# THE HISTORY OF CARTOGRAPHY AT THE AMERICAN GEOGRAPHICAL SOCIETY

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Wednesday, January 25, 2017

## Introduction:

At the end of last November, we heard a very interesting presentation by Dr. Tim Wallace about cartography at *The New York Times*. We saw how rapidly data can be handled today, and how imaginatively data can be depicted to reflect aspects of the presidential election process. In this manner, we were introduced to the cutting-edge tools of cartography today.

This evening, I would like to take you on a brief historical journey on what were once the stepping-stones of American cartography.

The map you see here, *Map of the Arctic Region* at the scale of 1:5,000,000, was the last sheet map published by the American Geographical Society in 1975. It may be accessed from the website of the Society's Library.

Two years ago, I was approached by Professor Frederick Nelson, an expert on the Arctic and a Councilor of the American Geographical Society. He told me about his plans for a special Arctic issue of the *Geographical Review*, the quarterly journal of the Society. He asked if I would contribute to it by describing the development of this map because, as he said, after 40 years many of us still consider it to be the finest map of the Arctic region ever

produced. This very timely issue, volume 107, number 1, was just published.

My presentation this evening is about the course of cartographic events at the Society that led up to the time of the issuance of this map.

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**[1]** By all accounts, not only is the story of The American Geographical Society unique, but, as you will see, mapmaking at the Society, and its place in the overall history of American cartography, is singular as well. Indeed, it may be argued that the cartographic achievements of the Society are unparalleled for institutions of its kind. This narrative will trace the principal cartographic stages during a125-year period, **[2]** which are somewhat arbitrarily selected as **[2a]** 1851 to 1899, characterized essentially by illustrative cartography, **[2b]** 1900 to 1948, principally a period of experimental and exploratory mapping, and **[2c]** 1949 to 1976, the era of thematic maps and atlas cartography at the Society. In 1976, the Cartographic Department was closed as part of a major retrenchment. I will briefly touch upon the main projects, and highlight the personal accomplishments of the key players. **[3]**

## 1851-1899

The story begins on September 19, 1851, when John Disturnell placed a small ad **[4]** in the just-launched *New York Times* calling attention to his Geographical Rooms and Statistical Library. The small notice read as follows, "Citizens and strangers are respectfully invited to visit the above rooms, where will be found a large collection of maps and statistical works," and solicited "A gentleman to obtain subscribers to the above rooms." Three weeks later, **[5]** *The Times* reported on the establishment of

a “Geographical and Statistical Society.” Disturnell was elected to serve as the Domestic Corresponding Secretary and Agent.

John Disturnell was an active marketer and publisher of cartographic material. For example, **[6]** the year the Society was established he published a “New Map of the United States and Canada Showing all the Canals, Railroads, Telegraph Lines and Principal Stage Routes.” **[7]** Disturnell’s Geographical Rooms were conveniently located near travel agencies at 179 Broadway, ready to supply appropriate information. One can easily understand how his place became the focal point of all those who were interested in geography.

For several years Disturnell was one of the more active members. He was a generous contributor of maps and atlases to the Society and eagerly helped to develop its map collection. He regularly presented the Society with new state and county maps, and occasionally, he distributed multiple copies at public meetings of the Society for the instruction and enjoyment of the attendees, and no doubt, for establishing a clientele.

An interesting contribution of John Disturnell was a motion put forth at a meeting on November 15, 1855, to memorialize the Legislature of New York on the subject of a topographical survey. Subsequently, for over thirty years, the Society took an active interest in the mapping of New York State through various committees. **[8]** In 1876, a newly formed committee presented a report to the Governor that described the hundred-year old, wholly unreliable patchwork of local surveys and the necessity and objective of an accurate triangulation. Based upon this report an Act was passed and $20,000 was appropriated. Work finally began under the able direction of J. T. Gardner, General Secretary of the Society at the time. On the domestic front, this initiative was the first significant cartographic contribution of the Society.

