

SECTION 2 – THE THEOLOGIANS

Chapter 5 - Creation Fell in 1500

*“You are worthy, our Lord and God,
to receive glory and honour and power,
for you created all things,
and by your will they were created
and have their being.”*

Rev 4.11

A dubious theological history

Most Evangelicals are astonished to hear it suggested that for three quarters of the Church's history the doctrine of a fallen creation was either unknown, or very much a minority view. Yet it is true that during most of the centuries of Christianity the natural creation has been seen as fundamentally *good*, unchanged in essentials from how it was first created by God, and therefore to be understood as a demonstration of God's wisdom, goodness and power and as a stimulus to wholehearted praise and worship. This was, in fact, one of the things that distinguished Christianity most markedly from popular paganism, in which nature was *“a hostile force constantly threatening to overwhelm us.”*¹ Contrary to modern romanticized notions polytheistic religion was less about with harmony with nature than trying to appease the right gods or goddesses to prevent disaster.

This chapter will be a survey of that theological history, and I will then, in the next, attempt some explanation, including a brief, new account of one historical reason for the change. It will be seen that this began at the start of the early modern period, particularly within the Protestant movement, and escalated out of all proportion thereafter up to the present. I'll quote at some length to allow the authors to speak for themselves. The ancients may also supply some worthwhile concepts for re-thinking our own assumptions about nature.

As we survey the material, one thing we should keep in mind is that before the nineteenth century, the effects of the Fall on nature were inextricably tied to its effects on mankind. The universal assumption of young earth chronology explains that. Since James Hutton and Charles Darwin, though, it has been necessary to account for the state of the natural world before mankind – a matter of a mere five days in the old chronology, but billions of years in the new. The discussions of the old writers, then, did not need to consider these matters separately as we do. What is amazing is that this is not what makes a theodicy of nature unnecessary for them. It is the fact that they do not see that there is anything *wrong* with nature even in the present state of man's misery. That should surely give us pause for thought.

Pre-Christian Jewish sources

It has often been remarked how little any doctrine of the Fall is alluded to either in the Old Testament or early Jewish thought in general. We can, however, point to a couple of disparate

¹ So writes Alister McGrath of the pagan influence on the Anglo-Saxon poem *Beowulf* (*The Re-enchantment of Nature*, London: Hodder & Stoughton, 1988, p.84).

Jewish sources overlapping the Christian era for hints on any connection Jews perceived between the garden events and the present natural world, before proceeding to the Christian sources.

Philo of Alexandria

The great Jewish philosopher Philo (c25BC-c50AD) wrote both an allegorical commentary on Genesis, and a more "popular" set of questions and answers on it². In commenting on the judgements of God in Gen. 3 (Q48-Q50) he takes the curse on the serpent as grammatically plain (but then allegorizes the serpent as "human desire"), the punishment of the woman as the inevitable fruit of sinful people living together, and the curse on the soil as, principally, an allegory on cultivating vice (leading to "sorrow and other ills" and loss of rationality) as opposed to virtue (leading to health). No change to the natural world is mentioned. The expulsion from Eden (Q56) Philo takes entirely spiritually as an exclusion from wisdom into ignorance.

Flavius Josephus

The historian of the Jewish revolt (37-c100) apparently received training from Pharisees, but was no religious sage. He naturally commences his *Antiquities*, a Jewish history for a Roman readership, with Genesis. His "Fall" is treated in a low-key and almost trivial manner: Adam and Eve eat the fruit of the tree of wisdom against God's command and find themselves naked. In punishment:

*God told Adam that the earth would no longer produce anything of itself except in return for grinding toil. He punished Eve through childbirth, and deprived the serpent of feet so that it would have to wiggle across the ground. Then God removed Adam and Eve from the garden to another place.*³

Patristic to mediaeval periods

Theophilus

The first of the Church Fathers to write on the creation was Theophilus, who was seventh Bishop of Antioch from 169-183. Describing the days of creation he writes:

Moreover, the things proceeding from the waters were blessed by God, that this might also be a sign of men's being destined to receive repentance and remission of sins, through the water and laver of regeneration... But the monsters of the deep and the birds of prey are a similitude of covetous men and transgressors. For as the fish and the fowls are of one nature – some indeed abide in their natural state, and do no harm to those weaker than themselves, but keep the law of God, and eat of the seeds of the earth; others of them, again, transgress the law of God, and eat flesh, and injure those weaker than themselves.

...The quadrupeds, too, and wild beasts, were made for a type of some men, who neither know nor worship God, but mind earthly things, and repent not... And the animals are named wild beasts from their being hunted, not as if they had been made evil or venomous from the first – for nothing was made evil by God, but all things good, yea, very good – but the sin in

² Philo, *Questions and Answers on Genesis*

(https://archive.org/stream/questionsanswers00philuoft/questionsanswers00philuoft_djvu.txt), accessed 06/01/2016.

³ Josephus, Flavius, *Antiquities Bk 1*, in Maier, Paul L, *Josephus – the Essential Writings* (Grand Rapids, Kregel, 1988) p.20.

*which men were concerned brought evil upon them. For when man transgressed, they also transgressed with him.*⁴

At first sight this may seem to lend support to the “fallen nature” theme, but if so it deals solely with the existence of carnivores. Some (not all, notice) of the originally good animals “transgress” and eat meat. But note the allegorical treatment: the carnivores are a *type* (“similitude”) of sinful men, not an evil in themselves. Then, also, Theophilus makes no observations from nature itself, but infers the creatures’ sinfulness from the fact that they depart from the provision of plants for food in Genesis 1:30, which he takes as a command (a dubious conclusion, as we saw in Chapter 2). Also note the quasi-rational way the animals follow the moral lead of their ruler, much as servants sin because of their master’s example. The *Catholic Encyclopedia*⁵ attributes this to “*the anthropomorphic tendency of primitive minds which appears in the doctrine of metempsychosis.*” It is notable that Theophilus is the only ancient authority this encyclopaedia can cite for animal suffering (or actually, animal violence) being the result of the Fall, for the doctrine doesn’t appear again for several centuries.

Irenaeus

By contrast, Irenaeus, the only other second century writer to deal at length with the Creation (and, contrary to what is often claimed nowadays, with the fall of the race and original sin too), says nothing about it. His interpretation of Genesis 3 is straightforward, and hardly goes beyond the text itself⁶. The ground is cursed on man’s behalf, and Eve is punished in childbirth and marriage, but the full curse is on the serpent, which Irenaeus takes to represent Satan. The exile from Eden accounts for thorns hindering cultivation, and they face death. Other passages speak of man’s bondage to Satan through sin, but say nothing of the natural world’s involvement.

