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Globalization: Past and Present

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I. Reflections on the Social Condition

Globalization has had, and is having, a profound effect on Brazil. We define the concept as the sum-total impact on a country due primarily to externally induced economic and cultural pressures. While globalization is important today, its roots go back to the sixteenth century. For many, it appears that this early encounter has shaped the entire social, cultural, educational, and economic fabric of Brazil.

Early European escapades led Portugal to establish a colony in Brazil for the economic development of sugarcane in the Northeast. This led to the need for slave labor to operate the plantations, to the oppression of the native cultures, the development of a class system, and to a violent society. It also led to an initial development of the Northeast. Conversion of the pagans to Christianity justified both slavery and oppression of the native populations. Large numbers of slaves were brought in from West and Southern Africa. Violent submission of the native populations to the "civilizing" process reduced the original population of 5 to 10 million natives to perhaps 300,000 today,[1] many of whom live under miserable conditions.

Globalization affects a variety of cultural aspects of present-day Brazil. If, as our Brazilian authors show, the country's earlier needs were to secure cheap labor to provide goods for internal consumption and global trade; this demand continues today and has given birth to a large, landless, lower class that lives in poverty and receives little education. In the modern and industrialized cities of the Southeast, such as São Paulo and Rio

de Janeiro, this underclass lives in miserable conditions: Unemployment, homelessness, abandoned children, crime, and extreme violence are the norm.[2] São Paulo is ringed with people living in small shanties made of pieces of wood and corrugated metal. This poverty greatly contributes to the violence found in the society today.

There is an overall sense of pessimism among the Brazilian intellectuals with whom we spoke. The government largely ignores the problems of the indigent. And while education could be the key to raising the lower class out of its present condition, the educational system, however, perpetuates the social exclusion of the lower class. But this cannot be the sole consequence of globalization, for already during the colonial period, Portugal neglected to develop an adequate educational system. The first printing press was not in operation until 1912, and the first university was not established until 1934.

Inequality of income between the upper and lower classes was documented by Gitahy and Hardman:[3] The richest 10 percent receive half of the national income, and the poorest 10 percent receive a mere 0.8 percent. The problem is also increasing: in the 1960s, the income of the wealthiest 10 percent was thirty-four times greater than the income of the poorest, and in the 1990s, it was seventy-eight times greater. The minimum wage in Brazil is about U.S.$150 per month, which is barely enough for survival. By comparison, Argentina's minimum wage is U.S.$700 per month. In 1990, 60 percent of Brazilian children and teenagers lived in families with a per capita monthly income of U.S.$50 or less. The Brazilian labor market employs 7.5 million people under the age of 18, the great majority of whom receive less than the minimum for survival. In addition, a few million children are urban marginals, engaged in informal or criminal activities including drug use and prostitution. These harsh conditions directly affect their school performance and contribute to the high elementary-school dropout rate. Two out of three Brazilian poor are urban or metropolitan. The 1990 census registered one-third of the population (58 million) living below the poverty line (U.S.$60 per month), 16 million of whom are living in absolute indigence. The miserable concentrate in the Northeast, with greater incidence in rural areas. Yet, and ironically, Brazil has one of the fastest growing economies in the

twentieth century, its GNP having multiplied eleven times between 1945 and 1980, and industrial productivity having grown sixteen times. The proceeds from this productivity are, however, not finding their way to the lower classes.

An attempt to distribute land to the landless lower class began in 1993, when lands were transferred to 20,000 families. Since 1993, the government has increased the land transfer program to 20,000 more families each year, ending in 1998, when 100,000 families will have been given land. This program is a local county-by-county plan allocating lands to people within their native county once they have proven unemployment for the required period. Generally, these people have previous agricultural experience and are given federal loans to make their farms operational. There are, unfortunately, numerous examples of land transfers that result in illegal harvests of mahogany for cash, after which the land is abandoned.[4] The Movimento dos Trabalhadores Rurais Sem Terra (Landless Rural Workers' Movement, or MST), which originated among the rural poor, has received support from rural Catholic clergy and is hopeful it can relocate the poor of the large cities to noncoastal, arable lands. The response of the government has been to buy out a sizable number of plantations and ranches and to redistribute them to the poor. In the end, however, Brazil continues to be burdened with chronic destitution among a significant portion of its poulation.

