

From dinosaurs to Earth expansion

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I started thinking about the concept of Earth expansion in 1987. I'm one of several individuals who "discovered" the concept for themselves, only to find that many others had discovered it long before me.

Looking back at all the science articles and books written about Earth expansion it seems strange to think that I had neither read nor heard anything about the Earth expansion concept in 1987. Although I was a well-read individual in most science subjects, regularly reading popular science journals like *Nature* and *Science*, the theory of Earth expansion and the scientists who supported the concept were completely unknown to me. Perhaps that's not surprising, since the concept of Earth expansion was rarely mentioned in popular science journals. Most of the articles were in obscure science publications only read by a few specialists. All this meant that the concept of Earth expansion was virtually unknown to countless people in the late 1980s.

Scale effects save my job

My discovery of Earth expansion was by a most unusual route. I wasn't trained in geology but as a design engineer, and I believe it was this training that provided a unique introduction to Earth expansion. Technical Drawing was my favourite subject in school and it was obvious that I should become an engineering designer, or a "draughtsman" to use the job description of the time. By the late 1970s I was a twenty-one year old starting a career in engineering design.

It was in the design office that older professionals began to teach me the value of the difference between academic learning and practical experience. As a young designer I was relatively academic and would

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often use calculations of one sort or another to help me design a particular project. The Section Leaders at BNFL¹ soon taught me to be wary of reliance on calculations. While still in my early twenties I'd been given the task of designing the supports for a large pipework system and began to tackle the job with all my academic training. I produced the calculations, checked them, and promptly had them rejected as wrong! I had overlooked the fact that maintenance staff might stand on the pipe (even if they shouldn't) so I needed to design it for that requirement. My initial assumptions about the forces involved were simply wrong because I had failed to consider all the factors involved. This lesson about considering design in a more holistic fashion stood me in good stead over the coming years and I soon began to notice this conflict between purely academic calculations and the more practical approach.

By 1987 I had moved on to become a Design Engineer at the Electricity Council Research Centre in the UK. Adopting the more practical engineering approach resulted in several memorable disagreements with the academic research scientists. I particularly remember one time I had calculated that an electric motor needed to be a specific kilowatt rating to pump some molten zinc. The scientist leading the team had carefully calculated the amount of energy needed to lift that amount of zinc and concluded the motor only needed to be a quarter of the power I had specified. He told me to reduce the size of the motor and seemed very surprised when I refused. He had after all obtained his doctorate in physics so his calculations were beyond reproach. My view from experience was that extra power was needed to overcome the initial starting torque of the motor and pump so I wasn't going to design something that wouldn't work. The discussion soon reached an impasse and the final decision about the size of the motor was passed to our superiors who eventually agreed with me by opting for the larger motor. As they diplomatically explained to the lead scientist this was "just to be on the safe side". This conflict between the scientists and the engineers in the Research Centre was a common theme. Most scientists thought that the engineers were just being awkward, had too much power, and needed to be controlled by the scientists. We just thought we were doing our jobs.

Years later I recognised the same sort of conflict between practice and theory happening in geology and physics. Geologists tend to be practical "boots on the ground" sort of people while physicists tend to rely on more theoretical considerations. A good geophysicist needs to combine both.

¹ *British Nuclear Fuels Ltd. (BNFL)*

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These experiences all had a profound effect on how I viewed the world of science. As a young man I would have probably granted that all scientists should be given the highest level of deference but by 1987 I was more circumspect. Scientists could easily be just as wrong as anybody else. I certainly thought we should all trust our own judgment as far as possible.

One highly relevant experience I had as an engineer directly concerned scale effects that were soon to be so crucial to my ideas about palaeogravity¹ and Earth expansion. Not long after I had joined the Electricity Research Centre the funding had been reduced and it seemed a real possibility that I might need to find a new employer. This looked even more likely after the science manager in one department told me he didn't see what I did for his teams and I was gradually removed from most of the projects in that division. It seemed he thought that the scientists and technicians could function just as well without a design engineer. For a time it appeared that I would certainly be made redundant. But events took another unexpected turn as I was urgently called down to offer some advice on a machine that worked well as a small scale model but didn't work at all as a full-sized industrial unit. What could be the problem?

It was immediately obvious what the problem was when I looked at it, since it was a surprisingly naive error. The scientists and the technicians had simply scaled-up the small model to a larger size without any thought of scale effects. Now scale effects are very relevant to engineering in general and even more so in research. When you try to convert small size laboratory research machines into much larger industrial machines the effect of scale can cause all sorts of problems. If you copy a small machine and reproduce it as another unit twice as big there is no guarantee the larger one will still work. This is because although the large machine is twice the linear size the area will be four times larger and the volume will be eight times larger. For heat flows for example, this difference in scale means that a condenser will not work on the large machine when it worked perfectly well on the small one. The stress within a supporting member can be even more critical since a beam that could easily support the mass of the smaller machine could buckle and fail when scaled up on the larger machine. All this was immediately obvious to me. They had simply forgotten the scale effect. However, it was fortunate for me because I was soon reinstated as part of the science teams in that department and the threat of redundancy was lifted for several years.

