Radiotelegraphy to Broadcasting: Wireless Communications in Porfirian and Revolutionary Mexico, 1899–1924

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This essay explores the development of wireless communications from radiotelegraphy to broadcasting. An under analyzed and important topic, Porfirian and revolutionary wireless officials and policies laid the foundation for Mexico's powerful broadcasting and telecommunications industries. From the beginning, communications specialists used radio for state and nation building, especially in the hinterlands. The Revolution briefly shifted the focus of wireless experts away from the frontiers and toward warfare; however, the upheaval actually expanded the number of wireless devices and technicians. These professionals subsequently became essential figures in communications projects carried out during the presidencies of Venustiano Carranza and Álvaro Obregón, as well as during the rise of broadcasting in the 1920s.

El presente ensayo analiza el desarrollo de las radiocomunicaciones, desde la radiotelegrafía hasta la radiodifusión. El tema ha sido poco analizado, pero es importante: los oficiales y las políticas de radiocomunicación porfiristas y revolucionarios sentaron las bases de las poderosas industrias de la radio y la telecomunicación en México. Desde un principio, especialistas en comunicaciones utilizaron la radio para la construcción del estado y la nación, especialmente en las fronteras del país. La revolución desplazó brevemente la atención de los expertos lejos de las fronteras y hacia la guerra; sin embargo, el levantamiento no hizo sino aumentar el número de aparatos y técnicos de radiocomunicación. Más adelante, estos profesionales se convertirían en figuras esenciales en proyectos de comunicación emprendidos

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durante las presidencias de Venustiano Carranza y Álvaro Obregón, así como durante el florecimiento de la radiodifusión en la década de 1920.

Key words: broadcasting, Carranza, Díaz, foreign relations, frontier, Mexican Revolution, Mexico, modernity, nationalism, Obregón, Porfiriato, radio, state formation, technology, wireless.

Palabras clave: Radiotransmisión, Carranza, Díaz, relaciones internacionales, frontera, Revolución mexicana, México, modernidad, nacionalismo, Obregón, Porfiriato, radio, formación del estado, tecnología, radiocomunicaciones.

Historians now take as axiomatic the link between technological innovation and the Porfirio Díaz administration (1876–1880, 1884–1911). Material progress came in the form of railroads, steamships, automobiles, and improved weaponry. These advancements benefited investors, elite members of society, an emerging middle class, and certainly Díaz himself, but, at the same time, led to massive land alienation and rural poverty. And although improvements in mechanization and science ultimately helped ignite the great 1910 Revolution, they also outlived the old order. If anything, the state builders of 1915 onward proved just as dedicated to material modernization as was Díaz himself.[1] In a phrase, modern Mexico has been about modern technology.

Radio communications figured prominently on the list of these technological changes. A small but growing literature has addressed links between broadcasting, the state, and nationalism.[2] Other authors have examined the influence of foreign capital and World War II

1. The attention given by Revolution-era presidents to modernization projects is demonstrated in a number of areas, including radio technologies. Their administrations also imported and constructed airplanes and increased telegraphs, highways, and port works. In the process, Obregón and his successors promoted Mexican capitalists and industries while striving to incorporate workers. Technological expansion and change in Mexico, however, was not something that state officials entirely controlled, but only aspired to shape. A much larger technological revolution was occurring across much of the globe during the first half of the twentieth century, influencing all aspects of society.For further works about Mexican modernization during the revolutionary period, see Rubén Gallo, *Mexican Modernity: The* Avant-Garde *and the Technological Revolution* (Cambridge, MA: MIT Press, 2005); Aurelio de los Reyes, *Medio siglo de cine mexicano (1906–1947)* (México: Editorial Trillas, 1987); Mary Kay Vaughn and Stephen E. Lewis, eds. *The Eagle and the Virgin: Nation and Cultural Revolution in Mexico, 1920–1940* (Durham: Duke University Press, 2006); Stephen Haber, *Industry and Underdevelopment: The Industrialization of Mexico, 1890–1940* (Stanford: Stanford University Press, 1989); in addition to the works in the following three footnotes.

