

40 INFLUENTIAL RESEARCH PROJECTS

For 40 years, *ROM* magazine has been keeping readers up to date on the latest scientific breakthroughs and most current findings in archaeology and art history by ROM researchers. In celebration of the magazine's 40th anniversary, we look at 40 of the Museum's influential projects. Take a look at the front fold-out featuring covers from 1968 to 2008 to see how the magazine has changed across time.

■ Burgess Shale

Canada's Burgess Shale is famous for its exceptional preservation of some of the oldest animals on Earth. ROM curator Desmond Collins has been conducting fieldwork there since 1975. The ROM's unique collection is currently the basis for several new research programs being developed by ROM paleobiologist Jean-Bernard Caron and colleagues. See "Star-Status Artifacts" on page 35.

■ Elite Glazed Ceramics of the Islamic World

Using scientific analysis to determine how and where ceramics were manufactured, along with standard archaeological approaches to determine dating, ROM researcher Robert Mason is aiming to understand the high-technology glazed ceramics of the Middle East made between c. 650 and 1700 CE.

■ American Pleistocene Mammal Research

During the years 1958–1961, ROM paleontologist Gordon Edmund excavated more than 20,000 Pleistocene fossil mammal specimens from Peru and Ecuador. Since then, Gord and subsequent ROM researchers, most recently Kevin Seymour, have continued to work on describing this unparalleled collection, the world's largest from the region.

sive mammal collection from this country at any institution. Burton Lim and Mark Engstrom re-initiated fieldwork in 1990 focusing on mammalian systematics and evolution. This project has more than doubled the known mammal biodiversity in Guyana.

■ Conservation of Migratory Shorebirds

Most migratory bird populations are in serious decline. For more than 15 years, ROM ornithologist Allan Baker has studied one shorebird, the red knot, to understand its migratory patterns and ecology, and to determine the causes for its declining numbers. Some successful conservation initiatives have already resulted from this work.

■ Amphibians and Reptiles in Southeast Asia

In 1994, ROM herpetologist Bob Murphy teamed up with Russian colleagues to investigate the diversity of amphibians and reptiles in Vietnam, the first Western expeditions into previously unexplored regions. Their efforts have drastically increased the numbers of amphibians and reptiles known from Vietnam, many of them new to science.

■ Bat Research at the ROM

ROM curator Randolph Peterson began collecting bats in

gists, rapidly and inexpensively, to identify organisms, massively advancing their capacity to monitor, know, and manage biodiversity.

■ Crawford Lake and Fossil Corn Pollen

In 1968, ROM researcher Jock McAndrews found fossil corn and purslane pollen dating to the 1400s in Ontario's Crawford Lake. The resulting archaeological survey revealed an unknown Iroquoian village site. It was excavated in 1973. The findings prompted the Halton Region Conservation Authority to turn the area over to research. New work focuses on fossil fungi spores that parasitize corn.

■ Serpentine Group Minerals

Fred Wicks's ongoing career has led to groundbreaking discoveries about serpentine minerals. He recognized that understanding their complex crystal structures would enable us to decipher textures in serpentine-rich rock and thus provide a better understanding of the serpentinization process. He was correct. His work is a foundation for future studies in the role of fluids in tectonic processes.

■ Coral Reef Conservation and Energetics

Research by the ROM's Rick Winterbottom and Laura Southcott has shown that the goby *Trimma nasa* and other tiny fishes living on the world's reefs are critical in capturing energy in the

■ Origin and Evolution of Flightless Birds

ROM scientists Allan Baker and Oliver Haddrath were among the first to extract ancient DNA from the extinct moa and sequence it to compare with other flightless birds, a group called ratites. They showed that all ratites share a common ancestry that goes back about 100 million years. A second study showed that 14 lineages of moa once existed.

■ Medieval Islamic City of Zabid, Yemen

The overall aim of the excavation project at the city of Zabid, in Yemen, led by ROM archaeologist Ed Keall, was to understand the way in which the city developed and flourished in medieval times as a market, administrative, and Islamic university centre with an international reputation.

■ Reconstructing the Avian Tree of Life

The international community of taxonomists and systematists are reconstructing the great tree of life. ROM ornithologists Allan Baker and Sergio Pereira—with the American Museum of Natural History—have worked out the relationships of 11 major groups of birds with the help of ROM scientist Oliver Haddrath who has pioneered a new DNA testing technique.



For full details on these research projects visit *ROM* magazine on-line at www.rom.on.ca/media/magazine/index.php

■ Amphibians and Reptiles of Guyana

Since 1990, ROM staff have collected amphibians and reptiles from Guyana. The most important are from the high-elevation cloud forest habitats of Mount Ayanganna and Mount Wokomung, which house a huge diversity of species. Guyanese government agencies and the Smithsonian Biodiversity of Guyana Program have named them the highest priority for study.

