

British Scriptural Geologists in the First Half of the Nineteenth Century: Part 3.

George Bugg (1769-1851)

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ABSTRACT

*An evangelical Anglican pastor, George Bugg faced difficulties and controversies within the church because of his uncompromising stand on the Scriptures as 'strictly and literally true'. In his **Scriptural Geology** he insisted the Scriptures are not a science textbook, but do provide an inerrant historical outline of the history of creation, and that geological facts based on observations must be distinguished from interpretations of the facts based on philosophical assumptions. He particularly took issue with old-Earth creationists, such as Buckland and Cuvier, and vehemently argued against the global extrapolations of Cuvier from his sketchy field work in the Paris Basin and his use of the fossils in his theory. Bugg was absolutely convinced of a recent Creation and a global Flood, and staunchly defended these and the six literal days of Creation against the Day-Age and Gap Theories. He clearly saw the crucial connection between the literal truth of Genesis and the Gospel.*

BIOGRAPHICAL SKETCH¹

George Bugg was born probably in 1769, the year he was baptized at the Anglican church in Stathern, Leicestershire. When he was nine, his mother died, which was the first of several mournful experiences for Bugg. Beginning in 1786, he received a few years of private tutoring from Reverend Thomas Baxter, curate of Ufford, Northamptonshire. He was admitted to St John's College, Cambridge in May 1791, and received the B.A. degree four years later.

In July 1795, he was ordained deacon in York and became curate of Dewsbury, near Leeds, where he was made priest the same year and served until 1801. Subsequent curacies included Welby with Stoke in Leicestershire (1802), Kettering in Northamptonshire (1803-1815), Lutterworth in Leicestershire (1817-1818), and Desborough near Kettering (1831-1845).² By March 1846 he had moved to Hull where he lived with his unmarried daughter, Elizabeth, and two teenage house servants until his death at home on August 15, 1851, at the age of 82.³ After a lifetime of ecclesiastical setbacks, he

was finally made rector of the parish of Wilsford in Lincolnshire in 1849, though he apparently never lived there.⁴

In 1804 he married Mary Ann Adams, daughter of a local prominent draper in Kettering. They had four daughters and one son (who died at 10 months old). Before Mary's premature death in 1815 she served with George in expanding the Sunday School ministry and the work of the Church Missionary Society and the British and Foreign Bible Society. When she died, Bugg was left with the care of his daughters, who were all under the age of seven at the time.

He was converted to the Christian faith in his late teens or early twenties,⁵ at which time he also apparently became convinced that '*the Scriptures are strictly and literally true*'.⁶ Every indication is that Bugg was a fervent evangelical Anglican all his life. His life-long friend, Reverend Thomas Jones of Creaton, was a leading evangelical Anglican. Bugg was noted for his effective preaching and had good relations with, and the respect of, many non-conformist (that is, non-Anglican) ministers. His two books on baptism and regeneration, written in 1816

and 1843, were refutations of the views of the Dr Richard Mant and Dr Edward Pusey, respectively.⁷ He considered the views on baptism of both Mant and Pusey to be virtually identical to the teaching of the Roman Catholic Church (that baptism is necessary for salvation), and therefore a serious threat to the doctrine of justification by faith, a concern expressed by many evangelicals in the 1830s and 1840s as the Anglo-catholic 'Tractarian movement' spread within the Anglican Church.⁸ In both treatises he was respectful toward his opponents, while strongly disagreeing with their views.⁹

Bugg's life was chequered with difficulties and controversies. Besides the death of loved ones and frequent struggles with illness, he was dismissed by two bishops from three of his curacies: in 1802 after only 11 weeks at Welby, in 1815 (the same year his wife died) after twelve years of ministry at Kettering, and in 1818 at Lutterworth.¹⁰ In each case the dismissal appears to have been the result of a few prominent non-evangelical parishioners complaining to a liberal Bishop and involved vague charges with no opportunity for redress.¹¹ Never was he accused of any particular doctrinal error, moral misconduct or ecclesiastical irresponsibility. In his last dismissal, in fact, 90 per cent of the congregation (481 adults) signed a petition asking the Bishop to reinstate Bugg,¹² and requested and paid for the publication of Bugg's farewell sermon, which was on how to endure suffering in a Christ-like manner.¹³ In this sermon, Bugg humbly offered himself as an example, explaining that in his dismissal he had suffered unjustly the loss of his beloved congregation, damage to his reputation and the loss of about £400,¹⁴ and yet maintained his Christian character with peace of mind and without animosity towards his enemies. Also, in defence of Bugg and other curates, who experienced similar unjustified dismissals, a number of clergymen together anonymously published a respectful appeal.¹⁵ In this they argued for a change to some recent Acts of Parliament, which empowered Anglican bishops arbitrarily to revoke the licence of any curate.

The anti-creationist Roberts asserted, without documentation, that some time after Bugg's dismissal from Lutterworth, he became a unitarian.¹⁶ This was most definitely not the case, however. He was never accused of any doctrinal errors when he was dismissed from his curacies. Also, his close life-long friendship with a leading evangelical Anglican, Reverend Thomas Jones, has already been noted. Certainly at the time Bugg wrote his **Scriptural Geology** (1826–1827), he was a thoroughgoing Trinitarian, evidenced by two statements he made against Socinians, a Unitarian sect.¹⁷ Also, he was equally Trinitarian in his two books on baptism and regeneration, in 1816 and 1843 respectively.

His other writings included a book of sermons (1817),¹⁸ an account of a legal squabble Bugg had with the husband of a woman who before her death had willed that Bugg distribute some of her money to certain charities (1835),¹⁹

and a pamphlet on the Anglican Prayer Book (1843).²⁰ By far Bugg's most significant work was his massive two-volume **Scriptural Geology**. Though the work appeared anonymously, a number of his readers knew he had written it, and Bugg freely identified himself with it in his correspondence with the **Christian Observer**, the leading evangelical magazine of the day.²¹ Volume I (361 pages) appeared in 1826, but due to Bugg's poor health, volume II (356 pages) was delayed until the following year. The work had 200 pre-publication subscribers, who included 85 clergymen, 15 members of the nobility, and seven students at Cambridge University. Five of the clergymen were leading evangelical Anglicans: Charles Simeon (in Cambridge), Josiah Pratt (in London), William Marsh (in Colchester), Legh Richmond (in Turvey, and whose varied accomplishments included the study of mineralogy)²² and Thomas Jones (in Creaton).²³

THE RELATIONSHIP BETWEEN SCRIPTURE AND GEOLOGY

Bugg held to the then dominant view of evangelicals and high churchmen regarding the infallibility of the Scriptures, not just in matters of religion and morality, but also of history. He also believed that, at least with respect to Genesis, the 'plain' and 'obvious' literal meaning is the correct one.²⁴ He reasoned,

*'I allow, as I before allowed, that Sacred writers may be silent about science or even ignorant of it, without impeaching their infallibility as recorders of divine revelation. But whatever they do declare, and on whatever subject (as we before observed from Bishop Horsley) is certainly true. They were under divine and supernatural guidance, and therefore personal ignorance in the writer is no defect; and error is impossible',*²⁵

Therefore when Bugg chose the title for his book, he was not asserting that the Bible teaches us the details of geology. Rather on the basis of Genesis, Bugg was cautious not to give 'any thing more than bare suggestions' about the geological effects of Creation and the Flood, for 'the Scriptural data certainly afford a mere outline' of the events of the past.²⁶ It gives clues or the foundational principles for interpreting the geological phenomena.^{27,28}

'Now, though we expect from the Bible, no detail of circumstances respecting what are the state and situation of the fossil strata, we have seen enough respecting the cause and operations of the Deluge to prove the real ground and principle upon which we account for the actually existing state of those strata'.²⁹

Bugg was quite emphatic that the Scriptures do not 'establish any peculiar system of philosophy'.³⁰ To the objection that 'the Bible is not given to us to teach us geology', Bugg agreed, partially at least, depending on the meaning of the phrase. He contended that geology and the Bible both had legitimate and illegitimate provinces.

*'The Bible is certainly **not** given to teach us Geology, as a **science**. But it is given to teach us what nothing else can teach us — the **time** and **manner** of the world's Creation. It is, moreover, given to inform us that the world has since been destroyed, and **why** it was destroyed. These "two events or epochs" are, when received in the light of Revelation, of immense **importance**. The **one**, displays the **Being** and **natural** perfections of the Deity, or as the Psalmist and St Paul have recorded it:- "The glory of God", and "His eternal power and Godhead". The **other** exhibits him in his moral character, as the just and righteous Governor of the world.*

***Geology**, in its **modern** character, does not only fall short of both these grand objects, but in its obvious consequences, thwarts, if not destroys them **both**. For, as we have seen, it would merge **our creation** among the **geological revolutions**, even among the **least** of them, and thus annihilate its **character**. And as to the **time and manner** of the Creation, it would make the "Word of God" to speak what is **unintelligible** or **erroneous**. With respect to the **other**, its obvious tendency is to diminish, if not subvert the **moral** causes which operated at the **Deluge**. For it bewilders and leads away the mind of the beholder from the awful import of **that** catastrophe, by presenting to him indefinite numbers of such events. And it blunts the edge of his **moral feeling** by familiarizing him with the misery and destruction of the earth's inhabitants, so many times repeated, without any connexion of **offence**, with the **suffering beings**.*

*It is the **province**, then, of **Geology**, and not of the **Bible**, to afford us "any curious information as to the structure of the earth". But it is **not** the province of Geology, as Mr Sumner seems to think it is, to "speculate on the formation of the globe ". The Bible does **not** "interfere with philosophical inquiry", or "repress the researches of mankind". But it **does** forbid us to interfere with "the literal interpretations of terms in Scripture ", when such interference would change the **character** of the **thing revealed**, and fritter down the **Creation of the Bible** into "**that Creation** which Moses records, and of which Adam and Eve were the first inhabitants"; and so make "the **Mosaic** account of Creation " a mere **epoch** in the progress of **Geology** from the "**primitive formations**" to the present times.³¹*

Buckland, Sumner, and other old-Earth proponents argued that the geological structure of the Earth displayed God's wisdom and benevolence in preparing the Earth for man. Again Bugg agreed. But it was not the structure (that is, the geological facts) of the Earth that was his concern. He objected that the old-Earth geological **theory** about the time and processes of the **formation** of that structure was inconsistent with the nature of God. He asked, where is the wisdom, kindness and justice of many revolutions on the Earth before man sinned, which

destroyed myriads of creatures? The Bible, on the other hand, taught that God had originally made a perfect, mature, productive and fertile creation, and that there was a holy and wise reason for the one destructive catastrophe, the Flood.

