

The stratigraphic geological column— a dead end

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The stratigraphic geological column is seen as a ‘grand endeavour’ by most geologists, but it provides a version of Earth’s history contrary to Scripture. Some Christians have come to trust this history, and have thereby subsumed Scripture’s authority to the geological column concept. However, even biblical creationists have come to varying conclusions on its truthfulness and utility for historical geology, ranging from acceptance (excluding uniformitarian timescales) to full rejection. Starting with Oard’s recent work, we remind ourselves that the geological column, which is constructed in a naturalistic framework, has numerous inconsistencies and non-linearities. We then confirm his conclusions with forceful European examples from palaeontology, the oil industry and rock mechanics. Finally, we take the logic of these combined conclusions one further step. Using methodological naturalism only, so as not to be accused of invoking any *a priori* biblical view of the world, we can then show that the column does not replicate earth’s history. It is a dead end concept.

The stratigraphic geological column is seen as a ‘grand endeavour’¹ by most geologists but it provides a version of Earth’s history very different from that of Scripture. Timescales are extensive in the column—multiple hundreds of millions of years. Fossils are seen as revealing the pattern of evolution, rather than death during the Noachian Flood. When Christians, armed with Scripture and science, have examined the column they have come to varying conclusions ranging from full acceptance (even with its timescale) to full rejection. For example, Alexander² uses the column to encourage Christians to accept evolution, and allow Christians in science to move freely in the corridors of academia without being questioned about their sanity.³ Some, like Tyler and Coffin,⁴ will accept the column, but not the absolute timescale or evolution. Others accept that there is some value in this column for making sense of the history recorded in the rocks regarding the Noachian Flood.⁵ Finally, others such as Reed *et al.*⁶ reject the column entirely.

A symposium took place in 2006 among young-earth creationists to try to find common ground on the value (if any) of this column for interpreting geology in a framework that did not automatically exclude the Scriptural testimony to a global Flood.⁷ Oard has recently brought the topic back into the arena by adapting two of his papers for *Journal of Creation*.^{5,8} He notes inconsistencies, exceptions and non-linearities in the column. Some arise as a result of the challenge from Scripture. Others arise even within the naturalistic framework used to construct the column.

This paper confirms his conclusions about exceptions and non-linearities using supplementary European examples, and then takes it one further step. Using methodological naturalism only,⁹ so as not to be accused of invoking any other metaphysical view of the world from the Bible, we can then show that the column is a stratigraphic dead end. This conclusion comes about since once we accept that one non-linearity exists, then there is at least one additional mechanism that needs to be invoked to make sense of geological data.

The next stage is to put on ‘Flood Glasses’ and look at geology through these.⁸ The aim would be to replace the stratigraphic column with a ‘biblical column’. A development of Walker’s ideas¹⁰ will be discussed in a companion paper.

The origin and nature of the geological column

As Oard reminds us,⁵ the first steps to constructing the geological column began in England, in the coal mining areas of the county of Somerset. Surveyors wanted to predict where seams might lie so as to reduce uneconomic mining activity. Mapping of exposures, dip and strike and common fossil sequences were the main tools. The question then arose as to whether there was a worldwide pattern to fossil sequences. Those searching for answers were keen to distance themselves from any hint in the Bible that the earth was young.¹¹ To that extent, they were already working in a framework of methodological naturalism, and we find no suggestion that they ever stopped to check their preconceived notions. We will stay with their assumption for the moment.

Fossiliferous layers occur across the earth. The construction of the geological column required a complex method of interweaving of the observed order of these fossiliferous layers to produce a time-sequence. The geological column is now claimed to be a ‘grand endeavour’, allowing Earth’s history to be unravelled and correlated worldwide.¹ Index fossils define timelines in Earth’s history. Where rocks are unfossiliferous or contain common fossils (meaning that they do not belong to the current set of index fossils), geographical relational and other dating techniques are used to assign rocks to a part of the column.¹² Figure 1 shows an example of the stratigraphic procedures and processes used to produce a modern version of the column.¹³ Biostratigraphy is the principal link, especially over the Phanerozoic part of the column.