¹ *Palaeogravity is the force of the Earth's surface gravity in the past.*

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My Eureka Moment

These scale effects were also to figure largely in my thoughts about palaeogravity and would eventually allow me to stumble across the expanding Earth concept by this obscure route. By late 1987 I had designed many engineering structures and was well aware of scale effects. Our three dimensional world sets limits on both man's and nature's creations so everything is limited in size by scale effects. The weight of an object is proportional to its volume (three dimensional) but the strength is proportional to its area (two dimensional). This means that as any object increases in size its volume is cubed while its area is only squared. The volume, and hence weight, of any object increase faster than the area, and hence strength. This scale effect is the fundamental reason that both man's and nature's creations are limited in size. All land animals are limited in size by this scale effect. But if all animals are limited in size by this scale effect then how do we explain the gigantic size of dinosaurs that were so much larger than present life?

I began considering this problem of the dinosaurs' large size in detail during a lazy beach holiday in Portugal. One idea that seemed to present a possible solution for dinosaurs' large size was that gravity was less on the ancient Earth. It's relatively easy to calculate how big life would become in a reduced gravity so I soon calculated that surface gravity would need to be about half its present value to enable dinosaurs to achieve the size they had. I was sufficiently scientifically literate to know that the popular view was that surface gravity was the same on the ancient Earth as it was now. How could surface gravity change on the ancient Earth? One possible solution was that the ancient Earth was smaller with a reduced mass and gravity. This concept of a smaller less massive planet seemed obvious to me because the Moon, Mars and Venus are smaller with less gravity. I could even roughly calculate that the smaller Earth would be about half its present diameter based on the relative size of ancient life. I reasoned that maybe the Earth was smaller some 150 million years ago and had gradually increased in size, perhaps by the gradual accretion of meteorites and comets. I'd never heard of any suggestion that this might be the case so I became one of a number of people who thought of the concept of Earth expansion without realizing that others had already explored this idea in great detail before.

After I returned home I researched into geology at my local library and began to slowly hunt for references indicating that the ancient Earth might be smaller. There was of course no internet at that time so a search through the geological textbooks was the only method

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available. I started with my concept that the ancient Earth was smaller and looked for any references that could be related to this in the geological dictionaries.

Many of the geological reference books didn't mention any concept of a smaller diameter Earth at all. The McGraw Hill Dictionary of Earth Science is typical of those reference books: it claimed to have "more than 10,000 essential terms" that covered "every discipline of Earth Science" but failed to indicate that anyone had ever considered that the Earth had been smaller in the past.

Eventually I managed to find the term "Expanding Earth" in a few geological books. The sort of passage I managed to find went something like this:

Expanding Earth: A hypothesis which was strongly supported by Warren Carey, but which was first proposed by M. R. Mantovani in 1907, and raised again in the 1930s by Hilgenberg (*sic*) and others. It holds that the diameter of the Earth has increased with time, fragmenting the continents and causing the growth of ocean basins at spreading axes (ridges). A conference to discuss the idea was hosted by Carey at Hobart, Tasmania, in 1956.¹

*A Dictionary of Geology and Earth Sciences (Oxford Reference)*² published in 2013 has virtually the same passage except it now gives the dates of birth and death of Carey. It still misspells Hilgenberg. But even though this reference was minimal it was sufficient to enable me to begin my research in earnest.

The passage was misleading in several ways. Firstly, the 1956 conference wasn't an expanding Earth conference but a Continental Drift Symposium (although Carey did introduce his concept of expansion in a chapter³ of the 1958 book issued to accompany the symposium). Secondly, there was no indication that papers or books were still being written about Earth expansion. There was no mention of any of Carey's books or any other author. The overwhelming impression this and other similar references gave me at the time was that this was an old idea that had been very briefly considered in the 1950s but soon discounted. This belief that the idea was virtually dead is something that I now know was completely wrong, but at the time I

¹ *N.B. This passage contains several errors. The concept of Earth expansion had certainly been proposed by the 1850s by a number of people. Drayson and Thorp even presented a talk about it to the Yorkshire Geological Society in 1859 (See Hurrell (2017) for more details). Hilgenberg is misspelt and the 1956 conference discussed Continental Drift, not Earth expansion.*

² Allaby (2013).

³ Carey (1958).

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had no reason to doubt the science textbooks, although it did mislead me for some time.

I was fortunate that the librarians at my local library were very helpful with my continuing “esoteric search” about expansion, as one of them liked to call it, and as months became years I slowly managed to build up a more complete picture of the history of the Expanding Earth theory. This was a long-winded process. Having found a reference to expansion I would ask for a copy of the paper or book to be delivered to the library within the next few weeks. This reference might generate a new lead and I could ask for yet another document. Fortunately the librarians seemed to treat my constant requests for strange documents from other libraries as an intellectual challenge and appeared to enjoy searching for them. But it did take an inordinately long time. Months soon turned into years.