*"Thus we see that, when compared with the **Scriptures**, the **modern Geological Theory** makes every thing unwise, unkind, and perhaps, unjust. It finds no original Creation: -And it cannot prove a first Creation, from "**wise design**". For "primitive" rocks remaining thousands of years **alone** is unwise, because useless. And, dashing these to pieces, in order to mend them and make fresh ones, designates either a want of wisdom in the primitive "design ", or a failure in the attempt, and a want of experience and power to **execute** a wise one. But whoever predicates either of these on the Most High, "charges God foolishly". . . . That the location and **adaptation** of the strata to the use of man are wise and good, is fully admitted. But these are **facts**. That the **time and manner** of these formations, however, which the modern Geology **Theory** professes to develop, shew "wise foresight and benevolent intention ", and exhibit "proofs of the most exalted attributes of the Creator", is, I believe, what few will have boldness enough to assert. Yet, if Geologists would recommend their **science** (which involves their "theory" of formations), they must not only shew that there is wisdom and goodness manifested in the **formation** of the strata, but in their **Theory** of that formation."³¹*

On the basis of the Scriptural account of Creation and the Flood then, Bugg explicitly disavowed 'all pretensions to a system of **operations and causes**, as well as classification and arrangement in the stratification.'³³ He did believe, however, that the character of the Flood as described by the Bible would correspond with the leading features of the geological phenomena of the Earth.³⁴ This correspondence he attempted to demonstrate, and we will consider it later.

Bugg was mindful that his critics would object that the insistence of binding geology to the Scriptures was a repetition of the mistakes of the Church at the time of Galileo. He replied that there was a significant difference: whereas Copernicus found no difficulty reconciling his theory with Scripture, modern geologists could not harmonise the Bible with their theories, without taking away from the Scriptures all legitimate meaning.³⁵ However, Bugg did not explain how he came to this conclusion about Copernicus.³⁶ To the charge that he was attempting, like the Catholic authorities of Galileo's day, to prevent all enquiry, Bugg countered that his two volume work was a '**most minute inquiry into every part of the subject in dispute**'.³⁷

Respecting the accommodation of the language of Scripture, Bugg contended that '**the history of creation has one plain, obvious, and consistent meaning, throughout**

all the Word of God'. The rest of Scripture offers no hint or key to any other meaning, so that if the obvious meaning is not the true one, then the Biblical authors have misled their readers and the creation narrative has no meaning or a false one. Furthermore, argued Bugg, the phenomenological language that the Bible uses to describe the movement of the heavenly bodies is the common language used then as now. Otherwise it would be intelligible to no one but astronomers. Also, it was foreign to the '*office of the sacred writers*' to teach the science of astronomy. However, although the Bible also was not intended to teach the science of geology, it did give detailed narratives of the Creation and the Flood, which were critically relevant to the discussion of geological theories about Earth history.³⁸

The historicity of the Genesis account and the historical nature of geological theories were what Bugg repeatedly emphasised. He quoted with approval the words of the **Quarterly Review** of Buckland's **Reliquiae Diluvianae**:

*'That in an inquiry into the history of the world to reject the evidence of written records as wholly irrelevant and undeserving of attention, is in itself illogical and unphilosophical. It is true that to assume these records to be infallible and above all criticism is to prejudge the question and to supersede all inquiry: but when the case is one of remote concern and full of difficulty, when we are compelled to compass sea and land for presumptive and circumstantial evidence, to turn a deaf ear to that Volume which professes to give a direct and detailed account of the whole transaction "is a great" violation of the laws of sound reasoning.'*³⁹

He considered it to be most unphilosophical for the old-Earth geologists and clergymen '*to reason from the operations of nature to the origin of nature, for which they have no data.*⁴⁰ At best, he argued in chapter one of Volume II, they theorised that the primitive mountains were formed out of a fluid. But they never explained the creation of the fluid. In fact, he contended, as they attempted to explain first formations solely by natural causes they were implying, sometimes no doubt unconsciously, an infinite series, which amounted to atheism.

*'Thus then, we see with perfect certainty, that the operations of nature afford us no data for a Theory on first formations; and that it is not the province of philosophy, which is concerned only with the operations of nature, to speculate about the time or manner of the world's first existence.'*⁴¹

The questions of origins (how? and when?) could only be answered by revelation, said Bugg.

*'Its Divine Author alone, knows how he made the world; and His Word therefore in this matter, is our only guide.'*⁴²

GEOLOGICAL COMPETENCE

Bugg did not have (or claim) geological competence,

but neither was he totally ignorant of geological facts and theories. At the end of his book Bugg declared that he '*sought no instruction (in Theory or argument), but that of his Bible.*⁴³ But this did not mean that he had read only the Bible. He admitted that he had little first-hand knowledge of geological phenomena and no skill as a practical geologist, but that he accepted the facts as described by the leading geologists, many of whose writings he had read.^{43,44} His work, representing three to four years of study,⁴⁵ contains many long quotations from Buckland's **Vindiciae Geologicae** (1820) and **Reliquiae Diluvianae** (1823), Cuvier's **Theory of the Earth** (1822, fourth English edition), Faber's **Treatise on the Dispensations** (1823), Sumner's **Records of Creation** (1816), Phillips' **Geology of England and Wales** (1818), and relevant recent journal articles from the **Journal of Science, Literature and the Arts**, **Philosophical Transactions**, and the **Quarterly Review**. Generally the quotations are fully documented. He also indicated that he had read at least some of the geological writings of continental geologists such as Deluc, Von Buch, Pallas and Saussure, as well as the theories of the Earth written by Buffon and Demaillet:

As far as other Scriptural geologists are concerned, Bugg responded to several of Granville Penn's minor arguments (usually rejecting Penn's conclusions), and also referred positively to Alexander Catcott's **Treatise on the Deluge** (1768), and Thomas Gisborne's **Testimony of Natural Theology** (1818).⁴⁶ He respected them all, but felt that Penn and Catcott particularly had not adhered to Scripture closely enough, and so had '*neither afforded assistance to Geology nor defence to the Sacred Records.*⁴⁷ This was one way in which Bugg expressed overconfidence about his own handling of the subject.

GEOLOGISTS AND GEOLOGY

One of Bugg's critics, 'Oxoniensis Alter', complained that Bugg's whole book was an *ad hominem* argument.⁴⁸ The editor of the **Christian Observer** said that Bugg '*had deviated from simple argument into criminations*', and that he had accused Faber, Buckland, Sumner and others of being perverters of Scripture and abettors of infidelity.⁴⁹ As Bugg focused his criticisms on the theories of Cuvier and Buckland it is true that, because he concluded that their theories were unphilosophical, illogical, and contradicted by their own description of the facts, this reflected quite negatively on these two men and the clergymen and other geologists who followed their theory. However, Bugg repeatedly and explicitly stated^{50,52} that he was not accusing Cuvier, Buckland, Sumner, Faber, Conybeare and Phillips, etc., of evil motives (that is, of intentionally trying to undermine Scripture by their theories).⁵³ He did, however, believe that many of the continental geologists did consciously intend to attack Scripture. He said that he had '*the highest opinion of Mr Buckland's integrity, and of Mr*

Faber's and the *Christian Observer's* sincerity.⁵⁴ But while their motives may have been commendable (that is, to vindicate Scripture), Bugg was certain that the actual effect of the old-Earth theory was nevertheless very detrimental to the Christian faith.

I have been particularly cautious not to charge individuals (not even Baron Cuvier) with hostile designs against the Scriptures; but that he has propagated, and others have adopted, a system which is hostile to the Scriptures is the subject for discussion, and is not to be silenced by rebuke or censure.^{55,56}

Several statements that Bugg made, if lifted out of the context of his whole argument, might lead us to think that he was opposed to the study of geology or denied the geological facts. For example, he said that the '*modern inquiries into Geology may justly lie under the imputation of being dangerous to religion*', and he called geology an '*insidious science*'.⁵⁷ But generally Bugg was most explicit in saying that what he opposed was the old-Earth 'theory', 'scheme' or 'system' of geology, because he believed it was contrary to reason, the geological facts, and the plain meaning of Scripture. Contrary to the charge of his critics,⁵⁸ he emphatically stated that he did not deny the 'physical facts' of geology, but opposed the old-Earth theoretical interpretations of those facts.

