

COMMUNICATIONS UNDER THE SEAS

The Evolving Cable Network and Its Implications

edited by Bernard Finn and Daqing Yang

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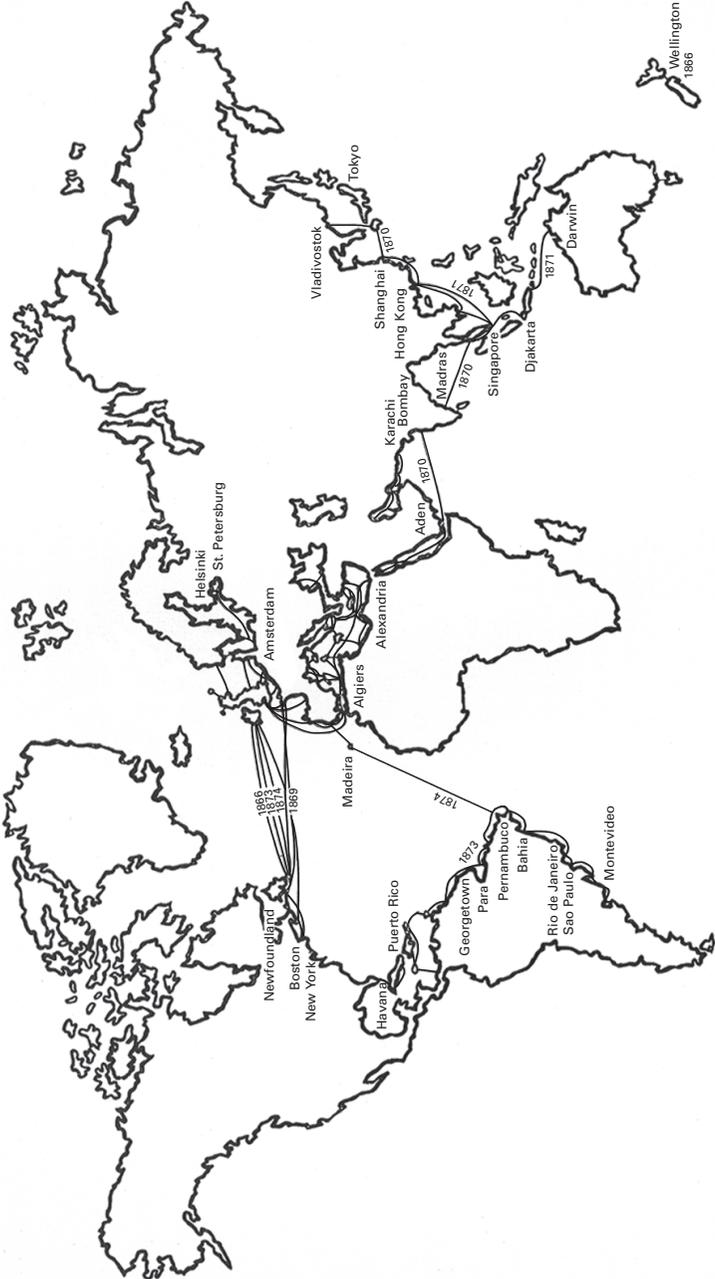
INTRODUCTION