Clement of Alexandria

Clement (150—215) was a professional theologian whose *Stromata* is a miscellany of teaching. In one passage he compares the Creation allegorically with the Decalogue (perhaps, incidentally, the first oblique Christian reference to “natural law”):

For by the “finger of God” is understood the power of God, by which the creation of heaven and earth is accomplished; of both of which the tables will be understood to be symbols. For the writing and handiwork of God put on the table is the creation of the world...

*And the representation of the earth contains men, cattle, reptiles, wild beasts; and of the inhabitants of the water, fishes and whales; and again, of the winged tribes, those that are carnivorous, and those that use mild food; and of plants likewise, both fruit-bearing and barren.*⁷

This writer’s attitude to carnivores contradicts that of Theophilus: he says they were created that way by God’s righteous “law”. It is Clement’s understanding that was to predominate in the Church into the late middle ages, and in Roman Catholicism even longer.

⁴ Theophilus of Antioch, *Apology to Autolytus* Bk 2 ch XVI-XVII.

⁵ Sharpe, A, *Evil*, In *The Catholic Encyclopedia* (New York, Robert Appleton Company, 1909) from New Advent: <http://www.newadvent.org/cathen/05649a.htm>, accessed 06/01/2016.

⁶ Irenaeus, *Against Heresies* III XXIII 3.

⁷ Clement of Alexandria, *Stromata* 6:14.

Lactantius

Lucius Lactantius (240-320) was religious advisor to the Emperor Constantine. In *On the Wrath of God*, written against Stoic and Epicurian philosophers, he says:

[W]e understand that even [dumb animals] in the same manner were made by God for the use of man, partly for food, partly for clothing, partly to assist him in his work; so that it is manifest that the divine providence wished to furnish and adorn the life of men with an abundance of objects and resources, and on this account He both filled the air with birds, and the sea with fishes, and the earth with quadrupeds.⁸

Having endorsed human meat-eating and possibly leatherwork in Eden, in the same chapter he argues that God necessarily included both “good and evil” (meaning here dangerous or injurious) things in creation, or men could not have been rational, choosing, beings; an early version of the free will defence. In another work, in describing how God is intelligence, perception and reason, Lactantius writes how he provided for irrational beasts at the dawn of Creation:

For He clothed them all with their own natural hair, in order that they might more easily be able to endure the severity of frosts and colds. Moreover, He has appointed to every kind its own peculiar defence for the repelling of attacks from without; so that they may either oppose the stronger animals with natural weapons, or the feebler ones may withdraw themselves from danger by the swiftness of their flight, or those which require at once both strength and swiftness may protect themselves by craft, or guard themselves in hiding-places. And so others of them either poise themselves aloft with light plumage, or are supported by hoofs, or are furnished with horns; some have arms in their mouth — namely, their teeth — or hooked talons on their feet; and none of them is destitute of a defence for its own protection.

For if you take from these the natural clothing of their body, or those things by which they are armed of themselves, they can be neither beautiful nor safe, so that they appear wonderfully furnished if you think of utility, and wonderfully adorned if you think of appearance: in such a wonderful manner is utility combined with beauty.⁹

For what if you should say, that birds were not made to fly, nor wild beasts to rage, nor fishes to swim, nor men to be wise, when it is evident that living creatures are subject to that natural disposition and office to which each was created?

...But since all the races of animals, and all the limbs, observe their own laws and arrangements, and the uses assigned to them, it is plain that nothing is made by chance, since a perpetual arrangement of the divine plan is preserved.¹⁰

Once more, it is the accessible Creation that he describes as being “in original condition”. The realisation that each creature has its own “law” from God, rather than deviating from a moral law that applies to every creature as well as humans made in God’s image, is a useful insight for today’s debates.

⁸ Lactantius, *A Treatise on the Anger of God* ch 13.

⁹ Lactantius, *On the Workmanship of God* 2.

¹⁰ *Ibid.*, 6-7.

Athanasius

Athanasius of Alexandria (about 296-373) was the great hero of the Arian controversy in the fourth century, who endured exile many times in defence of apostolic truth. He wrote:

*Now, nothing in creation had gone astray with regard to their notions of God, save man only. Why, neither sun, nor moon, nor heaven, nor the stars, nor water, nor air had swerved from their order; but knowing their Artificer and Sovereign, the Word, they remain as they were made. But men alone, having rejected what was good, then devised things of nought instead of the truth, and have ascribed the honour due to God, and their knowledge of Him, to demons and men in the shape of stones.*¹¹

Like Lactantius, he is clear that the natural realm remains now as it was first created. So is his contemporary Cyril, Bishop of Jerusalem.

Cyril

In his *Catechal Lectures* – basic teaching for baptism candidates – Cyril (313-386) writes:

God's command was but one, which said, Let the earth bring forth wild beasts, and cattle, and creeping things, after their kinds and from one earth, by one command, have sprung diverse natures, the gentle sheep and the carnivorous lion, and various instincts of irrational animals, bearing resemblance to the various characters of men; the fox to manifest the craft that is in men, and the snake the venomous treachery of friends, and the neighing horse the wantonness of young men, and the laborious ant, to arouse the sluggish and the dull...

*If thou knowest not the nature of all things, do the things that have been made forthwith become useless? Canst thou know the efficacy of all herbs? Or canst thou learn all the benefit which proceeds from every animal? Ere now even from venomous adders have come antidotes for the preservation of men. But thou wilt say to me, "The snake is terrible." Fear thou the Lord, and it shall not be able to hurt thee. "A scorpion stings." Fear the Lord, and it shall not sting thee. "A lion is bloodthirsty." Fear thou the Lord, and he shall lie down beside thee, as by Daniel. But truly wonderful also is the action of the animals: how some, as the scorpion, have the sharpness in a sting; and others have their power in their teeth; and others do battle with their claws; while the basilisk's power is his gaze. So then from this varied workmanship understand the Creator's power.*¹²

Note here how Cyril hints that nature's propensity to harm mankind stems from a change in mankind, not in nature, to be remedied by biblical faith. Thomas Aquinas will pick up this theme a millennium later, but we have already noted it in the biblical witness in Chapter 1.

