



**Highly Commended**

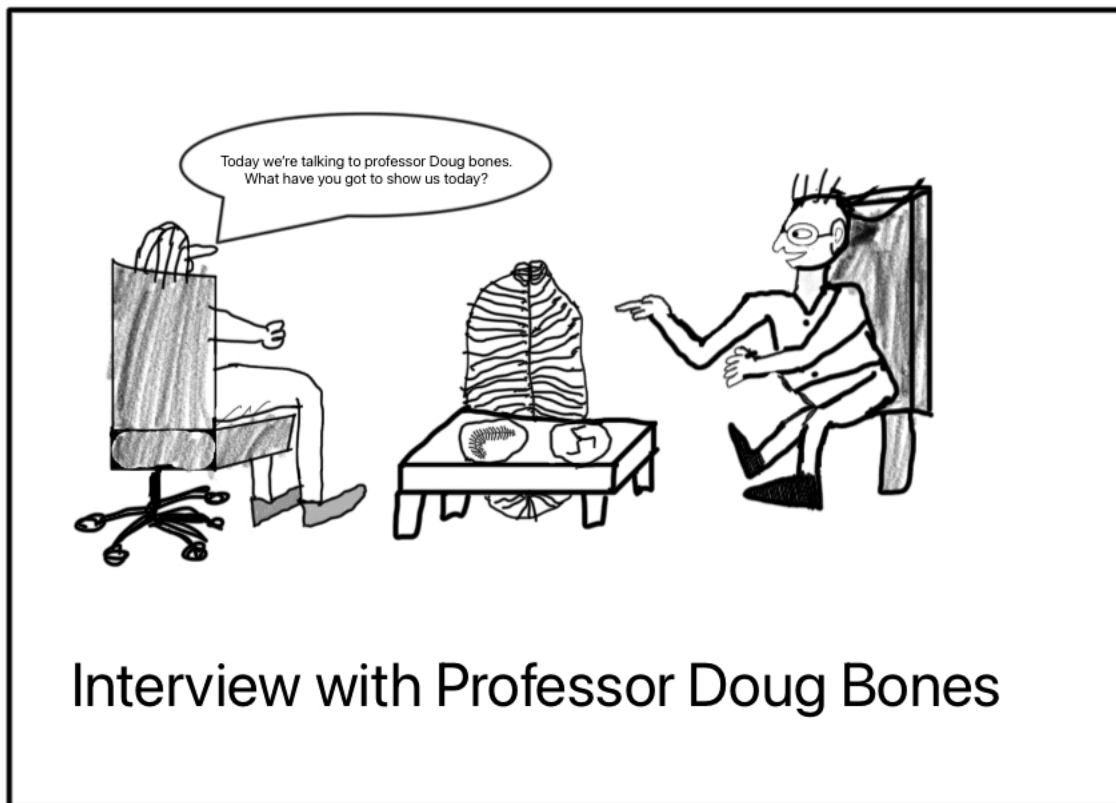
# **Science Writing - Commemorative Topic Year 7 - 8**

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## Commemorative Science Writing Topic



**Interviewer:** Today, we are here in South Australia talking with fossil expert **Professor Doug Bones**. Tell me the story of how **Spriggina** was discovered?

**Scientist:** Back in 1946 a geologist named Reginald Sprigg was investigating old mining leases near the Ediacara hills in the Flinders Ranges when he knocked over his water bottle, revealing a pattern on the rock. He picked up what he thought at the time, was a fossil of a sponge and that was the beginning of an incredible discovery of a collection of fossils in an area of the Flinders Ranges in called the Ediacara Hills (Dcceew.gov.au, 2022).

**Interviewer: Why did it take 30 years to name to recognise and these fossils?**

Scientist: First scientists believed it was impossible that fossils of early animals could be found in 550-million-year-old rocks. They thought that after death, animals with soft bodies and without a skeleton would decay too quickly preventing the normal fossil mineralisation of bones or shells. It was only after scientists discovered evidence that these fossils were molds or casts left by the soft bodies of animals and after more fossils were recognised in similar geologic formations around the world (Droser and Gehling, 2015) (Droser et al., 2022).

