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The latest regular ACS-NSTA High School Chemistry Examinations are divided into two sections comprised of forty items each. Each part tests a year's course, and the parts are of equal difficulty and also are balanced for content. Forty minutes is required for either section. If both sections are administered, the reliability of the examination is increased. All questions are multiple-choice items covering such topics as equilibrium, structure, kinetics, electro-chemistry, bonding, and organic chemistry.

Several features of the ACS-NSTA Test Program make it especially beneficial to high school teachers. The teacher not only can have this test to aid in evaluating his students and himself, he can also have the combined judgment of an independent group of chemistry teachers concerning what is important to test. And, of course, he has an estimate of how his students fared on what that group deemed significant. He can compare his class results with students and schools of similar characteristics using the national norms.

Complete norms are available for all but the most recent 1970 ADV test. Norms for the 1969 Form appear in the April 1970 issue of "The Science Teacher."

The ACS-NSTA National Testing Program has its headquarters at the University of South Florida. Requests for a brochure describing available tests and their costs and for order blanks should be addressed to The Examinations Committee—ACS, University of S. Florida, Tampa, Fl. 33620.

A Link Between Vertebrates and Invertebrates Found?

What may be a missing link between vertebrate and invertebrate animals has been found, according to a Michigan State University geologist.

"The animal, *Lochriea wellsensis*, fills the gap between vertebrate and invertebrate animals which has existed since man began to classify animals," said Dr. Harold W. Scott, chairman of the MSU geology department.

Vertebrate animals have a backbone whereas invertebrates do not.

"This could be the most unusual fossil find of our lifetime. It has all the characteristics of being the ancestor to vertebrate animals."

Dr. Scott presented his findings at the North Central Region of the American Geological Society Conference held at Michigan State.

Four fossils of the 200-million-year-old animal were discovered in limestone at a site in central Montana. William Melton of the University of Montana actually found the specimens, but Dr. Scott originally stated in 1934 that the animals might be found there.

The animal, shaped roughly like a fish, has a rudder-like tail, a crude circulatory system, a front oral opening but no head, and an anus. It is approximately 70 millimeters, or nearly three inches, in length and is covered with a netlike skin.

These characteristics were observed with the use of an electron micro-probe, said the MSU geologist. The probe bombards samples of material with electrons. Each mineral gives off a characteristic X-ray with this bombardment, showing the minutest traces of the mineral present. These mineral traces are associated with certain body tissues.

"We could not have drawn our conclusions without the aid of the micro-probe," said Dr. Scott.

Lochriea is half fish and half nonfish in its features, said Dr. Scott.

"We thought that a vertebrate-invertebrate animal would have these characteristics."

Early fish were the first to possess a notochord, the predecessor of the backbone. Animals with notochords, in the group which scientists call Chordata, were discovered many years ago. But their notochord runs the length of their body.

There are two nerve centers at the front of Lochriea. These nerve cords are the same length, only the uppermost is uncovered. The lower nerve cord is covered with a primary ingredient of bone structure, phosphorus. The hard mineral coating allowed the nerve center to function as a stabilizer while swimming.

"It may have helped the animal to direct its motion," said Dr. Scott. "The phosphorus-covered cord may also be a predecessor to the notochord. We call it a notostyle. It takes us farther back into the development of the backbone than ever before."

The discovery of the animal's stiffening-rod bears out previous theories that if a notochord were to develop, it would be at the front of the animal and would not run the length of the body, said Dr. Scott.

The recently-discovered animal is in the new animal group called Conodontochordata, named for animals which used a food-filtering system as part of a digestive tract.

"The animal is also fascinating because it may be the first free-swimming, fishlike animal able to search out its own food," said the MSU scientist. "The predecessors of Lochriea were fixed to one position on the sea floor."

"The first free-swimming animal, with a food-filtering system, represents a tremendous step in the evolutionary process."