Oard has pointed out that some of the results of putting geological data into the process shown in figure 1 are

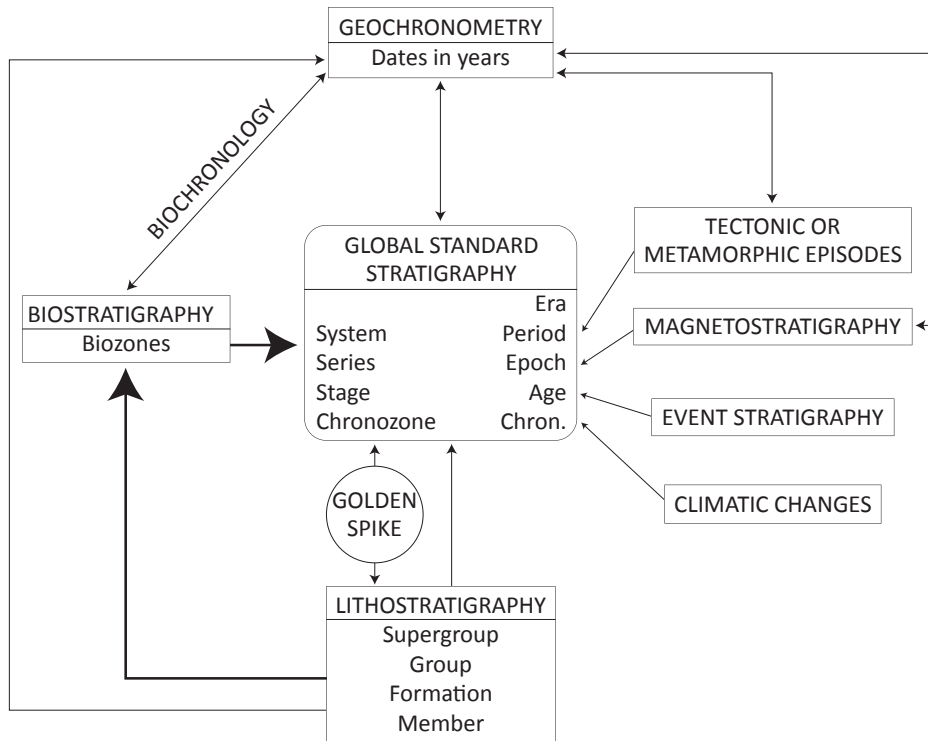


Figure 1. A standard stratigraphic procedure and classification procedure (after Holland, ref. 13). The main classification loop is shown with heavy lines.

inconsistencies and non-linearities.⁵ The non-linearities are essentially parts of the column that are out of order, and for which no explanation is available. The questions that challenge those who promote the geological column are therefore:

1. Are the data that have been included in the figure 1 process accurate?
2. Do the inconsistencies have a fundamental effect on the geological column?
3. Or, do we need adjustment to figure 1 to eliminate the inconsistencies?

The last part of the question challenges the very nature of the geological column.

Why is the geological column not challenged?

I hear four reasons why the column based on figure 1 is not challenged by those who practise methodological naturalism. The first is that it is valuable in the mineral extraction industries. The idea that there was a global flood in the days of Noah supposedly hindered the development of geology.¹⁴ Specifically, the Geological Society of London, even though it came into existence to help understand and develop the earth's mineral resources, forbids discussion of a biblical framework for interpreting geology.¹⁵ We deal with that below.

Another reason for the absence of formal checking is that a natural checking is assumed to occur at each stage when new data are discovered. But the problem is that the inconsistencies are ignored. There is also the convenient

flexibility over removing fossils from and adding fossils to the collection of index fossils when the results of including new data in the process challenge the very edifice of the column. The process should be rejected, but it isn't because it often leads to overlap in geological periods¹⁶ and that is not the desired answer. We will provide examples of overlap for varying reasons in this paper.

The third is: what to replace it with? If we are only prepared to work in a framework of methodological naturalism, then it is unlikely that evolution will be challenged in principle, though it may be challenged in the details of how it supposedly occurred. Thus mature creation is excluded by the main guardians of the geological column. However, we can still critique the column through the inconsistencies that are produced by figure 1 without being accused of scriptural fundamentalism.

The fourth reason why the geological column is not challenged comes mainly from old-earth Christians. They consider that the need to get alongside non-Christian scientists to evangelise them is hampered by young-earth creationism.² That problem needs addressing but would require a full-length paper, now in preparation. Fundamentally, it is the difference between insisting that scientists search for absolute truth rather than relative truth, which is all we get from methodological naturalism.

Does the geological column have value for mineral extraction industries?

