SCIENCE IN ANTARCTICA:

POLICY IN THE PATH OF PROGRESS

BY

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w/ Badarh, 1992

In 1959 the political rhetoric blew across the world in icy blasts as the US and the USSR remained locked in the grip of an escalating, nuclear Cold War. Mutual antagonism, mistrust, and fear pervaded the governments of both countries. Having recently concluded an indirect superpower war in Korea, the US and USSR were on a collision course for disaster that would culminate in Cuba two short years later, putting the world on the brink of nuclear war.

However, on December 1, 1959 these two nations, along with Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, and Great Britain, signed the Antarctic Treaty. Under the terms of this agreement, these nations would continue the international scientific exchange in Antarctica that was begun during the International Geophysical Year of 1957-58. This meant that in the cold lands of Antarctica there would be no Cold War. Antarctica would be given over to the nationless realm of science. The treaty called for:

> [The prohibition], inter alia, [of] any measure of a military nature . . . . Freedom of scientific investigation in Antarctica and co-operation towards that end . . . . [that] information regarding plans for scientific programs in Antarctica shall be exchanged . . . . [that] scientific personnel shall be exchanged . . . . [that] scientific observations and results from Antarctica shall be exchanged . . . . [and that] All areas of Antarctica, including all stations, installations and equipment within those areas, and all ships and aircraft . . . shall be open at all times to inspection.

An international scientific community was to reign supreme in Antarctica, nationalism would have no place on the frozen plateaus of the Southern Continent.

Was this ideal of an international scientific community in Antarctica ever realized? Did the Cold War spill over into the supposedly neutral pursuits of the Antarctic scientists? How did the Antarctic Treaty, a document that called upon the signatories to act with trust in a long term de-militarized co-operative venture, manage to achieve enactment amidst such geo-political antagonism? In attempt to answer these questions, this paper will examine the causes, the focus, and the results of the Antarctic Treaty of 1959.

In order to understand the Antarctic Treaty we must first look at the political, economic, and scientific foundations of the Antarctic, beginning, appropriately enough, with the chance encounter of two Russian ships and one American ship off the coast of the Antarctic mainland in 1820.

THE SEALING PERIOD

Prior to the beginning of the nineteenth century, the Antarctic islands and continent were virtually unexplored. Scholars of the time debated whether or not continental land even existed in the freezing waters of the Antarctic Ocean.

All of this changed in the 1810s and the early 1820s as men and ships by the dozens probed deeper and deeper into the heretofore unknown depths of the Antarctic region.

As the nineteenth century began, the sealing industry was poised on the brink of collapse. Having hunted out the traditional spawning grounds of the Northern Hemisphere seals, the sealers of this age were driven farther and farther away from their home ports in their pursuit of bounty. In the 1810s, driven by the published maps and the reports of animal abundance derived from the Antarctic explorations of James Cook in 1772-75, the sealers ventured into the Antarctic, discovering a motherlode of seals on the rocky islands of the Antarctic waters. Soon exploratory ventures were pouring into the region, each sealing company trying to discover its own secret hunting ground. From 1815 to 1825, over two hundred American and British sealers operated in the Antarctic.[1] With this ever increasing level of competition came an ever increasing drive on the part of the sealers to push farther and farther south to find seal spawning grounds that were unknown and untapped.

This economic impetus for Antarctic exploration resulted in the discovery of the Antarctic mainland in 1820. On November 17, 1820, the American Capt. Nathaniel Brown Palmer, commanding the fourteen meter sloop Hero, spotted the ice covered cliffs of the Antarctic Peninsula. The following spring, Palmer encountered the Russian Capt. Thaddeus von Bellingshausen, traveling with the men-of-war

ships Mirnyy and Vostok, off the coast of the South Shetland Islands in the southern depths of the Antarctic Ocean. The two men greeted each other and, as befitting their goals in the region, discussed the seal trade. Later, it would be asserted that Bellingshausen had actually encountered the Antarctic mainland prior to Palmer's sighting.[2] In this chance encounter was laid the geo-political struggle over Antarctic lands that would drive the creation of the Antarctic Treaty over a hundred years later.

By the start of the 1830s, the Antarctic waters had been worked out and the sealing industry was facing smaller and smaller harvests.[3] However, at the same time that this Antarctic industry was dying out, another economic imperative was manifesting itself in the Antarctic, that of international trade. As the nations of the world increasingly sent their ships abroad for supplies and to deliver goods to foreign markets, the use of the sea route around the tip of Tierra Del Fuego and into Antarctic waters grew increasingly important. Unfortunately, even though many sealers had traversed the Antarctic waters over the previous decade, little was known about such important navigational information as sea currents and magnetic direction. Without this knowledge, particularly that of magnetic bearings, a ship traveling through the Antarctic faced a very uncertain journey.

In the period 1838-42, three successive nationalist ventures would set forth to Antarctica in an attempt to codify navigational data in Antarctic waters and to discern the existence of the south magnetic pole that Johann Karl Friedrich Gauss predicted existed in the Antarctic region.[4] However, before this remarkable burst of Antarctic activity occurred, one other significant expedition braved the Antarctic waters, laying the ground work for the future Antarctic expeditions and, more importantly, producing the first scientific investigation of Antarctica.

In 1825, President John Quincy Adams, in his first annual message to Congress, called for American Antarctic activities "equal or proportionate" to those of Britain, France, and Russia. Seizing this incentive, Nathaniel Palmer and his associates, Edmund Fanning and Benjamin Pendleton, pressed Congress for government funding for an Antarctic expedition. Unfortunately, their efforts were stymied when Andrew Jackson ascended to the Presidency in 1828. Undaunted, the three men culled together private financing from various whaling and sealing interests and set forth for the Antarctic in 1830. Aboard the ship Annawan was James Eights, an Albany naturalist, "who was conducting research under a five-hundred-dollar grant from the New York Lyceum of Natural History (now the New York Academy of Science)."[5]

Eights conducted extensive research as the expedition traveled through the Antarctic waters. Amongst his findings, Eights discovered and illustrated both the isopod Glyptonotus antarctica and a rare ten-legged spider, Decolopoda australis.[6] More importantly, Eights examined erratics, the displaced rocks and boulders found on various Antarctic islands, correctly surmising that these erratics indicated the existence of a continental body in the far south of the Antarctic waters (a fact that was still in contention even though the Antarctic mainland had already been sighted a decade earlier).[7] Upon returning to the Unites States, Eights catalogued his findings in a series of papers that marked the first qualitative research in the Antarctic.