Despite the best efforts of the helpful librarians the results of my research also proved to be extremely patchy. I never located copies of either of the two books¹ Carey had written by then. It is particularly surprising that I never located his second book which had only been published in 1988 - I was to remain ignorant of it for a number of years. Most of the German researches weren't available to me either and even when I eventually found the correct spelling of Hilgenberg's name I was still thwarted: the British Library reported that copies of his book² from two different locations had disappeared. One book³ that I did manage to locate was by the German Professor of Physics at the University of Hamburg, Pascual Jordan, which had been translated into English in 1973.

Fortunately there was also a British expansionist, Dr. Hugh Owen⁴, who had published widely. By far the most information I managed to obtain at the time was by this British palaeontologist who was working at the Natural History Museum in London. He had written a number of articles about expansion and I was especially interested in his book, *Atlas of Continental displacement*⁵, reconstructing numerous globes at different stages of expansion. These globes had been set alongside reconstructions of the continents on a Plate Tectonic Earth that had remained constant for the last 200 million years, allowing the merits of both concepts to be compared.

Whilst I was continuing my slow research into the expanding Earth theory I also continued to refine my own estimates of palaeogravity.

¹ Carey (1976) and Carey (1988).

² Hilgenberg (1933).

³ Jordan (1973).

⁴ See also the chapter by Hugh G. Owen.

⁵ Owen (1983).

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Thus the enforced delay in establishing the exact details of the expanding Earth had the positive effect that I could establish estimates of palaeogravity completely independently of any previous thoughts about the expanding Earth. One of the first methods I used was to refine the technique of comparing relative scale of prehistoric life to present day life. In theory, once it is accepted that all life is limited in size by the force of gravity, it is relatively easy to calculate that a reduction in gravity will allow life to become larger by a set amount. So if we image all present day life evolving on another planet with only half the gravity then all the life would need to be twice the linear size to follow the same lifestyle with the same athletic ability. If we were to assume that the dinosaurs were similar in lifestyle to present-day life we could also assume that the largest of the dinosaurs were similar to elephants in athletic ability to enable a calculation of palaeogravity.

Other smaller dinosaurs were obviously more athletic than the large dinosaurs so these needed to be compared to present-day animals that were dynamically similar to them. An obvious example was the *Triceratops* dinosaur. This looks so similar to the rhinoceros that it is easy to imagine they both followed a very similar lifestyle and were dynamically similar. Being the size of an elephant, *Triceratops* is a much larger animal than the rhinoceros but the reduced gravity allows it to move more readily with a greater athletic ability than any elephant.

Using the dynamic similarity method I was once again able to calculate palaeogravity was roughly half its present value during the dinosaurs' time. I was also able to use this method with life from the Carboniferous, about 300 million years ago, and life after the dinosaurs when a range of supergiant mammals evolved. These results indicated that palaeogravity had been gradually increasing over hundreds of millions of years.

Meanwhile my research into the expanding Earth theory was beginning to show some results. One of the most fascinating aspects of these early researches was that estimates of the expansion agreed with my own rough estimates even though the other expansionists used completely different logic and reasoning. Earth expansionists believed the Earth could have expanded based on the geological evidence; I had estimated a similar amount of expansion based on palaeontological evidence of ancient life. This was a strong indication that they were related. They were simply different aspects of the same phenomenon.

It was also clear that there were many different versions of expansion. There was slow expansion that only suggested a small amount of expansion; and fast expansion that suggested the Earth had doubled in diameter over nearly two hundred million years since

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the beginning of the dinosaurs' time. There were also various suggestions why this expansion might be occurring. The first group of suggestions could be loosely lumped into constant mass models where the mass of the Earth stayed the same while the Earth expanded - due to a change of Universal Gravity¹ or some sort of phase change of the materials within the Earth. The second group concerned increasing mass models where the mass of the Earth grew to increase both the size and mass of the Earth.

In 1994 Marie Tharp recalled that the 1960s version of expansion was mainly rejected because most people believed it was just impossible for physical reasons. Because the Earth was supposed to be cooling off it should be shrinking, and getting all wrinkled, as it shrunk: not getting bigger. Also Universal Gravity couldn't have changed enough to cause the expansion. Certainly this is the same general view I acquired in the early 1990s about the expansion concept. But there is one critical point about these objections. They are all only relevant to the concept of a constant mass expanding Earth. Once we realize that expansion must be due to an increase in mass the old 1960s objections become irrelevant.

I quickly grasped that my work on the relative size of ancient life could resolve this debate because only one model could explain why palaeogravity had increased over time. If I was right, only relatively fast expansion caused by an increasing mass could explain the increasing palaeogravity I was seeing recorded in the fossils of ancient life. By the early 1990s I had realised that this information would advance the expanding Earth theory considerably by ruling out invalid models.

