

Helen Belyea

In a macho industry, bristling with male geologists, Helen Belyea carved out a career as a subsurface stratigrapher.

In the same year that Belyea became a geologist with the Geological Survey of Canada, the Leduc No. 1 well blew, and a new era began. The Survey decided to open a Calgary office, and Belyea was one of the geologists assigned there. With Digby McLaren, a leading paleontologist, Belyea conducted groundbreaking work on Devonian reef formations.

Belyea's ambition was to unlock the secrets of the ancient seabed of Alberta. Working with core samples brought to the surface by oil rig drills that penetrated thousands of feet underground, she recreated a portrait of Alberta as it would have been 350 million years ago. Under her inspired scrutiny, Alberta's ancient environments revealed their story.

In economic terms, Belyea mapped a comprehensive portion of the sedimentary basin beneath Alberta, indicating the possible location of oil deposits. In human terms, she translated the past into the present. Small and feisty, Helen Belyea mentored other women in the petroleum industry.



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Courtesy Natural Resources Canada KGS-2369T

Belyea's Field Work

Geologist Helen Belyea travelled by foot, horseback, and canoe to study Devonian outcrops in Western Canada. Field excursions lasted up to three months and were often plagued by pouring rain, sweltering heat, or biting insects (insect repellent revolutionized field work).

To measure and extract fossils embedded in rocks, geologists needed a basic set of tools:

- A rock hammer – to break small chips from exposed rock or mineral deposits.
- Chisels – to remove fossils from rock.
- A weak hydrochloric acid solution – applied to etch rock and test for carbonates.
- Large sample bags – to hold rocks and fossils collected in the field.
- Measuring sticks – to determine the incline of surfaces separating two beds of rock.
- Field notebooks and photographs – to record and document findings.

Understanding the “Age of Fishes”

During the Devonian Period, 375 million years ago, a tropical sea covered most of Alberta. Many species of fish thrived in this complex marine habitat.

Helen Belyea studied this ancient seabed. The rocks and minerals she excavated and examined allowed her to map Alberta’s ancient environments. Limestone could indicate clear water; coarse sandstone alluded to river channels or deltas; sandstone and fossils might define a shoreline; shale showed the presence of deep water.

The remains of life held in giant marine reefs were the first step in the creation of Alberta’s oil and gas. Belyea’s study of Devonian reefs led to oil exploration and provided a foundation for other geologists.

Logging Core

Helen Belyea, spent many hours studying core samples in unheated “core” shacks.

Columns of rock, removed during drilling, were five feet long and weighed 40 to 50 pounds. Samples were stored in wooden boxes on special floor-to-ceiling racks. Geologists handled only one sample at a time to avoid mixing data.

They measured, described, and sampled the core at intervals. Measurements and easily recognizable physical characteristics like colour, texture, and mineral composition were recorded in a field notebook. This work was known as “logging core.”

Born: February 11, 1913 – Died: May 20, 1986

Additional Resources

- **TrowelBlazers**
<https://trowelblazers.com/helen-belyea/>
- **The Canadian Encyclopedia**
<https://www.thecanadianencyclopedia.ca/en/article/helen-belyea>

Our Collections

Glenbow Museum

<https://www.glenbow.org>

Glenbow Western Research Centre | Glenbow Library and Archives

<https://libguides.ucalgary.ca/glenbowlibraryandarchives>

Glenbow Library and Archives | Digital Collection

<https://digitalcollections.ucalgary.ca/asset-management/2R340826N9XM?WS=PackagePres&Flat=1>