**[9]** A frequent visitor to the Geographical Rooms was George Schroeter. Before joining the Society as a fellow, he prepared a "skeleton map" of the Rio de la Plata region for the first public sitting of the Society on January 13, 1852. He was the former Secretary of H.R.H. Prince Albert of Prussia. How he came to America is not entirely clear. In fact, we know little of his background. It seems, however, that he was the first cartographer who regularly prepared maps for the Society for which he received remuneration. Schroeter leaves behind a clear trail with two maps, one of Paraguay and one of the Paraná River area accompanying an article on the same subject in Volume 1, No. 1 (1859) of the *Journal* of the Society. With this issue, the periodic publication of the Society took on a new form, and no doubt, the editors wanted to make a splash. **[10]** The color-lithographed maps were very nicely executed indeed, attesting to formal cartographic schooling. These are the only published maps we have, which carry attribution to Schroeter.

During the so-called "War of the Rebellion," publication of the *Journal* of the Society was suspended and its activities were curtailed. Sometime during this period, perhaps because the Society fell upon difficult financial times and was no longer able to support a cartographer, even on a part-time basis, Schroeter retired.

In 1866, Peter Cooper came to the rescue; he provided new, excellent rooms in his Cooper Union Institute, free of charge. After all, by now the Society possessed the most valuable geographical library in the country and deserved better quarters. Its map holdings were large and rare with atlases and maps from Ortelius to the most recent. These were now systematically arranged in cases, and on shelves and racks. Many were framed and displayed around the rooms.

**[11]** About this time, the Society acquired the services of a new cartographer on regular, albeit piecemeal basis. Records for

1870 indicate that $62 was spent on map-making in that year. The new cartographer was another man of German origin by the name of Frederick Leuthner. It is, however, not until Volume 19 (1887) of the *Journal* that we come upon a map, which gives attribution to him. **[12]** Like his predecessor, Leuthner also prepared many large maps to be displayed at the Society's public lectures, which were increasingly illuminated by stereopticon presentations. Leuthner's career ended abruptly. The minutes of the Council for March 1st, 1890, **[13]** contain the following stark entry, "Judge Daly [President of the Society] reported to the Council the death of Frederick Leuthner, for twenty years the draftsman of the Society, and who had left a widow and nine children in destitute circumstances. Voted on motion of Mr. Stout that $100 be paid by the Society to the widow of Frederick Leuthner in compensation for cartographic work done by him, the same to be in full for all services to date." [About $2,500 in 2016].

The Society did not acquire again the steady services of a cartographer until 1913.

**[14]** Charles Patrick Daly was one of the most prominent men in New York City during the second half of the 19th century. The Society benefited greatly from his able leadership. Daly joined the Society in 1855, and held the presidency for 35 years, from 1864 until his death in 1899. He was born in New York, son of an Irish immigrant master carpenter. His mother died in childbirth and his father past away while he was in his teens. He was determined to learn a trade following in his father's footsteps, but, to educate himself better, he started attending cultural and literary meetings. It was during a debate contest at one of these gatherings that he attracted the attention of a lawyer who offered employment and further education. Daly was an extraordinarily bright person who by 1839, at the age of 24 and with limited formal education, was admitted to the practice of law. In 1871, he was elected Chief Justice of the Court of Common Pleas. "During

his thirty-five years as president," wrote his biographer Professor Hammond, "his name was synonymous in the scientific world and in the public mind with that of the American Geographical Society…"

**[15]** To the Judge's home and to the Society's headquarters came travelers, explorers, scientists, to give of their knowledge and experience and to receive advice and assistance. The lectures of the Society were enormously popular, often attracting over a thousand people.

**[16]** Judge Daly's intimate understanding and passion for geography and cartography are marvelously revealed in his annual addresses, which *inter alia* include a long exposé "On the Early History of Cartography, Or What We Know of Maps And Map-making, Before the Time of Mercator."