2. Fernando Mejía Barquera, *La industria de la radio y televisión y la política del estado mexicano (1920–1960)* (México: Fundación Manuel Buendía, 1989); Joy

on radio, the "border blasters" along the Mexico-U.S. border, and the cultural impact of broadcasting.[3] The role of radio before broadcasting, however, remains much less explored; even though, it was a valuable tool in the incorporation of frontier territories, combat operations during the Revolution, and the nation's rise as an important disseminator of radio in Central America.[4] Scholars have also ignored the way in which revolutionary officers, who commonly worked with other forms of wireless technology, played a key role in the development of broadcasting in the 1920s. This article, in contrast, argues for the importance of the pre-broadcasting era as the crucible for telecommunications policy and practice. As is so often the case (bicycles as precursors of the automobile come to mind), norms established under earlier forms of technology defined the role and the legal framework for more sophisticated successor innovations. And so it was with radio. Revolutionaries designed and installed equipment, promoted the medium, and wrote regulations. These foundational figures not only exhibited continuity in communications development from telegraphy to broadcasting, but they also mediated between the triad forces of the Álvaro Obregón government (1920–1924), amateur radio experimenters, and private entrepreneurs.

Elizabeth Hayes, *Radio Nation: Communication, Popular Culture, and Nationalism in Mexico, 1920–1950* (Tucson: The University of Arizona Press, 2000).

3. Fátima Fernández Christlieb, *Los medios de difusión masiva en México* (México: Juan Pablos, 1985); José Luis Ortiz Garza, *La guerra de las ondas: Un libro que desmiente la historia "oficial" de la radio Mexicana* (México: Planeta Mexicana, 1992); José Luis Ortiz Garza, *Radio entre dos reinos: la increíble historia del la radiodifusora mexicana más potente del mundo en los años 30* (México: Vergara, 1997); Gene Fowler and Bill Crawford, *Border Radio: Quacks, Yodelers, Pitchmen, Psychics, and Other Amazing Broadcasters of the American Airwaves* (Austin: University of Texas Press, 2002); Gallo, *Mexican Modernity*, 117–58; Ángel Miquel, *Disolvencias: Literatura, cine y radio en México (1900–1950)* (México: Fondo de Cultura Económica, 2005), 171–95. *Border blasters* were border stations, often controlled by Americans, which broadcast powerful transmissions aimed mostly at U.S. audiences.

4. There are two existing publications that seriously address prebroadcasting radio, Carlos Merchán Escalante, *Telecomunicaciones* (México: Secretaría de Comunicaciones y Transportes, 1988); and Roberto Ornelas Herrera, "Radio y contidianidad en México (1900–1930)," in *Historia de la vida cotidiana en México*, tomo V, vol. 1, Siglo XX, Campo y ciudad, edited by Aurelio de los Reyes (México: Fondo de Cultura Económica, 2006), 127–69. Both of these works are well-researched and written, although sadly the first is not well-distributed or widely read. My article builds on the works of these groundbreaking authors, adding previously untapped source materials, context, and a stronger analytical framework.

The First Years of Radio

Radio was a child of many parents. Throughout the 1800s, European physicists, or "natural philosophers," debated electromagnetic theories and practices with ideas ranging from the prescient to the hairbrained.[5] In the preceding century, much of their efforts had focused on astronomy, but the nineteenth century ushered in an era of increased interest in electrical phenomena in general, not only among physicists but also across scientific disciplines and among businessmen.[6] It was the work undertaken by nineteenth-century European scientists, including the writings of mathematician James Clerk Maxwell, the experiments of physicist Heinrich Hertz, and the commercial applications of Guglielmo Marconi, that brought radio—first developed for communication as wireless telegraphy—to the world.[7] Although other prominent researchers studied electromagnetic phenomena and helped develop practical communications technologies, the efforts of these three men stood out. In 1865, Maxwell published his "Dynamical Theory of the Electromagnetic Field," which provided a sound theoretical underpinning for understanding electromagnetic wave propagation. Hertz proved Maxwell's hypothesis after using it as the foundation for his successful transmission of radio waves in 1887.[8] Whether the British scientist Oliver Lodge or the Italian "practician" Marconi first applied this science to radiotelegraphic transmissions using Morse code is still a matter of some debate. But it was not until Marconi's work in the 1890s persuaded the British post office and foreign governments to invest in the medium that wireless signaling became known and was developed

5. Sungook Hong, "Marconi and the Maxwellians: The Origins of Wireless Telegraphy Revisited," *Technology and Culture* 35, no. 4 (October 1994): 718. European scholars who studied nature and the physical universe sometimes referred to themselves as "natural philosophers," which by the mid-nineteenth century increasingly meant people we would today consider physicists.

