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This journal is analyzed and disseminated internationally by:

- Bowker International Serials Data Base.
- Current Antarctic Literature.
- Antarctic Bibliography.
- IBZ International Bibliography of Periodical Literature.
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The Chilean Antarctic Bulletin (Boletín Antártico Chileno) is the official publication of INACH. Its goals include dissemination of information on Chilean national scientific and related activities. The Bulletin recently received a new design and editorial approach in efforts to reach a larger audience. It is one of the few scientific magazines that is provided at no charge, from government funding, and aimed at the general public. The Bulletin includes a section on collaborative work that is open to all Antarctic researchers. In addition, there is a material covering international activity, interviews, news, along with the long-standing practice of special sections devoted to topics such as the International Polar Year, Antarctic cetaceans and Darwin in Patagonia. The Bulletin has a circulation of 2,000 copies, distributed free of charge to regional and national authorities, international Antarctic institutions, Chilean and foreign libraries, universities, researchers, and so on. The Bulletin is a biannual publication.

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## Editorial

Fifty years ago, Chile - along with eleven other countries - signed the Antarctic Treaty, a document unprecedented in the history of mankind, dedicating an entire continent to peace and science but also safeguarding, through a special judicial mechanism, the territorial claims as of that date and recognizing that there could possibly be other methods for claims or denial of claims. Fortunately, the tensions that existed in the past have not diminished our interest in this pristine continent, the largest natural preserve on the planet and, as a result, we have continued to press forward in seeking further knowledge there.

In recent years, Antarctica has provided two important wake-up calls (the ozone hole and climate change, both with elements of human origin) which have made many people stop and think about the behavior and development in our respective countries, along with the implications for our present and future activities. Those wake-up calls were made by the scientific community.

Chile has not been remiss in sharing these international concerns, and continues to step up its National Program for Antarctic Science. A new program for competition for scientific projects features seven finance sources. The funds are for laboratory research projects and thesis support, along with proposals for field studies. All proposals are to be prepared online in English, to be evaluated by Chilean and international peers. In addition, projects can be undertaken on the White Continent through the National Agency for Scientific and Technological Development (FONDECYT, for the acronym in Spanish) in three levels: experienced researchers, first-timers, and post-doctoral; and through the Program for Associative Research in Antarctica. In addition to this, special financing from the XII<sup>th</sup> Region of Chile (Magallanes and Chilean Antarctica) and a CORFO-INNOVA project are providing funds for modern laboratories at the Chilean Antarctic bases.

In the 2008-2009 season there were 35 scientific projects carried out, with 44 projects in the last season. Investment has also increased, reaching three times what Chile invested just four years ago. Statistics from 1988 to 2009 reveal that Chilean support to Antarctic science came in with 227 international publications, all peer-reviewed, in those 21 years. It is worth pointing out that 52% of those publications were created in the past six years.

This year the Antarctic School Fair, the main Chilean Antarctic Outreach Program and internationally recognized as a unique initiative, reached audiences throughout Chile, fulfilling the plan begun five years ago for increasing its coverage. Important information about Antarctic topics is being distributed throughout the nation of Chile, a country that is 4,300 km (2,700 miles) in length.

The *gentle siege* that science has taken over Antarctica is truly multifaceted. Geology, biology, oceanography, and paleobiology are just a few of the disciplines represented in the articles of the current Bulletin. Several of these projects have been made possible thanks to the growing worldwide cooperation that has generated Antarctic programs on an international scale, showing a renewed commitment to that promise of fraternity that grew out of the Antarctic Treaty signed in Washington on the first of December, 1959.

José Retamales, PhD  
Director INACH



## ■ ■ ■ Molluscs in the Bellingshausen Sea

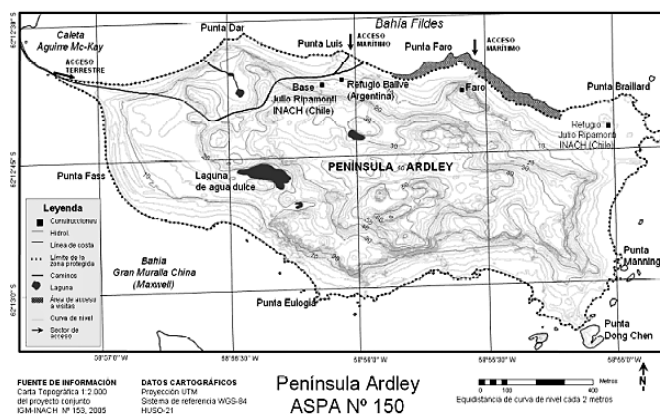
Antarctica continues to be one of the least explored and least known regions of the planet, and the moniker “unknown” extends as well to the presence of molluscs in polar waters. The article “Molluscs in the Bellingshausen Sea” (pages 4-6) presents the results of research done by Cristian Aldea and Jesús S. Troncoso, revealing an advance in knowledge of sea-bottom ecosystems in the Bellingshausen Sea and Peter I Island. At the same time this provides background information relating to the Antarctic Peninsula and the South Shetland Islands, contributing to a new understanding of the taxonomy of molluscs in the Atlantic Ocean.