*From an attentive consideration of their writings, it will be seen that Dr Buckland and Mr Faber, do much more than admit that the "physical" facts are true which geologists allege. They embrace the theories by which geologists account for the formation of those "physical phenomena", and from which they endeavour to prove, that numerous races of animals lived and died "on our globe during myriads of years before the formation of man". These theories are "inferences", or deductions, which geologists have drawn from their "physical facts". But these theories, inferences, or deductions, are not facts. They are conclusions which geologists assert to arise out of those facts. It is a fact that the "strata" are deposited in a certain form; —it is a fact that "animal remains" are found embedded in the strata. These are facts, and, generally speaking, we may say these facts are true.*⁵⁹

Bugg went on to say that facts do not speak for themselves,⁶⁰ but must be interpreted, and that often the old-Earth geologists were guilty of using language which ignored this distinction and therefore clouded the philosophical debate. He remarked,

The subject now before us is, whether the Scriptures and the modern theory of geology agree. Not "geological phenomena", as your correspondent has put it; but the geological theory. . . It is an artifice unworthy of philosophy, to say nothing of divinity, to make, as writers on geology very often make, and as Oxoniensis Alter has made, geological theories synonymous with geological phenomena; thus bewildering the reader, and involving in the premises

*what remains to be proved in the process.*⁶¹

This might be interpreted to mean that Bugg objected to all theorising and saw description and classification of phenomena as the only legitimate activities of geology. But Bugg was not opposed to drawing inferences about the physical causes and associated time-scale of geological effects, for he made such inferences in arguing for a young Earth.⁶²

Bugg wrote with strong conviction about many things: for example, the historicity of Genesis, the infallible authority of Scripture, the global and violent nature of the Flood, and the literal meaning of the days of Creation. But in his own theoretical attempts to harmonise the geological phenomena with the literal interpretation of the Scriptural accounts of Creation and the Flood, he explicitly expressed great caution. Examples included such matters as how the breaking of the fountains of the deep during the initial phase of the Flood would have caused faults, dips and inclinations, how whirlpools in the tumultuous Flood collecting floating animal debris could have formed highly concentrated fossil graveyards, why tropical creatures are found buried in the strata of the northern latitudes, and how the vast pebble and gravel beds were formed.⁶³ In ending one such discussion he stated that the explanation he offered

*'is only suggested as a probable circumstance from the analogy of cases. On subjects where data are so imperfect, it were arrogant, not to say impious, to assume airs of importance and confident dictation. The whole of these suggestions may one day prove to be nothing more than mere speculations. However, as the whole seems natural, and, from present data, not improbable, I have thought I might be allowed to throw out the foregoing hints on points on which Geologists speak with the fullest confidence.'*⁶⁴

CREATION AND THE AGE OF THE EARTH

Bugg believed in a literal six-day creation and a global Noachian Flood that produced most of the fossiliferous strata. He clearly believed the Earth was only about 6,000 years old, but he did not discuss the genealogies or the exact age of the Earth.⁶⁵ There is no indication that he was a strict Ussherite.

Though he was absolutely convinced of a recent Creation and global Flood, he was not dogmatic about every point within this view. Besides the cautious geological speculations mentioned above, he was not dogmatic on each of his interpretations of Scripture. For example, he was undecided whether all the matter of the Universe was created at once on the first day of creation and then formed and organised during the six days, or successively created over the course of the first six days.⁶⁶

In defence of this young-Earth view, he gave refutations of the Day-Age Theory of Faber and the Gap Theory favoured by Buckland and Sumner. Bugg argued that the Day-Age Theory is proven false on several counts.

First, in the period prior to the Flood, Cuvier's theory postulated many physical revolutions on the Earth after the creation of plants and animals, whereas the Bible declares only one physical pre-Flood revolution on Day 2 before the creation of plants. Second, the number and arrangement of the fossil remains of the supposed geological revolutions is inconsistent with the order of creation in Genesis. Bugg quoted Faber correctly as saying that the succession of organised fossils in the strata agree with '*the precise order of the Mosaic narrative*'. But Bugg replied that a careful enquirer would see that this was obviously false.⁶⁷ That the order of Genesis 1 did not fit the order of the fossil record was a conclusion also embraced by most old-Earth geologists in the late 1820s.

Bugg believed that the matter of the Sun, Moon and stars was created at the beginning of the first day, but that they only became endowed with luminosity on Day 4. 'Day' is clearly literal in Genesis 1:14, where the heavenly bodies are said to be for the purpose of telling time. But there is no reason to think that 'day' has any other meaning in the rest of the chapter, so the days of creation must be literal.⁶⁸ To the objection that light from distant stars could not have reached Earth in only a few thousand years, Bugg replied that the distance to stars and the nature of the transmission of light were too imperfectly known to overthrow the clear statements of Scripture.⁶⁹ The Day-Age Theory must also be rejected because it makes an absurdity of the Biblical statements about the origin of the Sabbath (Genesis 2:1-3 and Exodus 20:8-11).⁷⁰ To the objection that too much happened on Day 6 for it to be a literal day, Bugg replied that we are too ignorant of how many animals Adam named to say that he could not have done it in a few hours, which, if he did, would have left sufficient time for the other events assigned to that day.⁷¹

Bugg rejected the Gap Theory because, first, its notion of a long series of creation-revolution-creation-revolution-etc. reduced the Biblical account of creation to virtually nothing. His opponents considered the Biblical creation account to be a description only of the preparation of the Earth's surface for the creation of man,⁷² and as such only-related to a thin section of the total geological record, which itself was only a tiny fraction of the whole globe. Furthermore, the sedimentary rock formation which Cuvier attributed to the creation (which was just below the loam, clay, sand and gravel attributed to the Flood) was not in any way a suitable preparation for man. In fact, contended Bugg, on the old-Earth interpretation of the strata, the Flood would have a greater claim to being called a creation than the creation itself, because the geological results of the Flood were more suitable to plants, animals and man than the geological effects with old-Earth proponents attributed to creation week.⁷³

More general objections to both old-Earth interpretations of Genesis included the following. Bugg frequently referred to Exodus 20:11.^{74,75} He argued that since this verse says that 'For in six days the LORD made

the heavens and the Earth, and the sea and all that is in them', it must, especially when taken in conjunction with the second commandment and Moses' commentary on this passage in Deuteronomy 4:15-19, refer to the creation of the whole Universe and all it contained (including man), at the end of the sixth day, and could not refer only to the refurbishing of the surface of the Earth after thousands of ages before man. Also, since in the commandment the six days of God's creation week are linked to a week of literal days, the days of Genesis 1 must be literal. And since they were written directly by the hand of God they come with an added stamp of truth.

Also, several verses expressly connect man with the beginning of creation, not long ages after the beginning (II Peter 3:4, Matthew 24:21, Mark 13:19, Isaiah 45:5, 12, 18).⁷⁶ Buckland said that '*the declaration of Scripture is positive and decisive in asserting the low antiquity of the human race*' in comparison to the rest of the creation.⁷⁷ To this Bugg replied,

*'There is not a word or an intimation given which implies that man is more modern than the animals. If therefore this narrative does not deny a previous state of the earth, and previous races of animals, it does not deny the previous existence of other races of human beings ... If then the Scriptures are positive and decisive, and therefore correct in what they assert respecting the "low antiquity of the human race", they are equally decisive and correct in asserting the low antiquity of animals and fishes of "every race". And, therefore, the vast antiquity of the objects of Geology are fabulous and visionary.'*⁷⁸

Furthermore, wrote Bugg, in Scripture the creation and the destruction of the heavens and the Earth are always presented as occurring synchronously (Psalm 102:25-26, Isaiah 51:6, Revelation 20:11 and Revelation 21:1, Matthew 24:31, Hebrews 1:10-11, and II Peter 3:5-7). Hebrews 11:3 clearly states that the Earth was created out of nothing, not out of the wreck and ruins of a more ancient world, as Buckland asserted.⁷⁹ Bugg argued that the whole notion of a long series of revolutions causing animal extinctions before the creation and Fall of man was contrary to the original perfection of creation as described in Genesis 1:31. He believed on the basis of Genesis 1:29-30 that all the animals and man were originally herbivorous. Some animals became solely carnivores after the Fall and man was permitted to eat meat only after the Flood (Genesis 10:3). Whether the degeneration of animals into carnivorous habits was a result of physical change or simply a change in dietary tastes, he was unsure.⁸⁰

Bugg expressed his conviction many times that the old-Earth theories denigrated the character of God, especially His wisdom, kindness and justice.^{81,82} To the idea of many creations and revolutions before the creation of man, who was to be the lord of creation under God, Bugg objected,

'Where is the philosophy, the wisdom, yea the common sense in building, destroying, and rebuilding the

*mansion many times over, before its Lord is made to occupy it?*⁸³

To Bugg, such an idea was consistent with a Hindu, rather than Christian, concept of God:

*'Hence then, we have arrived at the wanton and wicked notion of the Hindoos, viz, that God has "created and destroyed worlds as if in sport, again and again"!! But will any Christian Divine who regards his Bible, or will any Philosopher who believes that the Almighty works no "superfluous miracles", and does nothing in vain, advocate the absurdity that a wise, just and benevolent Deity has, "numerous" times, wrought miracles, and gone out of his usual way for the sole purpose of destroying whole generations of animals, that he might create others very like them, but yet differing a little from their predecessors!!'*⁸⁴

Bugg also complained that professing Christian old-Earth geologists exhibited a very careless or superficial handling of Scripture, especially Genesis.^{85,86}

Finally, Bugg objected to the old-Earth theories (day-age and gap) because they involved creation by secondary causes, which was really no creation at all. This was because Buckland believed that the successive formations of geological record on the surface of the Earth (that is, from the primary to tertiary) were the result of many violent convulsions subsequent to the original creation, and that these convulsions were produced by secondary causes, superintended by God.⁸⁷ Bugg responded that, since in this old-Earth theory the six-day creation only related to the penultimate revolution, our creation was only part of a series resulting from secondary causes, which philosophers and theologians had always agreed were created causes.

'But to speak of "created causes" producing "creation", is a solecism in language', which 'reduces that creation to the class of second cause productions, and destroys the nature of creation'.

Such a view of creation, he said, was a revisitation of heathen atheistic notions of an infinite series.⁸⁸ Bugg wrote elsewhere about the initial creation of the Earth,

'If our Geologists therefore will reason from all we see and know to what is gone before, they must not and cannot stop at their "first mixture", for in truth there can be no first. Every stratum will come from a fluid mixture, and every fluid mixture from prior strata. So that in spite of all Mr Buckland has said, in his Inaugural Lecture, to rescue modern Geologists from the imputation of holding an "infinite series" of formations, the imputation can never be separated from the inevitable consequences of their doctrine.

This theory, and the reasoning of its authors upon it, imply that every thing we see is the effect of some natural cause, and is also itself the effect of something else which is also natural. Thus the origin of matter is indirectly denied. For if we allow that matter did ever begin to exist, we have no data to assert in what state it commenced its existence.

If a man therefore asserts that he knows from the strata of a primitive rock how that rock was originally formed, that man, if he knows what his assertion implies, means to say that that rock arose from a natural or material cause. For with any other cause of its mode of operation, he has no acquaintance. Then he certainly means that its cause or the mode of its operation is familiar to him. This implies an infinite series, and that there is no cause of formations but this.

