

A Trip to Mistaken Point,
Newfoundland

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In July 2017 I was very fortunate to be able to visit the Mistaken Point Ecological Reserve in Newfoundland on two successive days. Mistaken point is the southernmost tip of Newfoundland and faces out into the bleak Atlantic Ocean. It was nearby at Cape Race that the distress call from the Titanic was first received. The Gulf Stream meets the cold Arctic currents and thick fog blows inland much of the year.

My eagerness to visit such a bleak place was to see the world's oldest multi-cellular soft bodied fossils. Access is strictly controlled and a limited number of people are allowed on the daily Ranger-guided 6km walk to the fossil beds. Absolutely no collection or un-permitted access is allowed.

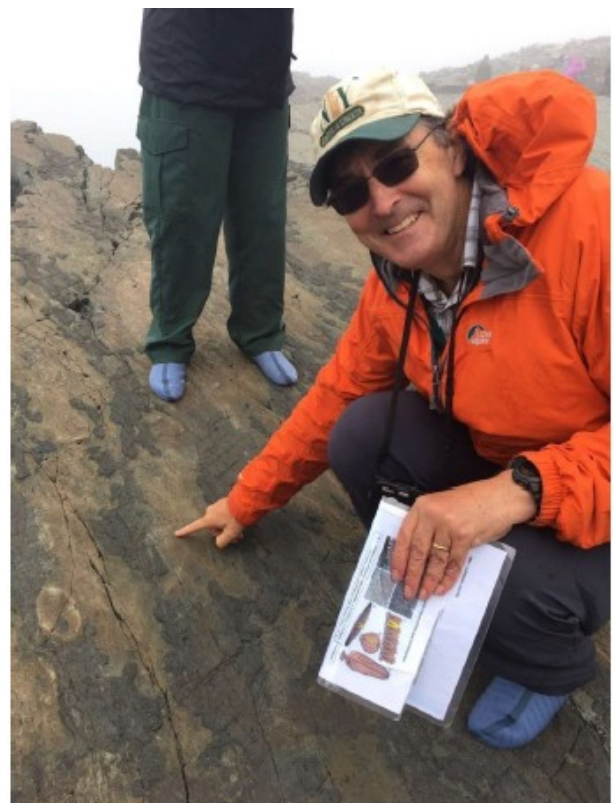


Fig 1, Graham Hickman on the 'E' surface



Fig 2, Close-ups of fossils with very fine details

At Mistaken Point over 100 bedding planes are reported to have fossil impressions. The Ranger-guided visit is to the 'D' and 'F' bedding planes within the Mistaken Point Formation. They were impressive with hundreds of fossils on each bedding plane. We had to remove our boots and were given soft slippers to wear before being allowed onto the rock surfaces. As my son later pointed out, all old things need slippers!

As a geology graduate from Leicester University I was very familiar with the ancient fossil *Charniodiscus*. My lecturer, Dr Trevor Ford, had been instrumental in publishing and naming the fossil after the school boy Rodger Mason who discovered it while rock climbing near Charnwood Forest. Subsequent discoveries of similarly old fossil strata from around the world have been studied and a great deal more is known about this period of time now. In 2004 it was given its own period name in the Geological Chart, the Ediacaran, after the mountains in Australia. It runs from 635 to 541 million years (according to the latest ISC chart) and is the last period of the Neoproterozoic Era. (Late Pre-Cambrian).

The amazing thing about Mistaken Point is the in-situ preservation, abundance and variety of Ediacaran fossils. Some 20 different species have been identified.

The sediments are fine grained turbidite silts and mudstones with only minor structural deformation. Many of the fossils have disc like attachments with which they attached themselves to the substrate. The turbidites are interpreted to have been deposited at the edge of submarine fans in water depths below the photic zone. The in-situ fossilisation and environmental interpretation makes these primitive animals rather than plants. The diorama below shows the likely life



Fig 3, Diorama of likely life positions of animals from Mistaken Point

positions of the different species of animals found at Mistaken Point, (The photo was taken in the Miller Hall Geological

Group	Formation	Known range of Ediacaran macrofossils in Newfoundland H14 'E' 'D'
St. John's	Renews Head	
	Fermeuse	
	Trepassey	
Conception	Mistaken Point	
	Briscol	
	Drook	
	Gaskiers	
	Mall Bay	

Fig 4, Stratigraphic Column

Museum in Kingston, Ontario, CA).

The preservation has occurred due to a layer of volcanic ash with little disruption to the fossils, a slight alignment is observed in the fossils but few broken or displaced pieces. Photo below left shows an abundance of fossil impressions on the 'E' bedding surface. The lighter brown areas are where the volcanic ash layer has not been eroded from the outcrop.



Fig 5, more fossils



Fig 6, expanded view of outcrop

There is much ongoing research to understand how this community fed, reproduced and evolved. The absence of bioturbation suggests life had not yet become mobile and the absence of shells indicates lack of predators.

Dr Alex Liu from Cambridge University, is actively studying these fossils and has found evidence for bioturbation in younger overlying strata, many of his papers are free to download as his research funding is through an NREC Independent Research fellowship. The fine details and preservation of fractal front patterns is truly amazing. If you ever get a chance to visit, do so it is a great experience.

References:

A.Liu et al. 2014 — Remarkable Insights into the palaeoecology of the Avalon Ediacaran macrobiota. *Gondwana Research*, 27:4 1355-1380. <http://eprints.esc.cam.ac.uk/3182/>

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