6. Laurens E. Whittemore, "The Development of Radio," *Annals of the American Academy of Political and Social Science* 142, Supplement: Radio (March 1929): 1. Radio was also an important component of atmospheric and geophysics research. See Aitor Anduaga, *Wireless & Empire: Geopolitics, Radio Industry & Ionosphere in the British Empire, 1918–1939* (Oxford: Oxford University Press, 2009).

7. *Radiotelegraphy* is the sending of nonvoice messages, usually Morse code, via electromagnetic or radio waves. When originally developed, it was meant to be a point-to-point form of communications, though messages could be intercepted by multiple receivers. *Radio broadcasting,* on the other hand, built on radiotelephone technology, which allowed for voice transmission. This medium, transmitted from a single source, is aimed at a mass audience.

8. Richard Glazebrook, "The Origins of Wireless," *The Scientific Monthly* (March 1925): 291.

as a special kind of telegraphy.[9] The technology quickly spread across much of the globe and the Marconi Company dominated a large portion of the initial business. German, French, and American companies quickly followed suit.

It makes sense then that ambassadors in Europe were the first to bring news of *telegrafía sin hilos,* often referred to as TSH, to Mexico.[10] The first account appears to have come from G. A. Esteva, the consul in Rome. This, too, is fitting because Italy was Marconi's birthplace. Italy's leaders and scientists took pride in the inventions of their increasingly famous native son, and publishers enthusiastically spread word of his innovations. News of wireless communications reached Esteva in the summer of 1897 when Marconi returned home to exhibit his devices to the Italian navy. Recognizing the important possibilities of the technology and the attention that it was receiving, Esteva relayed information about the new marvel "that interests the entire civilized world" to Secretary of Foreign Relations Ignacio Mariscal.[11] Afterward, Esteva sent back regular reports, including his own opinions and publications about the medium's development. For example, the first package he sent included an article in the Italian journal *L'Elettricista* by the prestigious professor Angelo Banti, which summarized some of Marconi's work.[12] The piece was likely a part of, or a predecessor to, Banti's *Il telefono senza fili sistema Marconi* (1897), an illustrated monograph on Marconi and wireless telegraphy.[13] Mariscal, in turn, disseminated this news to other people in the administration, including President Porfirio Díaz, Secretary of Defense General Bernardo Reyes, Secretary of Communications and Public Works General Francisco Z. Mena, and Director of the Department of National Telegraphs Camilo González.

In addition to Esteva's tireless reports, other ambassadors in Europe commented on TSH the following year. As a result, a number

9. William Crookes, "Address of the President before the British Association for the Advancement of Science, Bristol, 1898," *Science* 8, no. 201 (November 1898): 603.

10. Telegrafía sin hilos literally translates into telegraphy without wires, in other words, wireless.

11. G.A. Esteva to the Secretaría de Estado del Despacho de Relaciones Exteriores, Rome to Mexico City, July 16, 1897, caja 41-16-5, Archivo Histórico Genaro Estrada de la Secretaría de Relaciones Exteriores, Mexico City, hereafter cited as ASRE.

12. G. A. Esteva to the Secretaría de Estado del Despacho de Relaciones Exteriores, Rome to Mexico City, August 13, 1897, caja 41-16-5, ARSE; Banti, a specialist in electricity, founded *L'Elettricista* in 1892.