*Such an Author ought to know, however he may slight the information, that he is treading upon ground which leads, and not very indirectly, to a denial of the God that made him!*⁸⁹

If the Biblical account of creation is rejected, then we have no account of creation of first formations, Bugg argued, for geologists have given nothing in its place.⁹⁰

Bugg was insistent on arguing from analogy to present-day processes, when discussing post-creation history. In other words, apart from the divine miraculous interventions recorded in the Bible (of which one was the Flood), we should assume the uniformity of secondary causes.^{91,92} But to make creation the result of secondary causes was to confuse creation and providence.

'Here then we find the earth and the sea created immediately by God. We find these earth and sea bringing forth and swarming with life. But the immediate and sole parent of all is God. The fishes are generated without spawn—the fowls without eggs—the vegetables without seed, or "a man to till the ground"—and animals, without progenitors. There is no "second cause". God made them. He made them out of the waters and earth it is true; but who will call these "second causes". They are not causes at all. They are passive materials at most, and themselves just created by Jehovah.

"And God blessed them, saying be fruitful and multiply". Out of this benediction the earth is replenished.⁹³ "Second causes" are henceforth employed by the Almighty. He has formed a creation "whose seed is in itself". And we now know of neither fish, fowl, vegetable, or animal but what springs out of "their kind". Thus animals are generated; and their lives are sustained by food. God also made the "sun to rule the day", at the same time. It so continues. But prior to that arrangement, "second causes" cannot be found in earth or heaven.⁹⁴

Related to this idea of uniformity and miracles we should note that one of Bugg's frequent objections to Cuvier's and Buckland's theory was that to explain the fossil record they postulated a new creation of plants and animals after each revolution. Bugg found it extremely contradictory and unphilosophical that, in rejecting the Biblical account of a miraculous creation and miracle-attending Flood, these old-Earth geologists continually, though vaguely, invoked unknown and unspecified

miracles to explain their revolutions and creations, while all the time insisting on explaining everything by natural causes. Cuvier's whole argument about revolutions and different epochs was based on a view of species that allowed for very little biological variation, so that most fossil creatures must be extinct species unrelated to existing ones. In contrast, Bugg believed (as indicated in the above quotation), in the fixity of the original 'kinds', but that great variation in size, shape, colour, habits, diet, hairiness, etc. could be produced by natural causes such as climate change, population isolation and different food supplies.^{95,96} Such variation would be adequate to explain the relatively slight differences between existing species and their fossil counterparts. He succinctly summarised his view to the *Christian Observer* this way:

*'The only difficulty which needs to be admitted is, the comparatively slight variations in the animal creation, between the fossil remains and the existing species; variations which surely it is no way unnatural to believe Divine Providence may have effected, by natural causes, in several thousand years. This, however, modern geologists deny; and have therefore invented their present theory. But the theory almost instantly runs into the very difficulty it is constructed to escape; namely, a deviation from the ordinary course of nature.'*⁹⁷

Bugg did not believe there had been any extinction of the original kinds before or as a result of the Flood. And he doubted whether there had been any since the Flood, because to conclude this man must certainly know about all the plants and animals now on the Earth, and must certainly know that existing races did not arise from the fossil ones. But Bugg contended, man did not have such knowledge.⁹⁸ Furthermore, the notions of 'genera' and 'species' were human categories, and man had as yet insufficient knowledge to say whether his boundaries of classification were the same as the boundaries of nature. Certainly, the diversity of human races descended from Noah demonstrated how much variety there could be in a species.⁹⁹ Bugg also cited Cuvier's own statements about the variety of foxes in polar and tropical climates, all belonging to the same species.¹⁰⁰

THE FLOOD

Bugg argued from Scripture that the Flood waters advanced to their full height above the mountains in 40 days and then receded over the next 273 days, thereby rising seven times faster than they abated. Therefore the initial stages of the Flood would have been very violent. The waters came from the torrential rains and the 'fountains of the great deep', which he took to mean underground water, just as exists today.¹⁰¹ He did not believe that the Flood significantly rearranged the continents or mountain ranges,¹⁰² though it did damage the mountains and deposit the 'secondary formations', by which he meant everything

not 'primitive', except for post-diluvial formations of recent occurrence.¹⁰³

Bugg contended that the geologists dismissed the Flood as the cause of most of the geological record, because they failed to seriously take into account the violent nature of the Flood, especially the breaking up of the fountains of the deep, a worldwide aqueous and volcanic process, accompanied by earthquakes which elevated and shattered the crust over the subterranean waters (he never did clearly explain how such violent action could leave the continents and mountains basically in their antediluvian arrangement).

'From these irruptive fountains and descending cataracts of water we may, without fancy or theoretical pretensions, contemplate a scene most awful and tremendous. The waters would instantly, and from all quarters, descend to the low grounds. For we have no reason to suppose that gravity was suspended. These, meeting with waters boiling up from beneath the earth, would disturb each other, and form commotions. The diluvium, of whatever it might consist, whether of fragments of rocks, of soil and vegetables from the hills, and the loose or solid earth which the bursting forth of the waters would urge from beneath, would mingle and form unknown compounds. Stones and detritus, and whatever else might come in the way, would be dashed about, and rolled backwards and forwards in proportion to the impetuosity of the commotions occasioned by the issuing and falling waters.'

*The amount of the wreck, or the extent to which the hilly contents would be mixed with those in the valleys, or from beneath, cannot be calculated. Nor can we say to what distances either laterally, longitudinally, or perpendicularly, any current formed by the issuing waters, under particular circumstances, might advance. Nor can we conjecture how great a quantity of rocks, stones, mud detritus, small pebbles, or shells, such a mass of spouting waters, rushing with irresistible impetuosity, might force upon contiguous eminences, or deposit in the neighbouring hollows.'*¹⁰⁴

As the waters rose and conquered the land they would have become less violent. The retiring waters, abating at one seventh the speed back into underground cavities, would have been less violent than the rising waters. In Bugg's view, such a year-long catastrophe would have produced far more than just the diluvial detritus assigned to it by Cuvier and Buckland.¹⁰⁵

Bugg said that although the laws of nature (for example, gravity, aqueous erosion and transport, sedimentation, behaviour of volcanoes, etc.) continued during the Flood, it was not a strictly natural event in the normal course of nature, as the old-Earth geologists conceived it. The Biblical text, Bugg believed, indicated that it was attended by some miracles, such as the collection of wild and tame animals for Noah, the breaking open of the fountains of the deep, the preservation and landing of the Ark on a mountain instead of in a valley, and possibly the creation

of new vegetation to recover the Earth after the Flood.¹⁰⁶

While he often expressed his caution in his geological speculations, he was convinced that, and attempted to explain generally how, the character of the Flood, which he inferred from the Biblical account, would have produced most of the present physical features of the Earth's surface, namely, both its regularity and irregularity of rock formations, the mixtures of mineral types, the distinct stratification, the denudation of valleys, the formation of lakes, gorges, basins and barriers, the faults, dips and inclinations of the strata, the diluvial islands and trap rocks, and the fissures and fractures of the strata. Furthermore, he argued that Cuvier's and Buckland's theory of a number of revolutions during untold ages could not explain these features.¹⁰⁷

Likewise, Bugg believed that the nature of the Flood explained the fossil record, whereas Cuvier's theory did not. For example, the Flood would be expected to have buried plants at all levels and to mix together land and marine animals, and he cited evidence that this was the case.¹⁰⁸ He also quoted evidence from Jameson's appended notes to Cuvier's **Theory of the Earth** and Buckland's report of a recent discovery (in 1826) of an opossum found in the lower oolite, well below the level it should have appeared according to Cuvier's theory. Added to this was evidence from Conybeare, Phillips, and Jameson showing that supposedly extinct shellfish and land animals were mixed in recent deposits with the remains of existing species, in contradiction to Cuvier's theory, but just exactly as the Flood would be expected to produce.¹⁰⁹

ON HUMAN FOSSILS

The old-Earth geologists all agreed that human fossils had never been found except in what they considered to be post-Flood deposits. This then was stated to be positive proof that there had been many ages of creations and revolutions before man's creation. Bugg contested, however, that the absence of human fossils in a formation did not prove the non-existence of man at the time of the creatures found in the formation. This was because the bones of **all** creatures that the old-Earth theory said were contemporary were never found buried together, and the bones of modern animals contemporary with man were not only found in the alluvial formations where man was said to be found.

Bugg also asserted there was evidence of fossil man in the lower strata, but that Cuvier and other geologists had unjustifiably dismissed the evidence (of which he cited a few examples) because it militated against their theory.¹¹⁰¹¹¹ In Bugg's mind, the best example of this rejection of evidence was the human fossil of Guadaloupe.

Cuvier, Jameson and other geologists considered the rocks in which this fossil man was found to be a modern formation resulting from the slow daily process of encrustation performed by the sea. Like Cuvier and most

geologists, Bugg had not been to Guadaloupe but based his interpretation on an analysis of the published descriptions of others. *'After very long and very laborious consideration of this subject'*, Bugg rejected Cuvier's old-Earth interpretation in a 30 page discussion largely involving a detailed analysis of Konig's article on the fossil.¹¹²¹¹³ He argued that the nature of the enclosing limestone and the particular location and situation of the various bones (as described by Konig) completely excluded the notion of gradual sea encrustation in very recent times. Instead, the evidence strongly indicated that the skeleton was transported in a mass of tenacious, calcareous mud caused by the Noachian Flood, not the modern sea. After it became stationary, Bugg reasoned, the parts now missing were likely torn off by stones or tree branches floating over the skeleton. Bugg concluded that the Guadaloupe fossil did not support the old-Earth catastrophist theory, but corresponded with the expected results of the Flood, and that *'we have every right to suppose it to be as genuine and as ancient a fossil as any shell or bone in existence.'*¹¹⁴

HIS ARGUMENT AGAINST CUVIER

Since, at the time Bugg wrote, Cuvier's catastrophist theory of the Earth was dominant in geology, this is what he primarily criticised. Bugg argued that there were two propositions that needed to be proved in order for that theory of long ages of multiple revolutions to stand. First, *'the physical operations in the strata which the assumed revolutions involve, must be consistent with "physical and chemical science".'* Second, *'the evidence of these revolutions arising from the strata and fossil remains, must be so regular, consistent, and uniform, as to admit of no reasonable objection.'*¹¹⁵

Before proceeding to analyse these propositions, Bugg insisted that we need to follow three rules in judging the evidence brought forward in favour of Cuvier's theory. First, to make generalisations from the strata about certain epochs of Earth history, the strata must be distinct in character, be regularly and uniformly ordered with respect to the accompanying strata, and be general in extent in order to prove general revolutions. Second, if certain fossil species or genera are to prove the theory of the succession of different life-forms in different epochs, then they must be universally distributed,¹¹⁶ exclusive to the strata where they are found,¹¹⁷ successive in the order of appearance¹¹⁸ and non-recurrent.¹¹⁹

The final axiom, said Bugg, for evaluating the favourability of the evidence to Cuvier's theory pertained to the mode of ascertaining the evidence: obviously, it was actual inspection and examination. Since no strata could be exhaustively examined in minute detail to determine what fossils it did and did not contain, probability was the best that the theory could hope to attain. But to attain a sufficiently high probability to vindicate the truthfulness of the theory, said Bugg, the area examined

must have three characteristics.