Two new species described from Bentart sampling. A: *Antimargarita bentarti*. B: *Antimargarita powelli*. Scale marks: 5 mm.

## ■ ■ ■ Effects of climate change on the diet of marine birds at Ardley Island

During the past Antarctic study season, a new Funding Program for Undergraduate Theses started, promoted by the Chilean Antarctic Institute (INACH), the Chilean Post Office, and the Chilean Air Force. The project, entitled “Effects of climate change on the diet of marine birds on Ardley Island” belongs to this program and is looking into seasonal variations in the type of food eaten by the Adelia penguin, the Papua penguin, the Antarctic penguin, the Wilson’s petrel, and the black-bellied storm petrel. This will be accomplished by comparing present-day samples (from Ardley Island) with preserved samples that date back 50 years (from the Museum of Natural History and Zoology Laboratory at the University of Chile). This is done through the analysis of stable carbon and nitrogen isotopes.



Ardley Island. The route taken for collecting samples will be primarily along the coast of the island.

The inference of finding no changes in the diet of some species would be to suggest reductions in population sizes, while changes in the animals’ diets could indicate changes in food foraging and as a result, behavioral modifications that

tend to prevent extinction of a population. The basis for this study centers on the importance of krill, the most significant component in the Antarctic food chain and the fundamental food source for not only the majority of the sea birds on the Antarctic peninsula but also other macrovertebrates. The scope of this project is described in the article by Franco Perona, Pablo Negrete, Michel Sallaberry, and Pablo Sabat (pages 7-8).

## ■ ■ ■ Submarine hydrothermal vents: Extreme ecosystems

In their article “Antarctic Submarine Hydrothermal Vents - Extreme Ecosystems” (pages 9-11), INACH’s oceanographer, Dr. Cristián Rodrigo, and Sebastián Ruiz explain that submarine hydrothermal areas are considered highly delicate and isolated habitats. In these locations an extraordinarily specialized fauna has developed and adapted to the extremes of pressure, temperature, and toxicity, low levels of oxygen and low pH. On the other hand, the communities that inhabit these environments live in the absence of light and depend primarily on the productivity of chemosynthetic bacteria which make up the base of the food chain. For that reason these areas are ideal for the study of species diversification and adaptation, along with their interactions with the surroundings. Within the nearly frozen Antarctic seas we find these unusual warm microenvironments that differ from those found in other parts of the planet.



Photo of a black smoker and nearby tube worms, in the Juan de Fuca ridge, Pacific Ocean (photo by U. of Washington).

## ■ ■ ■ Evidence of Holocene volcanism in central Livingston Island

During austral summer 2008/2009, INACH’s geologist Dr. Stefan Kraus explored the interior of Livingston Island and tells us about his discoveries (pages 12-14). One significant expedition was directed to Rezen Peak, located in the center of the island, a volcano characterized by a probable subglacial origin and possible activity during the Holocene (the last 12,000 years). The expedition recovered volcanic rock samples of olivine-basaltic composition from a cliff beneath the summit of the volcano. The summit itself remained inaccessible due to fog and large amounts of snow. Another important discovery was the finding of a sequence of volcanic ash layers incorporated in the icecap of Livingston Island. These ash layers are visible in the approx. 60 m high front cliff of the Perunika Glacier, located at the bottom of South Bay. Up to ten layers can be distinguished. Due to the impossibility to access the front of the glacier and the difficult access from within crevasses, samples could be taken only from the two uppermost layers. Geochemical analysis showed conclusively that these two ash layers originated from Deception Island.



Panorama of the front of Perunika Glacier at the bottom of South Bay (Central Livingston Island, South Shetland Islands). Note the presence of volcanic ash layers incorporated in the ice.



since this source so far has not been identified unequivocally. Investigations carried out by Paula Castillo are supported by INACH's Funding Program for Undergraduate Theses.