Basil

The Cappadocian Fathers were three of the most brilliant theologians the Church has seen, developing teaching foundational for both east and west. Basil (330-379), bishop of Caesarea; his brother Gregory bishop of Nyssa (c.332-395) and Gregory of Nazianzus (329-389), Patriarch of Constantinople all held a high view of creation. Basil, also known as Basil the Great, was like Cyril not

¹¹ Athanasius, *On the Incarnation of the Word* 43:3.

¹² Cyril of Jerusalem, *Catechetical Lectures* 9:13-14.

only a great theologian but a great advocate for the poor. He composed a number of homilies on creation. Speaking of birds:

But we have enough words of common usage to characterize each species and to mark the distinction which Scripture sets up between clean and unclean birds.

Thus the species of carnivora is of one sort and of one constitution which suits their manner of living, sharp talons, curved beak, swift wings, allowing them to swoop easily upon their prey and to tear it up after having seized it. The constitution of those who pick up seeds is different, and again that of those who live on all they come across. What a variety in all these creatures!¹³

And on beasts:

“Let the earth bring forth the living creature.” Thus when the soul of brutes appeared it was not concealed in the earth, but it was born by the command of God. Brutes have one and the same soul of which the common characteristic is absence of reason. But each animal is distinguished by peculiar qualities. The ox is steady, the ass is lazy, the horse has strong passions, the wolf cannot be tamed, the fox is deceitful, the stag timid, the ant industrious, the dog grateful and faithful in his friendships. As each animal was created the distinctive character of his nature appeared in him in due measure; in the lion spirit, taste for solitary life, an unsociable character. True tyrant of animals, he, in his natural arrogance, admits but few to share his honours. He disdains his yesterday's food and never returns to the remains of the prey. Nature has provided his organs of voice with such great force that often much swifter animals are caught by his roaring alone. The panther, violent and impetuous in his leaps, has a body fitted for his activity and lightness, in accord with the movements of his soul. The bear has a sluggish nature, ways of its own, a sly character, and is very secret; therefore it has an analogous body, heavy, thick, without articulations such as are necessary for a cold dweller in dens... What language can attain to the marvels of the Creator? What ear could understand them? And what time would be sufficient to relate them? Let us say, then, with the prophet, “O Lord, how manifold are thy works! In wisdom hast thou made them all”...

Thus in nature all has been foreseen, all is the object of continual care. If you examine the members even of animals, you will find that the Creator has given them nothing superfluous, that He has omitted nothing that is necessary. To carnivorous animals He has given pointed teeth which their nature requires for their support...¹⁴

Gregory of Nazianzus

Another of the Cappadocian Fathers, Gregory has in one of his theological orations a long passage on creation, in discussing the nature of God. It actually begins with a natural theology that would have pleased the natural theologian William Paley (or the founder of the Intelligent Design movement Phillip E Johnson), but introduces the main discussion on the created order thus:

¹³ Basil of Caesarea, *Homilies on Creation* 8:3.

¹⁴ *Ibid.*, 9:3,5.

[Paul] confesses the unsearchableness of the judgments of God, in almost the very words of David, who at one time calls God's judgments the great deep whose foundations cannot be reached by measure or sense; and at another says that His knowledge of him and of his own constitution was marvellous, and had attained greater strength than was in his own power or grasp.¹⁵

We are to expect, then, some things that seem morally ambiguous to us, but not to God, in nature. After a chapter on the wonder of mankind, he further establishes God's wisdom by observations on the natural world, for which there is space only for a few extracts:

Shall I reckon up for you the differences of the other animals, both from us and from each other...? How is it that some are gregarious and others solitary, some herbivorous and others carnivorous, some fierce and others tame, some fond of man and domesticated, others untameable and free? And some we might call bordering on reason and power of learning, while others are altogether destitute of reason, and incapable of being taught... [H]ow is it that some ... delight in beauty and others are unadorned; some are married and some single; some temperate and others intemperate; some have numerous offspring and others not; some are long-lived and others have but short lives?¹⁶

...Now Holy Scripture admires the cleverness in weaving even of women, saying, Who gave to woman skill in weaving and cleverness in the art of embroidery? This belongeth to a living creature that hath reason, and exceedeth in wisdom and maketh way even as far as the things of heaven.

But I would have you marvel at the natural knowledge even of irrational creatures, and if you can, explain its cause. Whence do bees and spiders get their love of work and art, by which the former plan their honeycombs ... and the latter weave their intricate webs by such light and almost airy threads stretched in divers ways, and this from almost invisible beginnings, to be at once a precious dwelling, and a trap for weaker creatures with a view to enjoyment of food?¹⁷

Gregory proceeds to eulogise the plant kingdom and inanimate nature, saying of the sea:

Have your natural philosophers with their knowledge of useless details anything to tell us, those men I mean who are really endeavouring to measure the sea with a wineglass, and such mighty works by their own conceptions? Or shall I give the really scientific explanation of it from Scripture concisely, and yet more satisfactorily and truly than by the longest arguments? "He hath fenced the face of the water with His command."¹⁸

If the wisdom and goodness seen in "secondary natures", he concludes, is so great, how much more the wisdom of God himself? Of "evils" in creation he says not one word.

¹⁵ Gregory of Nazianzus, *Second Theological Oration*, XXI, <http://www.tertullian.org/fathers2/NPNF2-07/Npnf2-07-43.htm> accessed 06/01/2016.

¹⁶ *Ibid.*, XXIII.

¹⁷ *Ibid.*, XXIV-XXV.

¹⁸ *Ibid.*, XXVII.

John Chrysostom

John, also an Archbishop of Constantinople (347-407), was named “Golden-mouth” for his preaching style, which comes across in his preserved sermons. He too accepts the fierceness of the very nature of animals as God’s wise purpose in creation – which is remarkable considering how much more experience than us the ancients had of their power to destroy their livestock or even their families:

Again, the irrational animals have their weapons in their own body; thus, the ox has his horns; the wild boar his tusks; the lion his claws. But God hath not furnished the nature of my body with weapons, but hath made these to be extraneous to it, for the purpose of showing that man is a gentle animal... For it is not only in our possessing a rational nature that we surpass the brutes, but we also excel them in body.¹⁹

It should be noted that his Homily on Genesis 3, like that of Irenaeus, is a straight exposition of the text, with no mention of natural evil. He adds that human death was an act of God’s mercy as well as of judgement, in limiting the extent of a sinful life.