■ Mammals of Guyana

In 1961, ROM mammalogist Randolph Peterson began a 15-year research program in Guyana—resulting in the most comprehen-

sive mammal collection from this country at any institution. Burton Lim and Mark Engstrom re-initiated fieldwork in 1990 focusing on mammalian systematics and evolution. This project has more than doubled the known mammal biodiversity in Guyana.

■ DNA Barcoding of ROM Collections

The ROM is part of a research network of biodiversity scientists, genomists, technologists, and ethicists—the Canadian Barcode of Life Network—whose goal is to assemble a library of species-unique DNA sequences or “barcodes.” These will enable biolo-

gists, rapidly and inexpensively, to identify organisms, massively advancing their capacity to monitor, know, and manage biodiversity. Knowledge of these fishes could be critical in protecting the future of the reefs.

■ Aquatic Entomology

The ROM has long been a centre of excellence in aquatic entomology. It started with E. M. Walker who published on dragonflies and damselflies. Then Glenn Wiggins, arguably the ROM's most distinguished life science curator ever, published groundbreaking research on caddisflies. Today Doug Currie is carrying the torch further with his own research program on black flies.

■ Genetic Consequences of Plate Tectonics

In 1984, ROM herpetologist Bob Murphy began studying the genetic diversity of reptiles in the Baja California peninsula. Genetic studies revealed two major breaks in the DNA of animals at different locations on the peninsula, suggesting that major seaways once crossed this land. Subsequent genetic research has confirmed it. Now geologists are searching for corroborating evidence.

■ Conodonts

Dr. Peter von Bitter has spent his life studying the function and ecology of tooth-like fossils that turned out to be the mouth

parts of primitive marine vertebrates. In recent years he has discovered hundreds of complete conodont mouth apparatuses in 425-million-year-old lagoons on the Bruce Peninsula. These conodont beds are among the world's best.

■ **The Jack Satterly Geochronology Lab**

Established in 1975, the ROM's Jack Satterly Geochronology Lab was the birthplace of high-precision radiometric uranium-lead dating. New lab procedures and analytical methodologies developed under Dr. Tom Krogh have become the international de facto standards and permit ages of rocks to be determined with unprecedented accuracy.

■ **Paleozoic Fossils from Central Canada**

Studies by ROM paleontologist Dave Rudkin and colleagues of 450- to 400-million-year-old fossil arthropods—including trilobites, eurypterids, and horseshoe crabs—from the Hudson Bay and James Bay lowlands are revealing exciting new information on ancient biodiversity and evolutionary dynamics. Published highlights include the world's largest trilobite and the oldest horseshoe crabs in the fossil record.

■ **Ichthyosaur Research at the ROM**

ROM paleontologist Chris McGowan's connections with ichthyosaur collectors in southern England, one of the world's best locations for finding these Mesozoic marine reptiles, ensured that some of the best material came to the ROM. The Museum's ichthyosaur collection is now the most outstanding in North America. Chris has published more than 40 papers on these specimens.

■ **Freshwater Fishes of Canada**

Dr. E. J. Crossman studied freshwater fishes for 48 years and was widely regarded as a world authority on esocids, a group of fishes that includes northern pike, the grass and red-fin pickerels, and

■ **South Asian Photography**

An ongoing ROM project begun in 2002 by ROM curator Deepali Dewan examines the work of a well-known Indian photographer, Raja Deen Dayal (1844–1905). The project also compiles a history of photography in India using the newly acquired Jhabvala Collection of South Asian Photography at the ROM. Both parts of the project are the first of their kind.

■ **Excavations in Meroe**

ROM curator Krzys Grzymiski has been excavating an ancient African capital called Meroe in what is now Sudan. This work has resulted in numerous publications, conference presentations, and exhibitions. Meroe is considered one of the largest archaeological sites in Africa and has been submitted as a candidate for the UNESCO World Heritage Sites list.

■ **Excavations in Cotahuasi, Peru**

In 1997, ROM archaeologist Justin Jennings embarked on a project aimed at understanding the prehistory of the Cotahuasi Valley of southern Peru. Recent excavations at the site of Col-lota, which played an important role during the Wari (600–1000 CE) and Inca (1430–1532 CE) states, are revolutionizing our ideas of how states emerged and spread in the ancient Andes.

■ **Research on 20th-Century Haute Couture**

Research by the ROM's Nora E. Vaughan senior curator Alexandra Palmer focuses on the designs, trade, and consumption of haute couture in the 20th and 21st centuries. She is now working on the early 20th century, back in time from her research published in the 2001 *Couture & Commerce: The Transatlantic Fashion Trade in the 1950s*, which won a Clio award for Ontario history.