A reduced palaeogravity explained a number of seeming paradoxes about prehistoric life. Dinosaurs in particular appeared to follow a lifestyle much too active for their size. Calculations indicated their bones were too weak, blood pressure too high and they would be unable to run even if they looked like the should. The problems concerning their large size, high blood pressure, weak bones, ligaments and muscles had generated a large number of *ad hoc* theories totally unrelated to one another. The trouble with these theories is that they have no predictive power since they are only formulated to explain a restricted set of facts. In contrast the one theory of reduced gravity resolved *all* the different problems that had been assumed to be unrelated to each other. These were all important clarifications for science, so in the early 1990s I began to attempt to publish my results in a science journal.

¹ Note that Universal Gravity (big G) is not the same as the Earth's surface gravity (small g).

Early rejections

The editors of science journals regularly receive submissions that claim a discovery that will revolutionize all of science. These are usually discarded without much further thought unless they come from an established scientific authority. My own thoughts about palaeogravity could easily be considered in that light. It claimed a revolutionary advance in science and it also came from a scientific outsider. I didn't have high hopes that it would be published.

In order to try to avoid this averse depiction I wrote my first paper in very simple terms and kept my claims to an absolute minimum, trying to avoid any claim of a science revolution. I described how palaeogravity was nearly always believed to be the same as present gravity but a belief isn't science. It should, however, be possible to scientifically calculate palaeogravity using several differing methods. There were only three possible results of these calculations:

- (1) palaeogravity was the same as at present,
- (2) palaeogravity was greater,
- (3) palaeogravity was less.

After describing how to calculate palaeogravity I presented the "outrageous" answer that gravity during the dinosaurs' time seemed to be about half its present value based on these calculations. I then presented a number of different methods of calculating palaeogravity that all gave similar results. Having produced this first manuscript, I then began a very long term activity of submitting it to a number of likely science periodicals. This first manuscript was rejected several weeks later with comments about the reason for rejection. Using these comments I modified the article in an effort to make it more acceptable. Continuing rejections and subsequent modifications resulted in several different versions of the article. Some articles removed the admission that it was "outrageous" to suggest that palaeogravity was so much smaller, others added a general discussion of how it might have varied and still others gave a detailed description of the increasing mass expanding Earth theory and how this also predicted a reduced gravity. But however I presented the evidence the answer was always the same: a very definite no, this is impossible. In the early 1990s it seemed likely that the concept of an ancient reduced surface gravity was going to be strangled at birth.

These editors believed surface gravity had never varied. They had forgotten that it's not just what you don't know that causes problems in science. It's also what you think you know for sure that just isn't true.

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Eventually I came to realize that science editors have a fundamentally different outlook from science innovators. My outlook on the “outrageous” indications that palaeogravity was reduced was one of curiosity. I wondered if this evidence was real or if there was some other explanation. Could gravity really have been so much less, as indicated by the evidence, and if so, how? I saw in these questions a shiny new stone on the shore of a great undiscovered sea of science. Naturally I wanted to show others this new and shiny stone. The science editors didn’t share my views. They seemed to think that nearly everything worthwhile had already been discovered and they were custodians of that knowledge. There was no room, in their view, for a new mystery that might take science in a completely new and unexpected direction. Only papers that fitted this known view of science could, and would, be allowed. Any new discoveries would tend to be minor ones that supported what was already known. Even these minor discoveries would be made by established scientists - it certainly wouldn’t come from an unknown engineer.

On the other side of the Atlantic, in the USA, William Erickson¹ had already had his articles about reduced gravity rejected by various

¹ See also the chapter by William Erickson.

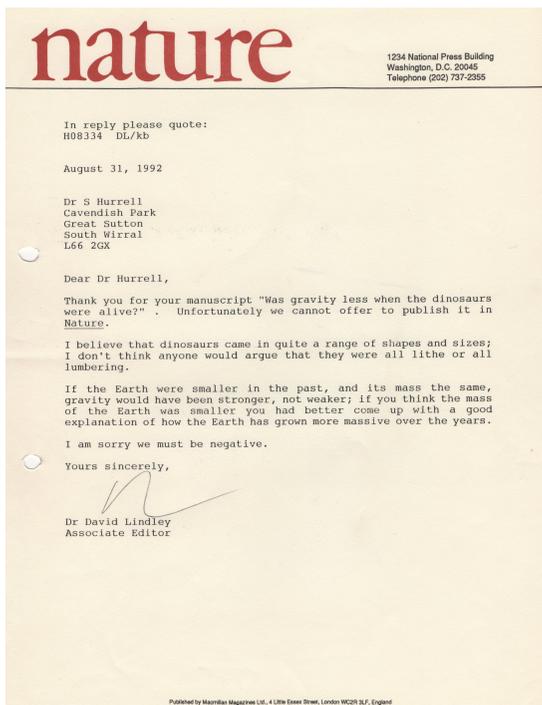


Fig 1. A typical rejection letter from the early 1990s. This is for one of the early articles outlining the evidence that the Earth's surface gravity was less in the past. Like most other rejection letters, the associate editor of the science journal Nature was clearly struggling to see the significance of the evidence I presented for an ancient reduced surface gravity.

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science journals, although we didn't discover the close correlation in our experiences until about a decade later. I have a copy of one of his papers downloaded in December 2003 so I would guess we made contact shortly before then. It transpired that we had both followed similar lines of reasoning, using almost the same reference materials to reach our conclusions, only to have our work rejected by the science journals.