## Following the tracks of a vicariant event of more than 100 million years

INACH's paleobiologist, Dr. Marcelo Leppe, heads up the project called "Paleophyto-geographical and evolutionary relationships between the flora of Southern Patagonia and the Antarctic Peninsula during the Cretaceous," funded by FONDECYT (Fondo Nacional de Desarrollo Científico y Tecnológico, the Chilean National Fund for Scientific and Technological Development). Recently there have been changes in the way that scientists view the long relationship of attraction and repulsion that South America and Antarctica have maintained for more than 250 million years. Thanks to new biogeographical techniques, a group of Chilean and German scientists plan to fill in the long-missing pages in the story of the history of the flora of the southern Cretaceous (pages 23-24). The discovery of lush vegetation including cycadales, araucarias, Podocarpacea conifers, and ferns, all more than 100 million years old, is providing the keys for understanding the evolutionary patterns for the biomass that is very similar to that found in present-day Patagonia.



Paleontology team on the ground, near the encampment set up at Snow Island.

## The "Ortega hypothesis" and the image of Science

The so-called "Ortega hypothesis" is a scientific fraud. The authors intended to present a thesis on the predominance of minorities within the process of general circulation of scientific ideas. To this end they quoted text from a book by a Spanish philosopher (José Ortega y Gasset, 1883 -1955) and altered its meaning by suppressing key paragraphs of the quotation. Exposure of this fraud gave rise to a broader and more important discussion of the role played by the procedures designed to measure (mostly quantitatively) the number of scientific publications related to a subject or discipline. This short essay, written by Ambassador Jorge Berguño of INACH, looks into the advantages and disadvantages of procedures such as those applied by the Institute for Scientific Information (ISI) and similar methodologies (pages 25-28). It concludes that the trends in this direction are inevitable in a mass society, and constructive approaches are required to enhance rather than detract from this approach, using to the greatest extent possible critical, qualitative, and more refined incentives to improve scientific productivity.

CHART OF THE FLOW OF SCIENTIFIC KNOWLEDGE

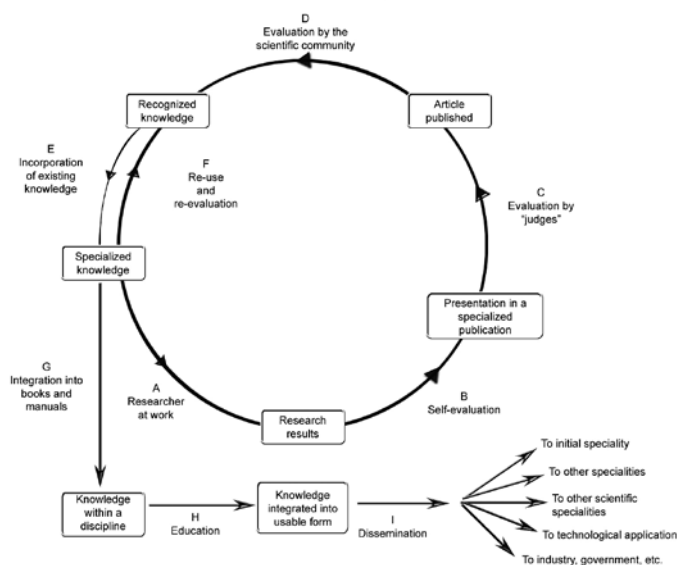


Diagram of the flow of scientific knowledge.

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## COLOPHON

Marcela Alcaíno Mancilla (born in Punta Arenas, 1966) is a self-taught goldsmith who learned her trade while traveling through Latin America, where she also learned about the significance of early peoples for contemporary communities. She has worked since 1998 in the remembrance of ancient Patagonian peoples through the use of her designs, iconography, and personal creations which were particularly inspired by the mythology of the Selknam and Aonikenk Indians. She has participated in shows and exhibits in Chile and internationally, and her work has been recognized in Patagonia and throughout Chile for its contribution to the understanding of cultural development. Currently she is continuing her work with the intent to pass it on through education of young people and the populace in general, through her workshop, Joyas de Patagonia ("Patagonia Jewels") in the city of Punta Arenas.

## COVER

THE SYMBOLOGY OF OBJECTS. This work is entitled "Taar" and is a testimonial item created to commemorate the 50th anniversary of the signing of the Antarctic Treaty. That treaty brings together the willingness of all nations of the world to work toward conservation, cooperation, and research on the continent that is both "snow-white" and multicolor at the same time, teeming with wild life and tales of perseverance. This object is a testament that such international willingness does exist, and that cooperation is an indispensable element for development, growth, and the building of a better world.



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