With this success, Palmer and his associates again pressed the government for funding for an Antarctic expedition. In 1836, Congress authorized $300,000 for Palmer's proposed venture on the basis of the "economic value of finding new sealing grounds,"[8] and "to extend the bounds of science."[9] So in 1838, the United States Exploring Expedition, under the direction of Lieutenant Charles Wilkes, set forth. The expedition consisted of 440 men, of which seven were scientists. Unfortunately, James Eights "was dropped [from the expedition] at the last moment without explanation."[10] Perhaps as a result of this, the expedition proceeded to produce scant scientific research.

Instead, for four years Wilkes traveled the Antarctic, paralleling and mapping the East Antarctic mainland's coastline for over 1,500 nautical miles.[11]

While Wilkes was charting East Antarctica's coastline, Britain and France were simultaneously sending expeditions to seek the southern magnetic pole. France's expedition, under the leadership of Jules Dumont d'Urville, was the most successful of the three in plotting the position of the southern magnetic pole, placing it 350 miles inland of the East Antarctic coastline. However, little else of value resulted from d'Urville's expedition.

Britain's expedition, guided by James Clark Ross, set forth slightly later than the other two, in 1840, and was ultimately the most successful. Ross' expedition discovered the active volcano Mount Erebus, the Transantarctic Mountains that divide the continent in two, and the "way in"[12] to Antarctica, the great ice plateau that lays before the Transantarctic Mountains (later to be named the Ross Ice Shelf).

Funded for economic reasons these three ventures laid the foundation for some of the Antarctic conflicts later to come. Having embraced nationalist pursuits in conducting their separate expeditions "in secrecy,"[13] rather than joining together to seek their common goal, these expeditions revealed a pattern of nationalism that would mark Antarctic activities for over the next hundred years. In addition, the widescale codifying and charting of

Antarctica conducted by these three ventures would form one basis for the conflicting land ownership claims that arose during the first half of the twentieth century.

With the end of these three expeditions came the end of major Antarctic activity for over fifty years.[14] The sealing grounds having been hunted out, Antarctica was no longer economically attractive, and hence did not merit the vast resources it took to mount an expedition into its frigid waters. Not until the whaling industry turned its focus towards Antarctica in the late nineteenth century would Antarctica again be assailed by organized expeditions.

THE WHALING PERIOD AND THE HEROIC AGE

Around the turn of the century two turning points were reached in world affairs that resulted in a return of the world's interest to Antarctica. First, much as the sealing industry before it, the whaling industry found itself driven to hunt in Antarctic waters. Second, the explorers and researchers of the world found that through colonization, imperialism, and adventuring, the map of the world had taken on a definition and structure heretofore unknown. Having explored and studied most of the more assailable regions of the world, the adventurous and inquisitive explorers and scientists started to focus their gaze on the vastly unknown, largely pristine, ice shrouded lands of Antarctica.

Having depleted much of the world's oceans of whales, in the late nineteenth century the whalers of Sweden, Norway, the US, Britain, and other nations descended upon the plentiful herds of humpback, blue, and fin whales in the Antarctic waters. Whaling in the Antarctic grew rapidly after the development of the first whaling factory in the Antarctic and the invention of the explosive harpoon cannon and motorized whale catcher in 1904. A further advance in the economic pursuit of whaling in the Antarctic came in 1925 with the addition of a flensing slipway to the whaling ships of the Antarctic.[15]

At the same time that the whaling industry was growing in Antarctic waters, the naturalists of the world were starting to take note of the uniqueness of Antarctica. At the Sixth International Geographic Congress in 1895, Clements Markham, president of the Royal Geographic Society, declared that "the exploration of the Antarctic regions is the greatest piece of geographical exploration yet to be undertaken."[16] The scientific attention that Antarctica was now receiving in this period was a direct result of the earlier lobbying of two men, Commander Matthew Maury and John Murray.

Superintendent of the US Naval Observatory and Hydrographical Office, Maury had compiled the widely hailed navigational source books Wind and Current Charts and Sailing Directions. However, Maury's research was inadequate for the Antarctic area and in order to fill in

his charts he needed international cooperation in gathering data. Hence, in April 1861, Maury sent a proposal for a cost-sharing, international campaign in Antarctica to nine governments. However, before his proposal could be considered, the US Civil War erupted and effectively dashed any chance of Maury's plan receiving serious consideration.[17]

Importantly though, Maury's plan did spark the British government to fund the expedition of the H.M.S. Challenger in 1874. This expedition dredged the Antarctic Ocean in the area of the iceberg melt line, discovering rocks and sediments that clearly indicated the presence of a large land mass to the south, thereby confirming James Eights' observations made half a century earlier.[18] From the results of this expedition, John Murray, a Canadian biologist and oceanographer, compiled fifty volumes of data on Antarctica, which he presented to the Royal Geographical Society in 1893 in a call for renewed scientific activity in Antarctica.[19] This presentation made a profound impact on those assembled, resulting in the aforementioned declaration of Clements Markham two years later and in the rekindled interest in Antarctic science over the next two decades.

These two groups, the whalers and the scientist explorers, would continue to exert their influence, dominating activities in the Antarctic until the first World War.

Following the effective cooperation of the Transit of Venus expedition in 1874 and the First International Polar Year in 1882-83, both of which had extremely limited activity in the Antarctic region, many of the Antarctic

expeditions of the period 1890 to 1918 had a level of internationalism. A typical venture of the time was that of the ship Belgica under the command of Adrien de Gerlache de Gomery in 1897. On this Belgian expedition were an American doctor and anthropologist, a Polish meteorologist, a Russian geologist, a Rumanian naturalist, and Roald Amundsen, the Norwegian who would, a decade later, be the first man to reach the South Pole.[20] Discovering and cataloguing numerous lichens and mosses, the Beligica contributed much to the biological study of Antarctica. On this expedition was made the first discovery of "the mites and wingless flies that are Antarctica's only form of terrestrial fauna."[21] The Belgica expedition was also the first group to 'winter over' in Antarctica when their ship inadvertently became frozen in the icy waters off the Antarctic mainland.

This first, accidental, wintering over was soon followed by the deliberate wintering over in 1899 of an expedition led by the Norwegian Carsten Borchgrevink and funded by the British publisher, Sir George Newnes.[22] This expedition was scientifically important in that it was the first to compile a continuous annual record of "magnetic, weather, and auroral observations during the austral winter."[23] In addition, Borchgrevink's expedition mounted a sled trek over the Ross Ice Shelf, probing further into the Antarctica mainland than any previous expedition.