We see that during this period the Society nurtured and took justifiable pride in its map collection. It developed close relationships with many geographical institutes, which numbered close to one hundred by 1890, and participated in international map exhibits and meetings. The Society also supported several cartographic activities, including preliminary maps for the construction of the trans-continental railroad lines, **[17]** the construction of a canal across the Central American isthmus, **[18]** the exploration of the Arctic, several surveys in the west and mid-west, and **[19]** various maps of Africa. But, other than illustrative cartography, no independent mapping projects were undertaken. Nevertheless, the maps included with the publications present us with an excellent mirror of evolving cartographic styles, of changing printing technologies, and their influence on map making. **[20]**

# 1900-1948

**[21]** With the election of young Archer Huntington as President in 1907, a new era was ushered in. He realized that maps played an important role in the Society's publications and activities. He, therefore, actively and financially supported the hiring of the first, full-time cartographer. **[22]** In 1913, William A. Briesemeister was hired on a one-year trial basis at $55 per month. This one year stretched to decades, and when he finally retired in 1964, he had remained with the Society for 51 years, longer than any other staff member. Briesemeister began his cartographic career at the age of 14 as an apprentice under his father, Arthur, who worked for the Museum of Natural History. **[23]** At the time, the Society was located next door on 81st Street. **[24]** Cyrus Adams was editor of the *Bulletin* and he got to know young Bill at the Museum who began to prepare some small drawings for him. He admired the exactitude and quickness of Bill, **[25]** and when the Society's new building was ready on Broadway at 156th Street, on Audubon Terrace, complete with a "drafting floor… with skylight roof above it," Adams suggested to Huntington that Briesemeister should be brought on board. **[26]** Readers of the Society's publications must have noticed right away the increased number of cartographic illustrations. Thanks to Bill's pride in his own work, we can identify most of his maps by the small initials he placed in one of the corners. **[27]** It is interesting to observe here that the year before Bill was employed, the Society and the Museum jointly published an unusual map of the Arctic Region that was prepared by his father. Decades later, nearing his retirement, Bill gave a talk about his tenure at the Society and mentioned that the compilers and fact checkers of this map, Adams and the librarian Dellenbough had serious disagreements. According to Bill this incident led indirectly to the appointment of a director by the Council.

**[28]** Two years later, in 1915, Isaiah Bowman became the first director of the Society. Briesemeister, and Adams' assistant, Wolfgang Joerg, were two of the few staff members who survived his hurricane takeover. Clearly, he had the ability to recognize and appreciate talent and he wasted no time in carefully putting together a thoroughly professional staff. He was acquainted with Briesemeister's work before he became director, as it was Bill who drew several maps illustrating his first South American excursion. **[29]** In Joerg, Bowman recognized a gifted, modern geographer. Although they often quarreled, Bill idolized Joerg and learned much from him, particularly the value of research and careful compilation. With the new *Geographical Review* and other publications, Bill soon had more work than he could handle. In 1916, an Austrian cartographer, Charles Krisch was added to the staff.

At the end of 1917, while away as a junior topographer for the Mississippi River Commission, Bowman called Briesemeister back to the Society to work for the Colonel House team in preparation for the Paris Peace Conference. As the preeminent geographical research institute in the country, Bowman opened the doors of the Society. **[30]** Under his direction, a group of experts known as The Inquiry established its headquarters there. An important component of the group was a specially formed cartographic team. First, under the direction of Bowman, and later supervised by Professor Mark Jefferson, the cartographers prepared a series of base maps on which ethnographic, economic, historic and political problems were depicted. Such information was constantly revised and adjusted by the cartographers, several of who traveled with Jefferson to Paris. Briesemeister often lamented that he could not go as his first son was born in 1918. The more than 300 maps prepared for the American Commission to the Peace Conference were the first significant cartographic contributions of the Society in the international arena. Some twenty years later, Bowman proudly declared, "they were the most

important maps to be used by the various delegations." Years later, maps and related material of The Inquiry were transferred to the Beinecke Rare Book & Manuscript Library of Yale University.