13. "Angelo Banti: Un pioneer dell'elettrotecnica," (Maggio, 2003)," http://www.anonimocosano.it/doc/biografiaAngeloBanti.pdf, accessed July 2, 2011; Angelo Banti, *Il telefono senza fili sistema Marconi* (Roma: Gli Editori Dell'*Elettricistta*, 1897).

of officials searched out wireless experiments in countries where developments in the field were taking place, particularly Great Britain, Germany, France, Spain, the United States, and Belgium.[14] These imperial powers used radio as a means to connect and exploit their empires while enhancing their militaries and navies, a fact that, in turn, greatly influenced how Mexican leaders perceived the technology. For example, the Mexican ambassador in Brussels paid close attention to King Leopold II's keen interest in radio. After obtaining data from the Belgium officer in charge of that army's telegraph division, the envoy enthusiastically reported on how the monarch was incorporating radio into his armed forces, which were then in the process of a brutal colonial enterprise in the African Congo. According to Ambassador Beuif, Mexico, also possessed "talented engineers and telegraphers that could take advantage of the new referred to advancements."[15] Seeing radio's potential for consolidating control over more autonomous and rebellious areas within Mexico, Reyes and Mena agreed.

Wireless devices arrived in Mexico from France in the summer of 1899.[16] Almost immediately thereafter, members of the Secretariat of Communications and Public Works' (SCOP) Department of National Telegraphs (DGTN) conducted the first experiments off the coast of Veracruz. After switching to radio equipment made by the German company Allegemeine Elektricitäts-Gesellschaft, the government funded the erection of wireless outposts along the country's peninsulas.[17] These projects aimed not only to allow communication with ships—commercial and naval—but also, and primarily, to connect

14. Other early radio experiments occurred in Russia, but Mexican officials appear to have focused more on western European countries.

15. J. Beuif to the Secretario de Relaciones Exteriores, Brussels to Mexico City, April 8, 1900, caja 41-16-5, ARSE.

16. Francisco Z. Mena, *Memoria por el Secretario Comunicaciones y Obras Públicas*, *1900–1901,* (México: Tipografía de Dirección General de Telégrafos, 1902), 169–170. Other authors have stated that the first radio equipment arrived in 1900. I selected the 1899 date because Mena in this *Memoria* specifically states that he received the devices at the beginning of the previous fiscal year, which would have been the summer of 1899.

17. M. Covarrubias to the Secretario de Relaciones Exteriores, Berlin to Mexico City, May 10, 1901, caja 41-16-5, ARSE; Leandro Fernández, *Memoria por el Secretario de Comunicaciones y Obras Públicas, 1902–1903* (México: Tipografía de Dirección General de Telégrafos, 1904), 244. Another early radio experiment occurred under the direction of Dr. Roberto Jofre in Mexico City in 1900, see Bernardo Reyes to el Secretario de Haciendo, *Memoria por el Secretario de Estado del Despacho de Guerra y Marina, 1900–1901* (México: Tipografía de la Oficina Impresora de Estampillas, 1901), 323; There is a photo of these experimenters in the Porfirio Díaz collection at the Universidad Íberoamericana, Dec.1900, Colección Fotografía Familiar, Acervos Históricos, la Universidad Íberoamericana, Mexico City, further stated as AHÍ; See also,

remote and disjoined regions to the core of the nation. In the south, officials used these stations to help complete a military campaign to suppress the rebellious and largely autonomous Maya populations in the recently created territory of Quintana Roo. In the northwest, state leaders hoped to incorporate the territory of Baja California, where a lack of central control left the region exposed to independence movements and American filibustering adventures. Starting late in 1902, engineers and construction workers built the first public radio stations in Cabo Haro, Sonora, near the port town of Guaymas, and another in Santa Rosalía, Southern District of Baja California.[18] These sites began transmissions in early 1903. Over the next seven years, the DGTN built additional stations along the border with British Honduras at the recently constructed naval base in Xcalak and in the town of Payo Obispo (present-day Chetumal), Quintana Roo; along the Gulf of California at Mazatlán and Cerritos, Sinaloa; at San José del Cabo, Baja California; and lastly at Campeche and Veracruz along the Gulf of Mexico.[19]

These first radio operations were largely extensions of the existing wire telegraph and telephone system. Wireless outposts remedied the difficulties of establishing communication links in regions where the construction and maintenance of telegraph lines proved difficult and costly, as in Baja California. Most of the land in that territory and in the northwest portion of the adjacent state of Sonora was immensely dry and mountainous. The environment, along with an absence of good roads, had frustrated a number of previous officials and kept them from establishing telegraph lines between the two regions. Attempts to connect the peninsula to Sinaloa by submarine cables had failed as well.[20]

TSH provided a quick means of incorporating this remote area into the national communication system. The distance across the Gulf of California was far less than the space separating the major ports along the Gulf of Mexico, which made the project feasible. The creation of a successful wireless link in the area, in turn, spurred new growth in the construction of wire telegraphs and other means of communication around the Gulf of California.[21] SCOP officials saw

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Roberto Ornelas Herrera, "Radio y contidianidad,"128. Ornelas Herrera contends that this was the first radio experiment in Mexico.