In 1901 Clements Markham "coordinated . . . [the Antarctic] expeditions of Sweden and Germany with that of Britain so that they would be geographically complementary."[24] The German expedition, lead by Erich von Drygalski in the ship Gauss, became the first group to explore the Indian Ocean sector of the Antarctic mainland. In addition, the men of the Gauss set up magnetic, meteorological, and astronomical observatories on the ice floes of the area.[25]

Led by the geologist Otto Nordenskjold in the ship Antarctic, the Swedish expedition set out to explore the eastern coast of the Antarctic Peninsula. Nordenskjold's expedition made several important scientific contributions, primarily that of finding the first fossil proof that the Antarctic continent had once been a vibrant, luxuriant land. In addition, Nordenskjold's expedition "obtained evidence of the extraordinary biological richness of the Antarctic's marginal sea."[26] Nordenskjold was also the first person to declare that the Antarctic Peninsula was an extension of South America.[27]

The British expedition was commanded by Robert Falcon Scott in the ship Discovery. Sailing with six scientists, the Discovery expedition compiled masses of meteorological, magnetic, biological, and geological data about the Antarctic continent and surrounding areas. The Discovery expedition was also the first group to discover the snowless 'dry' valleys that pocket Antarctica, a phenomena that holds deep scientific interest to this very day.[28] In

addition, on February 4, 1902, Scott made the first aerial reconnaissance of Antarctica, ascending 1,000 feet in a gas balloon.

In the decade following these three coordinated expeditions, numerous ventures set out to conquer the Antarctic. Befitting the name given to this era, the Heroic Age, most of these expeditions were formed as adventurous exploration missions rather than scientific pursuits. Undoubtedly, some scientific research was conducted on these expeditions, but the data gathering was always ancillary to the main purpose of the trip, the exploits inherent in conquering an unknown inhospitable land. This pattern of activity can be vividly illustrated by examining the culmination of the Heroic Age, Amundsen and Scott's race to the South Pole.

On October 19, 1911 Roald Amundsen set out from the edge of the Antarctic continent, bound for the South Pole. Fourteen days later, Robert Scott's party started for the same goal. The interest that sparked these simultaneous quests was primarily popular in nature. As historian Richard S. Lewis has noted, "the popular motive for reaching the South Pole was analogous to the incentive in 1960 for reaching the moon."[29] In fact, the Royal Geographical Society, a stanch sponsor of Scott's previous Antarctic expeditions, had deferred their status of official sponsor on this mission, stating that:

So far as attainment of the Pole is concerned,

> it is well known that only about a hundred miles remain to be covered. . . . This spot may not exhibit any features of exceptional scientific interest, and the Royal Geographical Society could hardly advocate an expedition with the South Pole as its sole objective.[30]

Clearly, the impetus for the polar race between Amundsen and Scott was the geographical challenge in crossing the icy distances rather than scientific curiosity of what might lay in those frozen wastelands.

Nevertheless, Scott, in forming his expedition party, chose Dr. Edward A. Wilson, a zoologist, to be his chief scientist. Along the journey, Wilson collected fossil and geological samples that he insisted the party transport with them, even as they futilely struggled to return to their home base after reaching the South Pole on January 17, 1912, only to discover Amundsen had beaten them there by over a month. When the final resting place of Scott's party was discovered at the end of 1912, amongst the discovered artifacts was a sled loaded with thirty-five pounds of geological specimens.[31] Amidst the specimens were coal samples, winged grains of pollen, and fossil plants, including Glossopteris, a big-leafed fern.[32] These samples indicated that the land mass of Antarctica once had had a different solar relationship than that which presently existed, because luxuriant plants that would metamophosize into coal would not be able to exist in a land that spent six months in the darkness. As such, Scott's <u>adventuring</u>

party contributed much to the body of Antarctic science, continuing the curious mix of exploits and research that marked the pre-World War I era.

The Heroic Age also witnessed one other development that would come to play a large part in the formation of the Antarctic Treaty. In 1908, the United Kingdom became the first country to lay claim to Antarctic lands, filing letters of patent that declared ownership of "some of the best whaling grounds in the Southern Ocean. . . . . includ(ing) the Antarctic Peninsula and the islands east of it."[33] Britain had made the first move in what would soon become a global land dispute in Antarctica.

Soon after these events the world plunged into the global conflict of World War I. In the immediacy of the all-encompassing war, Antarctica was abandoned by the nations of the world. However, less than a decade later, led by the technological assault of US Commander Richard E. Byrd, Antarctica would experience a rebirth of interest on an unprecedented scale.

US SUPREMACY

Between the two world wars, the Antarctic gave rise to many large scale ventures. These expeditions took on new levels of political importance as the nations of the world started to look towards Antarctica with an acquisitive eye. Primarily concerned with expanding the geographical knowledge of the continent, these expeditions continued the exploring tradition of the Heroic Age without contributing overly much in the way of science. Politics had become imbedded in the land of ice.

Spurred by economic considerations, between 1925 and 1939 Scott's old ship Discovery was commissioned to lead the British, Australian, New Zealand Antarctic Research Expedition (BANZARE). Financed through the lease of harbor and shore rights to British whaling interests, the expedition was primarily concerned with studying the conditions that promoted the success of the Antarctic whaling industry. As such, the BANZARE expedition conducted the first sustained research in Antarctic oceanography and marine biology.[34] Long term as this expedition was, the real impetus for Antarctic activity was to come from another Antarctic expedition.

Leading the renewed charge into Antarctica was retired US Commander Richard E. Byrd. Starting with a privately financed expedition in 1928, Byrd would work from his Little America Antarctic stations until the US government financed expeditions of the 1940s.