My book is born

After all this rejection a few more years had passed and it was now the early 1990s. I had managed to find a contact telephone number for Dr. Hugh Owen at the Natural History Museum and while discussing expansion in general I mentioned the problem of publishing in science journals. He was quick to suggest that I should simply ignore the science periodicals and publish a book. At first I wasn't sure if this was something I really wanted to do. It sounded like a lot of work and I thought it would likely only sell a few copies anyway. As far as I could tell at that time there only seemed to be about a dozen people at most who would be interested in this concept. But as I considered the possibility of writing a book it occurred to me that I already had much of the material I needed in the various versions of the rejected manuscripts sent to the science journals. Also, a few dozen copies of the book could be produced with the technology of the time with relative ease. Soon I found a local bookbinder with the correct equipment and my books were ready. There was no need to stop sending my various manuscripts to science periodicals either, since this only entailed a minimum of effort once every several weeks, so I could easily do both. So this suggestion from Hugh Owen eventually resulted in the first edition of *Dinosaurs and the Expanding Earth*¹ being published in August 1994.

The initial response to my book was very positive and I was soon finding that I was being contacted by people from all over the world with comments about palaeogravity and its implications for Earth expansion. It was soon evident that I had badly underestimated the interest in a publication about this subject and I began to produce more books to keep up with the orders. Nonetheless I had only scratched the surface of the full extent of the interest in the subject. If anyone could have told me at the time that my book would still be selling and gaining converts over twenty-five years later I wouldn't

¹ Hurrell (1994).

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have believed them. Yet that is exactly what has happened. The third edition of my book¹ is still selling.

When the book was first published there was a general lack of knowledge about Earth expansion amongst a generation of scientists educated in the early 1990s. After joining the local Geological Society I asked some of the geological graduates what they knew about the Earth expansion theory. The more recently graduated knew nothing about it. The older generation vaguely recalled the theory. Of course now, with the internet, it has all changed and I would be very surprised if any modern day geological student was unaware of the theory of Earth expansion. They probably know a lot more than their teachers.

The 21st century dawns

The 21st century opened with a very pleasant surprise for me. I had previously come across a copy of Professor Carey's latest book², *Earth, Universe, Cosmos*, uploaded to the internet by David Ford, but that was only a first edition copy. After I had read some of the professor's new book on the internet I bought a copy from the University of Tasmania in June 2000.

As far as I was aware at that time, Carey had never heard about me or my thoughts about dinosaurs and gravity, so I was delighted to find he had included me in the updated edition of his book³. This second edition, which had only just been published in March 2000, now included a new section about dinosaurs and gravity. It also referenced me in several other places.

The section about the effect of gravity on dinosaurs covered nearly a page. Part of the text in Carey's book explained:

“Mesozoic dinosaurs could not have existed with present surface gravity, nor would have bat-like pterosaurs with 12 metre wing spans. Engineers (Hurrell, 1994) have shown that dinosaurs' bones could not have borne their weight ...

The size of dinosaurs peaked in the Jurassic with *Diplodocus*, *Brontosaurus*, and flying reptiles like *Quetzalcoatlus*. By the mid-Cretaceous *Triceratops* and *Tyrannosaurus rex* were much smaller, although still huge. Oligocene animals were much smaller although very much larger than their modern relatives. Birds became lighter

¹ Hurrell (2011).

² Carey (1996).

³ Carey (2000).

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from the heavy-boned *Archaeopteryx* and the bird-like *Iguanodon* to much lighter modern birds.”¹

Carey was basically endorsing my own thoughts about palaeogravity. One of Carey’s former students, John Davidson, told me later that he had given Carey his own copy of my book in the late 1990s. One interesting point here is that William Erickson found that Carey didn’t believe that gravity could have been less when he contacted him in 1982. Clearly he had changed his mind by 2000.

I was also able to discover some of those specialist publications that allowed the discussion of Earth expansion and palaeogravity. One journal that encouraged articles about Earth expansion was the *New Concepts in Global Tectonics (NCGT) Journal*. It was originally initiated after a discussion at the symposium “Alternative Theories to Plate Tectonics” held in 1996 at the 30th International Geological Congress in Beijing. Over the coming years it featured many interesting articles discussing some of the problems with plate tectonics. One of my own articles² was published in 2014 and produced much interesting discussion from readers.

Earth expansion Science Conferences

Earth expansion has been discussed at numerous scientific conferences. There have even been a few conferences hosted specifically to discuss Earth expansion. Many of these passed me by but I remember seeing the *Why Expanding Earth?* conference advertised on the internet in the early 2000s. In the end I didn’t attend but Giancarlo Scalera sent me the 2003 book³ of published papers from the conference. I did attend the week-long conference, *The Earth Expansion Evidence*, held in Erice, Sicily in 2011 and have many fond memories of it. James Maxlow⁴ and his wife Anita had travelled all the way from Australia to attend. We had corresponded so frequently via email it was just like meeting an old friend. Klaus Vogel, who is well known for constructing many globes illustrating Earth expansion, was well into his eighties but enthusiastically described to me how he had just started looking at how the Chicxulub impact crater might affect his reconstructions. I was also able to discuss details of Earth expansion with Giancarlo Scalera, Jan Koviár, Stefan Cwojdzinński, Richard Guy, Vedat Shehu and many others.⁵ Ramin

¹ Carey (2000) p 131.

