Scientists prove all major animal groups with internal, external skeletons appeared in the Cambrian period

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(PhysOrg.com) -- New York State Paleontologist Dr. Ed Landing is the lead author of an article published in the June issue of *Geology* that provides the first definitive proof that all major animal groups with internal and external skeletons appeared in the Cambrian geological period (543-489 million years ago).

At this time in Earth's history all plants and animals lived in the sea and advanced groups, such as fresh-water and land plants and vertebrates (e.g., amphibians, reptiles, mammals), had not evolved yet. Landing discovered fossils of a major, colonial, reef-building group of animals known as bryozoans in Cambrian rocks of southern Mexico. At c. 490 million years old, these are Earth's oldest known bryozoans, and are eight million years older than forms described in 2003 from southern China.

The exquisite preservation of the tiny Mexican bryozoans (most occur as fragments only several millimeters long) suggests that highly mineralized, twig-like bryozoan colonies evolved from soft-bodied colonies that were attached to shells and pebbles on the sea floor. The twig-like form elevated the colony above the sea floor, and allowed feeding in higher energy and more food-rich waters above the sea floor.

Landing and his co-authors propose that the almost simultaneous first-occurrences of bryozoans, cephalopods (ancient squid relatives), polyplacophorans (chitons) and euconodonts (fish-like vertebrates),

about 490 million years ago, marked a key stage in the origin of complex marine animal communities that resemble those of modern oceans.

The field work in Mexico, which led to the discovery, was made possible by a $900 grant Landing received from the Rockland County Gem and Mineral Society when it closed its doors.

The *Geology* article is available at geology.gsapubs.org/content/38/6/547.full . The article's other co-authors are Dr. John D. Keppie of the Institute of Geology, Independent ITY eDINational University of Mexico and Adam English, now affiliated with the Chevron Gulf of Mexico Business Unit.

The state paleontologist and curator of paleontology at the State Museum since 1981, Landing has authored six books, 13 New York State Museum bulletins, 200 articles and field trip guides and has received more than a dozen competitive grants.

Provided by New York State Museum

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