The mineral extraction industries focus on the formations, facies (different rock types) and/or seams. These are diachronous, crossing timelines.¹⁷ So while the index fossils might give some clue as to where to expect the formations, there is no guarantee. In fact engineering geologists are now criticised for glibly assuming that fossil identification and formations match perfectly.^{18,19} Consider the following examples, taking the column at face value:

1. The economics of coal mining depend on finding seams where the sulphur content is low and coal rank is high. Yet the sulphur content does not correlate with geological age, and attempts to relate the sulphur content to the inferred marine conditions of the formations above the coal layers have proven to be unsuccessful in North America.²⁰
2. On coal rank, brown coals are typically found in young parts of the geological column while high-rank coals

such as anthracite are found in the Carboniferous. However, there are low-rank coals in the Carboniferous.²¹ So the supposed correlation as a function of geological time is lost. Depth of burial (Hilt's Law) was another idea to explain differing ranks. That has been quietly put aside.²²

3. Within the North Sea, there are a number of oil reservoirs in the Brent province²³ that belong to a part of the Jurassic (Bajocian and Aalenian stages). Yet the individual reservoirs contain different hydrocarbons and possess different tectonic histories (as shown by the nature and geometric arrangements of faults) and diagenetic histories (as shown by thin film and SEM photographs).²⁴ The development of any one reservoir provided little help in understanding how to develop others. For extreme examples, compare the development of the two reservoirs named NW Hutton²⁵ and Brent.²³ The former was very inefficient, the latter very efficient.
4. When enhanced oil recovery methods were being developed in the UK in the 1970s and 80s²⁶ it was assumed that techniques developed in North America could be used provided reservoirs were of the same age. The geochemistry did not carry over, making it impossible to use the same processes for recovery.²⁴

Unfossiliferous rocks

Many rocks either do not contain any fossils or contain commonly occurring fossils that are not part of the index list. So the main loop in figure 1 cannot be used to determine which part of the geological column those rocks must be assigned to. Yet it is rare to see geological maps with the word 'undifferentiated' on it to indicate such rocks.

Figure 1 provides a way of attaching a label to such rocks through dating techniques. Geometrical relational techniques can also be used. But if either of these is problematic then the rocks still need labelling as 'undifferentiated'. Radiometric dating is no help. It produces answers that are wide of reality²⁷ and are not even adequate for relative dating.

Regarding geometrical relational techniques, if a non-fossiliferous layer is sandwiched between two layers that can be identified (say the Jurassic stages Callovian and Aalenian), then it is possible to tie down the non-fossiliferous layer to a limited part of the column (the intermediate Bajocian or Bathonian). But even this causes problems. There are some fossiliferous rocks that are out of order in the local vertical pattern, and examples are given below. While some of these may be explained by observable faulting and folding patterns, others are inferred to have moved horizontally from a distant location.

Where some of these overthrusts are assumed to have occurred, the contact planes suggest continuous deposition rather than sliding. Once this is admitted, every other rock that is technically 'undifferentiated' could have moved

from some deeper part of the column rather than being deposited at its current position. This throws the whole of the geological column into confusion to the point at which it is useless because 'undifferentiated' rocks cannot be tied down anywhere within the column. The following is a specific example.

The labelling of unlabellable rocks

Surface exposures, cliffs, ravines, etc. only provide a limited amount of information on local geology. Subsurface rock can only be accessed through boreholes, but the inherent limitations on their size, frequency and nature means they can only provide clues to what lies beneath. However, the bulk of subsurface geological mapping is done on the assumption that the geological column is, *a priori*, the way to build the maps. In limited circumstances, formations can be traced by seismic surveys because seismic interpretation relies on the different acoustic velocities and densities of the formations. Fossils and timelines do not have seismic signatures.