² See Hurrell (2014).

³ See Scalera & Jacob (2003).

⁴ See also the chapter by James Maxlow.

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Fig 2. From left to right: Carl Strutinski, Ramin Amirmardfar and the author, who all presented talks about the effect of palaeogravity on Earth expansion during the 2011 Earth expansion conference held in Sicily.

Amirmardfar had brought his friend with him to act as an Iranian interpreter. There were more than thirty participants so it's impossible to mention everyone. Perhaps the most constructive periods were the meals after the presentations when we all discussed various aspects of expansion. I remember that this period of enthusiasm continued for some time after we returned home with even more emails than normal being exchanged.

There were three presentations about palaeogravity at the conference. I presented the first lecture, followed by Ramin Amirmardfar and then Carl Strutinski.¹ These three lectures were later written up and published² in the conference book³. I was unaware that Carl Strutinski was interested in palaeogravity before the conference but since then we have had many interesting discussions. Carl was also able to resolve something that I had been puzzling about

⁵ See also the chapters by Jan Koviár, Stefan CwojdzinŹski, Richard Guy and Vedat Shehu.

¹ See also the chapter by Carl Strutinski.

² Hurrell (2012), Amirmardfar (2012) and Strutinski (2012).

³ Boschi, Cwojdzinski & Scalera (2012).

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Fig 3. One of the meals at the 2011 Earth expansion conference were various aspects of Earth expansion continued to be discussed. The left hand picture shows Anita and James Maxlow. The author and Richard Guy are in the foreground of the right hand picture.

since the late 1990s. Around that time John Davidson had sent me the cover of an old book, *Das Wachsen Der Erde*¹, written by Ludwig Kort. On the cover was a picture of a dinosaur seemingly related to an expanding Earth. Was this an early discussion of reduced gravity? John didn't know and I couldn't find any more details. Over a decade later Carl was finally able to confirm that in 1949 Kort did propose that ancient gravity was less.²

The internet

One of the most profound influences for everyone has been the internet. When I think back to the difficulty I had with even finding references to Earth expansion in the late 1980s it seems like a different world. It *was* a different world. Today I can enter the search term "Earth Expansion" and be given multiple references to read. One of those results is my own website³, which has links to numerous scientific papers published in science journals, many made freely available by the authors. The internet links us to science papers and websites galore.

The internet has evolved slowly over the years. At first there were mainly emails. Looking through the emails from the late 1990s recalls many names: Ben Berends, Bas den Brok, John Davidson, John Mann, Bill Hokenberger, Karl Luckert, James Maxlow, David Ford, Edwin Myers, Larry Myers, Charles Stewart, Henry Gwillim, Ted Holden, Ray Peat, Mark Reinhold, Duff Smith, Bob Tuttle, Jozef

¹ Kort (1949).

² See Strutinski (2012) for more details.

³ <https://www.dinox.org>

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Verhulst, Niels Westh, Don Burnett. Some have drifted away but others have become firm friends (if only in the virtual world). One email I received on the 9th September 1999 was from James Maxlow. He had found my web site and went on to say.

“Your dinosaur information cleared up a very contentious issue for me regarding whether the Earth is expanding under conditions of constant mass, or increasing mass. After reading your web site I checked my mathematical modelling today and discovered that under conditions of mass increase the surface gravity during the Permian was about 50% what it is today, precisely what you are suggesting. Prior to this I had been erring towards a constant mass scenario because of the, what I thought was an, unacceptable increase in mass for the future.”¹

These sentiments were exactly what I had hoped to achieve and we soon exchanged our respective books. Whilst email allowed us to easily contact each other the amount of data was limited so a lot of information was still sent via surface mail. In the 1990s Larry Myers would send me many physical copies of different articles he had written, while James Maxlow would send me DVDs of his Earth expansion globes. A very early method of exchanging information was by bulletin boards, a sort of crude version of a website blog page. Eventually much of this information was transferred onto websites, Facebook, Twitter and YouTube as the technology developed.

One person who has been highly successful with promoting Earth expansion on the internet is Neal Adams. His 2005 video, *Science: 01 - Conspiracy: Earth is Growing!*², has been viewed more than 2.2 million times on YouTube alone. Jeff Ogrisseg, a science writer, is only one of many people who credit these videos for their initial interest in Earth expansion. In 2009 he wrote a three page article³ about the Expanding Earth for the Japan Times.