**[31]** Soon after Bowman returned from Paris, he lunged into the Millionth Map project, or the mapping of South and Central America at the scale of 1:1,000,000. This was to be based on the internationally agreed standards established by the International Geographical Union in 1913. The idea first occurred to Bowman on one of his South American expeditions and was solidified in Paris where he occasionally made use of the European maps of this series. It was a brilliant idea that profoundly influenced the work of the Society for nearly half a century. It was Briesemeister who undertook the pioneering compilations of the first sheets, La Paz and Panamá. **[32]** Twenty-five years later, with Charles Hitchcock, he completed the compilation of the last sheet, Bogotá. Within a couple of years, compilers and surveyors augmented the Society's cartographic staff. There were some Yankees among them, but mostly there were three distinct groups of recent immigrants who represented the best of the European tradition. Besides Briesemeister and Krisch, there were the Scots: **[33]** Forsyth, MacCleod, Miller and Philip, and an Englishman Smith. **[34]** Arnold, Noetzel, Schweizer, and Weldon were the Americans. And there were six Russian military officers, **[35]** Chern, George, Kostenko, Krijanowsky, Sovinsky, and Transehe, who together compiled 72 of the 104 sheets that made up the series. Seven of this group remained with the Society for more than thirty years. **[36]** In 1920, Professor Alan G. Ogilvie, whom Bowman first met in 1912, then again in Paris at the Peace Conference, was coaxed to join the Society's staff and lead the Millionth Map project. However, he only stayed for three years, and was followed by **[37]** Raye Platt, and still later **[38]** by Charles B. Hitchcock who supervised the Hispanic-America program.

**[39]** Near the completion of this series, the sheets were assembled in the courtyard in front of the building for a *Life* magazine photo.

These were simply outstanding craftsmen and scientists who created a product that no other similar institution has done before or since. In 1940, Earl P. Hanson wrote in the Harpers Magazine, "Only rarely now does a map appear that stands out above all the rest, commands respect for its beauty and adequacy, and paves the way for further advances, cartographic, economic, political, cultural. Of such the outstanding example of our time is the American Geographical Society's 'Millionth Map of Hispanic America.'"

Besides the cartographers at the Society, there were many others who were involved in this monumental undertaking. Special mention must be made of the contributions of Messrs Huntington and Ford, which amounted to the majority of financial support. **[40]** We should also note the large printing firm of A. Hoen & Company, who was the exclusive lithographer for this and many other maps. And there were many by-products, **[41]** such as the *Catalogue of Maps of Hispanic America,* or the delimitation of the Guatemala-Honduras boundary, but they are far too numerous to elaborate in the present narrative.

To top it all, the Millionth Map project was by no means the only cartographic undertaking of significance during this period. **[42]** For a decade, Osborn Maitland Miller and Weld Arnold, both trained at the Royal Geographical Society in London, and both joined the AGS in 1922, ran a School of Surveying at the Society, founded and directed by Professor Alexander Hamilton Rice, a member of the Council. **[43]** Walter A. Wood, a mountaineer and Arctic researcher, and later President of the Society, was among its first graduating class. A number of famous explorers also spent

weeks at the School receiving instructions in rudiments of route surveying and basic astronomy. Sir Hubert Wilkins, for example, got extensive assistance before both of his Arctic and Antarctic expeditions. **[44]** With the valuable input of such explorers, the Society compiled and published several groundbreaking maps of the Polar Regions. **[45]**

Besides Antarctica, globes and relief models remained a passion of Briesemeister throughout his career. In 1933, he compiled the gores for the 50-inch American Bible Society globe. Ten years later, he assisted with the construction of President Roosevelt's globe, **[46]** and in the mid 1950s with the Geo-Physical globe of Rand McNally. **[47]** He also built a partial globe at the scale of 1:1,000,000 for illustrating the Millionth Map project at the 1938 World's Fair, which was subsequently extended and installed as a permanent exhibit in the lobby of the Society building.

**[48]** Meanwhile, the restless, inventive mind of Miller experimented with photogrammetry, developing the first plotter for the use of oblique aerial photographs. **[49]** This method was demonstrated with excellent results during and after the Alexander Forbes Labrador expedition and subsequently received much attention at Government agencies. **[50]** In 1932, Miller also developed an experimental map design to be used in the cockpit by pilots and navigators. **[51]** And before that, Miller directed a survey expedition to central Peru in 1927, which eventually led to the first accurate survey of the source of the Marañon River, the farthest reach of the Amazon Basin. During this mission, the only survey directly undertaken by the Society in connection with the Millionth Map project, Mait was hospitalized in Lima with a sever case of malaria that nearly took his life.