Chrysostom does take a different view in his understanding of Romans 8, which I dealt with in Chapter 3.

Augustine

Augustine of Hippo (354-430) is one of the most influential theologians in the Church’s history. Since John Hick wrote *Evil and the God of Love* his theodicy has frequently been cited, and almost equally frequently deemed inadequate to account for natural evil. This is not surprising as Augustine did not intend it to deal with the natural world, but “for the spiritually damaged subject”²⁰. Since Augustine is such an important figure, and his teaching on nature is scattered widely and extensively in his work, I will give a number of quotes. First, let’s address how he deals with Genesis 3 itself:

The very fact, after all, that everyone born in this life finds the search for truth impeded by the perishable body is what is meant by the toil and grief which the man gets from the earth; and the thorns and thistles are the pricks and scratches of tortuous, intractable problems, or else the anxious thoughts about providing for this life, which frequently choke the word and stop it bearing any fruit in man...²¹

Note that his treatment is allegorical and spiritual: the thorns and thistles of life are “really” that which stops the word bearing fruit in our perishable lives, as in the parable of the sower. Nature he handles from other angles. In his autobiographical *Confessions* he prays his theology as it affects him practically from day to day:

To you nothing at all is evil, not only to you but to your creation at large, because there is nothing outside to break in and upset the order you have imposed on it. But in parts of it some things do not harmonise with other parts, and are considered evil for that reason. But with other parts they do harmonise and are good, good in themselves... Let it be far from me to say: “These things should not be”, for if these were the only things I could see, I should still long for the better, and should be bound to praise you for these alone. [But when I

¹⁹ John Chrysostom, *Homilies on the Statues* 11:11.

²⁰ Surin, Kenneth, *Theology and the Problem of Evil* (Eugene, Wipf and Stock, 2004) p.12.

²¹ Augustine, *On Genesis* 21:31.

understood from Scripture the praise arising from all things both in earth and heaven] I did not now long for better things because I considered everything.²²

Here we see the core of his thinking – that we see evil in creation only because we lack the big picture both of God's purposes, and of creation's functioning. He goes into more detail in *The City of God*:

This cause, however, of a good creation, namely, the goodness of God—this cause, I say, so just and fit, which, when piously and carefully weighed, terminates all the controversies of those who inquire into the origin of the world, has not been recognized by some heretics, because there are, forsooth, many things, such as fire, frost, wild beasts, and so forth, which do not suit but injure this thin blooded and frail mortality of our flesh, which is at present under just punishment. They do not consider how admirable these things are in their own places, how excellent in their own natures, how beautifully adjusted to the rest of creation, and how much grace they contribute to the universe by their own contributions as to a commonwealth; and how serviceable they are even to ourselves, if we use them with a knowledge of their fit adaptations,— so that even poisons, which are destructive when used injudiciously, become wholesome and medicinal when used in conformity with their qualities and design; just as, on the other hand, those things which give us pleasure, such as food, drink, and the light of the sun, are found to be hurtful when immoderately or unseasonably used... But we do not greatly wonder that persons, who suppose that some evil nature has been generated and propagated by a kind of opposing principle proper to it, refuse to admit that the cause of the creation was this, that the good God produced a good creation.²³

The same idea of the “big picture” is here, but there are several new things to note too. First is that he only considers “harm” in relation to *humanity*. Though he must have been as aware of nature's harshness to its own as we are, he simply saw no theological problem to address there, and no “privation of good”. Secondly we find the biblical idea that some things may harm us because we deserve punishment: yet the things that execute such punishment are not in themselves evil, but good. The third is that he regards those who see evil in God's present creation as heretics. It is hard to see that he would not apply his final sentence to those who see either Satan or *evolution* as an “opposing principle” in nature, responsible for its “evils” independent of God's determining will. In this, of course, he is following in direct line from Irenaeus and his condemnation of the Gnostics – who were almost the only people attached to the early Church talking about evil in the natural Creation.

Later, Augustine justifies the goodness even of animal death, which must surely be instructive if we seek to understand evolution as a work of God:

But it is ridiculous to condemn the faults of beasts and trees, and other such mortal and mutable things as are void of intelligence, sensation, or life, even though these faults should destroy their corruptible nature; for these creatures received, at their Creator's will, an existence fitting them, by passing away and giving place to others, to secure that lowest form of beauty, the beauty of seasons, which in its own place is a requisite part of this world.

²² Augustine, *Confessions* VII [XII]19.

²³ Augustine, *City of God* XI ch22.

For things earthly were neither to be made equal to things heavenly, nor were they, though inferior, to be quite omitted from the universe. Since, then, in those situations where such things are appropriate, some perish to make way for others that are born in their room, and the less succumb to the greater, and the things that are overcome are transformed into the quality of those that have the mastery, this is the appointed order of things transitory. Of this order the beauty does not strike us, because by our mortal frailty we are so involved in a part of it, that we cannot perceive the whole, in which these fragments that offend us are harmonized with the most accurate fitness and beauty. And therefore, where we are not so well able to perceive the wisdom of the Creator, we are very properly enjoined to believe it, lest in the vanity of human rashness we presume to find any fault with the work of so great an Artificer... Therefore it is not with respect to our convenience or discomfort, but with respect to their own nature, that the creatures are glorifying to their Artificer. Thus even the nature of the eternal fire, penal though it be to the condemned sinners, is most assuredly worthy of praise.²⁴

Augustine even doubts the commonly understood implication of Genesis 3:18:

Concerning thorns and thistles, we can give a more definite answer, because after the fall of man God said to him, speaking of the earth, Thorns and thistles shall it bring forth to you. But we should not jump to the conclusion that it was only then that these plants came forth from the earth. For it could be that, in view of the many advantages found in different kinds of seeds, these plants had a place on earth without afflicting man in any way. But since they were growing in the fields in which man was now labouring in punishment for his sin, it is reasonable to suppose that they became one of the means of punishing him. For they might have grown elsewhere, for the nourishment of birds and beasts, or even for the use of man.²⁵

Finally, a word from his work on original sin, which may serve to hinder us from being too ready to compare animal behaviours with human immorality, and so draw the conclusion that “original sin” is in fact an evolutionary phenomenon with natural evil simply merging into moral evil:

God's work continues still good, however evil the deeds of the impious may be. For although “man being placed in honour abideth not; and being without understanding, is compared with the beasts, and is like them,” yet the resemblance is not so absolute that man actually becomes a beast. There is a comparison, no doubt, between the two; but it is not by reason of nature, but through vice — not vice in the beast, but in nature [i.e. the difference between animal and human nature]. For so excellent is a man in comparison with a beast, that the man's vice is the beast's nature.²⁶

John of Damascus

We move forward now to the seventh century. John (679-749), a monk and polymath, like his predecessors is blissfully unaware that the creation story is supposed to teach vegetarianism, for man or beast, before the Fall:

²⁴ *Ibid.*, XII ch4.