Another person who was introduced to Earth expansion by the internet was Andrew Johnson, an Open University lecturer. He became so interested he began to deliver talks about Earth expansion at various venues around the UK. I met up with him in 2012 while he presented a talk in Blackpool. There were also printed copies of his talk, *The Earth... ..but not as we know it*, (something he would later publish in book⁴ form) and James Maxlow’s article, *Expansion Tectonics – an overview*⁵, available on a table at the back of the room. A few years

¹ Maxlow personal communication 09/09/99.

² <https://youtu.be/oJfBSc6e7QQ>

³ Ogrisseg (2009).

⁴ Johnson (2019).

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later, in 2015, Andrew Johnson interviewed Neal Adams about the Growing Earth theory and made the interview freely available on YouTube. In that interview Adams explained that Earth expansion needs to be called a Growing Earth instead of an Expanding Earth since there is mass increase. The interview covered the mass increase by “pair production”, his 2005 YouTube reconstructions and why they so closely match the reconstructions of James Maxlow and Klaus Vogel with identical exponential expansion. His long-term interest started with Prof. Carey’s concept of expansion over 30 years ago. He agreed that gravity must have been less during the dinosaurs’ time as described in my book - *T. rex* evolved to run and it can only run in a reduced gravity. And so the concept of Earth expansion is slowly passed on.

The internet has enabled me to be interviewed by people like the journalist Greg Moffitt on his Legalise Freedom program and David de Hilster on his Dissident Science channel. One particularly pleasant surprise was a video about Prof. Carey, *Planet Earth: A Question Of Expansion*¹. This was an illustrated presentation with Carey describing his long held theory that the Earth’s expansion provides an explanation of continental drift and other geological phenomena. It had been produced and distributed by the Tasmanian Film Corporation in 1982 but had been virtually forgotten until the Libraries of Tasmania put it on YouTube in 2017.

Not everyone is happy with this freedom of information. When Wikipedia launched a web page about the Expanding Earth there was a “call to arms” by some supporters of the rival theory of plate tectonics. They began “tidying up” the Expanding Earth page with a number of savage cuts beginning in June 2010. First one cut and then another removed any reference to palaeogravity or why the latest evidence indicated that Earth expansion must be caused by mass increase. By October 2010 the “improvement” had been the gradual deletion of any evidence in support of the Earth expansion theory and elimination of references to modern scientists developing it further. References to articles by the well-known expansionists, Giancarlo Scalera, James Maxlow, Stavros Tassos and others had been removed. The scientific evidence for a variation in palaeogravity had been removed completely. Later, Wikipedia editors opposed to Earth expansion deliberately deleted the page on Wikipedia describing the work of the celebrated German scientist Ott Christoph Hilgenberg, one of the founders of the expanding Earth theory.

⁵ http://www.jamesmaxlow.com/pdf/Expansion_Tectonics_2.pdf

¹ <https://youtu.be/Othb0xsvZb4>

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*

One place that prides itself on its scientific approach is the Geological Society of London. This institution was inaugurated in 1807 and has a long history of debating controversial geological topics. During its time the society's members have debated innovative geological ideas like the age of the Earth, Ice Ages and continental displacement while other people mostly ignored the subjects. During his presidential address in 1953, George Martin Lees highlighted the poor fit of South America-Africa as one of the crucial reasons to reject the controversial theory of continental displacement. The Australian geologist S. Warren Carey countered that the fit was very good and in 1955 the Geological Society published¹ Carey's South American-African assembly proving the point. Over a decade later a computer fit based on Carey's reconstruction was published - it became widely known as the Bullard Fit. Nowadays that same reconstruction is published in virtually every modern geological textbook as evidence for continental drift (known today as plate tectonics). With such a long history of debate it's no surprise that the Geological Society hosted a debate² about Earth expansion in January 1979. In 2016 they returned to the subject when they published Professor Stefan Cwojdzinski's article³ discussing Earth expansion. The concept of Earth expansion is one of the most long-running controversial geoscience topics still being debated by serious scientists.

Final thoughts

Today I am mostly involved with trying to generate the most accurate estimates of palaeogravity. The method showing the greatest promise is the weight-mass method. This compares the weight of a dinosaur (estimated from their leg bone dimensions) against their mass (estimated from the volume of their bodies), enabling the calculation of palaeogravity at various times in the past. It is giving the most

¹ Carey (1955).

² On the 17 January 1979, the Geological Society of London and the Association for Geophysics hosted a joint meeting entitled: *An expanding Earth? The meeting was a debate about the geological evidence for expansion by four speakers who had been chosen to present a balanced view of the evidence. The first talk by A. D. Stewart was; Quantitative limits to palaeoradius. The second talk was by S. Warren Carey; The expanding Earth. Keith Runcorn gave the third talk; A geophysicist's view of the expanding Earth hypothesis. The final talk presented was by Hugh G. Owen; Ocean-floor spreading patterns do not support the constant dimensions Earth.*

³ Cwojdzinski (2016).

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accurate values of palaeogravity yet and the results are being made freely available on my website and elsewhere as I produce them.