II. The Argentinean Experience

A. Sierra de la Ventana Project

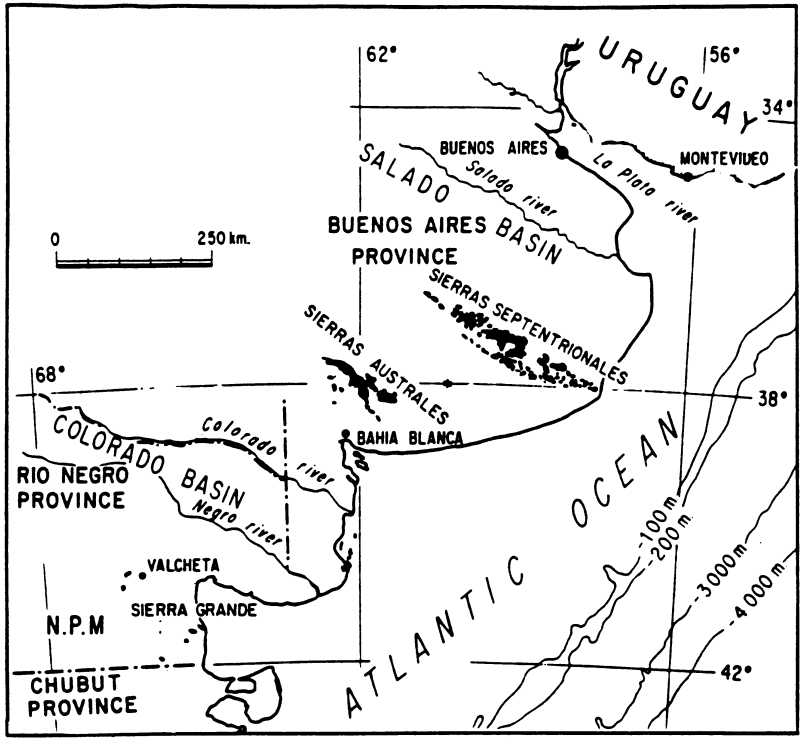
In addition to the lectures and collective discussions, our project was to visit the Sierra de la Ventana (Sierras Australes) region of Argentina to study and collect samples of this mountain belt, which is composed of rocks ranging in age from 1.5 billion to 250 million years, all of which were deformed about 175 million years ago. Having worked in the continuation of this mountain belt in the Ellsworth Mountains, Antarctica, and with the prospect of working in the near future on equivalent rocks in the Cape Fold Belt, South Africa, this seminar gave us a unique opportunity to be probably the second and third geologists to

visit this entire mountain belt (figure 1). We hope to contribute to the better understanding of Gondwanaland geology and its ultimate dispersal 150 million years ago.

1. Gondwanaland and Pangea

Charled Darwin first visited the region of the Sierra de la Ventana[5] in 1832 on an overland trip in Argentina from Bahía Blanca to Buenos Aires. To his knowledge, he was the first foreigner to visit the range. He had heard stories of gold, silver, caves, and forests—all of which piqued his interest. Darwin was quite disappointed in that none of the descriptions were accurate. "I do not think nature ever made a more solitary, desolate pile of

FIGURE 1



Sketch map of east central Argentina and southern Uruguay showing positions of the Sierras Australes (Sierra de la Ventana) and Sierras Septentrionales. (Modified after Buggisch, 1987)

rocks: it well deserves its name of Hurtado, or separated. The mountain is steep, extremely rugged and broken, and so entirely destitute of trees and even bushes that we actually could not find a skewer to stretch out our meat over the fire made of thistle stalks."[6] Darwin's description of the Sierra de la Ventana was influential in that it inspired a visit to Argentina and the Sierra de la Ventana by South African geologist Alec Du Toit. Du Toit postulated,[7] based on the similarity of sediments and their style of deformation, that the Sierra de la Ventana and Cape Mountains of South Africa were once physically connected as part of the same mountain range. His challenge was to understand how this mountain range became separated by the Atlantic Ocean as South America and Africa diverged; resolution of this problem evolved into a unified understanding of Earth dynamics now known as plate tectonics.

The Earth's surface is divided into eight major plates (e.g., Africa) and many small microplates (e.g., Caribbean, Scotia), all of which are in relative and absolute motion to each other at rates of 1–17 centimeters per year. The dynamics of these plate motions create both seismic and volcanic activity along the plate margins; some plate margins create new crustal material (e.g., along the Mid-Atlantic Ridge), while some plate margins destroy crustal material (e.g., around the Pacific Ocean margin). This process has been active throughout the 4.6 billion years of Earth history and, on at least three occasions, all of the continental landmasses have been accreted together for a few tens of millions of years. These supercontinents have been named Rhodinia, Pannotia, and Pangea, and their accretion and dispersal events have been important in the distribution of both economic resources and the evolution of life forms.