²⁵ Augustine, *On the Literal Meaning of Genesis Vol 1*, 18:27.

²⁶ Augustine, *On the Grace of Christ and Original Sin* 2:46.

Moreover, at the bidding of the Creator it produced also all manner of kinds of living creatures, creeping things, and wild beasts, and cattle. All, indeed, are for the seasonable use of man: but of them some are for food, such as stags, sheep, deer, and such like: others for service such as camels, oxen, horses, asses, and such like: and others for enjoyment, such as apes, and among birds, jays and parrots, and such like.²⁷

Anselm

Moving forward to the 11th century, Anselm (1033-1109) was probably the greatest thinker ever to occupy the See of Canterbury. He wrote extensively on the nature of evil, but notably little (or actually, nothing) on natural evil, and so nothing on the effect of the Fall upon it. The reason for this is simple: evil, to him, was *by definition* a product of free wills negating their original goodness. His profound philosophy of being saw what we call “evils” in nature simply as lower degrees of good, consistent with what Augustine had taught:

Rather, it must be the case that every created thing both exists and is excellent in proportion to its likeness to what exists supremely and is supremely great. For this reason, perhaps—or, rather, not perhaps but certainly—every intellect judges that natures which are in any way alive excel non-living [natures], and that sentient natures excel non-sentient [natures], and that rational natures excel nonrational [ones].²⁸

Thomas Aquinas

The importance of Thomas (1225-1275) cannot be overstated. His synthesis of Christian doctrine with the newly recovered teaching of Aristotle provided, quite simply, the intellectual underpinning of the entire late mediaeval period. Both his philosophy and theology still have many, possibly even an increasing number of, admirers today. The “Angelic Doctor’s” perennial influence lies partly in that he and the other scholastics sought not to redefine Church doctrine, but to ground it intellectually and to develop its implications exhaustively. Accordingly we may assume his teaching on this matter to embody the doctrinal mainstream. And he says this:

In the opinion of some, those animals which now are fierce and kill others, would, in that state [before the fall], have been tame, not only in regard to man, but also in regard to other animals. But this is quite unreasonable. For the nature of animals was not changed by man’s sin, as if those whose nature now it is to devour the flesh of others, would then have lived on herbs, as the lion and falcon. Nor does Bede’s gloss on Genesis 1:30, say that trees and herbs were given as food to all animals and birds, but to some. Thus there would have been a natural antipathy between some animals.²⁹

Aquinas admits there are those against his view – but he names none and he may only allude to outliers like Theophilus. Note that he also cites the seventh century Saxon monk Bede’s commentary to show that Genesis 1:29-30 had not been taken as a universal command to vegetarianism by his orthodox predecessors either. As to how this “wild” version of creation was compatible with man’s happiness before the Fall, Aquinas argues that the God-given spiritual nature, the rational soul ruling the body, made humans essentially invulnerable before they sinned – what cannot hurt you cannot

²⁷ John of Damascus, *op. cit.*

²⁸ Anselm, *Monologion* 31.

²⁹ Thomas Aquinas, *Summa Theologiae*, Part 1:96:A1.

be regarded as an evil. In this he echoes the universal sense of human exceptionalism in early theology, which is sometimes missing today:

*Hence, according to the teaching of faith, we affirm that man was, from the beginning, so fashioned that as long as his reason was subject to God, not only would his lower powers serve him without hindrance; but there would be nothing in his body to lessen its subjection; since whatever was lacking in nature to bring this about God by His grace would supply.*³⁰

The later scholastics appear to add little to this definitive mediaeval teaching on the (lack of) effects of the Fall on nature, though writers from Duns Scotus to Suarez have plenty to say on the question of evil (as sin) in relation to God's will. This appears to be because they, like their predecessors, simply recognised no problem of natural evil as such:

*Whether cast as a logical difficulty, or as an evidential one, the problem arises from conflict between belief in an omnipotent, all-good God, on the one hand, and the existence of pointless suffering, on the other. Medieval philosophers of all faiths regard this as a less pressing issue than moderns do, for few, if any, believe that there actually is any pointless suffering.*³¹

But the early modern period, for the first time, begins to display a different humour. To this we now turn.

Early modern to modern periods

A profound reversal in the theological picture appears, surprisingly, in the writings of the Reformers.

John Calvin

I cite Calvin (1509-1564) first, because his usually careful exegesis of Scripture provides a link with the older views. Thus in his commentary on Psalm 104:

*Although lions, if hunger compels them, go forth from their dens and roar even at noon-day, yet the prophet describes what is most usually the case. He therefore says, that lions do not venture to go abroad during the daytime, but that, trusting to the darkness of the night, they then sally forth in quest of their prey. Herein is manifested the wonderful providence of God, that a beast so dreadful confines itself within its den, that men may walk abroad with the greater freedom. And if lions sometimes range with greater liberty, this is to be imputed to the fall of Adam, which has deprived men of their dominion over the wild beasts.*³²

Here we see, on careful reading, that like his predecessors Calvin assumes lions ate prey, though not people, before the Fall. This accords with the idea of nature as God's obedient instrument for blessing or punishment in Chapter 1. Calvin's Genesis commentary on 1.28 mentions that some believe it teaches human vegetarianism, but he argues against this from other verses in Genesis. Animal predation he doesn't mention, but treats the whole command not as a prohibition, but as a declaration of God's abundant provision for all.

³⁰ Thomas Aquinas, *Summa Contra Gentiles*, Book IV, 52.

³¹ Kent, Bonnie, *Evil in Later Medieval Philosophy (Journal of the History of Philosophy. Volume 45, Issue 2. April 2007)* <http://www.omnilogos.com/2014/12/evil-in-later-medieval-philosophy.html> accessed 06/01/2016.

³² Calvin, John, *Commentary on Psalms*: Ps.104.