Byrd brought a new dimension to the assault on Antarctica. He was the first Antarctic explorer to employ on a widescale basis the advanced technological developments that arose in the first decades of the twentieth century. Making use of the airplane, radio, and tracked vehicles, Byrd traversed, photographed, and mapped more land in Antarctica than that of all previous expeditions combined.[35]

The first Byrd expedition in 1928-30 included Laurence M. Gould as chief scientist. During the course of the party's season on the continent, Gould proved that the Queen Maud Range of mountains were geologically similar to those in Victoria Land, establishing that the two combined to form "the most stupendous fault block mountain system in the world."[36] In addition, Gould's party became the first to traverse Marie Byrd Land. As such, Gould claimed it as a "dependency or possession of the Unites States."[37]

Meanwhile, Byrd was making the first successful attempt to fly over the South Pole. In this, and in other aerial reconnaissance flights, Byrd and his party were able to chart huge swaths of land. Where parties on the ground could chart a strip of land five kilometers wide, Byrd, in his aircraft, could map a strip of land up to 192 kilometers wide.[38] All sum, the first Byrd expedition photographed about 150,000 square miles of Antarctica.[39]

Public interest in these events was high. The New York Times had a reporter, Russell Owen, along on Byrd's first expedition. On Byrd's second expedition, CBS set up a licensed radio station at Little America that broadcast Antarctic news and entertainment programming. Byrd's Antarctic exploits had garnered the attention of the public imagination so much that in 1930 he was promoted to rear admiral (retired) by a special act of Congress.[40]

So, with heightened public awareness, Byrd returned to the Antarctic in 1933-35, again, privately funded by such entities as the Fords and the National Geographic Society.[41] This second venture was even more successful than the first. Scientifically, Byrd's second expedition:

> . . . did the first seismic work to determine the depth of the ice on the Ross Shelf; proved almost beyond doubt that no strait existed between the Ross and Weddell seas; advanced cosmic research; [and] collected many samples of rock, moss, and lichen.[42]

In addition, the expedition also mapped another 1.16 million square kilometers of Antarctica's interior.[43] This wide-scale charting was politically important as back home in the US Senator Millard E. Tydings of Maryland had introduced Senate Resolution 310 which called Congress to "authorize and direct the President to lay claim to all areas in the Antarctic which have been discovered or explored by American citizens."[44]

Following up on Byrd's wide-scale mapping, in 1935 the American Lincoln Ellsworth flew down across the length of the Antarctica Peninsula and into the interior, claiming 906,500 square kilometers of land for the United States.[45] In 1939, Ellsworth again flew over Antarctic lands, dropping claims markers, as he and Byrd had previously done, and staking out another 207,200 square kilometers in the name of the United States.

The US land claims made by these two men presented a political problem. Ever since the United Kingdom had made its initial land claim in 1908 and a subsequent, New Zealand administered, land claim in 1923, the United States had been in a quandry. Not wanting to recognize the United Kingdom's Antarctic land claims but still wishing to leave open the opportunity to make its own claims, the US in the 1920s and early 1930s moved away from the traditional legal position of ownership of new lands being based on discovery. The new US position would be the "doctrine of 'constructive occupation.'"[46] Under this structure, ownership of Antarctic lands arose out of "the revisiting [and occupation] of lands previously seen and mapped."[47] As Secretary of State Charles Evans Hughes stated in May of 1924:

> It is the opinion of the Department that the discovery of lands unknown to civilization, even when coupled with a formal taking of possession, does not support a valid claim of sovereignty unless the discovery is followed by an actual settlement of the discovered country.[48]

In this manner, the US was able to refuse to honor any other country's Antarctic land claims while still holding out the opportunity to make its own claim.

Having decided upon this route of action, the US actively pursued its Antarctic interests. As historian Deborah Shapley has noted, "by the 1930s, the State Department allowed acts of administration to take place on Antarctic expeditions; these would later be invoked to support the doctrine of 'constructive occupation.'"[49] The US government was also working behind the scenes to bolster its Antarctic activities. When Lincoln Ellsworth stopped in Capetown, South Africa in August 1938 while en route to the Antarctic, he received the following secret official instructions transmitted by Secretary of State Cordell Hull to the US consul:

> . . . it seems appropriate for [Ellsworth] to assert claims in the name of the United States . . . regardless of whether or not it lies within a sector or sphere of influence already claimed by another country. . . . Reassertion of American claims to territory visited by American explorers several decades ago would seem to be appropriate . . . . suggest the possibility of dropping notes or personal proclamations. . . . It should be made clear to Ellsworth that he should not indicate or imply advance knowledge of approval of the Government of the United States [in this matter].[50]

Clearly, the US was aggressively pursuing a piece of the Antarctic pie.

Meanwhile, still other nations of the world were staking their claims to the Antarctic. In 1924, France announced its claim to a sector of land lying to the East of the New Zealand claim. Following the precedent it established with the New Zealand claim in 1923, in 1933 the United Kingdom claimed a quarter of Antarctica's land mass in the name of Australia. By the late 1930s, Norway, Argentina, and Chile were also making overtures of Antarctic sovereignty.[51] These political maneuverings were both a result and a cause of the pre-dominant US activity in the Antarctic. By responding to the US's covert attempts to create a claim on the basis of constructive occupation, these nations only increased the pressure on the US to make an overt claim on Antarctic lands and to expand its Antarctic activities.

In 1938 President Roosevelt commissioned a study of the political situation in Antarctica.[52] Hugh S. Cummings Jr. of the Division of European Affairs at the Department of State responded to the President that a "naked reservation of American rights now would probably have little weight in an ultimate settlement when balanced against the concrete acts of other nations," and hence the US should approach gaining sovereignty through the formal implementation of constructive occupation.[53] Based on this appraisal, on January 7, 1939, Roosevelt approved an official US government expedition to Antarctica. Again, however, "the

goal of sovereignty was to remain secret so as not to alarm rival claimants and spur an outright territorial race [in Antarctica]."[54]

Nevertheless, the mere mounting of a US government expedition to Antarctica was enough to spur first Argentina, in 1939,[55] and then Chile,[56] in 1940, to formalize their Antarctic land claims.

All of this political activity was largely based on economic speculation. At this point in time, the existence of valuable mineral wealth in Antarctica was surmised, but still unproven. As early as 1933, Samuel W. Boggs, a US State Department geographer, compiled a study that declared Antarctica to be "rich in resources and a fair prize"[57] and that in its frozen lands there was a high "likelihood of finding petroleum".[58] Yet even had mineral wealth been discovered, at this early date the technology did not exist to extract it from the entombed lands of the Antarctic. There was, however, another more pressing reason for taking possession of Antarctic lands.

With the rise of the Axis powers in Europe in the late 1930s came an increased military presence in the Antarctic. Suddenly the strategic importance of controlling the only natural navigable sea way around the North and South American land mass was realized. The key to controlling the waters of the Antarctic lay in control of Antarctica.