*It must appear 1) that a space sufficiently large has been examined, to warrant a probable opinion respecting the rest, 2) that the parts examined, correspond with the rest of the strata, so as to make them a fair specimen of the whole, and 3) that those parts accurately exhibit such phenomena, and such only as the Theory requires... For if the specimen by which we determine the rest, be itself refractory, how absurd to suppose that a general correct theory can be proved by an erroneous specimen.*¹²⁰

Bugg devoted nearly one hundred pages of Volume I¹²¹ to attempting to show, from the geologists' (mainly Cuvier's and Jameson's) own description of the geological facts, that Cuvier's **Theory of the Earth** failed the above test fatally.

As regards the space examined, Cuvier based his theory almost completely on his and Brongniart's investigations of the fossils and strata of the Paris Basin.¹²² By comparing the surface area of the Paris Basin to that of the whole Earth, Bugg calculated that Cuvier had only examined one twenty-thousandth of the Earth — hardly sufficient, he said, to erect a theory of the whole Earth. But then by comparing the depth of the Paris formation in comparison to the total stratigraphic record, Bugg concluded that Cuvier could have been familiar with only one twenty-millionth of the fossiliferous strata of the globe — again, objected Bugg, woefully inadequate as a basis for a global theory. Additionally, the Paris formation contained strata only above the chalk (that is, in the tertiary formation) and so was not a fair representative specimen of the strata in general. Finally, as Bugg noted from the writings of geologists, in comparison to other studied basins above the chalk (that is, under London and on the Isle of Wight off the south coast of England), the strata of the Paris Basin did not agree in the number of strata or their mineralogical content (for example, Paris did not have the London clay, London lacked the Paris coarse limestone, and both London and the Isle of Wight were void of the Paris gypsum.) Therefore, Bugg concluded, the Paris Basin absolutely fails as a specimen on which to build a general theory of the Earth.¹²³

Next, Bugg turned his attention to the fossil shells in the strata. He reminded his readers that Cuvier's essential principle in his theory was that the species and genera change with the strata (that is, the animal nature changed with the chemical nature of the depositing fluid), so that species and genera gradually disappeared or became increasingly similar to living species, as one moves up through the strata from the most ancient to the most recent. Accurately quoting Jameson from the appendix to Cuvier's Theory, Bugg then argued this to be contrary to the geological facts. For example, two different mineralogical formations, the London clay and the Paris limestone, contained the same fossils. The four different fossiliferous strata of the Transition formation, the lowest such strata in

the geological record, in general all contained (in intermixed fashion) the same fossil species, which were very similar to living tropical species. He also quoted the article on 'Organic Remains' from the Edinburgh Encyclopaedia¹²⁴ to the effect that many fossils appeared throughout many of the strata, and that formations of the same mineralogical content in different places had different fossils. Finally, he quoted from Cuvier himself that the same species occurred in different strata, that many strata contained a mixture of land and sea creatures, and that shellfish species could not indicate more than one revolution because the slightest change in the chemistry or temperature of the water could change the species, and there was at the time still a great ignorance of testaceous animals and fishes. These facts, Bugg charged, were fatal to Cuvier's theory. He believed this was precisely the reason that Cuvier abandoned shellfish as indicators of Earth history and instead focused on fossil quadrupeds as the basis of his theory.¹²⁵

Cuvier said that his whole theory depended on his ability to accurately identify and then to reconstruct a species of quadruped on the basis of a single fragment of bone.¹²⁶ But Bugg contested that even in Cuvier's own field of expertise he displayed the most fallacious reasoning. For example, Cuvier believed that carnivores would have the intestines to digest the flesh, the jaws to devour their prey, the claws to seize and rip it, the teeth to cut and divide the flesh, the limbs for pursuing the prey, etc.¹²⁷ But, said Bugg, even a child knows that carnivorous dogs, wolves and hyaenas have no such claws. Cuvier said that a cloven hoof footprint would be proof positive that the animal to which it belonged was a ruminant.¹²⁸ But Bugg cited Moses (Leviticus 11:7) to remind his readers that pigs divide the hoof but do not chew the cud. He seriously questioned therefore why anyone should reject the Biblical history to accept Cuvier's theory of revolutions in Earth history, based on extinctions which he had inferred from his fossil reconstructions.¹²⁹ Very similar criticisms of Cuvier on this matter of species reconstruction (even of a ruminant) from a single bone were made by John Fleming, an old-Earth proponent and prominent Scottish zoologist. Like Bugg, Fleming cited the example of a pig to contest Cuvier's 'silly gasconading'.^{130,131}

Bugg rejected Cuvier's argument for extinctions, because of the imprecise definition of a species, the lack of knowledge of the whole world to declare positively an extinction, and Cuvier's too limited view of variation within the created kinds. He concluded his discussion as follows:

'From all we have seen of the change in animals since the Deluge, it seems impossible that M. Cuvier can prove that a great portion of the fossil bones of animals which he has examined and pronounced extinct, might not vary so much as those vary from the bones of existing animals, by climate, food, and change of place, in the course of four or five thousand years. But upon the proof of this point the whole system hangs.

Again. Analogy even from M. Cuvier's own pen is against himself. We remember with respect to **fishes**, how he stated that the species might easily be driven away, or even **changed**, only by the "temperature" of the water. What then should hinder the extreme variation of heat and cold on **land &c.** from producing the same effect?

But even were the globe to be drowned now, not the least evidence from analogy could be derived to M. Cuvier's system. For we find **different** animals in almost every country. Were **these** then to be imbedded where they are, it would be the highest possible absurdity, for any naturalist, who should examine a small space, like the Paris stone quarries, for instance, to pronounce upon the state of the globe from such a **specimen**.¹³²

Continuing on, Bugg presented evidence, again largely from Cuvier's and Jameson's own statements, that the fossil quadrupeds in fact were not situated in the strata in a way that supported the notion of successive revolutions. First, he argued that the strata of the Paris Basin were not distinct and well defined by Cuvier; that he often spoke in ambiguous terms about where the extinct genera, extinct species and existing species were found. Nor were the strata regular in their situation relative to other strata, and uniform or homogeneous in their composition. Neither were they all extensive enough to warrant the generalisations made. Finally, species were not always confined to one particular formation. Bugg argued that the evidence proved the strata of the Paris Basin to have been of contemporaneous formation.¹³³

Regarding the fossils, Cuvier's theory required that extinct genera were lower in the strata than extinct species, which were in turn lower than existing species, and that these three kinds of fossils (extinct genera, extinct species and existing species) were never intermixed.¹³⁴ Bugg argued that even one example would be fatal to this theory.¹³⁵ He cited Jameson's comments about an existing species of roe which had been found with an ancient genera (the palaeotheria) in limestone near Orleans, France.¹³⁶ Jameson said that Cuvier explained this anomaly by suggesting that the exact species of roe maybe is only discernible from parts that had not been discovered. Bugg replied,

*'It is quite clear that this explanation is equally ruinous to modern Geology, with the fact itself. For if this roe cannot be distinguished by the parts which have been discovered, the very pretence of all M. Cuvier's science — to discover a genus or distinguish a species by half a bone — is absurd; and he had no more claim to regard on the assumption of anatomical knowledge, than other men.'*¹³⁷

Bugg then spent the next 15 pages documenting, often from Cuvier's and Jameson's writings, other examples of extinct species or genera intermixed with the fossil remains of existing species, all quite contrary to Cuvier's theory.¹³⁸

Finally, in his attempt to expose the contradictions and fatal weaknesses of Cuvier's theory, Bugg recorded Cuvier's own admissions of his ignorance about the stratigraphic locations where his Paris fossils had been found and even the correct species identification of the fossils, the two critical factors on which his theory of successive epochs was built (see endnote for Cuvier's revealing statement).¹³⁹ After several long quotations from Cuvier, Bugg vehemently objected, using some of Cuvier's own words:

*'This "Theory" then, which is to establish a new philosophy and change the faith of Christians, is built upon "vague and ambiguous accounts", not on knowledge "personally" acquired, respecting the situation of "fossil remains", but on the information of persons ignorant of the subject, and "still more frequently" upon no "information whatever"!!!!'*¹⁴⁰

That Bugg did not grossly misunderstand and was not totally unjustified in his criticism may perhaps be indicated by Cuvier's opening remarks in the preface to his 1831 revision of his theory:

'The first edition of this work, published in 1812, is nothing more than a collection of Memoirs published successively by the Author . . . From this mode of publication, many of the chapters remained incomplete, others had been composed of various fragments written at different times and in contradiction with each other. It was not possible to arrange them all in a order sufficiently methodical'.