But in contrast his commentary on Genesis 3:18 goes against nearly everything we have read so far:

Therefore we may know, that whatsoever unwholesome things may be produced, are not natural fruits of the earth, but are corruptions which originate from sin. Yet it is not our part to expostulate with the earth for not answering to our wishes, and to the labours of its cultivators as if it were maliciously frustrating our purpose; but in its sterility let us mark the anger of God and mourn over our own sins...

Moreover, Moses does not enumerate all the disadvantages in which man, by sin, has involved himself; for it appears that all the evils of the present life, which experience proves to be innumerable, have proceeded from the same fountain. The inclemency of the air, frost, thunders, unseasonable rains, drought, hail, and whatever is disorderly in the world, are the fruits of sin. Nor is there any other primary cause of diseases.³³

Our former writers have sometimes suggested natural (good) creation being used in punishment. But here Calvin appears to suggest a wholesale corruption of nature, albeit still mainly as a judgement, and is apparently the first to suggest that Genesis's sparse reference to soil, thorns and thistles was adopting "a brevity adapted to the capacity of the common people, ... content to touch upon what was most apparent, in order that, from one example, we may learn that the whole order of nature was subverted by the sin of man."³⁴ This appears to be a case of "It's right there, between the lines."

This is, on consideration, quite a dramatic theological departure, which has also been noted by authors like Alister McGrath and Robert J Schenider, but without an attempt at an explanation:

In this respect Calvin departed from the view of Aquinas and the Catholic tradition generally, which understands nature as showing the signs of imperfection that need to be brought to perfection by grace. Calvin went much further: creation has been corrupted by sin, suffers along with humankind disorder and death, and awaits its final restoration by the redemptive activity of Christ, the savior as well as the creator (McGrath 174-175).³⁵

Such novelty and stepping beyond the biblical witness is rather uncharacteristic of Calvin, who was keen to preserve what had gone before except where it deviated from Scripture. We must therefore ask its origin.

Martin Luther

Luther (1483-1546), although the earlier reformer, goes even further in his pessimism about nature than Calvin, though his starting point is still the existing teaching. So in his dispute with Erasmus on free will he writes:

This must be said: if you want the words 'they were very good' to be understood of God's works after the fall, you will notice that the words were spoken with reference, not to us, but to God. It does not say: 'Man saw what God had made, and it was very good.' Many things

³³ Calvin, John, *Commentary on Genesis*: 3.18.

³⁴ *Ibid.*

³⁵ Scheider, Robert J, <http://community.berea.edu/scienceandfaith/essay02.asp>, accessed 06/01/2015. His citation refers to McGrath, Alister E, *A Scientific Theology. Vol. 1: Nature* (Grand Rapids: Eerdmans, 2001) pp.174-175.

*seem, and are, very good to God which seem, and are, very bad to us. Thus, afflictions, sorrows, errors, hell, and all God's best works are in the world's eyes very bad, and damnable.*³⁶

But a remark in his *Table Talk* resembles Calvin's position, if in muted form:

*Though by reason of original sin many wild beasts hurt mankind, as lions, wolves, bears, snakes, adders, &c., yet the merciful God has in such manner mitigated our well-deserved punishments that there are many more beasts that serve us for our good and profit, than of those which do us hurt ... in all creatures more good than evil, more benefit than hurts and hindrances.*³⁷

See how he has transitioned from the concept of "good things that God might use for our punishment" to "more good than evil". "Natural evil" has seemingly made its first major appearance in Christian thought since the Gnostics, and in the mouth of its chief reformer too. Luther's own commentary on Genesis 3 goes well beyond Calvin's, and light years beyond the older writers:

...because [the earth] does bear many hurtful things, which but for man's sin she would not have borne, such as the destructive weeds, darnel, tares, nettles, thorns, thistles, etc., to which may be added, poison, noxious reptiles and other like hurtful things, brought into the creation by sin.

*For my own part I entertain no doubt that before the sin of the fall the air was more pure and healthful, the water more wholesome and fructifying, and the light of the sun more bright and beautiful*³⁸. *So that the whole creation as it now is reminds us in every part of the curse inflicted on it, on account of the sin of the fall...*

This original curse moreover was afterwards greatly increased by the Deluge, when all the good trees were rooted up and destroyed, barren sands accumulated and both noxious herbs and beasts multiplied.... The earth herself indeed is innocent and would of its own free nature bring forth all things which are the best and most excellent. But she is prevented from doing so by the curse inflicted on man for his sin.

... In the antediluvian state of the curse no other mention is made than of thorns, and thistles, and labour, and sweat; but now we experience numberless other additional evils. How many diseases and pestilential injuries are inflicted on the standing corn, on the plants of pulse, on trees, and finally on all the productions of the earth? How many evils are wrought by destructive birds and noxious caterpillars? Add to these evils, extremes of cold and frost, thunderings, lightnings, excessive wet, winds, rivers bursting their banks, fissures of the earth, earthquakes, etc. Of none of these is any mention made in the state of things under the curse before the Deluge. My firm belief is therefore that as the sins of men increased the

³⁶ Luther, Martin, *Bondage of the Will* (Packer J I, Johnston O R, London: James Clark & Co Ltd, 1957) V(iii) p203.

³⁷ Luther, Martin, *Table Talk* (Hazlitt W, London: H G Bohn, 1862) p46 CIII.

³⁸ But in his Romans commentary he says of the dimming of the sun, "This opinion cannot be proved from Scripture."

punishments of those sins increased also; and that all such punishments and evils were added to the original curse of the earth...

*In the same manner, as in the present day, we experience more frequent calamities befalling the fruits of the earth than in former times. For the world degenerates and grows worse and worse every day.*³⁹

Whence does Luther get this progressive destruction of the natural order up to, and after the flood, and even now “*growing worse and worse every day*”? Certainly not from Genesis, which says that in the covenant God makes with Noah after the Flood he promises, “*Never again will I curse the ground because of man.*” (Genesis 8:21). If anything, Scripture *rescinds* the curse, rather than increasing it (see Chapter 2).

I’ll propose an explanation for this new pessimism in the next chapter, but whatever the reason it is clearly a radical departure from the old doctrine. And it is teaching that becomes progressively more negative, if that were possible, down the years. I’ve quoted at length from Luther, so I’ll just give two brief citations of how things continued in this vein at the height of the Reformation. The *Westminster Greater Catechism* of the 1640s, answering its question on earthly punishments, says:

*Q28: The punishments of sin in this world, are either inward ... or outward, as the curse of God upon the creatures for our sakes...*⁴⁰

And that other monument to English Puritanism, *Matthew Henry’s Commentary*, says on Romans 8:20-21:

When man sinned, the ground was cursed for man’s sake, and with it all the creatures. The creation is sullied and stained, much of the beauty of the world gone. And it is not the least part of their bondage that they are used, or abused rather, by men as instruments of sin.