In 1938-39 a Nazi expedition, under direct orders of Hermann Goering, surveyed the coast of Antarctica. Taking over 11,600 aerial photographs and dropping swastika emblazoned claims markers every 15 to 20 miles, the Nazis attempted to establish a foothold in the strategic area of the Antarctic.[59] Their actions prompted Norway to formalize its Antarctic claim in 1939. As a result, the Germans attacked and captured three Norwegian whaling factories and eleven ships that were operating in the Queen Maud Land area.[60] Soon, the immediacy of the European conflict would draw the Nazis and most of the other nations of the world out of Antarctic operations, but in the tense years surrounding the outbreak of war, the military importance of Antarctica had impinged itself upon the world's consciousness.

FROM THE WAR TO THE IGY

As world tension exploded in war in Europe, the tensions in the Antarctic were also growing to a perilous level. The nations of the world were now in open competition for the Antarctic.

In making their claims in 1939 and 1940, Argentina and Chile had declared possession of the same area of the Antarctic, an area which the UK had claimed for itself over two decades earlier. Argentina and Chile quickly settled

their dispute with a 1941 agreement that declared they would ignore their conflict and work together to keep the Europeans out of Antarctica, claiming that "a South American Antarctic existed and that [Argentina and Chile] had exclusive rights over it."[61]

The UK responded by stepping up its presence in the Antarctic, even while fighting the war in Europe. In 1943, "in a bid to reassert her sovereignty"[62] the British commissioned Operation Tabarin, a naval expedition, to establish permanent bases on the South Orkney and South Shetland Islands. These stations were to remain continuously manned throughout the following decade. A year later, in 1944, the British established a permanent programme of scientific research under the name of the Falkland Islands Dependencies Survey. This organization was a predecessor of the British Antarctic Survey, which directs British Antarctic activities to this day.[63] In taking these steps, Britain was attempting to formalize its claim under the American structure of constructive occupation. Most important of all, Britain was setting the precedent of scientific occupation of the Antarctic as key to the political control of the Antarctic. Britain had created the new role of political pawn for Antarctic scientists.

After the end of the war in 1945, the nations of the world returned to the Antarctic. Following the lead of the British, in 1947 Argentina and Chile established permanent meteorological bases on the Antarctic Peninsula. Similarly, Australia established a permanent scientific research

programme in the Antarctic, working under the name of the Australian National Antarctic Research Expeditions (ANARE). France, too, began a regular programme of scientific study, establishing a permanent base in Terre Adelie in 1950.

While politically the Antarctic was splintering apart, there was still an openness for scientific cooperation among friendly nations. In 1949-52 the Norwegian-British-Swedish Expedition proved the fruitfulness of scientific cooperation. Working together the group was able to complete the first seismic traverse of the inland ice sheet. Already, the first large-scale efforts at international Antarctic science were underway.

However, the major change in the Antarctic after the war was the relation of the United States to the world. Emerging from the war as the dominant world leader, the US quickly reasserted itself as the dominant power in the Antarctic.

In 1946-47 the US launched Operation Highjump under the command of Rear-Admiral R. H. Cruzen. The most massive expedition ever undertaken in Antarctica, Operation Highjump involved thirteen ships and over four thousand men. Taking advantage of new war technology, the expedition employed aircraft launched from carriers, helicopters, and modern icebreakers. Primarily political in nature, Operation Highjump served to both prepare US naval forces for a possible "war against the Soviet Union in the far north . . . [and to demonstrate the navy's] unique importance [to those] back in Washington."[64] However, even more

importantly, Operation Highjump served to reposition the US to "establish a claim in Antarctica."[65] Regardless of its motives, Operation Highjump cemented the US position as political leader of the Antarctic.

In 1946, the US State Department conducted a study and determined that if the US Antarctic claim was made and put before the Hague that the outcome would be uncertain.[66] Hence, the US government was not willing to risk its Antarctic interests in arbitration. As such, it now fell upon the US to mediate the growing land disputes both to its own and to the other involved nations' best advantage.

In 1948, around the start of the Berlin blockade, the US made its first attempt at arbitrating the Antarctic situation. The US proposed the creation of a United Nations governed eight nation trusteeship involving the seven nations who had made claims in the Antarctic and the US, which would now take possession of the remaining unclaimed lands in Antarctica. Designed not only to solve the issue of land claims, the US proposal was also an attempt to freeze the USSR out of Antarctica.[67]

Quickly realizing the inability of this proposal to keep the UN member nation, the USSR, out of Antarctica and realizing the proposal's unacceptability to the claimant nations, the US almost immediately issued another alternative, the condominium proposal, in 1948,[68] under which Antarctica would be sectored amongst the claimant nations in a uniform manner. The condominium idea was quickly dispatched, with five nations rejecting it outright. In

rejecting the condominium proposal, the Chilean government responded with what is now known as the Escudero Declaration. In this document, Chile proposed that a five year moratorium be placed on Antarctic claims and that a "modus vivendi that would welcome scientific cooperation"[69] be constructed. This was to be the first seedbed of the international realm of science created in the Antarctic by the Antarctic Treaty a decade later.

Meeting resistance to its settlement proposals, the US continued to actively work to formalize its claims on the basis of its work in the Antarctic. In 1950, the US embarked upon the National Program, a ten-year effort charged with planting claims markers, mapping the Antarctic, and, back in Washington, consolidating all the pertinent documentation that could justify an American claim on Antarctic lands.[70] The reason for the sudden urgency in documenting the US Antarctic claim was the June 10, 1950 announcement of the Soviet government that:

> The Government of the Soviet Union cannot agree that such a question as that of the regime for the Antarctic should be decided without their participation.[71]

In the delay in achieving a successful resolution to the land disputes of the seven claimant nations and itself, the US had lost the chance to keep its Cold War enemy out of the cold lands of Antarctica. The USSR was returning to the ice

and it too would claim Antarctic lands, on the basis of its belief in the discovery of Antarctica by the Russian Captain Bellingshausen over a century earlier.

At the same time that the Soviet Union was preparing its statement on Antarctica, a dinner party was being held in Silver Springs, Maryland that would eventually lead to the key to the solution of the Antarctic political situation. On April 5, 1950, at the home of James A. Van Allen, a gathering was held, at which Dr. Lloyd V. Berkner proposed the Third International Polar, which would eventually become the International Geophysical Year (IGY).

