Looking for a lost ocean

by Dr. Martin Gibling

During the time the dinosaurs roamed the globe, an ocean may have existed on the present-day site of the world's highest mountains in central Asia. Scientists believe this ocean once stretched from northern Australia northward to the southern margin of what is now the Tibetan highland China.

In the spring, summer, and fall of 1988, extensive international scientific exploration of rocks typical of this lost ocean will include detailed geological fieldwork in the north flank of the Himalayas of Nepal, followed by drilling in old ocean rocks off northwest Australia.

Firstly, from March 29 to April 29, 1988, an international group of prominent geologists, including five Canadians from Dalhousie and McMaster Universities, will trek across the Himalayan mountain chain in Nepal to visit a remote part of the highland area close to the border with Tibetan China. The scientific purpose of this trip is to gather evidence in the twisted rocks of the mountain chain for an ancient, lost ocean called Tethys. Scientists suspect that, 150 million years ago, the Tethys Ocean connected a narrow Atlantic Ocean eastward with the Pacific Ocean, based on their analysis of sediments and

Dal geologists join the hunt in the Himalayas.

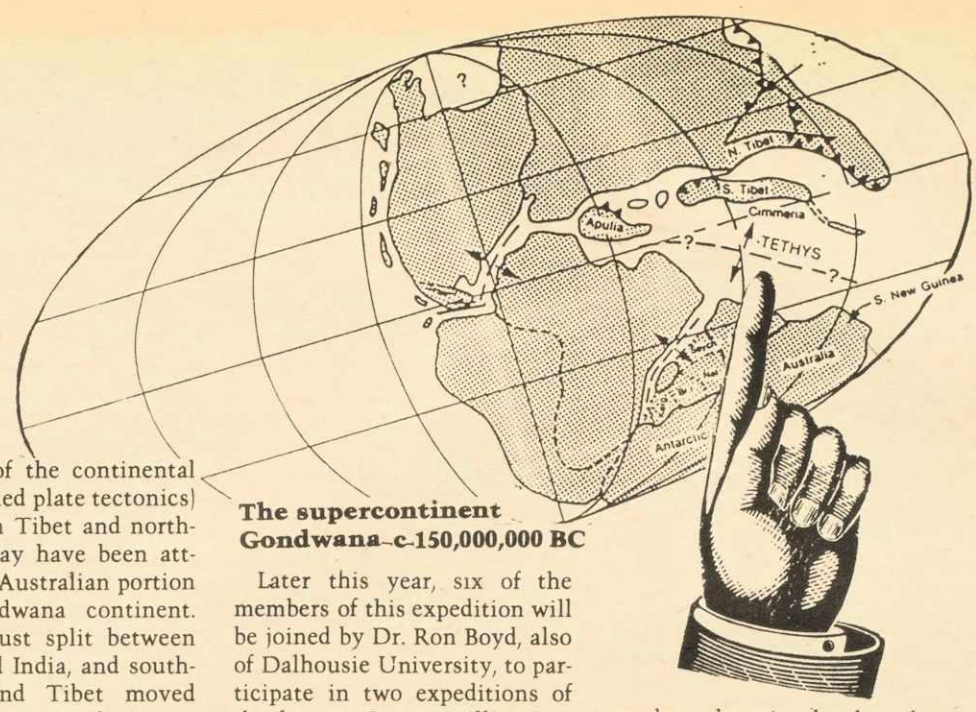
crust around the present Indian and Atlantic oceans.

Strange as it may sound, the Himalayan mountains are a relatively recent phenomenon on the earth's surface. It is generally assumed that this giant mountain chain formed when the so-called Indian continental plate colided about 15 million years ago with what is now China and the southeastern USSR. The collision forced up part of the earth's crust to form the highest mountains in the world — up to 8700 metres above sea level. At the same time, Indonesia and Malaysia formed when Australia moved north and collided with southeastern Asia.

If we go back in time about 150 million years, Australia, India, African and Antarctica were all welded together as a giant southern supercontinent called Gondwana, which formed the southern shore of Tethys. There is good evidence to show that northern Australia belonged to Gondwana, but the original location of other pieces of the jigsaw puzzle is still uncertain.

There is growing evidence from detailed studies of the past movements of the continental places (so-called plate tectonics) that southern Tibet and northern Nepal may have been attached to the Australian portion of the Gondwana continent. Later, the crust split between Australia and India, and southern India and Tibet moved across the equator to their present positions, closing the Tethys Ocean in front of them but opening the presnt Indian Ocean in their wake.