The thorns and thistles of Genesis have now become “*all the creatures*”, and their goodness (even to those who perceived their being used in judgement) has become “*sullied and stained*”.

The older teaching did not disappear quickly, even amongst the Reformed. The Puritan poet, John Milton (1608-1674), in describing the days of Creation in *Paradise Lost*, seems to glory in the wilder products of God’s hand. On the fifth day he names leviathan, and the eagle as well as the stork, nightingale, swan and cock. His sixth day has the lion “pawing to get free”, the lynx, the leopard, the tiger, the stag, the behemoth (like leviathan, from Job), before moving to serpents and invertebrates⁴¹. In Book X Milton has Adam submit himself and Eve penitently to the kindness of judgement – death (with hints of mercy), pains in childbearing (recompensed with the fruit of the womb), labouring for sustenance (better than idleness!) – and adds “inclement seasons”, mitigated by possessing fire⁴². This matches the old, gentler, view of nature as well as the actual words of Genesis.

³⁹ Luther, Martin, *A Critical and Devotional Commentary on Genesis ch 3: v.17*.

⁴⁰ *Confession of Faith and Larger and Shorter Catechism* (Edinburgh, Swinton & Brown, 1671), p.85.

⁴¹ Milton, John, *Paradise Lost*, London: Penguin 1989, VII.387-503.

⁴² *Ibid.*, X.1010-1104.

Similarly the metaphysical poet Thomas Traherne (1636-1674) retains a refreshingly high vision of nature. He writes:

*To contemn the world and to enjoy the world are things contrary to each other. How, then can we contemn the world, which we are born to enjoy? Truly there are two worlds. One was made by God, the other by men. That made by God was great and beautiful. Before the Fall it was Adam's joy and the Temple of his Glory. That made by men is a Babel of Confusions: Invented Riches, Poms and Vanities, brought in by Sin: Give all (saith Thomas à Kempis) for all. Leave the one that you may enjoy the other.*⁴³

Jacobus Arminius

Surprising support for the older view also comes from the Dutch theologian, Arminius (1560-1609), usually seen as the supporter of free will and therefore (obliquely and quite wrongly) of the independence of nature from God. Instead his somewhat scholastic approach to theology follows the ancient tradition on Creation. A dense passage on the creation includes:

This world is an entire something, which is perfect and complete, having no defect of any form, that can bear relation to the whole or to its parts; nor is redundant in any form which has no relation to the whole and its parts... This was necessary, not only to adumbrate, in some measure, the perfection of God in variety and multitude, but also to demonstrate that the Lord omnipotent did not create the world by a natural necessity, but by the freedom of his will.

*This creation is the foundation of that right by which God can require religion from man, which is a matter that will be more certainly and fully understood, when we come more specially to treat on the primeval creation of man; for he who is not the creator of all things, and who, therefore, has not all things under his command, cannot be believed, neither can any sure hope and confidence be placed in him, nor can he alone be feared. Yet all these are acts which belong to religion.*⁴⁴

An important (though not unique) observation here is that it is the integrity and goodness of a creation entirely under God's command that is the very *foundation* of religion. There is no room here for the random, or partly "free", evolution acting as a *Demiurge*, the exaggeration of his position on free-will now seen in the Open Theism that has influenced many theistic evolutionists. This total control of nature, in the present age, is even clearer in Arminius's teaching on providence:

*My sentiments respecting the providence of God are these: It is present with, and presides over, all things; and all things, according to their essences, quantities, qualities, relations, actions, passions, places, times, stations and habits, are subject to its governance, conservation, and direction.*⁴⁵

I want to end this theological survey with one more significant name: John Wesley.

⁴³ Traherne, Thomas, *Centuries of Meditations*, New York: Cosimo Classics 2007 1/7, p.6.

⁴⁴ Arminius, Jacobus, *Disputation XXIV on Creation*, <http://www.godrules.net/library/arminius/arminius67.htm>, accessed 06/01/2016.

⁴⁵ Arminius, Jacobus, *The Providence of God*, <http://www.godrules.net/library/arminius/arminius153.htm>, accessed 06/01/2016.

John Wesley

Wesley (1703-1791) takes the doctrine of fallen creation to new heights (or depths) of lurid description, achieving at last the kind of teaching frequently seen today. Extracts from just one sermon are sufficient to show the complete change from the teaching of the Church Fathers, from joy in God's creation to utter pessimism:

As all the blessings of God in paradise flowed through man to the inferior creatures; as man was the great channel of communication, between the Creator and the whole brute creation; so when man made himself incapable of transmitting those blessings, that communication was necessarily cut off. The intercourse between God and the inferior creatures being stopped, those blessings could no longer flow in upon them. And then it was that "the creature," every creature, "was subjected to vanity," to sorrow, to pain of every kind, to all manner of evils...

But in what respect was "the creature," every creature, then "made subject to vanity?" What did the meaner creatures suffer, when man rebelled against God? It is probable they sustained much loss, even in the lower faculties; their vigour, strength, and swiftness. But undoubtedly they suffered far more in their understanding; more than we can easily conceive. Perhaps insects and worms had then as much understanding as the most intelligent brutes have now: Whereas millions of creatures have, at present, little more understanding than the earth on which they crawl, or the rock to which they adhere. They suffered still more in their will, in their passions; which were then variously distorted, and frequently set in flat opposition to the little understanding that was left them. Their liberty, likewise, was greatly impaired; yea, in many cases, totally destroyed. They are still utterly enslaved to irrational appetites, which have the full dominion over them. The very foundations of their nature are out of course; are turned upside down. As man is deprived of his perfection, his loving obedience to God; so brutes are deprived of their perfection, their loving obedience to man. The far greater part of them flee from him; studiously avoid his hated presence. The most of the rest set him at open defiance; yea, destroy him, if it be in their power. A few only, those we commonly term domestic animals, retain more or less of their original disposition, (through the mercy of God) love him still, and pay obedience to him.

