



Prize Winner

Science Writing

Year 9 - 10

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Spriggina: Palaeontological Secrets Discovered in Stone

Written by Yesha Patel
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The rock had kept its secret for over half a billion years.

It had survived continents drifting apart, oceans rising and falling, mass extinctions, asteroid impacts, and ice ages.

It had remained silent through the reign of dinosaurs and watched humans appear only in the final heartbeat of Earth's history.

Then one day...

Someone split it open.

Inside was not treasure.

It was a question.

Imagine discovering a machine unlike anything humanity has ever built, but its instruction manual had vanished.

You could examine every screw, every gear and every circuit. You could measure it, compare it and even predict how some parts might work. Yet without the instructions you could never be completely certain what it was designed to do.

This is the challenge facing palaeontologists.

Spriggina is one of the most iconic fossils from the Ediacaran Period, preserved within the ancient rocks of South Australia's Flinders Ranges. Scientists can observe its segmented body, its distinctive crescent-shaped head and its remarkable bilateral symmetry. They can predict when it lived, where it was buried and how it became fossilised.

The fossils preserved fragments of Spriggina's instruction manual. Some pages remained remarkably clear, however others were faded, torn or missing altogether. For more than eighty years, palaeontologists have been trying to reconstruct what time erased.

How did it move?

What did it eat?

Was it one of the earliest animals, a distant relative of arthropods or a member of an entirely extinct lineage unlike anything that is roaming the Earth today?

For more than eighty years, each new discovery has attempted to rewrite another page of that missing manual. Piece by piece, discovery by discovery, scientists have reconstructed a creature that lived over 541 million years ago, not by guessing, but through careful observation, comparison, and evidence.

This is the secret of how science rebuilds an ancient instruction manual that nature never intended for us to read.

Manual Page 1: Blueprint

The first clues for the instruction manual came from the fossil itself.

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Spriggina is an extinct genus of soft-bodied organisms that lived approximately 541 million years ago during the late Ediacaran Period. It is known from fossil impressions discovered in the Ediacara Hills of South Australia's Flinders Ranges, where geologist Reginald 'Reg' Sprigg first uncovered the remarkable fossil assemblage in 1946, as shown in Figure 1. Dr Reg Sprigg was the first person to document the Ediacara fossils in South Australia, making an important contribution to the study of ancient life. At first his discoveries were met with scepticism, but he remained determined and continued to prove that the fossils he had discovered were extremely significant (Gage, 2017). His work was later recognised when the genus Spriggina was named in his honour. Spriggina is now the 'fossil emblem of South Australia' and has never been found anywhere else in the world. (Government House Adelaide, 2025).



*Figure 1 - Size Comparison of Spriggina
(Desonie, 2026)*

Spriggina floundersi grew around 3-5cm in length and is vital to understanding bilateral symmetry, a development of evolution that became a trait of more complex organisms including humans. Spriggina presents a crescent shaped head and several segments tapering to the posterior end (UCMP Berkeley, n.d.). While it is likely that Spriggina may have been capable of movement, no direct evidence has been published (Flinders University, 2025).

Manual Page 2: Environment

The next clues for the instruction manual came from the rocks surrounding it.

Around 550 million years ago, during the late Ediacaran Period, *Spriggina* inhabited shallow marine environments that covered much of what is now South Australia (SA Museum, 2025). Unlike modern oceans, these seas contained no fish, coral reefs or marine plants. Instead, the seafloor was carpeted by sticky microbial mats which were dense communities of microorganisms that stabilised sediments and played a vital role in preserving soft-bodied organisms after death. (Droser et al., 2017).

Geochemical evidence suggests that the Ediacaran oceans were becoming increasingly oxygenated, proving conditions that supported the emergence and diversification of complex multicellular life. (Fike et al., 2006).

Together, these unique Ediacaran conditions shaped the unusual environment in which Spriggina lived and was eventually preserved.

Manual Page 3: Classification

Now the evidence for the next pages had to be compared with other organisms, both living and extinct.