In the county of Dorset (south UK, see figure 2), the oldest visible rocks are labelled Jurassic. Beneath this (based on a single 2,800-m-deep borehole in an area exceeding a hundred square kilometres) is a reddish-coloured facies labelled ?Permo-Trias.²⁸ Deeper still is a green-grey phyllite with a radiometric age of ~350 Ma, and labelled Devonian. Then a metamorphic basement is reached. While basement rock is typically synonymous with Precambrian,²⁹ the link is nothing other than a questionable assumption. England and Wales are "almost wholly underlain by continental basement, the nature of which is obscure".³⁰ The reality is:

1. The red facies have been labelled ?Permo-Trias on the basis of facies similarity with Permo-Trias exposures 100 km away to the west in the Exeter region.³¹ The regional dip supports the facies continuity in the subsurface, but facies are not timelines. As a particular Dorset example of diachronism, a shallow sandstone in the Jurassic passes up through three zones (from Whitbian—part of the Toarcian to Aalenian via Yeovilian) in just 100 km.¹⁷
2. The phyllite is labelled as Devonian on the basis of radiometric dating without recognising the severe problems with that method of dating.²⁷
3. There is no intermediate Carboniferous. The red facies and the phyllite could be Triassic, Permian, Carboniferous or anything else once we accept that overthrusting does not always leave a clear signature, especially when all we have are rock samples a few centimetres in size. Thus by labelling what is strictly 'undifferentiated' rock, ignorance has been hidden.

There is a further problem with the ?Permo-Trias. The fossil content of the exposures in the Exeter region is poor. Thus "the [Permian-Triassic] boundary could be anywhere within the 560-m vertical section of Exeter Group and Otter Sandstone. For descriptive convenience, it is taken



Figure 2. Distribution of Permian rocks in the UK (from Smith, ref. 33).

as the base of the Ayelsbury Mudstone Group”²⁸ and then illustrated in that way (their Table 10). Is the ‘descriptive convenience’ another fudge?

Because it is host to the oil field at Wytch Farm (Dorset), many geoscientific studies of the ?Permo-Trias have been carried out using this ‘descriptive convenience’.³² The boundary has thereby been set in tablets of stone, the ‘Golden Spike’ hammered in, by two high-profile authors. But is this universal timeline not a figment of their imagination?

The fact that the Permian and Triassic do not have a clear boundary, and this is true for much of the UK,^{33,34} should cause a critical documented appraisal of the idea of the geological column. The boundary between the Permian and Triassic is the worldwide boundary between Palaeozoic rocks and Mesozoic rocks caused by major extinctions. Yet the UK was largely untouched by the evidence. In fact, even charitably accepting the maps produced, there is little Permian exposed on land or known in the subsurface (figure 2).³⁵

The reality of the crisis with the Permian and Triassic, let alone the other parts of the geological column, comes home to roost with the following quote from respected authors:³⁶ “British Permian is difficult to decipher since there are different styles of sedimentation in different basins.”

Therefore, at best, correlations are not fit for purpose. Substandard science and superficiality reign supreme.

Specific failings of the geological column

We now turn our attention to specific failings of the column that show why many periods, supposedly separated by millions of years, were contemporaneous. The focus is mainly, though not exclusively, on Europe. Within Dorset, there is evidence that Cretaceous strata were being laid down while Tertiary folding was taking place.³⁷ In NE Brazil,¹⁹ “the K-T boundary had to be drawn at two quite different stratigraphic horizons”. So, based on this double-whammy, the words ‘Cretaceous’ and ‘Tertiary’ are not connected robustly with geological time. Twenty millions of years are thus ‘lost’ from the column.

In the North Sea, the Buchan oil reservoir (Devonian) is capped by Cretaceous deposits.³⁸ The oil is over-pressured and this pressure regime extends into the

‘Cretaceous’. Not far from the reservoir, the Devonian rocks are covered in rocks from the periods intermediate to Devonian and Cretaceous. This means that:

1. The Devonian deposits are younger than 10,000 years. Otherwise the high pressures would have dissipated.³⁹ Thus Earth’s history shrinks by 350 million years.
2. The sedimentary processes giving rise to the Cretaceous deposits over the reservoir were contemporaneous with the arrival of other deposits (supposedly millions of years apart) in the same region. Otherwise the over-pressure profile, which grades smoothly from the Devonian straight into the Cretaceous, could not have been achieved. Four adjacent periods of the column are thereby shown to be contemporaneous.

Taken in total, the loss of millions of years from the column revealed by these examples confirms the independent evidence of the need to reject radiometric dating directly from nuclear studies.²⁷ This means that assignment of ‘undifferentiated’ rocks (such as the phyllite demanded by figure 1) to parts of the column is impossible.