Setting these few aside, how little shadow of good, of gratitude, of benevolence, of any right temper, is now to be found in any part of the brute creation! On the contrary, what savage fierceness, what unrelenting cruelty; are invariably observed in thousands of creatures; yea, is inseparable from their natures! Is it only the lion, the tiger, the wolf, among the inhabitants of the forest and plains – the shark, and a few more voracious monsters, among the inhabitants of the waters, – or the eagle, among birds, – that tears the flesh, sucks the blood, and crushes the bones of their helpless fellow-creatures? Nay; the harmless fly, the laborious ant, the painted butterfly, are treated in the same merciless manner, even by the innocent songsters of the grove! The innumerable tribes of poor insects are continually devoured by them. And whereas there is but a small number, comparatively, of beasts of prey on the earth, it is quite otherwise in the liquid element. There are but few inhabitants of the waters, whether of the sea, or of the rivers, which do not devour whatsoever they can master: Yea, they exceed herein all the beasts of the forest, and all the birds of prey. For none

of these have been ever observed to prey upon their own species: "Saevis inter se convenit ursoris: Even savage bears will not each other tear."

But the water-savages swallow up all, even of their own kind, that are smaller and weaker than themselves. Yea, such, at present, is the miserable constitution of the world, to such vanity is it now subjected, that an immense majority of creatures, perhaps a million to one, can no otherwise preserve their own lives, than by destroying their fellow-creatures!

And is not the very form, the outward appearance, of many of the creatures, as horrid as their dispositions? Where is the beauty which was stamped upon them when they came first out of the hands of their Creator? There is not the least trace of it left: So far from it, that they are shocking to behold! Nay, they are not only terrible and grisly to look upon, but deformed, and that to a high degree. Yet their features, ugly as they are at best, are frequently made more deformed than usual, when they are distorted by pain; which they cannot avoid, any more than the wretched sons of men. Pain of various kinds, weakness, sickness, diseases innumerable, come upon them; perhaps from within; perhaps from one another; perhaps from the inclemency of seasons; from fire, hail, snow, or storm; or from a thousand causes which they cannot foresee or prevent.⁴⁶

We're on familiar territory now. Wesley's eloquent sermon might largely have been ghosted by Richard Dawkins (or even the Catholic theistic evolutionist Francisco Ayala). And that is no coincidence, for Wesley reflected the way ideas were developing throughout Enlightenment Europe, but especially in Protestant territories. Furthermore, his influence on popular Christianity, not only through the Methodist Awakening but through the Pietist movement's predominance within US and European Evangelicalism, probably ensured the spread of this brand of imaginative Bible interpretation to this day.

It is noteworthy how this progressively growing fear and dread⁴⁷ of the natural Creation was paralleled outside the theological world. I'll cite just one example, since it is the actual source of the slogan "*red in tooth and claw*" (used by Dawkins in *The Selfish Gene*). Canto 55-56 of Alfred Lord Tennyson's 1850 poem *In Memoriam A.H.H.*:

*Who trusted God was love indeed
And love Creation's final law
Tho' Nature, red in tooth and claw
With ravine, shriek'd against his creed⁴⁸*

The subject was the deceased Arthur Henry Hallam, a friend who agonised with Tennyson about the conflict between God's love and nature's cruelty, purposelessness and heartlessness. If this sounds familiar, it is because the poem became a feature of the debate surrounding natural selection after the publication of Darwin's *Origin of Species* a few years later.

Literary critic Holly Furneaux writes on the *British Library* website:

⁴⁶ Wesley, John, *The General Deliverance Sermon 60*, <http://wesley.nnu.edu/john-wesley/the-sermons-of-john-wesley-1872-edition/sermon-60-the-general-deliverance/> accessed 06/01/2016.

⁴⁷ A reversal, ironically, of what happened after the Flood (Gen. 9.2).

⁴⁸ Tennyson, Alfred Lord *In Memoriam A. H. H.*, 1850 Canto 56.

*In the central lyrics of 55 and 56, Tennyson considers the theory of natural selection long before Darwin made it famous in *On the Origin of Species* (1859) ... The poet considers Nature to be 'so careful of the type ... So careless of the single life' (55, stanza 2), reflecting on the impersonal, amoral processes of the natural world in which types of species evolve without heed of the individuals who are extinguished along the way. This wanton waste of potential life - 'of fifty seeds' Nature often allows only one to bear fruit - offers an allegorical expression of the waste of potential in the early death of Hallam. This seemingly senseless loss leads him to 'falter where I firmly trod' on the 'world's altar stairs/That slope thro' darkness up to God'. At the close of this lyric he has recourse to feelings which are posited against scientific discoveries, and he 'faintly' reasserts his trust that at length the human race will be spiritually redeemed. In section 56, even that faint hope is crushed as Nature is personified as, famously, 'red in tooth and claw'. The savage voice of Nature avers that thousands of species have been wiped out; the holy spirit is reduced to mere 'breath', and man to 'desert dust'.⁴⁹*

The poem as a whole became for Tennyson himself, according to many, an attempted theodicy in response to Darwin, and anticipates the anxious doubt expressed in most modern approaches to theodicy.

I close this chapter, already too long, with a comment of Rev Charles Kingsley from 1871 on the "state of play" he found, and lamented as unscriptural, within the Christian culture he knew:

We have only, if we need proof, to look at the hymns – many of them very pure, pious, and beautiful – which are used at this day in churches and chapels by persons of every shade of opinion. How often is the tone in which they speak of the natural world one of dissatisfaction, distrust, almost contempt. "Disease, decay, and death around I see," is their key-note, rather than "O all ye works of the Lord, bless Him, praise Him, and magnify Him together." There lingers about them a savour of the old monastic theory, that this earth is the devil's planet, fallen, accursed, goblin-haunted, needing to be exorcised at every turn before it is useful or even safe for man.⁵⁰

But of course, as we have seen the underlying assumptions about "the nature of nature" do not reflect at all the viewpoint of Christians in the first fifteen hundred years of the Church, including those monks. What, then, actually led to the change?

⁴⁹ Furneaux, Holly, *An introduction to In Memoriam A.H.H.*, <http://www.bl.uk/romantics-and-victorians/articles/in-memoriam#sthash.9ro6iQkY.dpuf> accessed 06/01/2016.

⁵⁰ Kingsley, Charles, *The Natural Theology of the Future* (read at Sion College, 1871) <http://www.online-literature.com/charles-kingsley/scientific/7/> accessed 06/01/2016.