18. "El telégrafos sin hilos," *El Mundo*, December 9, 1902, 1; Fernández, *Memoria, 1902–1903*, 245.

19. Merchán Escalante, *Telecomunicaciones*, 64.

20. Fernández, *Memoria, 1902–1903*, 244.

21. "Ferrocarriles al Pacífico," *El Mundo,* February 14, 1902, 1; "Comunicaciones al Pacifico," *El Mundo,* February 21, 1902, 1; "La línea del Pacífico," *El Mundo,*

radio as an extension of, not a replacement for, already developed means of communications.

Although Baja California had historically contained a relatively small population, the region had increasingly become important to trade in the Pacific and for its mineral resources, a fact exhibited by the growing influence of El Boleo, the French-financed Baja California mining company.[22] This enterprise not only owned its own small fleet of ships but also helped build the Santa Rosalía radio station (in addition to the town of Santa Rosalía itself).[23] El Boleo had become a large supplier of copper, which they both exported and sold to government officials who bought the metal to replace the less conductive iron wires in older telegraph lines. SCOP directors hoped to better facilitate this and similar economic developments while bringing the area more under government control.

Political considerations for these stations existed as well. Difficulties in receiving consistent information from Baja California had plagued federal officials since independence. The administrations of Benito Juárez (1867–1871) and Porfirio Díaz both made considerable progress in centralizing and consolidating power, but the lack of a reliable means of communication with these far-western districts had kept them relatively independent. Another problem was the deepening connections between Baja California and the United States. Indeed, much of the northwest, largely due to the Díaz's own policies, became home to a number of foreign businesses and residents. Not content with the vast amounts of territory gained during the Mexican-American War (1846–1848), some U.S. citizens clamored for the acquisition of portions of Mexico. Filibusters had plagued the border territories, and Americans had made much of the region a part of their economic orbit vis-à-vis capital, highways, and railroads.[24] Díaz and his advisors hoped to gain from this investment of U.S. technologies and capital while simultaneously keeping

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December 23, 1902, 1; "Las vías de comunicación," *El Mundo,* August 19,1903, 1; "La línea de Cananea," *El Economista Mexicano,* February 1, 1908, 353; Leandro Fernández, *Memoria por el Secretario de Comunicaciones y Obras Públicas, 1908–1909* (México: Tipografía de la Dirección General de Telégrafos, 1910), 195.

22. Secretaría de Fomento Colonización e Industria, *Censo de 1900* (México: Oficina Tipografía de la Secretaría de Fomento, 1901), Colección Porfirio Díaz, AHÍ. his document put the population of the entire peninsula at 47,082 in 1900.

23. Fernández, *Memoria*, *1902–1903*, 245; "En la Baja California se ha despertado gran interés," *El Economista Mexicano*, January 4, 1908, 207.

24. See Edith González Cruz, Coor., and María Eugenia Altable, ed., *Historia general de Baja California Sur,* vol. II, *Los procesos políticos* (La Paz: Universidad Autónoma de Baja California Sur, 2003).

the area under government control through increased internal communications and by training a new generation of engineers and other specialists to replace foreigners.