So, in summary of Bugg's argument against Cuvier, he contended that the area and depth of geological phenomena upon which Cuvier based his theory was too incredibly tiny to justify the grand generalisations about Earth history, which completely subverted the 'plain teaching of Scripture'. Furthermore, Cuvier's own admissions of ignorance about critical details related to the strata and fossils, which he did investigate, made his theoretical inferences exceedingly suspect, in Bugg's mind. Also, even in Cuvier's own book with Jameson's lengthy endnotes, Bugg saw abundant evidence of the complete fallacy of the theory: geological facts that refuted the theory, contradictions, and extremely faulty logic.¹⁴¹ That Bugg did not grossly misunderstand and was not totally unjustified in his criticism may perhaps be indicated by Cuvier's opening remarks in the preface to his 1831 revision of his theory:

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Finally, Bugg contended that Cuvier invoked many miracles to explain revolutions and creations of the past,

without any basis in Scriptural revelation, while at the same time insisting on referring everything to the laws of nature.

An analysis of several chapters in Volume II would reveal that Bugg had very similar arguments against Buckland's interpretations of the fossils found in limestone caves, such as the famous one at Kirkdale.¹⁴³ In both cases, Bugg concluded that although Cuvier and Buckland attempted, with apparent sincerity, to defend the Flood, they in actuality did the opposite: by limiting its effects to a relatively insignificant part of the geological record, they denied it.

Bugg's book was totally ignored by the geologists at the time, particularly the clerical geologists, such as Buckland, Sedgwick and Conybeare. His critics in the non-scientific journals were apparently all non-geologists.¹⁴⁴⁻¹⁴⁷ The only 'review' I could find in the scientific journals was a brief statement by 'R.C.T.'¹⁴⁸ to a reader, who as '*an Admirer of Buckland*' was concerned about the impact of Bugg's book and wanted a geologist's response. Taylor declined to present any refutation because '*it was wasting words and time to combat with ignorance and prejudice*'.¹⁴⁹

A number of facts raise doubts, however, whether this was the real reason for Taylor's lack of critique. First, Bugg was making a Biblical response to Buckland's and Cuvier's theories which openly purported to defend the Biblical Flood and recent creation of man. Second, several prominent old-Earth proponents were criticising Cuvier's theory, sometimes with very similar arguments to Bugg's. For example, Constant Prevost, a leading French geologist, had opposed Cuvier's interpretation of the Paris Basin since as early as 1809. Prevost argued that the marine and freshwater fossils did not depict a succession of alternating environments, but rather contemporaneous lateral deposits in a river-fed saltwater gulf.¹⁵⁰ Phillips argued that Cuvier's theoretical conclusions only applied to limited districts, not to the whole Earth.¹⁵¹

Also, Charles Lyell favoured many of Prevost's interpretations of the Paris Basin, and assigned the whole basin to one great epoch. He used some of the same objections to Cuvier's theory that Bugg raised:-

- (1) the lowest formation of strata attributed by Cuvier to be a freshwater deposit '*is not only of very partial extent, but is by no means restricted to a fixed place in the series*',
- (2) in the great coarse limestone formation marine, terrestrial and freshwater shellfish species were mingled together,
- (3) in the gypsum and marl formations the strata repeatedly alternated with a limestone, which in Cuvier's reckoning was placed below them, and
- (4) shells of the various freshwater formations from the lowest to the uppermost strata were virtually all the same species.¹⁵²

William Whewell, a very prominent old-Earth scientist and leading historian/philosopher of science, agreed with

Bugg, probably unknowingly, when he wrote in 1837,

*'We know that serious errors were incurred by the attempts made to identify the tertiary strata of other countries with those first studied in the Paris Basin. Fancied points of resemblance, Mr Lyell observes, were magnified into undue importance, and essential differences in mineral character and organic contents were slurred over.'*¹⁵³

Fleming was also quite critical of Cuvier's theory. The old-Earth evangelical zoologist, John Fleming, was also quite critical in his review of the 1822 English edition of Cuvier's **Theory of the Earth**,¹⁵⁴ he argued that Cuvier revealed a great ignorance of geological facts. Like Bugg, Fleming pointed out that Cuvier's and Jameson's stated facts about the location of fossil shells in the Paris Basin contradicted Cuvier's theory about the fossils changing with the strata. Like Bugg, he also considered Cuvier's conclusions to be far too general given the skimpiness of the quadruped fossil evidence. Finally, like Bugg, Fleming felt that the area of Paris Basin was far too small to justly and safely erect a theory of the whole Earth.

So then Bugg did make some very substantive scientific criticisms of Cuvier's theory, contrary to the conclusion drawn by the **Christian Observer** that

*'all the scientific journals hold the same language, plainly stating, that the reason they do not answer Mr Bugg's book, is, that there is nothing in it to answer; nothing really tangible and solid.'*¹⁵⁵

CONCLUSION

Bugg was not opposed to the study of geology. For the most part he accepted the geological facts as he argued against old-Earth interpretations of those facts. Though he agreed with his opponents that the Bible was not a science textbook, Bugg was convinced that, since it was the infallible Word of God, it provided a general framework for interpreting geological phenomena and reconstructing Earth history, and that within this outline of a recent creation and global Flood (which he believed had produced most of the geological record) there was plenty of latitude for speculation about the details. By focusing on accepted geological facts and what appeared to him to be the old-Earth geologists' logical contradictions, unproven assumptions (for example, about the extent of variation within species), and invocation of unwarranted miracles (that is, multiple creations), Bugg attempted to convince his readers that the old-Earth catastrophist theory was fatally flawed. He engaged in this controversy, because he firmly believed that the authority and sound interpretation of the whole Bible, the Gospel, and the spiritual and moral future of the nation would be undermined and the character of God slandered by the old-Earth theory, regardless of the intention of its authors and defenders.

Bugg clearly stated that he engaged in this debate

because of his love for the truth.¹⁵⁶ He perceived there was a battle going on. But it was not science against religion. He had no antipathy to the pursuit of knowledge about the physical creation by the method of experimentation and observation. Rather, he saw it as a battle between the Christian faith and ancient heathen, atheistic ideas, which were being revived primarily by continental philosophers and were penetrating the Church.¹⁵⁷¹⁵⁸ This battle was really only a part of a long-standing strategy of Satan to undermine faith in the inspiration and infallible truth of Scripture, a battle especially intense in the minds of the young men training for ministry at British universities.¹⁵⁹¹⁶⁰

Bugg further argued that the old-Earth theory reduced the creation and Flood to very insignificant events (contrary to the Biblical description), making them part of an indefinite series.¹⁶¹ By ignoring and in effect rejecting the Fourth Commandment in Exodus 20:8-11 in order to introduce immense time into Genesis 1, old-Earth proponents were also introducing a dangerous mysticism into Bible interpretation. The Mosaic narrative professed to be history, said Bugg, and to take it figuratively opens the rest of Scripture to such non-literal interpretation. Out the window then would go the doctrines of the temptation, the Fall, and the redemption of man, thereby destroying the Gospel. Gone too would be the basis for keeping the Sabbath and worshipping the Creator, as well as obeying the rest of the Ten Commandments. Missions to the Hindus would also be undermined since their own view of Earth history meshed with the old-Earth geological view of many revolutions over millions of years; so they would not want to convert to belief in a book which they deemed less reliable than their own.¹⁶²¹⁶³

Bugg was a bold preacher and contended firmly for what he believed all his life. As a relatively poor minister in various rather insignificant parishes, the income from good sales of the book would have been helpful. But he could not have predicted sales for such a large work that took several years to write. There is no evidence that he was driven by a desire for money. On the contrary, two of his books¹⁶⁴¹⁶⁵ show that he was willing to suffer financial hardship (and did) in order to be faithful to the Scriptures. Also, it is very doubtful that he would think that the harsh tone of his book would advance his ecclesiastical career, which in any case he had demonstrated he was willing to risk for the sake of his Biblical convictions. His attempted defence of the Gospel in his works on baptism and regeneration in opposition to the views of some leading clergymen, his efforts with other ministers to influence a change in the laws regarding the arbitrary dismissal of curates, his battle with an unspecified, but very debilitating illness,¹⁶⁶ the fact that he wrote the book in the face of expected opposition, and his own statement about being tolerant of other's views on 'non-essential' but uncompromising on 'fundamental doctrines'¹⁶⁷ (which he considered Genesis to involve), all would seem to indicate

that this passion for truth, especially the truth of Scripture, was indeed his primary motivation for writing on geology.

REFERENCES

1. Unless otherwise indicated, this is based on the most extensive biographical material I could find:
Dunhill, R., 1983-1984. The Rev. George Bugg: the fortunes of a 19th century curate. *Northamptonshire Past and Present*, VIII(1): 41-50.
2. During the years 1818 to 1831 he apparently lived in Lutterworth, though what he did with his time and how he maintained himself is unclear. He made some attempts to appeal his dismissal, but his Christian principles prevented him from going so far as to bring a case to court. See: Dunhill, Ref. 1, p. 46. During the first half of these years he clearly spent time reading, thinking and writing about geology in preparation for the publication of his two-volume work in 1826-1827.
3. Both servants were girls and were 18 and 19 years old respectively at the time of Bugg's death, according to the 1851 Census return for Hull.
4. In addition to Dunhill, Ref. 1, see also:
Venn, J. A., 1940. *Alumni Canabrigiensis*, 1:437.
5. Bugg, G., 1843, *The Key to Modern Controversy*, p. x.
Here in 1843 as he refuted Pusey's tractarian views of baptismal regeneration, he said that he had had more than 50 years of experiencing the life-changing effects of spiritual regeneration through repentance and faith in Christ.
6. Bugg, G., 1827. *Scriptural Geology*, 11:351.
Here he wrote, '[I have] lived nearly forty years under the full and firm belief that the Scriptures are strictly and literally true'. He was probably referring to his conversion.
7. Bugg, G., 1816. *Spiritual Regeneration, not necessarily connected with Baptism*.
Bugg, G., 1843. *The Key to Modern Controversy, or the Baptismal Regeneration of the Established Church explained and justified*. Bugg's doctrine seems to me to be the same in both books. He had a very polemical style, though in the first he explicitly said that he was not attacking Mant personally, but only his erroneous doctrine (vi-vii, p. 171). On the other hand, in the second book Bugg considered Pusey to be a Romanist in disguise and a false prophet in the Anglican Church, pp. vii-xi.
8. Toon, P., 1979. *Evangelical Theory 1833-1856: A Response to Tractarianism*.
9. Bugg was also respectful in his response to a fellow Anglican, Rev. J. Cunningham, who in Bugg's view misrepresented both the debate and the debaters on baptism, Bugg and Mant. See:
Bugg, G., 1816. *Friendly Remarks on the Rev. J. W. Cunningham's Conciliatory Suggestions on the Subject of Regeneration*.
10. Bugg, G., 1820. *Hard Measures*.
This is where Bugg published his account of these dismissals.
11. Bugg, Ref. 10. Bugg recounted these dismissals with thorough documentation here, and his assessment of his dismissals received confirmation from *The Curate's Appeal*, 1819. See text following at and in footnote 14.
12. Bugg, Ref. 10, pp. 29, 37.
13. Bugg, G., 1819. *Appeal to Truth*, title page.
14. This was a very significant sum: in today's money about £16,000 or US\$28,000.
15. *The Curate's Appeal to the Equity and Christian Principles of the British Legislature, the Bishops, the clergy, and the Public on the peculiar hardships of their situation; and on the dangers resulting in religion, to morals, and to the community from the Arbitrary Nature of the Laws, as they are now frequently enforced against them*, 1819.
This 177-page book went through a second edition the same year and a third appeared in 1820. It was penned 'under the direction of a committee of clergymen, and is approved and sanctioned by an