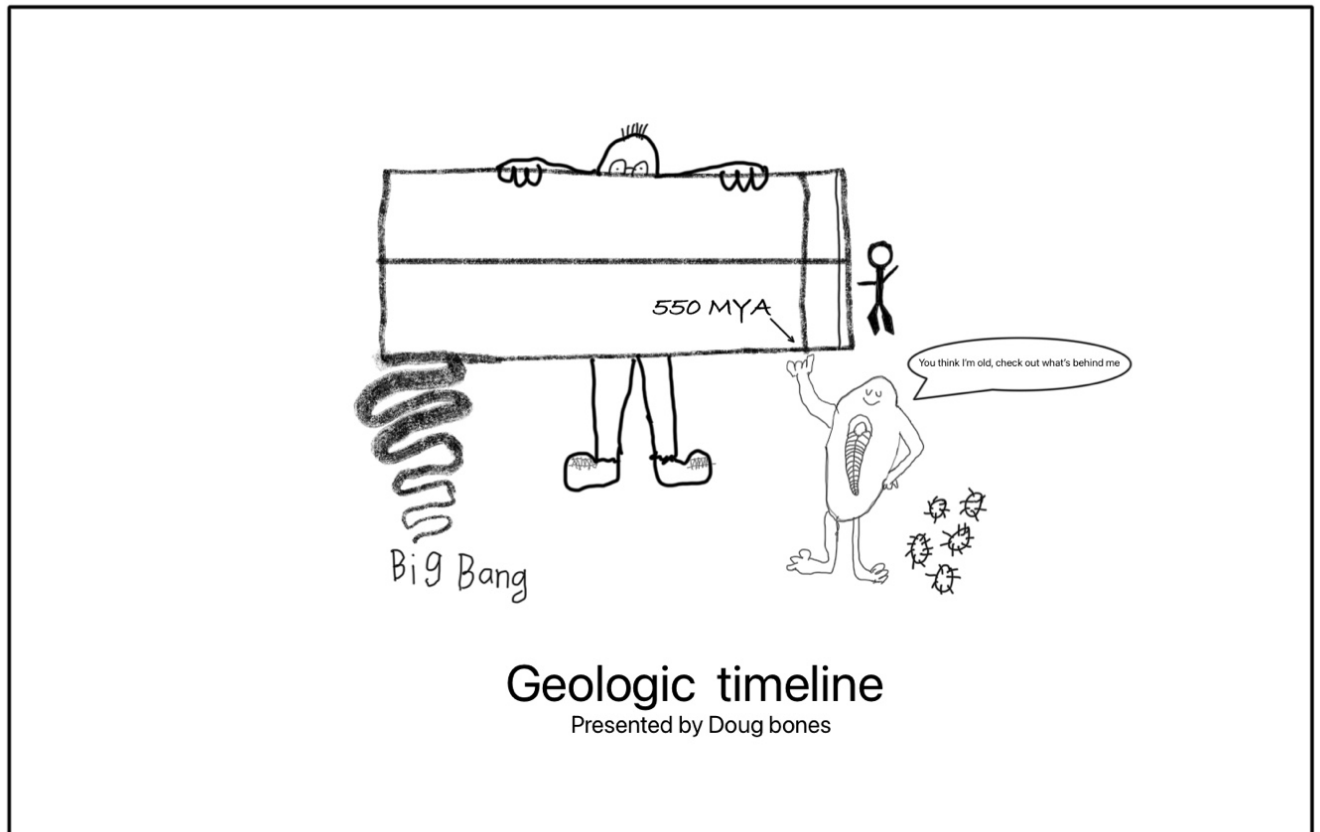
**Interviewer: What fossils have been found?**

Scientist: First, we have *Spriggina floundersi*, a small tapered fossil with an obvious head and tail end (3 – 5cm long) named after Reginald Sprigg, then *Dickinsonia rex*, a rather large fossil (over a metre in length) and *Dickinsonia costata* (4– 150mm long), named after a mining department colleague (Flinders Ranges Ediacara Foundation, 2024), Attenborities, grape sized, translucent creatures that resemble jellyfish, named after Sir David Attenborough and *Tribrachidium*, named after its triradial symmetry or three legged appearance (Good Living, 2023).

**Interviewer: We now refer to these fossils as coming from the Ediacaran period, what does this mean?**

Scientist: We use a scale called geologic time to describe earth history from its formation to the present. The first three eons, long periods of time around 1-2 billion years each, were a time when the earth's crust was being formed. It was a terrible environment with glacial freezes, oceans and atmosphere mostly devoid of oxygen. The current or fourth eon, called the Phanerozoic from 541 million years ago is when biology has flourished (Earth@Home, 2024).