About the same time, the US National Academy of Science concluded a State Department requested review of the feasibility of future US scientific programmes in the Antarctic. Its formal report, dated May 1949, "pointed out the necessity for a coordinated international scientific programme with the free exchange of information among the various national groups involved."[72] Between this report, the Chilean Escudero Declaration, and the several examples of scientific fruitfulness resulting from international cooperation, the IGY proposal received US support and was sent to and accepted by the International Council of Scientific Unions (ICSU). The IGY was set for the period July 1, 1957 to December 31, 1958.

In July 1954, in response to these events, President Eisenhower approved NSC 5424/1 which declared the

Antarctic's value to be primarily scientific and as such urged funding for the foundations of permanent scientific stations so as to ensure US "rights [in the Antarctic and], . . . [to] assure access to any natural resources found there."[73] The US was now formally embarked on a wide-scale scientific attack on Antarctica.

In 1955, the Special Committee for the International Geophysical Year met to coordinate the Antarctic IGY activities and thereby avoid cross-national duplication. Even at this cooperative meeting Cold War politics interfered with scientific pursuits. The US insisted upon building a permanent station at the South Pole not for the scientific value, for there was no inherent research value from being at the South Pole, but rather for its political statement. As Deborah Shapley noted:

> [The South Pole] station symbolized the previous American interest in acquiring territorial rights to the entire continent, standing there in silent rebuke to the others, who had neither the money nor logistical expertise to build it.[74]

Not to be out done, the Soviets announced their scientifically non-sensible goal of placing a permanent station at the pole of inaccessibility (the most isolated point in Antarctica). In both cases the clear message was sent that even though the scientific pursuits during the IGY would be cooperative, they would still retain nationalistic frameworks. The politicians had turned to using the scientists as bulwarks in their nationalist Antarctic policy.

THE IGY AND THE ANTARCTIC TREATY

By the time of the start of the IGY, twelve nations - Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the UK, the USA, and the USSR - had established IGY Antarctic research programmes and built over sixty research stations, more than forty of which were on the Antarctic mainland.[75] All of these various research programmes had been cooperatively coordinated and the results were to be cooperatively shared.

Amongst the numerous areas of research undertaken in Antarctica during the IGY were meteorology, geomagnetism, upper air studies, glaciology, seismic and gravity surveys of the Antarctic ice-sheets, and oceanography.[76] Amongst the findings determined by the research of the IGY were: the discovery and confirmation of continental bedrock beneath the Antarctic ice by the USSR, the US, Australia, and France; the calculation of the Earth's crust by the detection of seismic disturbances in the Antarctic ice sheet; and a wide scale study of the aurora that correlated Arctic and Antarctic auroral phenomena.[77] Strangely enough, admist all this scientific activity, no programme of geology was conducted.

Perhaps the most important contribution of the IGY to the future of Antarctica was the American run Antarctic Weather Central at the US Little America base. Throughout the IGY, the Weather Central was operated with a policy of scientific personnel exchange. Meteorologists from Argentina, Australia, France, New Zealand, South Africa, and the USSR all worked at the Little America weather station. As a result of this exchange, the USSR allowed a US exchange scientist to work at its Mirnyy station, beginning with Gordon Cartwright of the US Weather Bureau in 1957.[78] This exchange was to come to symbolize the internationalism of science in the Antarctic during the IGY. Political enemies in the rest of the world, in Antarctica, the USSR and the US could seemingly focus on science in the Antarctic and successfully work together.

By the middle of the IGY in late 1957 it was clear that Antarctic research would continue long beyond the IGY's end. In order to continue the international scientific cooperation of the IGY, the Antarctic scientists, operating from a directive from the ICSU, formed the Special Committee on Antarctic Research (SCAR), which was renamed the Scientific Committee on Antarctic Research in 1961. SCAR was to have an immediate impact on the post-IGY developments in Antarctica. SCAR's working body consisted of "one delegate from a designated scientific body in each of the countries involved in Antarctic research,"[79] in addition to several representatives from various ICSU scientific bodies. SCAR's commission was to "further the cooperation of

scientific activity in Antarctica with a view to framing a scientific program of circumpolar scope and significance."[90] In years to come, SCAR would be the centralizing body that set research directions in the Antarctic, proposed directions of scientific inquiry, and coordinated the various national research programme to maximum scientific efficiency. With the advent of SCAR a permanent structure of Antarctic scientific cooperation was in place. However, in order for SCAR to succeed in its plans it was essential that the Antarctic not return to a political realm of land ownership squabbles. Clearly, a legal legitimization of Antarctica's status was needed if wide-scale scientific research was to continue in the frigid lands of the Southern Continent.

With the end of IGY in 1958, the US emerged in a clearly superior position in the Antarctic. In May 1958 President Eisenhower had invited the other eleven nations working in the Antarctic under the auspices of the IGY to come to Washington to "reach agreement among themselves on a program to assure continuation of the fruitful scientific cooperation [in Antarctica]."[91] The US had started the legalization of the international scientific community of Antarctica that would become the Antarctic Treaty of 1959.

On October 1, 1959 the twelve nations met in Washington and started to hammer out a proposal. On December 1, 1959 they signed the Antarctic Treaty. The treaty made Antarctica a scientific land. Land claims were to be suspended, <u>not</u> voided, for the thirty year duration of the

treaty. In addition, military exercises were outlawed from the Antarctic region. Also, free inspections would be allowed of all Antarctic installations. Most importantly, the treaty called for all Antarctic research and data to be shared and coordinated through SCAR so that science in Antarctica would be international in scope.

Over some Congressional opposition the Antarctic Treaty was ratified by the US on August 11, 1960. Clearly this was the most rational policy for the US to follow. For in proposing the Antarctic Treaty, the US had been rather self-serving. As Harlan Cleveland, future Assistant Secretary of State for International Organizational Affairs, stated in testimony before the House Committee on Interior and Insular Affairs in 1965:

> For the United States, as the nation with the greatest capability to mount and support scientific investigations in Antarctica, this treaty was clearly better than limiting ourselves to one slice of a much divided pie. As things stand, we are at liberty to investigate anywhere, build anywhere, fly anywhere, traverse anywhere in this vast and still mysterious southland.[82]

In formulating the Antarctic Treaty, the US was sidestepping the uncertainty that world arbitration of Antarctic claims settlement presented, for the political expediency of creating an Antarctic scientific regime. This was undertaken with the full knowledge that the US held a far superior advantage in the ability to explore the Antarctic. As a result of this, by the time the treaty expired thirty

years later the US would have far surpassed the Antarctic settlement efforts of the other nations of the world, and thereby would have indisputably formalized its land claim over a predominant portion of Antarctica. An international sponsorship of science in Antarctica became the US's politically expedient way of gaining political advantage in the frozen south.