Similar to how they employed the wireless stations in Baja California, Sinaloa, and Sonora, Díaz officials used radio in the territory of Quintana Roo—created by the federal government in 1902—to incorporate a weakly controlled hinterland. But unlike the Pacific operations, which were largely defensive toward American expansionism, military officials used the radio towers along the Caribbean to consolidate offensive gains made against Maya peasant insurgents. After decades of violent conflicts, federal forces had only recently, and nominally, pacified the area.[25] In 1902, the armed forces built the small naval base at Xcalak, at the mouth of the Bay of Chetumal, to watch the frontier. Construction on the wireless facilities in Xcalak and Payo Obispo, on the other side of the bay, commenced in 1905 and were completed in 1908.[26]

These locations were selected for various reasons. For one, Díaz had ordered the nation's small southern flotilla to observe the bay and the Río Hondo, which drained into it. The fleet searched for contraband from British Honduras, which they tried to stop from reaching Maya rebels, especially weapons. Great Britain and Mexico had, however, reached an impasse over Mexican ships traveling to Payo Obispo. The only passable channel through the shallow bay zigzagged across the international border, and British officials feared that any decision allowing the free passage of Mexican vessels would someday haunt them if Mexico continued to become a more powerful nation.[27] The radio station connecting the naval base and the entrance of the bay and Payo Obispo at the other end helped alleviate some of the communications problems. It allowed Xcalak to send messages about naval operations and other matters to Payo Obispo, which could then be telegraphically relayed to Peto, Yucatán—and, in turn, to Mexico City—or to British Honduras and vice versa.[28] Military officials may have also hoped that the stations could be used to communicate with portable radios carried by military detachments. The army had started experimenting with such portable devices beginning

25. Carlos Macías Richard, "El territorio de Quintana Roo. Tentativas de colonización y control militar en la selva maya (1888–1902)," *Historia Mexicana* 49, no.1 (July–September 1999): 5–54.

26. Fernández, *Memoria 1908–1909,* 102.

27. Wayne M. Clegern, "British Honduras and the Pacification of Yucatan," *The Americas* 18, no. 3 (January 1962): 252.

28. *Convención entre los Estados Unidos Mexicanos y la Colonia de Honduras Británica para el enlace de sus líneas telegráficas*, 1910, caja 7-14-58, ARSE.

in 1906.[29] It appears, however—at least on record—that this equipment was not used in an actual military campaign until the Revolution's outbreak in 1910 and 1911.[30] These Quintana Roo installations also complemented the incorporation of radio devices aboard coast guard vessels and the anticipation of continued advancements in naval communications.[31]

Life for federal telegraphers at these early radio stations must have been fairly simple, if not boring at times. Although interaction with foreign traders and important officials was surely interesting, these outposts were often in desolate locations. Employees opened their doors sometime in the morning and generally closed around one in the afternoon.[32] Separated from nearby villages, these stations sometimes included things like warehouses, an oven for baking bread, a post office, a wharf, and a rain-catching system for drinking water.[33] A typical station consisted of "a house of iron and wood and two iron towers forty-five meters tall upon elevated land."[34] One scholar described the epicenter of these locations as "a couple of buildings: the work station with a gigantic antennae and the staff house, which included a kitchen and a cellar. In the rooms, the furniture was minimal, and the workplace was full of cables and bulky equipment."[35]

But the job had its dangers too. For example, in February 1909, the manager at the Cabo Haro station ignited the radio building while cleaning a gas generator. After the fire exploded nearby cans of gas, oil, and alcohol, the blaze ravished most of the structure within minutes. The fire also destroyed all of the equipment, suspending communications with Santa Rosalía until the government constructed another station at Bacochibampo near Guaymas in June 1910.[36] But

29. Leandro Fernández, *Memoria por el Secretario de Estado y del Despacho Comunicaciones y Obras Publicas, 1906–1907* (México: Tipografía de la Dirección General de Telégrafos), 103–104.

30. Juan A. Hernández to Gral. de División Secretario de Guerra y Marina, Chihuahua City to Mexico City, 17 Dec. 1910, exp. xi/481.5/60, tomo 2, Fondo Revolucionario, Archivo Histórico de la Secretaría de la Defensa Nacional, hereafter cited as AHSDN; "Another Victory for Mexican Rebels," *New York Times,* December 27, 1910, 4.