The 100 million years we now know as the Ediacaran period is the last time period of the previous eon called the Proterozoic, just before the Cambrian period. It was recognised in the 2003 by the Geological Survey and (KNOLL et al., 2006) Scientists believe the Ediacaran period forms the missing link between single cell life and the Cambrian explosion of life.



**Interviewer: What changed around 600ma to make life happen?**

**Scientist:** The environment was incredibly hostile in at the end of the Proterozoic but as the earth warmed after one of its coldest periods called “snowball earth”, the increase in volcanic activity melted glaciers caused nutrients from rocks to enter the ocean. These nutrients fed the photosynthetic algal blooms and cyanobacteria which in turn increased the oxygen levels in oceans. We think this oxygen supported the development of multicellular organisms and helped build huge microbial mats covering the floor of the oceans. This is the change that triggered the Ediacaran biota development (Si.edu, 2024)

**Interviewer: Why the Ediacaran hills in South Australia and not somewhere else?**

Scientist: This area was once a shallow marine environment (Droser et al., 2022) (Droser and Gehling, 2015). A perfect spot, so that when soft bodied organisms died in low wave energy environment, fine sediment could rapidly cover the dead organism. These seas were very rich in a silica laden sediment, called siliciclastic mudstones and siltstones that could settle on and around the body forming a type of natural cement.

As the body decays its image remains imprinted with its detail preserved in “rapid set cement” and the result is a concave or mold fossil. If the sediment flows into and hardens in the space where the body has decayed, a convex or cast fossil is created (Slagter et al., 2022).

**Interviewer: What can you tell us about Spriggina and the other animals found at Ediacara?**

Scientist: These animals lived and fed on the algal and bacterial slime mats that covered the sea floor in the shallow marine environments. We have evidence of these mats from rock impressions known as Textured Organic Surfaces or TOS (Gehling and Droser, 2009). As gentle marine animals they did not need protective shells, armour or teeth as there were no predators.

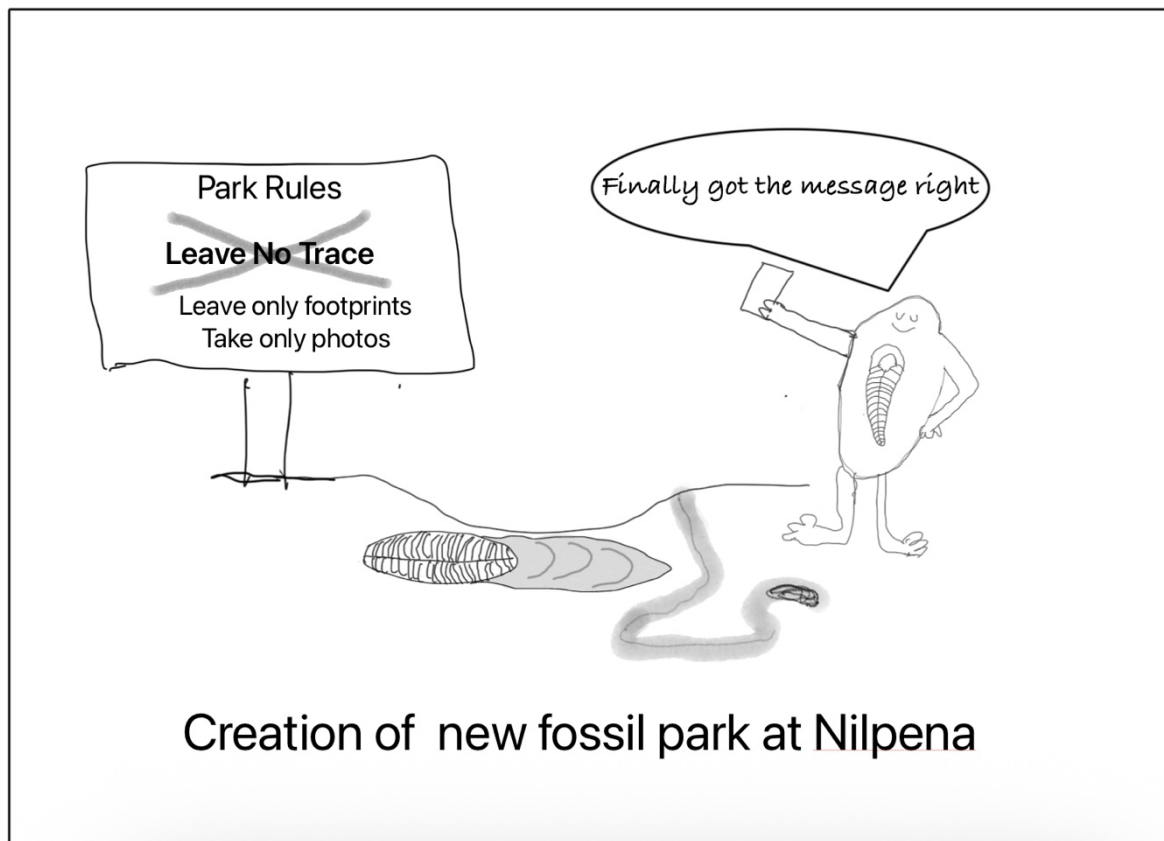
**Interviewer: Is Spriggina an animal?**