This story sounds — and is — truly complicated. The Canadian scientists and their colleagues from the USA, West Germany and Italy will gather evidence on the precise ages of the rocks in northern Nepal to see if the ages match those of northwestern Australia. Also, the environment in which the rocks were formed, for example continental shelf or deep ocean, will be studied, as will the direction of transport of the sediments away from an ancient landmass or delta. Special considerations will be given to the magnetic properties of these rocks: this may indicate where the region lay relative to the magnetic north pole 150 million years ago and hence assist in "restoring" the crustal fragment of northern Nepal to its original position.



The supercontinent Gondwana–c.150,000,000 BC

Later this year, six of the members of this expedition will be joined by Dr. Ron Boyd, also of Dalhousie University, to participate in two expeditions of the famous Ocean Drilling Project, off northwestern Australia. Canada is an important partner in this large, international project that gathers scientific data from the world's oceans and continental margins. In 1985, the Project drilled in the Labrador Sea and Baffin Bay. The drillship is the Sedco 747, built in Halifax. Drilling and coring off northwest Australia will shed light on the ancient history of this margin and on the source of the oil and gas deposits that have been discovered there by international oil companies. That is precisely why participants in this ocean expedition will venture first across the Himalayas in search of the other side of the now-lost ocean. Ultimately, the scientists hope to make detailed reconstructions of this ancient ocean and its margins, which will assist with the economic and geologic assessment of the Australian margin.

The geologists involved are:

Dr. Felix Gradstein, ocean microfossil specialist who is Adjunct Professor at the Geology Department of Dalhousie University and marine geologist at the Bedford Institute of Oceanography (expedition organizer).
Dr. Martin Gibling, specialist in ancient coastal sediment deposits and Professor at Dalhousie's Geology Department.
Dr. Michael Kaminski, specialist in ocean microfossils and Post-doctoral Fellow at Dalhousie' Geology Department.
Dr. Lubomir Jansa, specialist in ocean sediments at the Atlantic Geoscience Centre, Bedford Institute.
Dr. Gerd Westermann, specialist in ammonite fossils and Tibetan geology at the Geology Department, McMaster University, Hamilton, Ontario.
And 5 other from the U.S., Germany, and Italy.

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technocrats and techno-peasants:

The context of science

by Geoff Stone

"In the end, the scientist is no more or less than a citizen with a toolbox," said Ursula Franklin, speaking at the Dunn Science Building two weeks ago.

Franklin, a metallurgist, has been active in numerous community, peace, and women's organizations, and is internationally respected for her theories on science. She spoke to a high turnout of students, faculty and community members about the context of science.

In her talk, Franklin described how scientific education has much to gain from citizens without a degree in science at a certified university. She also said those who have acquired the toolbox of science should teach others. "It is a toolbox someone can share. I know how easy it is," she said.

Franklin's talk began by describing the structure of science. Franklin described how science has a context, and can be influenced by culture. "Science is human, and it is intensely political," she said.

Franklin explained how scientific methods involved reducing complex problems. It is this reductionism which produced biases in the observer. "There is a separation of variables. Some essential variables are kept. While some variables are valid up to a certain point, we must consider what variables are not kept."

Franklin explained the dilemma of being able to spread scientific knowledge without ever doing the activity. "This also means you can go to an accredited university and learn how to build a bridge. All the knowledge is separated from the experience."

Franklin said scientific knowledge has discredited experience, and the reductionism of science is beginning "to haunt us, as some variables are left out".

This same scientific reductionism has resulted in a social reductionism. Franklin said it has caused the removal of interactive parameters from the system. "A problem in science begins to be formulated by those parameters one can see and measure."

Because many issues in science are left up to the scientist, the scientist will influence the final result. "It involves who says what is a problem, and who is entitled to solve a problem," Franklin said.

Franklin said because of this, science has tended to yield knowledge without context.

Franklin said the instrument for science in Canada has been the granting structure. Because science is expensive to do and to teach, the Canadian granting system before the 1970s set out to give a broad spectrum of competent people money for research.

Franklin said this system had its weaknesses, especially for women, but since quality of research was central, it was "an excellent system".

But in the mid- and late 1970s, the system shifted to one where the category of research was most important. This meant Ottawa was deciding what was important in research in Canada. But because, as Franklin said, "if something is a problem in Ottawa it is 10 years too late," the system has never worked.

Franklin said this change to funding by category is a major shift. "It is a shift I do not consider at all helpful or useful. I see university industry interfaces and strategic research as controlling the area of research.

"This does not put confidence in building up knowledge from the inside," said Franklin. It has put in the idea of control and has made knowledge into a commodity.

But Franklin said it is the public that funds the research, and the knowledge of science is for the public good.

Franklin said it is also up to the scientist to teach others about science, and to make science more understandable to the "technopeasants" of the scientific era.

Using an analogy to the Reformation, when religious works were translated into common languages, Franklin said science should reach more into society, and let society have a greater say in the context of science.