Spriggina's position on the tree of life is hotly debated by palaeontologists, linking it to three major possibilities:

Arthropods: Spriggina has a distinct crescent shaped head and heavily segmented body, sternly resembling early trilobites. Some researchers consider it an ancestor or close relative of modern arthropods. That being said, this idea is not strongly supported because Spriggina does not clearly

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show jointed limbs or a mineralised exoskeleton which are major arthropod features, meaning this theory is mostly based on superficial similarity (UCMP Berkeley, n.d.). Additionally, Spriggina possesses glide-reflection morphology rather than bilateral symmetry, precluding it from the arthropod phylum (PaleoZoo, n.d.).

Annelid Worms: Spriggina was first interpreted as an annelid because its body looks worm-like and segmented. However modern research identifies that Spriggina does not possess conclusive evidence of parapodia (paired, lateral outgrowths characteristic of annelid worms) or bristles (Trevelyan, 2026).

Proarticulata: The most widely accepted modern view is that Spriggina belongs to an entirely extinct phylum of bilaterian animals known as Proarticulata. These animals are notable for 'glide symmetry' meaning their left and right body segments are offset rather than aligned perfectly (Ivantsov, n.d.)

Because Spriggina is known only from imprecise fossil impressions and its key body structures are unclear, its exact evolutionary relationship still remains uncertain.

Manual Page 4: Behaviour

Here, the evidence for the manual becomes sparse. Scientists are forced to infer behaviour mostly from anatomy alone.

The most mysterious pages of Spriggina's instruction manual are those describing how it actually lived. Without a preserved mouth, digestive organs or limbs, scientists must reconstruct its behaviour from indirect evidence preserved in the fossil record.

Its flattened body and bilateral organisation suggest that Spriggina was capable of directed movement across microbial mat-covered seafloors, although unlike some other Ediacaran organisms, there is no direct evidence that it fed by grazing on the mats. (Evans, 2019) Unlike radially symmetrical organisms which lack a distinct front and back, Spriggina possessed a clear anterior (head) and posterior (tail) end. This body organisation, known as bilateral symmetry, allows organisms to move purposefully through its environment rather than drifting passively. Its broad ventral surface may also have distributed its weight across the soft microbial mats, preventing it from sinking to fine marine sediments. Its ventral characteristics may have also distributed its weight more evenly across the soft seafloor, reducing the likelihood of sinking into loose sediments.

In the contrary, exactly how Spriggina obtained food remains uncertain. Unlike Dickinsonia, another Ediacaran organism which is associated with distinctive grazing traces along the sea-floor mat, no such feeding traces have been definitively linked to Spriggina (Finkel, 2019)

Manual Page 5: Preservation

Ironically, the final clue for the manual came from the very process that buried it.

Unlike animals with bones or shells, Spriggina possessed a completely soft body, making fossilisation highly unlikely. Under normal conditions, soft tissues rapidly decompose or are consumed by organisms in the environment, leaving minimal trace. However, the Ediacaran seafloor was an ecosystem unlike anything today.

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Since the ocean floor was blanketed in microbial mats which were sticky and gelatinous, when an organism died it made its way directly into this surface. Some of these organisms then became trapped in the fine silt located in the tides and fossilised as the silt turned into stone. With the alteration of sea levels, the sea floor evolved into what we recognise today as the Flinders Ranges in South Australia (Slagter et al, 2022).

Without this specific type of preservation, known as Ediacara-style fossilisation, organisms such as Spriggina and Dickinsonia may have never entered the fossil record (Slagter et al, 2022).

Manual Page 6: Legacy

Even after assembling every piece of evidence, parts of the manual still remain unreadable.

Despite decades of research, scientists continue to debate where Spriggina belongs on the tree of evolution. Each new fossil, improved imaging technique and scientific discovery offers more clues, yet no single piece of evidence has solved the puzzle.

This uncertainty is not a weakness of science; it is actually one of its greatest strengths. Rather than accepting assumptions, palaeontologists continually test hypotheses against new evidence, refining our understanding of Earth's earliest animals as new discoveries emerge.