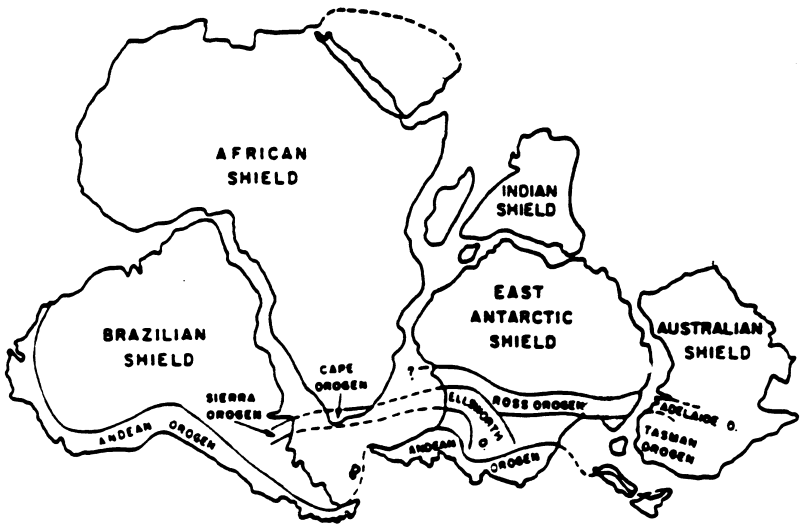
The most recent of these supercontinents is Pangea, which formed when a large continental mass in the Southern Hemisphere called Gondwanaland joined a Northern Hemisphere landmass called Laurasia during the Permian period of the Paleozoic era. Of these two landmasses, Gondwanaland (figure 2) is the best understood, and geologic phenomena (e.g., sedimentary sequences, fossils, deformation ages and styles, etc.) can be correlated between India, Australia, Antarctica, South America, and Africa for nearly 300 million years of Earth history. Clearly, the key to understanding any Gondwanaland tectonic recon-

struction lies in unraveling the Ventana-Cape-Ellsworth Mountains orogen. In each of these mountain ranges, the sedimentary sequences are nearly identical (figure 3), although the Ellsworth Mountains contain a unique Cambrian-aged section,[8] as are the inclusive fossils. Each mountain range was deformed at the same time (about 175 million years ago) and to the same level of green schist-grade metamorphism, with fold-and-thrust fault vergence in the same northerly direction.

2. Research Project

The Sierra de la Ventana is a treeless mountain range of modest elevation (1,500 meters) covering an area of 2,500 square kilometers, made accessible by reasonable secondary roads and excellent field guides[9] and regional studies.[10] Excellent weather made our twelve days most productive, including a visit to the eastern continuation of the range, the Sierra Septentrionales. The Sierra

FIGURE 2



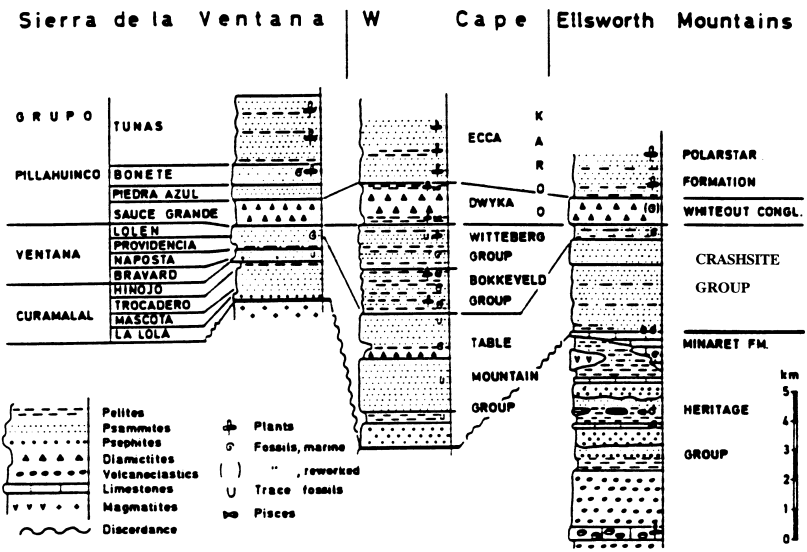
Schematic reconstruction of Gondwanaland in the early Mesozoic era before fragmentation. The link between the Sierra Orogen (Sierra de la Ventana), the Cape Orogen (Cape Fold Belt), and the Ellsworth Orogen (Ellsworth Mountains) is shown by dashed lines. (Modified after John C. Craddock, "Antarctica and Gondwanaland," in *Antarctic Geoscience* (Madison: University of Wisconsin Press, 1977), 3–13).