Scientist: Yes, its most definitely an animal. We need to remember that a primitive animal that we find in the Ediacaran fossil bed looks quite different to animals today. But that doesn't mean they are bacteria or plants.

We define animals as living things that have developed a multicellular structure with flexible cell walls and a body shape with a head end and tail end, something we call axial polarity. Animals also have bilateral symmetry which means they have developed a nodal pathway, you could say they have their own GPS system to direct which side of their body is left and right, directing which cells develop into different parts of the body and organs.

The last critical piece of evidence is movement. For this we have some evidence that species like Dickinsonia and Kimberella could move. We have discovered external mold fossils of Kimberella at the end of what we believe are feeding trails in the rocks at Nilpena (Droser and Gehling,

2015). These feeding trails we call trace fossils because they are impressions left by these animals as they moved, grazed and burrowed their way across the landscape (www.Ediacaran.org, n.d.). Just because we can't link any of these fossils to modern animals suggests that they went extinct after the Ediacaran and before the Cambrian explosion. Maybe a failed evolutionary experiment or we just haven't identified their ancestral link yet.



**Interviewer:** Yes, all good evidence but some scientists still think that fossils like Dickinsonia are not true animals because they represent fluid filled multicellular organisms. and that there is no evidence of movement (RETALLACK, 2025)

**Scientist:** Yes, Yes There is a category of called vendobionts and certainly Dickinsonia with its quilted appearance looks like it fits that category. But an Australian researcher Ilya Bobrovskiy applied the study of the specific molecular chemistry of animals to the fossil environment. In other words, he began studying fossil fats in the sediments immediately surrounding these fossil casts (ANU Research School of Earth Sciences, 2024). Finding that the Dickinsonia fossil contained 90% cholesterol compounds, only found in animals, he concluded Dickinsonia was an animal (PBS Eons, 2020)

**Interviewer:** What do you think these fossils can show us about evolution?

**Scientist:** The Ediacaran period provides the evolutionary link between single cell organisms known as protozoans to the huge group we call the metazoans made up of all multicellular animals from sponges and jellyfish at one end to humans at the other. It reveals the Cambrian explosion did not come from nowhere, but it was fuelled by the changes occurring in the Ediacaran.

The appearance of the first marine predators at the beginning of the Cambrian meant the end of the gentle filter feeder of the Ediacaran. After all animals that had mouths, teeth and developed a gut could move around and eat other animals would certainly be more successful driver of evolution for other predators and protective shells.

**Interviewer:** What's the future for the study of these fossils?

**Scientist:** As I have mentioned molecular chemistry techniques are starting to help separate these fossils from their environment. Whilst it's not DNA, there are other unique chemical signatures in living cells such as cholesterol and primitive embryonic proteins that may will help us sort out this puzzle further. Even the study of biomechanics of modern animals directs the modelling of how primitive animals moved and the traces they leave (Nhm.ac.uk, 2025). Who knows, another big discovery could be under the next rock.

**Interviewer: Finally, why is it important to learn about something that lived 550 million years ago?**

**Scientist:** Geologists are interested in fossils because it reveals the age of a rock and its useful in finding minerals.

We also want to know how life developed on earth. When we discover how life developed in the different the climatic and geologic conditions it will help us search for evidence of life on other planets. The story of fossils can provide critical insight into how our planet might continue to sustain life with the changing climate.

**Interviewer: Thank you for your time today and telling us about the wonderful discoveries made in outback South Australia.**

**Scientist:** It's really the start of an exciting journey and Spriggina has certainly put us on the map.



**Word Count 1468**

## **Reference list**

ANU Research School of Earth Sciences. (2024). *Latest Discoveries and Updates from Brocks Geobiology Group*. [online] Available at: <https://earthsciences.anu.edu.au/news-events/news/latest-discoveries-and-updates-brocks-geobiology-group> [Accessed 28 Jun. 2026].