THE POST ANTARCTIC TREATY PERIOD

Subsequent science in Antarctica took place within the international cooperative structure set forth in the Antarctic Treaty. Quite successful in many ways, the treaty served to promote a regular exchange of scientific data throughout the next thirty years. However, in the area of true side-by-side cooperative teamwork, the treaty was not successful in separating science from politics.

In January 1959, after a period of mutual cohabitation, the US bequeathed two of its old IGY bases, Wilkes Station and Ellsworth Station, to Australia and Argentina, respectively. In addition, the US continued to jointly occupy Hallet Station with New Zealand. From these beginnings, the US would establish its policy of conducting joint research with its allies.

Instances of US international collaboration are fairly numerous in the post-Antarctic Treaty period. From 1957 to 1965 the US joint occupation of Hallet Station with New Zealand produced many scientific results. The dual occupied Antarctic stations conducted seismic studies, geological, survey, installed a cosmic ray scintillometer to examine atmospheric phenomena, and conducted biological studies of the indigenous Antarctic animal populations, primarily Adelie penguins.[83] Late in the 1961 Antarctic research season, the US conducted a joint hydrographic survey of the South Shetland Islands with Chile.[84] On this expedition, the two countries extracted water core samples, measured the geo-magnetic pull, and measured gravity and seismic reflections through the Antarctic ice shroud. In 1967, the US collaborated with France in conducting atmospheric rocket studies during a major solar flare.[85] From 1967-70 the US joined with Argentina and Norway in conducting an oceanographic study of the Weddell Sea.[86]

Meanwhile, the USSR was conducting joint research of its own. For over twenty years, the USSR shared its bases with East Germany, Poland, and, late in the 1970s, Cuba. In this manner, the USSR allowed the two nations to gain footholds in Antarctica that would subsequently lead to their full participation in the Antarctic Treaty. While jointly occupying the Soviet stations, the German scientists assisted in conducting study of the ice sheets between Vostok and Mirnyy stations (1963-63); conducting

examinations of radio propagation, atmospheric CO2 density, and radioactive fallout (1965-66); and, conducting palaeontological surveys of Mac. Robertson Land (1973-74).[87]

Yet, while large scale joint ventures were undertaken after the Antarctic Treaty, they were, as illustrated, almost exclusively divided along the political lines of the Cold War. The exception was that throughout the treaty period, each year the US and the USSR exchanged a scientist between two of its stations.

Gilbert Dewart was one of the earliest of the exchange scientists and his experiences were typical of those of later scientists. During his stay at Mirnyy Station in 1960, Dewart had the fortune of being amidst the 'Cold War enemy' during the tense political crisis surrounding the downing of Gary Powers' US U-2 spy plane while on a reconnaissance mission over the USSR. Dewart relates that the station commander rose before the assembled station personnel and declared that they should "let none of this [political incident] affect our relationship with our good comrade Gil. Whatever problems may exist between our governments, let our personal friendship live on."[88] Dewart also tells of how the Soviets "spoke reverently of Scott, Amundsen and Byrd [bestowing on them the word] geroi (hero)."[89] These types of interactions were typical of those experienced by the exchange scientists of the US and the USSR. Each countries scientists greeted the scientist of the other nation as a colleague, not as a political enemy. On this personal, man-to-man level, true scientific

internationalism existed between the superpowers. Unfortunately, this microcosm of joint scientific participation did not spill over into the larger realm of Antarctic science. Throughout the treaty period, as the Cold War raged, the Antarctic remained divided by its own iron curtain.

While the Antarctic pursuits of the superpowers were defined by politics, so too were the other nations of the world striving to maximize their political position in Antarctica. Throughout the treaty period, the claimant nations continued to try to implement actions designed to reinforce their land claims at a later date. Hence, Argentina's President Raul Lastiri made a visit to an Argentinian Antarctic base on August 10, 1973 and declared that his presence "reaffirms [Argentina's] national sovereignty over these southern regions."[90] Five years later, the Argentinian government would fly a pregnant woman to Esperanza Base so she could give birth to her child on Antarctic soil, and her newborn could then promptly be declared an Argentinian citizen.[91] The other treaty nations pursued actions similar to those of Argentina, attempting to perform deeds and construct settlement patterns that would in the future be construed as representing constructive occupation or colonization of Antartica, thereby justifying the nation's claim of Antarctic sovereignty.

The continuing Cold War division in the Antarctic and the continuing attempts at claims justifications vividly illustrate the central problem of the Antarctic Treaty, and hence the central threat to Antarctic science. In forming the Antarctic Treaty, the signatory nations were crafting a document designed to put off a problem rather than solve a problem. The whole system of open scientific activity in the Antarctic was created as a means of forestalling the culmination of the struggle over land claims. However, in not relinquishing the claims when forming the treaty, the Antarctic nations created a political time bomb. As Dewart noted as early as 1960, "the Antarctic Treaty should work very well, at least until something of real commercial value is found down here to set us at loggerheads again."[92]

The minerals issue of Antarctica threatened to force such a situation as the end of the treaty neared in late 1991. Back in 1973 two events occurred that triggered the minerals debate in the Antarctic. First, the US scientific drilling ship the Glomar Challange accidentally discovered gaseous hydrocarbons in three holes it drilled in the Ross Sea continental shelf.[93] Second, Middle Eastern oil prices soared. While not actually revealing a significant mineral deposit, the US drilling shipping had reignited the belief in the mineral potential of the Antarctic at a time when mineral issues were pre-dominant in geo-politics. From this point on, the treaty nations would be pressured both internally and externally to reach an accord on the minerals issue.

From 1948 to 1970, nearly every US policy review had concluded that "resources were a key aim"[94] in the Antarctic. In 1965, US policy guidelines were laid down in the hope that "these great projects of peaceful cooperation in Antarctica will yield resources."[95] As such, it has been the long term policy of the US that it will not accept a permanent mineral ban in the Antarctic nor any other treaty provision that would strip its long term reserved right to harvest mineral resources in the Antarctic.