31. Merchán Escalante, *Telecomunicaciones,* 57.

32. Ornelas Herrera, "Radio y cotidianidad," 132–134.

33. Ibid, 132.

34. Fernández, *Memoria,1906-07,* 102–103.

35. Ornelas Herrera, "Radio y cotidianidad," 132–133.

36. Leandro Fernández, *Memoria por el Secretario de Comunicaciones y Obras Públicas, 1909–1910* (México: Tipografía de la Dirección General de Telégrafos, 1911), 107.

even if the work was sometimes tedious, telegraphers were important to a number of powerful businesses and government leaders. Although hardly an entrée into high society, the job of radio telegrapher offered stability, respectability, and relatively good pay.

While the SCOP was building stations in Quintana Roo and Baja California, the Porfirian government also participated in the 1906 International Radiotelegraph Convention in Berlin. For the event, the Díaz administration sent General José M. Pérez to contribute to global radio policies and debates about Marconi's attempt to monopolize radio services. It was the second-ever international conference on wireless communications, which had expanded significantly since the first meeting in Berlin in 1903. The earlier convention only included representatives from France, Great Britain, Italy, Austria-Hungary, Russia, Spain, and the United States.[37] In 1906, there were delegates from twenty additional countries, including five from Latin America: Argentina, Brazil, Chile, Mexico, and Uruguay. In addition to working out an alphabet for international signaling, the meeting discussed matters of war, trade, and especially transmissions between ships and from sea vessels to shore. Precedents for the discussion were not only the first radio convention, but also the October 9, 1874, Treaty of Berne and the June 15, 1897, Washington Universal Postal Convention, both of which had focused on unifying disjointed international mail services and regulations.[38] These discussions indicate how many of the attending officials viewed the use of radio as an extension of public postal and telegraphic operations. There was, however, a large military element to Mexico's position as well. Indeed, the general had specific orders to "ensure the interests of Mexico; understanding the military relationship to the coastal stations and aboard our ships of war."[39] Following the wishes of his superiors, Pérez sided against Marconi and England, as most other representatives did, and with Mexico's German radio providers.

37. Letter from the German ambassador to the U.S. Secretary of State, "International Wireless Telegraphy Convention," *Papers Relating to the Foreign Relations of the United States with the Annual Message of the President, Transmitted to Congress, December 3, 1906, part 2* (Washington, D.C.: Government Printing press, 1909), 1513–1514; Linwood S. Howeth, *History of Communications-Electronics in the United States Navy* (Lansing: University of Michigan Library, 1963), 547–548.

38. *International Radiotelegraph Convention of Berlin: 1906* (Washington, D.C.: Government Printing Press, 1912); "General Postal Union; October 9, 1874," The Avalon Project: Documents in Law, History and Diplomacy, Yale Law School, Lillian Goldman Law Library, http://avalon.law.yale.edu/19th_century/usmu010.asp, accessed November 22, 2010.

39. Merchán Escalante, *Telecommunications,* 57.

The Díaz administration strove diligently to oblige the new guidelines on wave frequencies and international communications. In fact, the government used the resulting treaty to set its wireless policy at home. Officials from most of these nation-states met again at the following International Radiotelegraph Convention in London in 1912. By then, significant changes had occurred. More countries participated, and the U.S. government promoted a more private capital-driven agenda. Most critical of all, however, revolutionary unrest prevented a Mexican presence.[40]

Revolutionary Radio

Despite scotching participation in the 1912 event, the Revolution did not stop radio development, though it did temporarily slow plans to use the technology to connect frontier territories. In fact, radio operators and equipment increased substantially during the upheaval. Numerous telegraph operators—wired and wireless—joined the ranks of the revolutionary factions. Although radios were still far from commonplace, they played a significant role as "the eyes and ears" of armies in the field and aboard trains used for combat operations.[41] Agents of the Carranza administration (1915–1920) significantly expanded the medium, using it not only in war but also in renewed efforts at nation and state building.

As a part of the Porfirian army's efforts to modernize, it already possessed some portable radio equipment at the onset of the Revolution. The first serious military experiments with field radios occurred in conjunction with SCOP employees in 1907, and the military used these devices against rebel forces after suffering embarrassing defeats at Aldana and Mal Paso, Chihuahua, in December 1910. In response to the losses, Díaz demanded the accounts of almost every surviving officer involved and sent the 9th battalion northward. General Ángel Garcia Peña, head of the Geographic Explorers Commission came along. His goal was to use radio to "establish and experiment with TSH in order to connect [General Juan J.] Navarro to this city [Chihuahua]."[42] But one set of field radios was not enough to save the crumbling regime and its demoralized army.