de la Ventana region was uplifted during the Triassic period (about 175 million years ago), later buried by Cretaceous-Miocene sediments shed off of the adjacent Andes Mountains to the west, then uplifted again after the Miocene epoch as the Miocene sediments are now eroded.

We made a variety of traverses along and across the range collecting suites of samples for sedimentological and paleontological (including microfossils) studies, structural and deformational (quartz and calcite microstructures, and magnetic anisotropy and paleopole analysis) studies, uplift studies using fission-track analysis, and to perhaps obtain a U-Pb radiometric age on the problematic Ermita rhyolite,[11] which may be of Ordovician age and does not correlate with anything in the Ellsworth Mountains or Cape Fold Belt.

To and from the Sierra de la Ventana, we passed through the Sierra Septentrionales (figure 1), a low range of mountains that parallels the Sierra de la Ventana to the northeast. Near the town of Bayas and in the coastal city of Mar del Plata, we visited a variety of outcrops and quarries where the basement crystalline rocks are exposed and are unconformably overlain by a variety

FIGURE 3



Comparison of stratigraphic sections of Paleozoic strata from Argentina, South America, and Antarctica. (Modified after Buggisch, 1987)

of lower Paleozoic sediments. The ages of these sediements are poorly constrained due to the absence of fossils.

One of our goals was to be able to collect enough material to be able to present our research results at the Gondwanaland 10 conference in Cape Town, South Africa, in June 1998, thereby allowing us to also conduct some fieldwork on the Cape Fold Belt. We have also submitted a proposal to the National Science Foundation to return to the Ellsworth Mountains with 35 geologists during the austral summer of 1998–99.

B. Contrast

The contrasts between Brazil and Argentina were quite striking and multifarious. Argentina is essentially a Western European country, slightly more economically stable than Brazil but with far less racial diversity. The minimum Argentinean monthly salary is about $700, which seems generous compared to the $150 per month in Brazil. This higher standard of living in Argentina is immediately obvious and its effects are pervasive. People seem better dressed and more outgoing. We did not see any major slum areas or street people in either Mar del Plata or Buenos Aires. We also felt completely safe walking the streets at night.

The population of Argentina appeared to be an admixture of Spanish, Italian, German, and English immigrants. We hardly saw anyone who was not of European descent. We talked with a number of Argentineans about their history and their present condition. We mentioned that it was our impression that there were no Blacks or Indians in Argentina. They responded that although it is a grim thing to think about, when the nation began some 150–200 years ago, there was a conscious effort to eliminate them and build a Western European country. There were Indian wars in which most of the indigenous people were killed or driven out. In Tierra del Fuego, there is only one full-blooded Indian alive (in Chile). These Indian wars were witnessed by Charles Darwin in 1832 on his visit to Bahía Blanca, Argentina. Although he did not like their personal habits, Darwin expressed concern for them: "Everyone here is convinced that this is the most just war because it is against barbarians. Who would believe in this age, in a Christian civilized country, that

such atrocities were committed?"[12] We asked our informants whether Argentina used slaves in the past and, if so, what happened to them. All of our contacts indicated that slaves were indeed used, but none could recall what happened to them. One contact responded (after some reflection) that "they just sort of disappeared." José Luiz dos Santos mentioned that after slavery was abolished in Argentina, a number of the Blacks were recruited into military units to fight the Indians, thus reducing the size of both minority groups.[13]

Argentina is located at a higher latitude than Brazil and in a generally coastal (flat) geologic setting, allowing for the development of an impressive agricultural economic base. The soils are black, organically rich, and productive. Because of the more temperate climate, the clays are illitic and have good base ion exchange capabilities for agriculture. The extensive Pampas, treeless except for the imported eucalyptus surrounding the ranch homes, produce large quantities of wheat, corn, soybeans, and beef. Farms are thousands of hectares in area, and often there is not a ranch home in sight.

While Brazil is an enormous, resource-rich country with many, diverse geologic and ecological settings, it is equally diverse in its population, political agendas, and social problems. Economic globalization, if it generates wealth, seems likely to benefit all Argentineans and only a few highly privileged Brazilians.