Perhaps that is what makes Spriggina so legendary. It reminds us that fossils are much more than impressions of ancient organisms preserved in stone, they are fragments of Earth's biological history, waiting to be understood and interpreted.

The rock in which Spriggina was found did not preserve all the answers.

It preserved something far more valuable.

The opportunity to keep asking the questions which shape scientific discovery today.

Reference List:

1. Evans, S.D., Gehling, J.G. and Droser, M.L. (2019). Slime travelers: Early evidence of animal mobility and feeding in an organic mat world. *Geobiology*, 17(5), pp.490–509.
doi:<https://doi.org/10.1111/gbi.12351>.
2. Fike, D.A., Grotzinger, J.P., Pratt, L.M. and Summons, R.E. (2006). Oxidation of the Ediacaran Ocean. *Nature*, [online] 444(7120). Available at:
<https://pubmed.ncbi.nlm.nih.gov/17151665/>.
3. Flinders.edu.au. (2025). *Spriggina floundersi* | VAMP. [online] Available at:
<https://sites.flinders.edu.au/vamp/969-2/>.

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4. Gage, N. (2017). *Reg Sprigg honoured with South Australia's first fossil emblem, the Spriggina*. [online] Abc.net.au. Available at: <https://www.abc.net.au/news/2017-02-15/reg-sprigg-recognised-honoured-with-sa-fossil-emblem-spriggina/8271586>.
5. Government House Adelaide. (2025). *Prehistoric Wonders: A Deep Dive into... | Government House Adelaide*. [online] Available at: <https://www.governor.sa.gov.au/government-house/exhibits-at-government-house/prehistoric-wonders-a-deep-dive-into-fossils-from-south-australias-past>.
6. Ivantsov, A. (n.d.). *Vendian Animals in the Phylum Proarticulata*. [online] Available at: https://www.monash.edu/data/assets/pdf_file/0010/75655/ivantsov.pdf.
7. Sa.gov.au. (2025). *Ediacara fossils gallery*. [online] Available at: <https://www.samuseum.sa.gov.au/ediacara-fossils-gallery>.
8. 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>.
9. Tarhan, L., Droser, M., Gehling, J. and Dzaugis, M. (2017). *Microbial mat sandwiches and other anactulistic sedimentary features of the Ediacara Member (Rawnsley Quartzite, South Australia): Implications for interpretation of the Ediacaran sedimentary record*. [online] Research Gate. Available at: https://www.researchgate.net/publication/314288480_Microbial_mat_sandwiches_and_other_anactulistic_sedimentary_features_of_the_Ediacara_Member_Rawnsley_Quartzite_South_Australia_Implications_for_interpretation_of_the_Ediacaran_sedimentary_record.
10. Trevelyan, J. (2026). *The weird and wonderful of the Ediacaran Period (Part 9): Spriggina – a segmented pioneer of the Ediacaran world*. [online] Deposits Earth Science Archive. Available at: <https://depositsmag.com/2026/03/11/the-weird-and-wonderful-of-the-ediacaran-period-part-9-spriggina-a-segmented-pioneer-of-the-ediacaran-world/>.
11. ucmp.berkeley.edu. (n.d.). *Introduction to the Arthropoda*. [online] Available at: <https://ucmp.berkeley.edu/arthropoda/arthropoda.html>.
12. ucmp.berkeley.edu. (n.d.). *Spriggina*. [online] Available at: <https://ucmp.berkeley.edu/vendian/spriggina.html>.

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13. www.paleozoo.com.au. (n.d.). *Spriggina floundersi* model from Paleozoo Evolutionary Models. [online] Available at: <https://www.paleozoo.com.au/spriggina.php>.
14. Finkil (2019). *This Australian farmer is saving fossils of some of the planet's weirdest, most ancient creatures*. Science.org. Available at: <https://www.science.org/content/article/australian-farmer-saving-fossils-some-planet-s-weirdest-most-ancient-creatures>