Bernard Finn and Daqing Yang

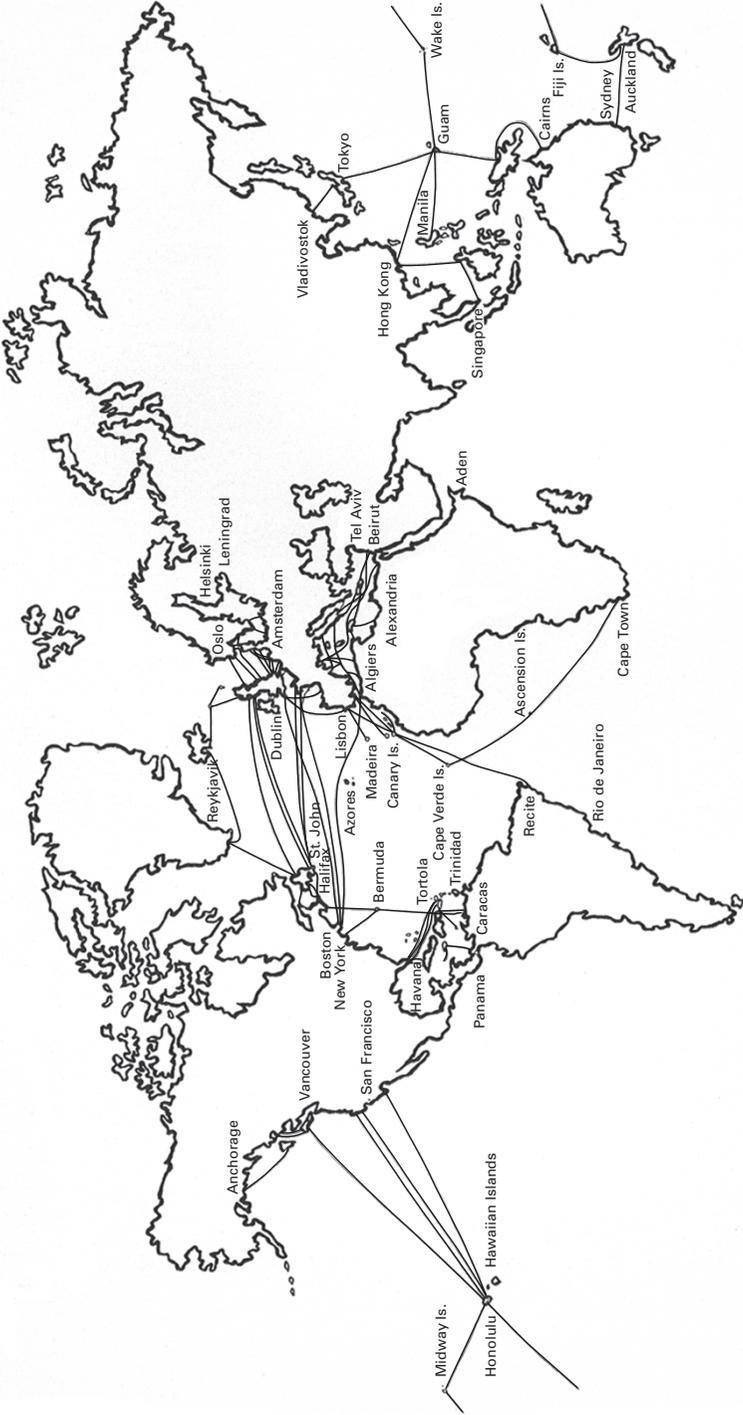
On December 26, 2006, a 7.1 magnitude earthquake took place under the ocean off Taiwan and caused widespread disruption to telephone and Internet connections in East and Southeast Asia. A little over a year later, in early 2008, damage to cables near Alexandria and elsewhere in the Middle East—its causes still a mystery—affected over 80 million Internet users in the region and in locations like India and Pakistan. Although rerouting helped reduce the adverse impact on business and personal activities to some extent, such incidents reminded the world that, for all the excitement about new technologies such as Wi-Fi, mobile networks, and communication satellites, the bulk of its long-distance communication remains dependent on what one newspaper called “altogether older technology: cables under the earth’s oceans.” As the public realized that full repairs to these damaged cables would take weeks, if not months, another newspaper remarked that “workers are relying on 19th century technology to fix a 21st century problem.”¹

In the closing decade of the twentieth century we were presented with a worldwide communications system of breathtaking speed and capacity. Economically it was spawned by society’s voracious appetite for information, especially as generated by computers and fed over the Internet. Technologically it was fueled by low-loss optical fibers, an indication of the increasing importance of science in an industry that for its first century paid little attention to research.

The implications for society of these advances in communications speed and capacity are difficult to predict. Will they bring greater stability to economic markets or make them more erratic? Will they encourage the expression of multiple voices or the dominance of a few? Will their net effect be to serve the cause of peace or of strife? And will the conflict between wired and wireless be settled—at least for the twenty-first century—in favor of the wires, or will the ether (presumably with the assistance of satellites) mount an effective response? If we cannot predict how these issues will be played out in the decades ahead, we can at least examine how they have been dealt with in the past.



Telegraph cables, 1875.



Telephone cables, 1975.

This collection of essays focuses on point-to-point communications (as opposed to broadcasting) and, in particular, on undersea cables. For more than a half century, beginning in the 1860s, submarine electric telegraph cables provided the only means of conveying information in “real time” across large bodies of water. From the beginning of the twentieth century to the mid-1950s this technology was challenged by wireless, especially shortwave radio, which reduced the fixed cost and was capable of transmitting voice. In the 1960s, the emergence of communications satellites seemed to spell the end of intercontinental submarine cables. Since then, however, technological innovations, involving first the introduction of submerged amplifiers and then the substitution of optical fibers for copper conductors, have restored hard-wired systems as the dominant technology for the global network—both figuratively and literally a world wide web.

