of the Hexameron as six consecutive periods in the history of creation, which geologists have confirmed. According to Genesis, light was formed on the first day, atmosphere

on the second, the waters were separated from the land, and plants were created, on the third day; the Earth's relation to the heavenly bodies was established on the fourth day, water and air animals appeared on the 5th, and land animals and man on the 6th day.

Give the ordinary man the palaeontological discoveries and request him to write a succinct account of creation in a few sentences, and he must follow the order of the first Chapter of Genesis, barring possibly the 4th day.

The agreement in outline is wonderful. In particularizing some opposition is felt. "In the first or Palaeozoic division, we find corals, Crustaceans, molluscs, fishes and in its later formation a few reptiles. But none of these classes of reptiles gives its leading character to the Palaeozoic; they do not constitute its prominent feature or render it more remarkable as a scene of life than any of the divisions which followed. That which chiefly distinguished the Palaeozoic from the Secondary and

Tertiary periods was its gorgeous flora. It was Emphatically the period of plants, of herbs yielding seed after their kind." The vegetable world reached its luxuriance in the Paleozoic Period. The Mesozoic Period, geology teaches, produced in quantity hardly anything vegetable — only weak continuations. But in the Triassic group (Mesozoic Period) a mighty animal world springs into existence, corals, shells, snails, polypi and even saurians (lizards) etc. The character of the Mesozoic period is decidedly of the water animals, (Gen. 1-20) although some vegetation is also found. Birds, according to the Mosaic account, were also created on the 5th day with water animals. Birds are also found in this period, in isolated cases, but we must bear in mind that petrifications occur less easily with them. They live on dry land and pass away, while animals in water are imbedded, covered by mud, and thus preserved. It is unjust to expect many bird fossils.

"The Tertiary (Cenozoic) period had also its prominent class of existences. Its flora seem to have been no more conspicuous than that of the present time, its reptiles occupy a very subordinate place, but its beasts of the field were by far the most wonderfully developed, both in size and numbers, that ever appeared upon Earth. Its mammoths and its mastodons, its rhinoceri and its hippopotami, its enormous doonotherium and colossal megatherium, greatly more than equalled in bulk the largest animals of the present time and vastly exceeded them in number. -- Truly, this Tertiary age -- the third and last of the great geological periods -- was particularly the age of great beasts of the Earth after their kind, and of cattle after their kind. The plants, reptiles and animals, we see, have been found the prominent characteristics of the Periods to which they are assigned. The Palaeozoic Period corresponds to the creation of plants, the Mesozoic, to reptiles,

the Cambrian to mammals. What do geologists who support the Concordance Theory and theologians make of the Azoic period in geology and of the other acts of creation in the Mosaic account. They maintain that the second day, the formation of the atmosphere corresponds to the Azoic period, that when the atmosphere was separated, gneiss, granite, mica schist and slate the primitive rocks were forming. The third day, the formation of dry land and plants is given to the Palaeozoic period. The reconciliation with geology is correct in generalities. The Palaeozoic period (3rd day) however, besides producing plants, shows animals. The Mesozoic period, (5th day), besides producing water and air animals, shows land animals. The Cambrian period (6th day) which ought to produce only land animals, shows also plants and water and air animals. We notice that water, air and land animals have not the distinctiveness given

them in Genesis. Huxley tries to show that animals existed before plants. His reasoning has no elements upon which to base itself, he theorizes. Animals must have existed after plants, for there are some animals that live exclusively on vegetation. Palaeontology furnishes no proof for the latter theory. The Silurian strata contains fossils of plants and animals. —

"In the primary formations, zoophytes, trilobites and fish preponderate; they all inhabit the water; they represent the most imperfect stage of development. In the secondary formations the water animals again appear in great numbers, but at the same time crabs and amphibious animals are seen in manifold shapes, giving to the period its peculiar character. They denote the 2nd stage of development in which the transition from life in the water to life on land and in the air is seen. Lastly in the tertiary strata, the highest classes of vertebrata and articulate, the insects, birds and

(1) Giebel 'Allgemeine Palaeontologie'

mammals are found; and in these the development of the animal organism is completed. The preponderance of the determining classes in the series of formations in question is an acknowledged fact. There is an apparent contradiction in the appearance of insects and lizards in the coal measures and Permian System, i.e. in the primary period, and in that of mammals and birds in the Cretaceous and Caenozoic ages. The wings of moths found at Netin, no doubt represent insect life in the Carboniferous age, and the opossums found at Stonesfield and animals in the period of amphibious life. But these single instances are no more characteristic of the general animal creation of the period than are the apes at Gibraltar of the European fauna." Notwithstanding the opinions of opponents, as Geibel, even in their own statements, they make geology and the Bible, agree in the main outlines. The third day and the Palaeozoic, the 5th day and the Mesozoic, the 6th and the Caenozoic.

do not correspond as exactly as is necessary with the Concordistic Theory. Then again, we are lead to understand that plants were created on the 3rd day, water and air animals on the 5th, and that they were limited to these days. We have the expression 'And God saw that it was good' denoting complete creation.