Both Briesemeister and Miller were very interested in map projections, a field that they approached in an entirely different way. Briesemeister had excellent knowledge of spherical geometry and an unusually sharp, graphic imagination. Miller, on the other hand, was quite the mathematical genius. **[52]** One project, in which their collaboration is little known, was the bi-polar conic conformal projection for the Americas. Briesemeister first constructed this on the drawing table and then Miller developed the mathematical formula and description of it, demonstrating its unique scale preservation properties. **[53]** The projection was specifically developed for a 1:12,000,000 scale, single-sheet map of the Americas, **[54]** which was then expanded to a 1:5,000,000 five-sheet set of maps. This method of cartographic representation of the Western Hemisphere remains the best and most widely used to date.

**[55]** Two other leading staff members whose related contributions must be pointed out here were Charles B. Hitchcock and John K. Wright. Hitchcock, after graduating from Harvard, came to the Society in 1928 to take a course in reconnaissance under Miller and Arnold. The following year, he accepted an invitation from Bowman to join the Society's staff. Charlie was a geomorphologist who first distinguished himself as an excellent compiler and a keen field observer. He took part in over half dozen expeditions to South America, several to hitherto unexplored areas. During this period his greatest contributions were the work he undertook for the Hispanic America program and the supervision of the many projects for the Department of State during the Second World War. In the words of Mait Miller, "He was the best map editor and cartographic administrator the Society has ever had, and it is largely to his credit that the Society established an enviable reputation for cartographic excellence."

**[56]** John K. Wright was another of Bowman's find. He was hired as the Librarian in 1920; a position, he said, "really fitted him." He also remarked at one point that the Research Catalogue, a topical and regional classification system he developed for the Society's collections, was "perhaps his most important contribution to scholarship." But, as many of you may know, he was an imaginative cartographic thinker as well. Maps were his life-long passion. In his youth, he loved field sketching, an avocation he was able to carry on in Europe during the First World War. He was an erudite, prolific writer. He wrote extensively on cartography, particularly on thematic mapping. One of his most popular pieces was the essay on "Map Makers are Human." **[57]** Jack's first foray into cartography at the Society was guiding and completing Charles O. Paulin's "Atlas of the Historical Geography of the United States" in 1932. This was, in his words, "one of the most comprehensive historical atlases that have ever been produced for a single nation." Twenty years later, this atlas paved the way for the preparation of a 400-page prototype for a national atlas by the Society, which was eventually modified and published by the U. S. Geological Survey in 1970.

**[58]** What was truly amazing about this group was their camaraderie and respect for each other. To be sure there was professional rivalry and pride, but rarely at each other's expense. Jack Wright lovingly describes the family in his book entitled *Geography in the Making,* a detailed history of the first 100 years of the Society. After Bowman assumed the Presidency of John Hopkins University he wrote to Wright on more than one occasion how much he missed the Society, his "family." Bowman had enormous drive, but the staff respected and loved him. Briesemeister had a gruff exterior, but he was a very loyal and generous person. Miller may have seemed aloof, but only because he was lost in thought. On the occasion of his sickness-enforced retirement, Hitchcock wrote to the staff, "I consider you not only

as loyal and able employees of the Society, but as my own personal good friends."

One would imagine that Bowman's departure would have meant an insurmountable void. But, such was the strength of the Society that the staff managed to overcome this loss. To be sure, Bowman remained a strong supporter; in fact, to some it seemed that he never left. There were times when he would dash off three, four letters a day to the Society. It was he who supported Jack Wright for the directorship in 1938, and later told Jack to groom Charlie Hitchcock for the eventual day.

**[59]** When the Second World War erupted, the Society once again made its services available to the Government. Wright developed a close professional friendship with the State Department's chief geographer, Samuel Wittmore Boggs. The Society undertook close to 80 projects for the war effort, most of which were cartography related. These activities not only reinforced the value of an institution like the Society, but also produced some badly needed income, as well as new ideas for the staff. It was during this period that Miller devised his modified cylindrical projection for a world map. And it was Boggs who told Wright that Miller should put aside his modesty and name the projection after himself, hence the Miller Cylindrical Projection, one of the most popular for decades. **[60]** The map was widely used, including at the United Nations, where it hung for a number of years in Dag Hammarskjöld's office.