■ **The Illustrated Manuscript in Central Asia**

ROM art historian Karin Ruehrdanz is analyzing the develop-

ment of the illustrated manuscript in Central Asia between 1500 and 1700. The art of manuscript illustration in Central Asia had repeated breakdowns and revivals over these two centuries and therefore is useful as a case study for survival strategies of an art form in cultural environments that are less than favourable to it.

■ **Early Hominids in China**

Started in 1998, an ongoing project by Dr. Chen Shen and his Chinese colleagues discovered the earliest hominid occupation in northern China dating back 1.7 million years or more. The team is exploring Stone Age technology and human evolution in China, including hotly debated issues on handaxe use in East Asia and origins of the modern human.

■ **Bishop White Wall Paintings**

Since the early 1990s ROM curator Dr. Ka Bo Tsang has been studying the ROM's three world-renowned Chinese Yuan dynasty (1279–1368) Buddhist and Daoist wall paintings. Initial results have been published in major academic journals and a forthcoming ROM book will update our knowledge on the significance of these works.

■ **Canadian Art History**

In 1999 ROM curator Mary Allodi was invested as a Member of the Order of Canada in recognition of her contribution to the literature on Canadian art history. Among her writings, Mary co-wrote *Printmaking in Canada* and *Berczy*, a groundbreaking catalogue accompanying a 1991 exhibition by the National Gallery of Canada, which stands as a monument to her achievements.

■ **Altun Ha Excavations, Belize**

The Altun Ha project (1964–1970), directed by ROM curator David Pendergast, was the first long-term excavation of a Maya centre in the country that is now Belize, and it radically altered our understanding of the importance of the Caribbean coastal zone in Maya prehistory from the 9th century BCE to 950 CE

■ **Canadian Textiles**

Publishing dozens of books from 1944 to 2001, the ROM's Dorothy Burnham was a pioneer in the field of Canadian textiles. Dorothy was invested as a Member of the Order of Canada in 1985. Her works remain the standard references in the field.

■ **Timurid Architecture**

From the late 14th to the early 16th century, much of Central Asian architecture was characterized by extraordinary technical and artistic achievements. To discover how this technology developed, ROM curator Lisa Golombek analyzed monuments across the Middle East and Central Asia. The project culminated in an influential two-volume publication.

■ **Round Lake Ojibwa Ethnographic Project**

Between July 1958 and July 1959 ROM anthropologist Dr. Edward S. Rogers lived with the Ojibwa and through "participant observation" studied their contemporary situation with a specific interest in the interrelationships among social organization, economics, and religion. He was also interested in the collection and description of a range of material culture.

■ **Earliest Humans in Ontario**

Over a nearly 30-year career ROM archaeologist Dr. Peter Storck discovered several important sites occupied by the first people to live in Ontario after the retreat of the continental ice sheet. His work revealed new information about their way of life, which was quite different from those of related peoples elsewhere. His 2004 book *Journey to the Ice Age* received numerous awards.

■ **Excavations at Jerusalem**

From 1963 to 1967, eminent ROM archaeologist Dr. Douglas Tushingham led excavations in the Armenian Garden in the Old City of Jerusalem. The site lay outside the city as known to



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muskellunge. He co-authored the most important work on freshwater fishes in Canada. Beginning in 1957, he began keeping tabs on muskellunge populations across Ontario and North America.

■ **Plains Indian Pictographic Painting**

Representational paintings by North American Plains Indians in the 19th century most often took the form of pictographic records of warriors' military achievements displayed on hide clothing and shelters. ROM assistant curator Arni Brownstone employs electronic re-drawings combined with ethnohistorical data, to better understand the social significance of these paintings.

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■ **Traces of a General in the Ming-Qing War**

There has been a tradition that the Museum's famous Ming Tomb was that of 17th-century Chinese general Zu Dashou. Since 2003, ROM curator Klaas Ruitenbeek has been studying Zu family tombs, residences, honorific arches, city walls, and

or so. The site remains the richest of its size known in the Maya world and the largest and most famous jade recovered in the excavations is now the national symbol of Belize.

■ **18th-Century Indian Chintz**

With colleague John Irwin, ROM curator Katherine Brett undertook a collaborative research project examining 18th-century export textiles from India—chintz—in the collections of the ROM and the Victoria & Albert Museum. Their work resulted in a major exhibition in 1971 and a catalogue that still serves as the major resource on chintz textiles today.

the early kings of Judah, allowing researchers to determine when the city had first expanded that far west. Tushingham was the main author of the expedition's results written in 1985.

■ **Excavations at Godin Tepe**

The archaeological site of Godin Tepe was excavated under the direction of Dr. T. Cuyler Young, Jr., from 1965 to 1973. Located in the Zagros Mountains of Iran, the site was occupied during all the important cultural periods of the ancient Near East from the 4th millennium to the mid-1st millennium BCE. The full results will appear for the first time this fall. ROM