Palaontology teaches that all plants were not created on the 3rd day, only the more imperfect kinds, while in the same period are found water animals which belong to the fifth day. The period which corresponds to the 4th day, produces land animals, the work of the 6th day. The Concordistic Theory cannot carry out a detailed correspondence between the six days of Genesis and palaeontological discoveries. The Concordistic Theory must assign places to the first and fourth days. It does not dispose of these with as much satisfaction to scientists, as to itself. The first day, we have accounted for, before. The work

of the fourth day, the relation of the heavenly bodies to the Earth, is placed between the Carboniferous age, (work of the 2nd half of the 3rd day) and the Triassic age, (beginning of the 5th day) - in the Permian system.

But how do we account for the luxuriance of plants, as shown in the Carboniferous system, prior to the appearance of the sun?

The coal formations everywhere show that they contained the same species of plants, and therefore the climate was the same over all the earth, which was warmed, not by the sun but by its own heat. In the following ages, the Triassic and Oolitic, climatic differences are manifest. Therefore the relation between the earth and the heavenly bodies is placed in the Permian age, after which plants bloom with renewed vigor, nature is clothed with beautiful greenness and animals appear. " But scientists will not subscribe to the internal heat theory, and Palaeontologists affirm

that the sun was created before the Carboniferous age. Even so, the sun may have shone on the Earth immediately after the first appearance of vegetation, and only a short time have expired before it broke through the thick atmosphere enveloping the Earth.

Nevertheless, the agreements between Science and the Bible, according to the Concordistic Theory, are too forced; let us turn to another.

Reconciliation according to the Ideal Theory.

The Ideal Theory differs widely from the other three considered, namely The Literal, Restitution and Concordistic Theories. The Ideal Theory considers the six days of the Hexameron as six chief moments of the creative activity of God "which can be logically distinguished from one another, six Divine thoughts or ideas realized in the creation." The development of these acts is not mentioned in the term "6 days". The Hexameron does not tell us

117

this, for it is not of religious importance.

The six days are used as a prototype of the human week. They are neither to point to succession in time, nor to separate periods. They are six moments of the creative activity of God, and the works of the separate days may have taken place in a measure simultaneously.

The account of creation may be divided into two parts. The works of the first part are works of separation, — the separation of light from darkness, of the waters above from those below the firmament, of the land from the sea. The works of the second part are works of embellishment, — the heavens receive the sun and stars, and water, air and land their organisms.

Geology agrees with the outlines, viz: formation of the atmosphere of the earth, appearance of dry land, creation of plants, of water and air animals, and land animals. The Bible does not enter into further scientific statements. It is a grand development of the power and wisdom of God.

The two halves of creation, are each headed by works not important to the earth itself. The first half commences with the separation of light from darkness, the second with the appearance of the heavenly bodies. This is a logical distinction, which may have been chronologically simultaneous, and the sun may have shone before the creation of plants. The sun's mention, after the creation of plants, may be attributed to the fact that the regular changes of day and night are important to animal and not to vegetable life.

The Ideal Theory gives very little of scientific truth, but the object of the Bible is to teach religion. Consequently that interpretation is correct which brings out clearest its great truths, — that God is the Creator of all things — man the object of creation, — and the Sabbath, the day to be kept holy in honor of the Creator of the world. These three great truths are the three great religious teachings of the Hexameron, for which it was written.

The further details of the development of the earth are scientifically important, and further study enhances the brilliancy of the Creator, while the investigation of Formations shows the wonderful design of a great hand. The first chapter of Genesis teaches three important religious principles.

Such questions as, Why were millions of plants petrified in the rocks before the appearance of man, — Why did the immense fermentations and developments of the earth require so many periods of time, — Why did not God create man immediately, — we cannot answer. The Bible and Revelation teach nothing about these phenomena. They are left to the efforts of man. The designs of God are incomprehensible, his works beyond our understanding. We have no right with our limited capabilities to question them. God could have created all in a moment — we have not the right to ask, why he did not, — He is infinite reason. There are

many phenomena much nearer to us, to which we hand in no satisfactory reply.

Why does Africa, ^{produce} the most wonderful vegetation, hidden from the sight of man, — why are our American forests filled with the great variety of animals, — why does the most beautiful plumage grown unseen on the birds of Polynesia? Answer this, and we will

answer, why millions of plants and animals were created, whose remains lie imbedded in the strata of the earth.

Why are there countless stars, many of which have been recently discovered, while hosts are shining unseen in the firmament?

Everything has a duty and object in the domain of God. Agassiz believes that the natural science of the future will point out with growing minuteness and will describe more and more clearly, and suitably, the manifold ties binding together all animals and plants into one living expression of the gigantic conception of the Creator, which like a grand Epic, has, in the course of

centuries, attained its fulfillment. The more we learn of the earth and its developments, the more will we recognize the connection between the prehistoric and present worlds.

The Carboniferous period, absorbed carbon, and thus allowed the existence of animals. In addition, its coal formations furnish the material for warming the house, and make possible the use of railways and steamships. With increasing knowledge, the scientist may be enabled to point out the progress of this Earth and its developments, until it was made a convenient home for man.

Contradictions in the Bible, are due to the mistakes of scientists or exegetes.