It was also during this period that several of the leading staff assumed important roles in shaping the future of cartography in the United States. For example, Miller served as the President of the American Society of Photogrammetry, Wright was the first Chairman of the Division of Cartography of the American Congress on Surveying and Mapping, and for a decade, Hitchcock was the Chairman of the United States Advisory Committee on

American Cartography. Wright was also a close advisor to Robert H. Randall of the Bureau of the Budget, who was the Chairman of the United Nations Conference on Cartography in 1948. Boggs and Wright developed many of the recommendations that were put forth by Randall at this first international conference of its kind.

**[61]** Before leaving this period, mention must be made of Ena Yonge. Although not a cartographer, she was very closely attached to the cartographic activities as the Society's Map Curator. She joined the Society in 1917 and served in this capacity for 45 years. Through her industry the Society's map collection grew to be one of the finest in the world. With all the activities going on in the Society, she had a tough job keeping track of her holdings and preventing the users and compilers from damaging them. Such was the fame of Briesemeister, however, that she once declared that only he was allowed to mark them since anything Bill put on the maps could only be an improvement. Upon her retirement, Roman Drazniowsky assumed the post of Map Curator, and eventually he was instrumental in bringing the collections to Milwaukee.

As Wright prepared to leave the post of Director, a definite sense of change permeated the Society. There was an atmosphere of uncertainty that caused anxiety among all. **[62]** Dr. Richard Light, President of the Society, most prophetically expressed this in the April 1948 issue of the *Geographical Review* when he wrote, "In an age when institutions are faced with economic extinction, their very right of survival in dispute, the quiet warning of what would be lost by the disappearance of such unique forces as this little body of map makers should be received with the utmost seriousness. It is all too easy to destroy, whether by direction or neglect. The rebuilding is another matter."

As we see, the first half of the twentieth century was a very powerful period in the history of cartography at the Society.

Invaluable service was extended to the Government during two world wars. A remarkable, unique contribution was made to the mapping of the Western Hemisphere. New instruments, techniques, and map projections were invented. At a time when there were no cartographic journals, *The Geographical Review* was the principal source for newly issued maps, technical cartographic articles, and reviews of atlases and books on the subject. The Society exercised dynamic leadership that helped shape both American and international cartography. **[63]**

## 1949-1976

By the time Hitchcock was appointed director of the Society in 1953, the financial situation was dismal. But Hitchcock had a way about him that generated warmth and respect and hope. The staff's morale was lifted as they saw the beginnings of new and exciting undertakings. Certainly, the cartographers relaxed a bit. After all, Charlie was one of them.

**[64]** But, there was a dramatic staffing change during this period. Remnants of the old guard, Schweizer, Philip, Weldon, Krijanowsky, all retired in 1956 and 1957. This was followed by a transition period when some cartographers came and stayed for a year or two, then moved on. For Example, Jean Paul Tremblay prepared the *Geographical Review* maps for a while and then was replace by a lawyer-turned-cartographer, Francis Barkóczy in 1958. The ones who stayed on longer were **[65]** Norman Swanston, Douglas Waugh and José Uzcátegui. After Briesemeister retired, Doug Waugh assumed the position of Chief Cartographer. Swanston came over from General Drafting Co. in 1953, and Waugh and Uzcátegui switched from Rand McNally in 1958. **[66]** Among the first new trainees were Miklos Pinther and Peter Fust, while they were both attending Columbia University,

and Chih Chwen Huang from Taiwan who just completed her graduate studies at Southern Illinois University. **[67]** The next additions were Edward Schwartz, Luba Prokop, and Lidia Romash. Eddie was a recent graduate from Hunter College. Both Luba and Lidia were also previously employed by Rand McNally & Co. **[68]** In 1969-1971 another group of trainees were hired, Cristy Brause, Nancy Kreitler, and Trina Mansfield. They were graduates from Briarcliff College where for a time an excellent two-year program in cartography was offered. **[69]** Bernhard H. Wagner, a highly skilled cartographer from Berlin, Attila Sioreti, a topographic engineer from Hungary, and Harris Graber and Susan Grande, also recent Hunter College graduates, were the final additions to the Cartographic Department.