Exploring linear overthrusting

To maintain the geological column, overthrusting sometimes has to be invoked. Some overthrusts where the natural depositional order has been altered can be

explained by folding and/or movement before formations became consolidated, but others cannot. However, as discussed above, once we accept the need to invoke overthrusting to keep the geological column from falling apart even when there is no evidence of brecciation at the contact plane, then the geological column is impossible to constrain under stratigraphic control. Does that mean that if overthrusting is impossible we can still construct a naturalistic geological column?

In Switzerland, Permian rocks lie on top of Tertiary rocks⁴⁰ at Glarus. There were plenty of rocks locally that had been folded, but no visible evidence of folding to move this Permian over the Tertiary. Since this discovery (1849) predated radiometric dating, it is interesting to speculate what the geological column would look like if its early development had been in Switzerland rather than England. It could be England that would have many overthrusts because Tertiary is regularly shallower than Permian in the UK.

If the geological maps of Glarus⁴¹ and the Moine thrust in Scotland⁴² are taken at face value, we have to explain how massive amounts of consolidated rock moved horizontally, or even uphill,⁴² without fracturing and leaving trails of breccia. The alternative is to abandon the relevant parts of the geological column.

The closest that typical texts get to explaining how this linear and horizontal/uphill overthrusting occurred is to show that if the rocks are porous and fluids in the pores had pressures much greater than normal (the Buchan oil reservoir is a specific example), then huge volumes of rocks can slide over each other without fracturing.⁴¹ But these studies do not address the question as to how the high pressures were sustained during the overthrusting. The only way is to completely surround the high-pressure porous rock with additional impervious rock. But by definition this rock cannot have overpressured pores. This outer rock will be in tension, and rocks in tension are weak. The amount of additional rock needed can be computed from the stresses it needs to sustain the high pressure in the porous rock. The amount exceeds ten times the original. The forces now necessary to move this duplex mass exceed the fracture limits. The high pressure will then be lost.

To make matters worse for horizontal and uphill overthrusting, we have to find masses of rocks sliding downhill (needing angles exceeding 45°) to do the pushing. Somehow evidence for their existence conveniently disappeared from the regions around Glarus and Moine. For Moine, there would have to have been a huge mountain range in the North Sea. Furthermore, this would have to have happened five times.⁴² That puts a firm 'no' to large parts of the geological column. And if they have failed, why is anything that is left considered reliable?

Implications

Since the assumptions in the stratigraphic processes shown in figure 1 are known to produce inconsistent answers, then one or more of the key assumptions in the figure are wrong. Inaccurate data is not an explanation

for its problems. For assigning rocks to the Phanerozoic, biostratigraphy is the crucial loop, and therefore that loop is fundamentally flawed. If the biostratigraphy is wrong, then either evolution did not take place in the way expected or evolution did not take place at all. No one has offered a systematic alternative to Darwinian evolution except for punctuated equilibrium. The latter does not solve the problems identified in this paper with the geological column. Therefore evolution did not happen.

If radiometric dating is so flawed that it can produce errors exceeding 350 million years, then it is not possible to develop the Proterozoic part of the geological column below the Phanerozoic.

Maybe the need to sustain evolution is the real reason that geologists will not attempt to rework figure 1 (the stratigraphic process). They prefer to keep the Creator at arm's length. But is this really so much to ask when He has done so much to reach out to us?

Summary and future work

This paper has examined the geological column within its own framework of methodological naturalism. Even within this framework, the geological column has a number of severe inconsistencies and exceptions. All rocks labelled Devonian to Tertiary may be contemporary (hours rather than millions of years apart) depending on location. That removes 350 million years from Earth's history.

If they are contemporary, then the ground rules used to construct the geological column are flawed, and therefore so are statements about rocks supposedly older than Carboniferous.

But the writing was always on the wall. In the words of Torrens,¹⁹ writing in a secular journal, "It now seems axiomatic that the harder you look at a rock, the more incomplete its stratigraphy appears to become." He is only repeating with slightly different words what Woodmorappe¹⁶ said two years earlier, though he does not acknowledge Woodmorappe. If they can say that, why not all creationists, and why not all Christians, be they evangelical or liberal? For that matter, why cannot all geologists acknowledge that the geological column has been fully falsified? Tenets of evolution are then dismissed.

The aim is now on replacing the icon of the geological column with a physically realistic and biblically acceptable alternative. One suggestion is to draw on the ideas of Walker¹⁰ regarding 'biblical columns' and put those in the context of Flood-mechanisms. The other challenge is to heal the wounds of divisions between old-earth and young-earth Christians.

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