Dcceew.gov.au. (2022). *National Heritage Places - Ediacara Fossil Site - Nilpena - DCCEEW*. [online] Available at: <https://www.dcceew.gov.au/parks-heritage/heritage/places/national/ediacara>.

Droser, M.L., Evans, S.D., Tarhan, L.G., Surprenant, R.L., Hughes, I.V., Hughes, E.B. and Gehling, J.G. (2022). What Happens Between Depositional Events, Stays Between Depositional Events: The Significance of Organic Mat Surfaces in the Capture of Ediacara Communities and the Sedimentary Rocks That Preserve Them. *Frontiers in Earth Science*, 10. doi:<https://doi.org/10.3389/feart.2022.826353>.

Droser, M.L. and Gehling, J.G. (2015). The advent of animals: The view from the Ediacaran. *Proceedings of the National Academy of Sciences*, [online] 112(16), pp.4865–4870. doi:<https://doi.org/10.1073/pnas.1403669112>.

Earth@Home. (2024). *Geologic Time Scale*. [online] Available at: <https://earthathome.org/geologic-time-scale> [Accessed 28 Jun. 2026].

Flinders Ranges Ediacara Foundation. (2024). *Ediacaran Fossils | Flinders Ranges Ediacara Foundation*. [online] Available at: <https://ediacarafoundation.org/ediacaran-fossils/>.

Gehling, J.G. and Droser, M.L. (2009). Textured organic surfaces associated with the Ediacara biota in South Australia. *Earth-Science Reviews*, 96(3), pp.196–206. doi:<https://doi.org/10.1016/j.earscirev.2009.03.002>.

Good Living. (2023). *Meet the who's who of the Ediacara world*. [online] Available at: <https://www.environment.sa.gov.au/goodliving/posts/2023/05/nilpena-ediacara-park-fossils>.

KNOLL, A., WALTER, M., NARBONNE, G. and CHRISTIE-BLICK, N. (2006). The Ediacaran Period: a new addition to the geologic time scale. *Lethaia*, 39(1), pp.13–30. doi:<https://doi.org/10.1080/00241160500409223>.

MacGabhann, Breandán Anraoi (2014). There is no such thing as the ‘Ediacara Biota’. *Thematic Section: Geophysical signatures of Precambrian shields and suture zones*, [online] 5(1), pp.53–62. doi:<https://doi.org/10.1016/j.gsf.2013.08.001>.

Nhm.ac.uk. (2025). *Complex animals living millions of years before the Cambrian Explosion revealed by seabed tracks | Natural History Museum*. [online] Available at: <https://www.nhm.ac.uk/discover/news/2025/july/complex-animals-living-before-cambrian-explosion.html>.

PBS Eons (2020). *How We Identified One of Earth’s Earliest Animals*. YouTube. Available at: <https://www.youtube.com/watch?v=PGBf4Q2XWZo>.

RETALLACK, G.J. (2025). Mobility of Ediacaran organisms: A review. *Journal of the Palaeontological Society of India*. doi:<https://doi.org/10.1177/05529360251353060>.

Runnegar, B. (2021). Following the logic behind biological interpretations of the Ediacaran biotas. *Geological Magazine*, 159(7), pp.1093–1117. doi:<https://doi.org/10.1017/s0016756821000443>.

Si.edu. (2024). *Life in the Ediacaran | Smithsonian Ocean*. [online] Available at: <https://ocean.si.edu/through-time/ancient-seas/life-edicaran>.

Slagter, S., Hao, W., Planavsky, N.J., Konhauser, K.O. and Tarhan, L.G. (2022). Biofilms as agents of Ediacara-style fossilization. *Scientific Reports*, 12(1). doi:<https://doi.org/10.1038/s41598-022-12473-1>.

Wang, Z. and Miguez-Salas, O. (2025). Quantitative decoding of Ediacaran locomotory trace fossil morphologies: Evidence for the emergence of slender anterior-posterior body profiles. *Geology*, [online] 53(9), pp.732–736. doi:<https://doi.org/10.1130/g53332.1>.

www.Ediacaran.org. (n.d.). *Flinders Ranges, South Australia*. [online] Available at: <http://www.ediacaran.org/flinders-ranges-south-australia.html>.

www.Ediacaran.org. (n.d.). *Trace fossils*. [online] Available at: <http://www.ediacaran.org/trace-fossils.html>.