- increasingly numerous body of divines, both incumbents and curates, but especially the former' (from the preface, p. iii). Though most library catalogues list it as Bugg's work, Bugg clearly indicated in **Hard Measures**, 1820, p. 42, that it was written by others, who were fully acquainted with, and referred to, his cases of dismissal.
16. Robert, M. B., 1986. The roots of creationism. **Faith and Thought**. 112(1):28.
From personal conversation with Roberts on 15 December 1995, it is clear that he was led astray by the fact that a pamphlet entitled **Four Letters from a Unity Man**, 1847, is listed in leading library catalogues with the other works by Rev. George Bugg. However, Roberts overlooked the fact that the anti-Trinitarian author of these letters, also George Bugg, was a farmer from Horbling, a town in which Rev. George Bugg never lived.
 17. Bugg, G., 1826. **Scriptural Geology**, 1:78-79.
He wrote, 'And it has ever been considered perfectly conclusive in proof of the *divinity* of Christ to shew that He was *the* Creator, the first *cause* of all things. It is not my intention in this place to shew what *Socinians* will be ready enough to urge against the "orthodox" faith, viz. that, according to this notion of 'second causes' operating in *Creation*, even *Christ* might be employed in *Creation*, and yet after all be himself only a *created Being*'. This statement could be clearer if it is to be taken as anti-Socinian, but given all the other evidence of his orthodoxy, we must give the benefit of the doubt to the author. The statement below is unambiguously anti-Socinian.
In volume II (p. 333) he added, 'If the history of *Moses* be a figure, what are we to say of his *doctrines*? What dependence can we place on the record respecting the temptation—the fall,—and even the redemption of man, as intimated by the woman's seed? Will not these *doctrines* stand in danger of being proved *figurative* also? And will not *Socinians* gain an unanswerable argument in favour of their errors? and will they not have some pretence for turning the "mysteries of our holy religion" into Eastern metaphors [sic], into historical figures, or poetical fictions!!'
 18. Bugg, G., 1817. **The Country Pastor**.
 19. Bugg, G., 1835. **Plain Statement of an Unusual Case of Prosecutions, Biggs v Bugg**.
The problems with Mr Biggs were solved out of court, and Bugg does not appear to have been guilty of any wrong-doing in the handling of the money for Mrs Biggs. See: Dunhill, Ref. 1, pp. 47-48.
 20. **The Book of Common Prayer: its baptismal offices, catechism, and other services explained and justified, in an address to the churchmen of Kettering and its neighbourhood**, 1840.
The work does not bear his name, but it is attributed to Bugg by the Northampton Central Library.
 21. **Christian Observer**, 28:235-244 (1828). I could discover no reason why his book itself did not identify him as the author.
 22. Overton, J. H., 1894. **The English Church in the Nineteenth Century: 1800-1833**, London, pp. 52, 81, 86-87.
 23. Dunhill, Ref. 1, p. 42.
 24. Bugg, Ref. 16, pp. 126, 173, and many other places.
 25. Bugg, Ref. 6, pp. 352-353. He remarked on the infallibility of Scripture several other times (pp. 20, 272, 351). In all quotations, the emphasis is in the original.
 26. Bugg, Ref. 6, p. 99.
 27. Bugg, Ref. 6, p. 348.
 28. Ref. 20, pp. 430-431.
 29. Bugg, Ref. 6, p. 349.
 30. Bugg, Ref. 17, p. 129.
 31. Bugg, Ref. 6, pp. 39-41.
 32. Bugg, Ref. 6, pp. 47-48.
 33. Bugg, Ref. 6, p. 57.
 34. Bugg, Ref. 6, pp. 82-83.
 35. Bugg, Ref. 17, p. xii.
 36. He cited no writings by Copernicus or others to support this view.
 37. Ref. 20, p. 237.
 38. Bugg, Ref. 17, pp. xii-xiv.
 39. Bugg, Ref. 17, p. 10.
Quarterly Review, XXIX:142-143 (April 1823).
Bugg did not just blindly assume the infallibility of the Scriptures.
 - Like most evangelical and high churchmen of the day, he believed there were compelling historical, archaeological, philological, Biblical and experiential reasons for holding this view of Scripture.
 40. Bugg, Ref. 17, p. 132.
 41. Bugg, Ref. 6, p. 12.
 42. Bugg, Ref. 6, p. 18.
 43. Bugg, Ref. 6, p. 351.
 44. Ref. 20, p. 237.
 45. Bugg, Ref. 6, p. 118.
 46. Bugg, Ref. 6, p. 270.
In a passing comment Bugg agreed with Gisborne's argument that the Earth and fossil remains provided evidence of the punitive nature of the Flood. This aspect of Gisborne's view will be discussed later in the paper in this series devoted to him.
 47. Bugg, Ref. 6, p. 323. Bugg considered Penn to be 'truly learned and very respectable' (Ref. 16, p. 134) and he had a 'very high opinion generally' of Penn's philosophical discussions and refutation of Faber's Day-Age Theory (Ref. 6, p. 323). Though he rejected Catcott's idea that the Earth's surface had been dissolved at the Flood, he said Catcott's theory was not one quarter as 'absurd and preposterous' as the old-Earth geological theories of the early 1800s (Ref. 6, p. 326).
 48. Ref. 20, p. 312.
 49. Ref. 20, p. 647.
 50. Ref. 20, p. 433.
 51. Bugg, Ref. 17, pp. xii, 17, 204.
 52. Bugg, Ref. 6, pp. 307, 322, 330, 352.
 53. Bugg, Ref. 6, p. 321.
 54. Bugg, Ref. 17, p. 56. The **Christian Observer**, though at this time not absolutely convinced of the Day-Age or Gap Theory, was clearly leaning toward the latter and did not like Bugg's strong criticisms of Buckland and Cuvier. From 1827 to 1829 it published a number of letters to the editor by Bugg and his anonymous opponents, none of whom gave any indication of being geologists.
 55. Ref. 20, p. 242.
 56. Bugg, Ref. 6, p. 330. Regarding not questioning Buckland's motives, see also Ref. 20, p. 433.
 57. Bugg, Ref. 17, pp. 78, 83.
 58. For example, see **Christian Observer**, 27:738-740 (1827).
 59. Ref. 20, pp. 237-238. Similar remarks appear in:
Bugg, Ref. 17, pp. 6-7 and
Bugg, Ref. 6, pp. 304-305.
 60. Ref. 20, pp. 308-309.
 61. Ref. 20, p. 242.
Several times Bugg complained that the geologists merely assumed their theory was correct in spite of contrary geological evidence:
Bugg, Ref. 17, pp. 259, 272 and
Bugg, Ref. 6, p. 311.
 62. This is seen throughout his work, but especially clearly in his section on the Guadalupe fossil man. See:
Bugg, Ref. 17, pp. 282-312.
 63. Bugg, Ref. 6, pp. 99, 107, 128, 247, 287.
 64. Bugg, Ref. 6, p. 291.
 65. Bugg, Ref. 6, pp. 308-315, 332.
 66. Bugg, Ref. 17, pp. 117-118.
 67. Bugg, Ref. 17, pp. 48-59.
 68. Bugg, Ref. 17, pp. 134-137.
 69. Bugg, Ref. 17, pp. 115-116.
 70. Bugg, Ref. 17, pp. 150-151.
 71. Bugg, Ref. 17, pp. 151-152.
He also objected to what he considered to be the atheistic notion that Adam was a barbarian and that man has since advanced in perfection. Instead, Adam was created perfect with extensive wisdom, by which he named the animals, and man and the rest of nature with him have degenerated since the Fall. See also Bugg, Ref. 6, pp. 315-316.
 72. Buckland's words, correctly quoted by Bugg, were that '*Moses confines the detail of his history to the preparation of this globe for the reception of the human race*'. See:
Buckland, W., 1820. **Vindiciae Geologicae**, p. 24.
A few years later John Phillips remarked similarly, '*The historic records of man's residence on the earth are, for most parts of the globe, utterly*

incomplete; so that, but for the Jewish Scriptures and other documents of eastern nations, we should be in danger of attributing to the human race an origin too recent by thousands of years. Now, as all historic records end, for each country, with the surface, — terminate at some point of man's history posterior to the preparation of that tract for his residence, we see how far more ancient than the historic date of the human race is the series of productions which lie below the surface'.
See:

Phillips, J., 1837. Treatise on Geology, 1:10.