From the beginning—usually identified with the failed transatlantic cable of 1858 (promoted by American Cyrus Field and built with British capital and technology)—the sheer scope of this evolving enterprise has attracted attention, and several popular accounts have dramatized the challenges involved.² Only in recent years, however, have historians looked seriously at the development of the technology itself or at its social implications. In April 2002 some of those most prominently engaged in such studies came together for a two-day symposium sponsored by the Dibner Institute for the History of Science and Technology in Cambridge, Massachusetts. The presentations and discussions were suffused by a special sense that this topic was timely: cable enterprises were international in their historical unfoldings as well as their physical manifestations, and as such they were the harbingers of globalization. Fittingly, the conference had brought together an international group of scholars who were testing the extent of this field of inquiry and laying the groundwork for future studies. In this volume we have the substance of most of those presentations, with modifications inspired by discussion and further thought.³

These accounts focus principally on the period from the 1850s to the 1950s, when cables had limited capacities and could not carry voice signals. It seems important, however, to consider technical developments up to the present era, and this is done by the first three papers in this book. Bernard Finn concentrates on the early years, when a financially and technically daring group of entrepreneurs wove a network of insulated copper wires around the globe and then quickly became conservative as they consolidated their gains. Jonathan Winkler takes us from the period immediately following the First World War, when the cables were threatened with economic extinction by a rival international wireless network, to the era following the Second

World War, when new electronic techniques reinvigorated the industry. Jeff Hecht then tells how, in the closing years of the twentieth century, new techniques employing light-carrying glass fibers provided the enormous increase in information capacity required in the Internet age.

The next four papers explore the ways in which governments and private companies interacted in the process of establishing a viable communications network with truly global reach. By the early 1870s the world's major population centers were linked by wire, and a fully reliable system, with sufficient redundancies, was in place by the first decade of the twentieth century. Jorma Ahvenainen provides an overarching account of how government and business forces overcame political, economic, and technical obstacles to make the telegraphic network available to the general public. Examining the crisis of the 1920s, when the cable industry was threatened by cheaper shortwave radio technology, Robert Boyce shows how government and commercial interests in Great Britain successfully forced a merger of wireless and cable companies. Kurt Jacobsen shows how a small company in a small nation (Denmark) used clever tactics based on its nonthreatening position to construct a significant link—across Russia to Japan and China—in the global network. And Pascal Griset examines transatlantic cables from a French viewpoint, describing how negotiations with other governments (Britain and the United States) and corporations (principally the Commercial Cable Company) were complicated by cultural and economic differences.

Three studies look in the other direction, examining the role of cable communication in government activities. David Nickles comments broadly on ways that cables affected the style and effectiveness of the foreign service. Daniel Headrick describes how British dominance of the cable network affected that nation's international strategies and how well the cables served the country during the world wars. Daqing Yang explains how modern Japan's expansion of telegraph cables and its imperialist ambitions became intertwined.

Finally, by way of summary, Peter Hugill places these contributions in the context of concepts of macrotechnology and national hegemonies as developed by Wallerstein, Hall and Preston, Mahan, Mackinder, and himself. As a finale he offers a set of alternative predictions for the decades ahead.

This book is not intended to be the final word. By focusing attention on how undersea communication networks have shaped and been shaped by government institutions, affected by technological change and stagnation, we hope to stimulate further investigations. One might, for instance, expand our coverage to include other countries or regions. But it would be especially interesting to look at the relationships of the evolving cable networks to

other elements of society: financial, corporate, political, and cultural, as well as personal. Communication is at the heart of them all; thus the quality, cost, speed, accessibility, and stability of communications is inevitably of great significance. Such historical investigations will likely yield a better appreciation of the potential and the fault lines of our communication-dependent global society.

NOTES

1. “Damaged Phone Cables Get Low-Technology Fix,” *Taipei Times*, January 13, 2007; “Underwater Peril,” *Business Week*, January 15, 2007; “2008 Submarine Cable Disruption,” Wikipedia (accessed November 22, 2008).

2. The first popular account was the sixteen-page “Telegraph Supplement” published by *Harpers Weekly* on September 4, 1858—just as the Field cable was being declared dead. William Howard Russell wrote a more extensive narrative, *The Transatlantic Submarine Telegraph* (London: Dawson, 1866), with color illustrations by Robert Dudley. These were followed by Henry M. Field (Cyrus’s brother), *The Story of the Atlantic Telegraph* (New York: Scribner’s Sons, 1892), and Charles Bright (son of the engineer who oversaw the laying of the first Atlantic cables), *The Story of the Atlantic Cable* (New York: Appleton, 1903). The centennial of the first Atlantic cable inspired works by Arthur C. Clarke, *Voice across the Sea* (New York: Harper, 1958), and Bern Dibner, *The Atlantic Cable* (Norwalk: Burndy Library, 1959).

3. In addition to the those contributing to this volume, Menahem Blondheim of the Hebrew University in Jerusalem and Janet Abbate, then of the University of Maryland, made valuable formal presentations at the conference. Among others in attendance, John Britton of Francis Marion University and José Altshuler of the Sociedad Cubana de Historia de la Ciencias y la Tecnología were especially helpful in sharing their observations with the conferees.