III. Relevance to Teaching

Student-faculty research has been a vital learning tool in our department, and our fieldwork in Argentina will also involve a number of Macalester students in that process. Ideally, these students would have participated in the field portions of these studies, but this is not the case here. However, fieldwork and the resultant research projects will be fed directly into the classroom. Student research projects from this trip will involve the following topics: strain analysis of quartzites (deformation lamellae, center-to-center finite strains) and calcite (mechanical twin analysis), magnetic anisotropy and paleopole analyses, stratigraphic and paleontologic correlation studies, and fission-track uplift studies.

We also have a history of running international departmental sojourns (see homepage)[14] that usually serve as a scouting journey. In the last few years, we have offered short learning expeditions to Iceland, Hawaii, Yucatán, Costa Rica, and the Galápagos Islands of Ecuador. Preparation for these courses includes a study of the history, culture, and geology of the region to be visited. We now have enough knowledge of the culture and geology of Brazil and Argentina to enrich our course offerings.

A. Personal View of Experience

Two obvious outcomes resulted from our participation in this faculty development seminar. First, we became better acquainted with fifteen members of the Macalester community who we see regularly on campus and in committee meetings but with whom we previously shared a fairly superficial personal and professional relationship. We also benefitted from the intellectual portion of their Brazilian experiences in the overall context of faculty development. Our excursion to the Sierra de la Ventana region was of enormous importance to our professional growth, especially with regard to our ongoing efforts in Antarctica. We also established a variety of personal and Internet colleagues, namely Anthony Rocha Campos (University of São Paulo), Sylvia Japas (University of Buenos Aires), Arturo Amos, and Werner Buggisch (University of Erlangen, Germany). If our proposal to the National Science Foundation is approved, Rocha Campos and Buggisch will accompany us to Antarctica.

As a faculty development undertaking, a program such as this is invaluable to the Macalester community. This program is a relatively low-cost method of enhancing internationalism at Macalester and bringing it into the classroom.

Notes

1. Maria Lucia Caira Gitahy and Francisco Foot Hardman, oral communication and their "Brazil in the Global World: Five Centuries of Lost Memories" in *Macalester International* 5 (Fall 1997): 76.

2. Ibid.

3. Ibid., 77.

4. David C. Oren, oral communication and his "Biodiversity Patterns and Management in a Changing Brazil" in *Macalester International* 5 (Autumn 1997): 53.

5. Charles Darwin, *The Voyage of the Beagle: Charles Darwin's Journal of Researches*, edited and abridged by Janet Browne and Michael Neve (London: Penguin Books, Clays Ltd., 1989).

6. Ibid., 116.

7. Alec Du Toit, *A Geologic Comparison of South America with Africa*, pub. 381 (Washington, D.C.: Carnegie Institute of Washington, 1927) and *Our Wandering Continents* (Edinburgh: Oliver and Boyd, 1937).

8. Gerald F. Webers et al., "Geologic History of the Ellsworth Mountains, West Antarctica" in *The Geology and Paleontology of the Ellsworth Mountains, West Antarctica*, Geological Society of America, Memoir 170 (1992): 1–8.

9. María Sylvia Japas and Arturo J. Amos, "Sierras Australes de Buenos Aires (Ventania), Field Trip No. 1A, XII International Congress on Carboniferous and Permian Stratigraphy and Geology (1991), 14 pp.; and Luis V. Dimieri and Luciano R. Di Nardo, COB '95, "Curved Orogenic Belts, Their Nature and Significance," Field Guide, Sierras Australes, Buenos Aires, Argentina (1995), 28 pp.

10. P. R. Cobbold, D. Gapais, and E. A. Rossello, "Partitioning of Transpressive Motions within a Sigmoidal Foldbelt: The Variscan Sierras Australes, Argentina" in *Journal of Structural Geology* 13, no. 7 (1991): 743–58; and Werner Buggisch, "Stratigraphy and Very Low Grade Metamorphism of the Sierras Australes de la Provincia de Buenos Aires (Argentina) and Implication in Gondwana Correlation," Zbl. Geol. Palanot., Teil 1, (1987): 819–37.

11. Buggisch, "Stratigraphy and Very Low Grade Metamorphism."

12. Darwin, *The Voyage of the Beagle*, 111.

13. José Luiz dos Santos, oral communication, June 1997.

14. www.macalester.edu