The team was rounded out by Dr. Harry Steward, a research cartographer from England, who was hired in the wake of Miller's retirement in 1968. **[70]** That year, the Society honored Mait by establishing the *O. M. Miller Cartographic Medal*. In accepting this tribute, Mait expressed feelings of "outraged humility."

In 1969, Pinther was selected to head the Cartographic Department. By 1971, the Department swelled to a twelve-member team.

One of the new projects, a harbinger of the type of mapmaking to come, was the preparation of an Atlas of Diseases. In 1944, Dr. Light, a neurosurgeon, proposed the ideas that a Department of Medical Geography be established at the Society and that the study of diseases be treated cartographically. **[71]** At the end of 1948, Dr. Jacques M. May assumed the directorship of this new activity. Distribution of any phenomenon is usually best depicted on equal-area maps. Concerned with reducing shape distortion on such world maps, Briesemeister began to experiment with projections for possible use in the Atlas. **[72]** The result of

his efforts was an elegant modification of the Lambert Azimuthal Equal-Area projection via the Hammer-Aitoff construction method, which now bears his name. The new projection was adopted for the Atlas to high acclaim.

**[73]** One of the older projects, which had been previously connected with the War Department and now with the Army Map Service, was the 1:5,000,000 map series. As we saw before, this was first developed for the Americas on a unique bipolar conic conformal projection. Later, Miller devised an oblique stereographic projection for the Europe and Africa portion. Next the Government requested that this series be extended to cover Asia as well. With so-called "fill-in" projections, Miller continued the oblique stereographic projection all the way to cover the Philippines and other Pacific nations. Miller never cared much for this "minestrone soup" of projections, but the project reviewers were very much impressed with the mathematics of it all. In spite of this deficiency, the maps were the best published for a couple of decades and were adopted for depicting world geology, soil, and vegetation by UNESCO and FAO.

**[74]** In 1972, Pinther initiated the last map of this series, a map of the Arctic Region. This was also the last cartographic endeavor that Mait Miller was involved in as a consultant in retirement. A unique feature of this map was the first use of satellite imagery as an aid in medium-scale map compilation. In a collaborative arrangement, Susan Grande worked for several weeks at the U.S. Geological Survey under the direction of Dr. Calvocoresses. Other special contributions were the high-quality bathymetry by Bruce Heezen and Marie Tharp of Lamont-Doherty Geological Observatory, at a time when much of that data for the Arctic was classified. And, there was also the careful interpretation of Russian cartographic sources by Ted Shabad of *The New York Times*. Ted was also the editor of the periodical *Soviet Geography*, published by the Society.

As we saw throughout this narrative, the Society maintained an interest in the Polar regions from the very beginning. **[75]** Mapping of glaciers was a significant part of this. A number of different glacier maps were prepared, many under the direction of William O. Field, who was in charge of Glaciological Research and head of the World Data Center for Glaciology at the Society.

**[76]** Never to be left behind, in the late 60's the Society also produced a globe for the general public. We do not have sufficient time to discuss the merits of this globe, suffice it to say, however, that Mait Miller, always ready with novel ideas, had a hand in its rather different design. He reversed the usual coloring of bathymetry, showing shallower depths darker rather than lighter. He thought this would help to highlight the land areas.

**[77]** In 1964, although not a cartographer, at least not via formal training, William Warntz created a cartographic model that received a lot of attention. As a Research Associate at the Society, he developed a methodology to calculate potential population and proceeded to demonstrate this with a physical model. After hammering a lot of nails into a map of the U.S., he built a plaster model that was quite effective. Now, you may be interested to know that a few years later he took a significant turn in his career when he left the Society to head up the Harvard Computer Graphics Lab.

As we saw, atlas cartography began during this period with the Atlas of Diseases. It continued with the Serial Atlas of the Marine Environment and the Antarctic Map Folio Series. These two folio series of loose maps with ancillary text were the ideas of Hitchcock and they were his final cartographic contributions.