73. Bugg, Ref. 17, pp. 26-29, 60-68.
74. Bugg, Ref. 17, pp. 29, 62, 103-107.
Bugg, Ref. 6, p. 307.
75. Ref. 20, pp. 239-240.
76. Bugg, Ref. 17, pp. 108-109.
77. Buckland, Ref. 72, p. 23.
78. Bugg, Ref. 17, pp. 142, 157.
79. Bugg, Ref. 17, pp. 109-112.
80. Bugg, Ref. 17, pp. 143-149.
81. Bugg, Ref. 17, pp. 109, 139.
82. Bugg, Ref. 6, pp. 43-48, 278-279.
83. Bugg, Ref. 17, p. 142.
84. Bugg, Ref. 17, pp. 318-319.
85. Bugg, Ref. 17, pp. 40, 47, 71, 88.
86. Bugg, Ref. 6, p. 322.
87. Buckland, Ref. 72, pp. 18-21.
88. Bugg, Ref. 17, pp. 79-80, 113.
89. Bugg, Ref. 6, pp. 10-11.
90. Bugg, Ref. 17, pp. 69-88.
Bugg, Ref. 6, pp. 1-18. The quote is on p. 79.
91. Bugg, Ref. 6, pp. 69-71.
92. Ref. 20, pp. 368, 429-431.
93. Bugg was using 'replenish' as is found in the King James Version of Genesis 1:28, which most generally means simply 'fill', rather than 'refill'.
94. Bugg, Ref. 17, p. 158.
95. Bugg, Ref. 17, pp. 219-227, 315-319.
96. Bugg, Ref. 6, pp. 24-25, 32-37, 275-302.
97. Ref. 20, p. 370.
98. Bugg, Ref. 6, pp. 38, 71-72.
99. Bugg, Ref. 6, pp. 284-285.
100. Bugg, Ref. 6, pp. 299-301.
101. Bugg, Ref. 17, pp. 160-172.
102. Bugg, Ref. 6, pp. 61, 68, 85-88.
He rejected Penn's notion that the sea and land had changed places during the Flood. Because the Bible says the Flood covered all the mountains, he concluded that the Flood covered the 28,000 foot high Himalayas.
103. Bugg, Ref. 6, p. 84.
104. Bugg, Ref. 6, pp. 61-62.
105. Bugg, Ref. 6, pp. 63-66, 77-81.
106. Bugg, Ref. 6, pp. 69-71.
107. Bugg, Ref. 6, pp. 88-108.
108. However, he did not attempt to explain the vast remains of plants in the form of the coal measures, concentrated in the lower part of the geological column.
109. Bugg, Ref. 6, pp. 109-133.
110. Bugg, Ref. 17, pp. 265-270.
111. Bugg, Ref. 6, p. 290.
112. Bugg, Ref. 17, pp. 282-312.
113. Konig, C., 1814. On a fossil human skeleton from Guadaloupe. Philosophical Transactions, CIV (1):107-120.
114. Bugg, Ref. 17, p. 312.
115. Bugg, Ref. 17, p. 181.
116. In other words, they should exist in every part of the world where animals exist and the strata to which they are peculiar are found.
117. In other words, they should not be intermixed with the remains of other animals which supposedly lived in another epoch.
118. In other words, the same sort of fossils should not be found in successive strata, but rather different species and genera should appear in different strata.

119. In other words, as we move up through the strata lower fossils should not reappear in the upper strata, but rather new species and genera should appear after the extinction of the lower ones.
120. Bugg, Ref. 17, p. 187.
121. Bugg, Ref. 17, pp. 189-281.
122. Cuvier, G., 1822. Theory of the Earth, fourth edition, pp. 177-178.
123. Bugg, Ref. 17, pp. 191-199.
124. I attempted to confirm the accuracy of this quote, but did not find the encyclopaedia to which Bugg referred. I presume it was the 1813 edition of the named text, as listed in the National Union Catalogue.
125. Bugg, Ref. 17, pp. 200-211. Regarding the differences of the rock formations and the similarities of fossils seen in the London, Isle of Wight and Paris formations, Lyell agreed with Jameson. See: Lyell, C., 1830-1833. Principles of Geology, 111:18-19.
It is worth noting that in his rejection of shellfish as the indicators of Earth history (by defining and differentiating the strata) Cuvier was operating contrary to the method advocated by William Smith, whom in this matter most contemporary and later geologists followed. See: Smith, W., 1816. Strata Identified by Organized Fossils.
This work was almost exclusively based on shellfish.
126. Cuvier, Ref. 122, p. 5.
127. Cuvier, Ref. 122, pp. 90-91.
128. Cuvier, Ref. 122, pp. 89-90.
129. Bugg, Ref. 17, pp. 212-218.
130. Fleming, J., 1829. On the value of the evidence from the animal kingdom, tending to prove that the Arctic Regions formerly enjoyed a milder climate than at present. Edinburgh New Philosophical Journal, VI:279-280.
131. Fleming, J., 1830. Additional remarks on the climate of the Arctic Regions, in answer to Mr Conybeare. Edinburgh New Philosophical Journal, VIII:69-70.
132. Bugg, Ref. 17, pp. 228-229.
133. Bugg, Ref. 17, pp. 232-253.
134. Cuvier, G., 1813. Theory of the Earth, pp. 109-111.
135. Bugg, Ref. 17, p. 255.
136. Cuvier, Ref. 122, p. 374.
137. Bugg, Ref. 17, p. 257.
138. Similarly, Bakewell, in discussing the discovery of recent animal remains with ancient ones, said, '*Such instances should lead us to receive the evidence from animal remains alone, with much caution.*' See: Bakewell, R., 1838. Introduction to Geology, pp. 406-407.
139. Cuvier, Ref. 122, pp. 111-113.
Cuvier's words, which triggered Bugg's response, were as follows:
'It must not, however, be thought that this classification of the various mineral repositories is as certain as that of the species, and that it has nearly the same character of demonstration. Many reasons might be assigned to shew that this could not be the case. All the determinations of the species have been made, either by means of the bones themselves, or from good figures; whereas it has been impossible for me personally to examine the places in which these bones were found. Indeed I have often been reduced to the necessity of satisfying myself with vague and ambiguous accounts, given by persons who did not know well what was necessary to be noticed; and I have still more frequently been unable to procure any information whatever on the subject. Secondly, these mineral repositories are subject to infinitely greater doubts in regard to their successive formations, than are the fossil bones respecting their arrangement and determination. The same formation may seem recent in those places where it happens to be superficial, and ancient where it has been covered over by succeeding formations. Ancient formations may have been transported into new situations by means of partial inundations, and may thus have covered over recent formations containing bones; they may have been carried over them by debris, so as to surround these recent bones, and may have mixed with them the productions of the ancient sea, which they previously contained. Anciently-deposited bones may have been washed out from their original situations by the waters, and been afterwards enveloped in recent alluvial formations. And, lastly, recent bones may have fallen into the crevices and caverns of ancient rocks, where they may have been covered up by stalactites or other

incrustations [sic]. In every individual instance, therefore, it becomes necessary to examine and appreciate all these circumstances, which might otherwise conceal the real origin of extraneous fossils; and it rarely happens that the people who found these fossil bones were aware of this necessity, and consequently the true characters of their repositories have almost always been overlooked or misunderstood. Thirdly, there are still some doubtful species of these fossil bones, which must occasion more or less uncertainty in the results of our researches, until they have been clearly ascertained. Thus the fossil bones of horses and buffaloes, which have been found along with those of elephants, have not hitherto presented sufficiently distinct specific characters; and such geologists as are disinclined to adopt the successive epochs which I have endeavoured to establish in regard to fossil bones, may for many years draw from thence an argument against my system, so much the more convenient as it is contained in my own work'.

Slightly reworded, these same admissions were made in 1831 in Cuvier's revised edition of his theory, which appeared as the introductory 'Discourse' of the 4-volume **Researches on Fossil Bones**, 1834 (fourth edition), Volume I, pp. 68-69.

140. Bugg, Ref. 17, p. 276.
141. Cuvier, G., 1834. **Researches on Fossil Bones**, fourth edition, Vol. I, p. 16.
142. Cuvier, G., 1834. **Researches on Fossil Bones**, p. 16. This is the English translation of Cuvier's 1831 French edition.
143. Bugg made no reference to the analyses of Buckland's interpretation of Kirkdale Cave done by Granville Penn or George Young.
144. **Christian Remembrancer**, VIII:530-532 (1826).
145. Ref. 58, pp. 738-740.
146. Ref. 20, pp. 98, 311-312, 628-631, 750-755.
147. **Christian Observer**, 29:647-648 (1829).
148. This was probably the geologist Richard Cowling Taylor (FGS).
149. **Magazine of Natural History**, II(6):108-109 (1829).
150. **Dictionary of Scientific Biography** on Prevost.
151. Phillips, J., 1829-1836. **Illustrations of the Geology of Yorkshire**, 1:23.
152. Lyell, Ref. 125, pp. 240-256.
153. Whewell, W., 1837. **History of the Inductive Sciences**, Vol. III, p. 538.
154. **New Edinburgh Review**, IV:381-398 (April 1823).
155. **Christian Observer**, 29:648 (1829).
156. Bugg, Ref. 17, p. xv.

At the beginning of the work he wrote that his '*sole aim has been to*

elicit truth, and confront error'. He concluded with these words about himself: '*Truth he values above all things. But the truths of the Bible alone, have the keys of "eternal life" . He will, therefore, esteem it his greatest honour and happiness, if, before he go to be judged by **that word**, he shall have done any thing which may tend to illustrate its truth, to unfold its correctness, or to shew its importance*'. See:

- Bugg, Ref. 6, p. 355.
157. Bugg, Ref. 17, pp. 113, 277.
158. Bugg, Ref. 6, p. 310.
159. Bugg, Ref. 17, p. 11.
160. Bugg, Ref. 6, p. 344.
161. Bugg, Ref. 17, pp. 89-98.
162. Bugg, Ref. 6, pp. 328-329, 332-344.
163. Ref. 20, pp. 239-241.
164. Bugg, Ref. 13.
165. Bugg, Ref. 10.
166. Bugg, Ref. 6, pp. 353-354. Bugg said this illness increased during the writing of the book and at times brought the work to a complete halt with no hope of it resuming.
167. Bugg, Ref. 9, p. 46.

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