An impoverished third world agreed with the US, it too wanted the option to harvest the Antarctic's resources. During the early 1980s a small group of third world nations started to exert their joint influence to try to wrest control of the Antarctic, and hence its mineral resources, out of the hands of the western industrialized world. In (s3t12vp10HSeptember 1983, led by Malaysia, they were successful in getting the issue of Antarctica placed on the agenda of the United Nations for the very first time.[96] Unable to convince the majority of third world nations to expend their limited energies on a battle over the Antarctic, the movement died.[97] However, the fact that the Malaysian led group was able to bring the issue before the UN was significant because if there was one thing the treaty nations feared, it was that their treaty powers would be overtaken by the UN general assembly. Hence, the Antarctic nations now had renewed incentive in solving the minerals issue before the treaty ended in 1991.

The issue of mineral rights was an important one for the scientists. For with the Antarctic Treaty coming up for renewal in 1991, the debate over the dispensation of mineral rights threatened to rip apart the fragile Antarctic truce of science created three decades earlier. The future of Antarctic science rested on the successful resolution of the mineral issue.

The treaty nations made their first attempt at diffusing the minerals issue in a 1977 agreement signed at the ninth consultative meeting of the Antarctic Treaty in London. Under this agreement the treaty nations adopted a policy that would:

> Urge [the treaty nations] . . . to refrain from all exploration and exploitation of Antarctic mineral resources while making progress towards the timely adoption of an agreed regime concerning Antarctic mineral resource activities. They will thus endeavor to ensure that, pending the timely adoption of agreed solutions pertaining to exploration and exploitation of mineral resources, no activity shall be conducted to explore or exploit such resources.[98]

While this was an admirable policy, the treaty nations wasted no time in breaking their agreement.

Even though the minerals issue was a disaster waiting to happen, the Antarctic treaty nations, driven by their economic greed, expanded their search for Antarctic mineral deposits. As noted, this mineral exploration occurred while the treaty nations remained bound to the voluntary restraint agreement. Furthermore, this mineral exploration occurred

with the full knowledge that the discovery of a vast mineral deposit would throw Antarctica into a political holocaust that would most assuredly destroy all traces of the cooperative Antarctic scientific community as the treaty nations fought over Antarctic mineral and land claims. From 1977 to 1983, Norway, the USSR, France, West Germany, Australia, and Japan all conducted multi-channel seismic reflection profiles of the Ross and Weddell Seas and the Amery Ice Shelf in an attempt to locate petroleum deposits.[99] Fortunately, no oil or other mineral deposits were discovered by these expeditions.

The treaty nations were also less than diligent in fulfilling their promise of forming a minerals agreement in a "timely" manner. After a decade of arguing and in-fighting, in June 1990, the treaty nations, now twenty-six in number, reached an agreement under which, all Antarctic mineral and oil exploration and development would be banned for fifty years. Under the terms of this agreement the fifty year moratorium on drilling and mining could be lifted by a unanimous vote of the treaty nations.[100]

Revealing its real interests in the Antarctic, the US became the only treaty nation to oppose the ban. With the Antarctic Treaty coming to an end in under a year and with its renewal dependent upon the approval of a minerals agreement, the US pushed its economic desires in the Antarctic, opposing the 1990 agreement "on the grounds that a fifty year moratorium was effectively a permanent ban,"[101] a proposition that the US had staunchly opposed from the

earliest days of US Antarctic exploration. Finally, as the deadline approached, the other treaty nations budged, changing the overturning vote of the moratorium from a unanimous decision to a two-thirds vote. With this change the US and the other treaty nations signed the Antarctic minerals accord, effectively renewing the Antarctic Treaty, on Oct. 4, 1991.

CONCLUSION

The actions of the treaty nations in the face of the Antarctic minerals issue emphasize the major problem facing Antarctic science under the Antarctic Treaty System.

Indisputably, the Antarctic Treaty was a boon to science in the Antarctic. Under the treaty's framework the international exchange of research results and data were formalized and implemented. In addition, science in the Antarctica of the Antarctic Treaty was the recipient of an unprecedented level of government support and funding. While the scientists were still largely restricted from working with their Cold War enemy-colleagues, they were exchanging representatives, data, and coordinating their research programs. All sum, the Antarctic Treaty succeeded in creating a cooperative, well funded, jointly directed scientific community. While not truly the full realization of an international community of science, Antarctic science

from 1959 through 1992 conducted itself with an unprecedented level of formalized international cooperation and guidance.

Unfortunately, the forces that restricted the idealization of an international community of science from fully developing in Antarctica, were exactly the same forces that held the control of Antarctic science's destiny. As Assistant Secretary of State Harlan Cleveland noted before Congress in 1965, the Antarctic Treaty was not a document for science but rather a political tool designed to enhance the US' economic and political fortunes in Antarctica.[102]

By the time of the signing of the Antarctic Treaty in 1959, the Antarctic had been subjected to over a hundred years of international economic and geographical conflict. The numerous nations operating in the Antarctic before the creation of the Antarctic Treaty were there in pursuit of economic benefit. From the sealers of the 1820s, through the whalers of the early twentieth century, up to the mineral speculators of the 1930s, 40s, and 50's, the national expeditions in the Antarctic were guided and sponsored with the goal of exploiting Antarctica's accessible resources and claiming the lands of Antarctica in the hope that, in the future, mineral resources could be extracted from the Antarctic ice.

Not wanting to limit its claim on Antarctic resources to one small sector of the continent, the US proposed the Antarctic Treaty. Using the scientific establishment as a front to expand its constructive occupation over the entire

continent during the thirty year period of the Antarctic Treaty, the US hoped to gain firm control of Antarctica's resources. In this manner, the scientific community of Antarctica laid out in the Antarctic Treaty was designed as an expedient solution to the economic struggles in the Antarctic.

The scientists themselves contributed to this process by pushing for an international structure of science in Antarctica without insisting that the political issue of Antarctic land claims be settled first. By allowing the Antarctic Treaty to be designed with the Antarctic claims and economic competition of the treaty nations remaining unresolved, the scientists assured their own co-opting, as political pawns to their government's Antarctic economic imperative.

Therein lies the fault and the danger of the Antarctic Treaty. Until the treaty nations resolve their political 3t12vp10Hand economic disputes over Antarctica's lands and resources, the scientists in the Antarctic will remain hostage to a scientifically-dispassionate politically-motivated Antarctic Treaty. Fifty year moratoriums notwithstanding, the words of Gilbert Dewart in 1960 ring hauntingly true today:

> The Antarctic Treaty should work very well, at least until something of real commercial value is found down here to set us at loggerheads again.[103]

As long as the scientists of the Antarctic conduct their programmes under the auspices of the Antarctic Treaty, they remain atop a scientific holocaustic political time bomb that threatens to explode with any significant resource discovery.

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