Originally, Charlie thought of the Marine Folios as a cartographic medium that would bring together physical

oceanographers and marine biologists. **[78]** In 1961, one of New York's most respected geographical editors, Wilfrid Webster, was appointed as Project Director. In the ensuing ten years, a total of 23 Folios were published. Soon, Webster also assumed the editorship of all non-periodical publications. But, the title he cherished most was that of "map editor." Bill was of great influence on the cartographic staff. He was an honest, blunt Quaker, who would not overlook the slightest error. But, he was also a fountain of knowledge and a patient teacher for which he earned the respect of all.

**[79]** The concept of the Antarctic Map Folio Series was similar to the Marine Folios, that is, cartographic analysis with ancillary text. Charlie thought of publishing such a series when the International Geophysical Year was launched in 1957. Five years later, Vivian C. Bushnell, a geophysicist with the Air Force Cambridge Research Labs, was hired to lead this project. Between 1964 and 1975, 19 folios were published which provided excellent summaries of our knowledge at the time of Antarctica.

In 1970, two other major atlas projects were launched that largely preoccupied the last five years of the Society's cartographers. These were *A Historical Atlas of South Asia* and the *Ethnographic Atlas of Ifugao*. Both atlases proved to be of monumental undertakings, representing the very best in scholarship in the specific disciplines.

**[80]** Professor Joseph E. Schwartzberg of the University of Minnesota directed the South Asia atlas. To be frank, this was one of those undertakings that benefited from the ignorance of its eventual enormity. Had the principal participants known, they would have been scared off. It has been calculated that the Atlas consumed over 50 academic years of research by Joe's team, and 11 cartographic years by the Society. In 1980, Joe received the Watumull Foundation Bi-annual Book Prize for the Atlas. David

Watumull said at the time, "Over the years, since 1946 when this Prize was instituted, I can personally say, without a doubt, that this is the finest and most worthwhile book to be selected."

**[81]** The *Ethnographic Atlas of Ifugao* was the last cartographic project undertaken by the Society. In fact, Pinther completed the final stages under a special arrangement, three years after the Cartographic Department was dissolved. The Atlas, a cartographic record of an upland agricultural system in North-central Luzon, is the singular contribution to scholarship by Professor Harold C. Conklin of Yale University. Early in his research work, Hal contacted Mait Miller for advice on mapping a portion of Northern Luzon. This lead first to a series of highly detailed land-use maps at the scale of 1:5,000, published by the Society in 1972, and subsequently to the preparation of the Atlas. Its level of textual analysis and meticulous cartographic detail has been widely recognized to be of the highest order. In recognition for his outstanding work, Hal was chosen by the Fyssen Foundation of Paris to be the recipient of its annual prize for 1983.

**[82]** Just as Charlie Hitchcock ushered in new hope, his early retirement due to illness brought sadness. This was preceded by Briesemeister's retirement in 1964, and followed by Miller's departure in 1968. Coming so closely one after the other, the loss of these three giants of American Cartography was devastating. For a while it seemed that there were several exciting cartographic projects on the horizon, but words of austerity and retrenchment crept into daily life, particularly affecting other departments of the Society. In 1974, the cartographic staff was reduced by half. And finally, in the summer of 1976, the cartographic, as well as other activities of the Society, came to an end after 125 years.

**[83]** What all of this map-making activity represented was a special collaboration between the cartographers at AGS and the academicians, researchers, and scientists at other institutions. It is

not easy to define precisely why this was so unique or what made it so special. Certainly, the care and scholarly contributions by the cartographers and authors were there. As were the contributions of other Society staff, whose advice and input were constantly sought. Perhaps, it was the sum of all this plus the very fortunate assembly of unusual talents. AGS cartographers were never paid well. Yet, as you saw, many remained with the Society for very long periods of time. What the Society gave them was intellectual and artistic freedom, an atmosphere of creativity, a sense of pride and worth, and the recognition that they were often at the cutting edge of their field. At AGS, they had a unique, irreplaceable home. **[84]**

THANK YOU

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