The application of this weight-mass technique to four specimens of *Tyrannosaurus rex*, representing some of the most complete theropod dinosaur skeletons known, provides us with a reasonably accurate value of palaeogravity when they lived. For the four *Tyrannosaurus rex* specimens “Carnegie” CMNH 9380, “Wankel rex” MOR 555, “Stan” BHI 3033 and “Sue” FMNH PR 2081, the results indicate that a palaeogravity of 0.67g, 0.66g, 0.61g, and 0.64g respectively are reliable estimates for 67 million years ago.

Using this weight-mass technique allows me to push the palaeogravity calculations back in time to one of the very first dinosaurs, *Coelophysis*. Two specimens of this animal allow us to predict palaeogravities of approximately 0.42g and 0.44g at 210 million years ago (Ma). Other animals produce a range of palaeogravity estimates: *Megalosaurus* predicts 0.51g at 167 Ma, *Giraffatitan* predicts 0.54g at 152 Ma, *Acrocanthosaurus* predicts 0.54g at 113 Ma, *Gigantoraptor* predicts 0.61g at 80 Ma, *Euoplocephalus* predicts 0.65g at 76 Ma, *Ankylosaurus* predicts 0.69g at 67Ma and *Paraceratherium* predicts

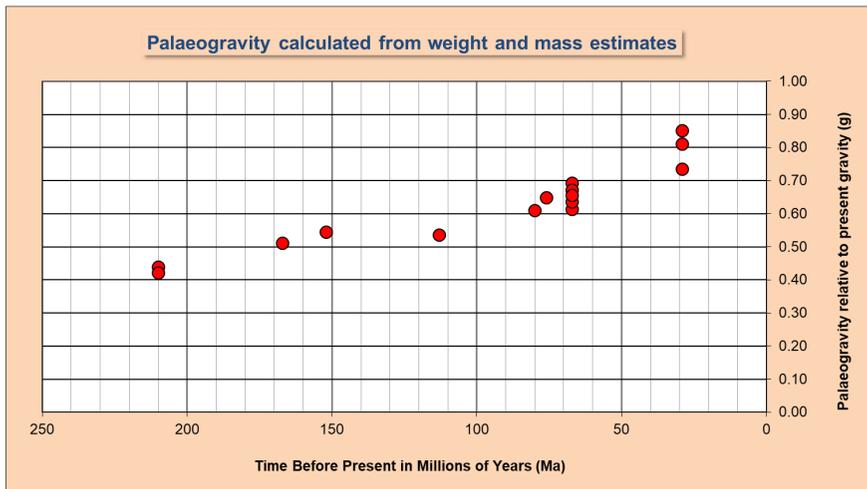


Fig 4. Graph showing slowly increasing palaeogravity over time, based on weight and mass estimates of prehistoric life. *Coelophysis*: 0.42g and 0.44g at 210 Ma, *Megalosaurus*: 0.51g at 167 Ma, *Giraffatitan*: 0.54g at 152 Ma, *Acrocanthosaurus*: 0.54g at 113 Ma, *Gigantoraptor*: 0.61g at 80 Ma, *Euoplocephalus*: 0.65g at 76 Ma, *Tyrannosaurus rex*: 0.67g, 0.66g, 0.61g, and 0.64g at 67 Ma, *Ankylosaurus*: 0.69g at 67Ma and *Paraceratherium*: 0.73g, 0.81g and 0.85g at 29 Ma. See Hurrell (2018) and Hurrell (2019a to 2019h) for complete details.

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0.73g, 0.81g and 0.85g at 29 Ma. Plotting all these results, as shown in Fig. 4, indicates that palaeogravity has been slowly increasing to its present-day value.

Looking back over the years I don't feel my evidence for an ancient reduced gravity has changed substantially. In 1992 my article to the science journal *Nature* was entitled, "Was gravity less when the dinosaurs were alive?". In 2019 my 10 minute talk to the Liverpool Geological Society was entitled, "Can we calculate palaeogravity?", detailing some of my latest estimates for palaeogravity using the weight-mass method. I intend to give a very similar talk at the Polish Geological Congress in June 2020. What *has* changed significantly is that whereas science editors struggled to see any relevance for my evidence in the 1990s, today people are starting to agree that the evidence does indicate gravity was less in the past. Perhaps in another 30 years virtually everyone will agree it is obvious.

About the Contributor



Stephen W. Hurrell was a Design Engineer working at the UK's Electricity Research Centre when he first became interested in the structural strength of dinosaurs. This developed into the concept of a Reduced Gravity Earth and a life long interest in developing various methods to calculate palaeogravity. He has interacted with many Earth expansionists to argue that palaeogravity must be related to Earth expansion and this implies it was caused by the mass increase of the Earth. Details of his latest work are available on his web site dinox.org.

This essay was first published as a chapter in the 2020 book, *The Hidden History of Earth Expansion*, which is widely available from good bookshops in both Hardback and Paperback editions, as well as a Google eBook.

The Hidden History of Earth Expansion presents the personal histories of some of the most well-known researchers into Earth expansion in 14 original essays. In addition to furnishing us with their personal histories, as they strived to explore the seemingly overwhelming evidence for confirmation of Earth expansion, the authors' highlight areas where further research is required.

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