40. U.S. Army, *Regulations Governing Commercial Radio Service between Ship and Shore Stations* (Washington, D.C.: Government Printing Press, 1914), 108. Madero did, however, sign onto the 1912 conference agreements after the fact.

41. Ornelas Herrera, "Radio y contidianidad," 135.

42. Juan A. Hernández to Gral. de División Secretario de Guerra y Marina, Chihuahua City to Mexico City, December 17, 1910, exp. xi/481.5/60, tomo 2, Fondo Revolucionario, AHSDN; Juan A. Hernández to Gral. División Secretario De Guerra y

Rebels, too, realized the potential of electronic communications, including radio. Throughout the revolution, insurgent telegraphers spied on enemy movements, helping to hinder and destroy the communications of rivals. TSH became especially important because, unlike cable systems, there were no connecting wires to cut, making them more difficult to sabotage. Wireless devices could also be made mobile, if still cumbersome. Commanders constructed stations in their trains, and operators joined battalions and other military units. The forces of Madero, Huerta, Carranza, Villa, and Zapata all used radios. Carranza's Director of Telegraphs, Mario Méndez, reported on American wireless messages intercepted by the Campeche station in 1914.[43] In 1915, the Zapatista Clandestine Wireless Office in Cuernavaca listened in on transmissions across the country and to and from the United States in order to gather intelligence.[44] The following year, Carrancistas used stations along the American border to spy on and interfere with the U.S. Punitive Expedition, which had invaded in search of Pancho Villa.[45]

More than any other faction, Carranza's Constitutionalists mastered and expanded wireless communications, especially after 1915. In fact, the medium became an essential tool in their military and nationalist endeavors. As Carranza obtained some modicum of control over the state apparatus, his agents built, confiscated, and regulated radio at an unprecedented level. Earlier in 1914, Carrancistas constructed stations in Saltillo and Tampico and improved the facilities in Veracruz.[46] After Carranza obtained a fragile hold over Mexico City in August 1915, he worked rapidly to repair communications, including restoring the powerful radio facility at Chapultepec.[47]

Marina, Chihuahua City to Mexico City, December 18, 1910, exp. xi/481.5/60, tomo 3, Fondo Revolucionario, AHSDN; J. A. Hernández to Gral. Srio. Guerra y Marina, Chihuahua City to Mexico City, December 18, 1910, exp. xi/481.5/60, tomo 3, Fondo Revolucionario, AHSDN; "Another Victory for Mexican Rebels," *New York Times,* December 27, 1910, 4.

43. Mario Méndez to Venustiano Carranza, Mexico City, October 12, 1914, Centro de Estudios de Historia de México, CARSO, Fondo Primer Jefe del Ejército Constituionalista Venustiano Carranza, XXI. 17. 1721. 1, Centro de Estudios de Historia de México, CARSO, Mexico City, further stated as CEHM; Mario Méndez to Venustiano Carranza, Mexico City, October 7, 1914 Fondo Primer Jefe del Ejército Constituionalista Venustiano Carranza, XXI. 17. 1686. 1, CEHM.

44. L. G. González to the Official Mayor Encargado del Cuartel General, Cuernavaca, March 1, 1915, caja 15, exp. 9, Fondo Emiliano Zapata, AGN.

45. "Interrupt Army Wireless," *New York Times,* March 31, 1916, 2; "Expect Carrancistas to Seize Railroad," *New York Times,* June 27, 1916, 2.

46. "Three Capitals Neutral," *New York Times,* December 23, 1914, 20.

47. "Expects Carranza Reply this Week," *New York Times,* August 24, 1915, 6.

Subsequent military victories over Zapata and Villa in 1915 and 1916 brought a number of other stations and wireless equipment under Constitutionalist control. In a revealing 1916 interview, Minister of Communications and future presidential candidate Ignacio Bonillas discussed the consolidation of communications under the Carranza government and the importance of radio to the Constitutionalist movement. In his statement, he explained that as Carrancistas acquired new territory, establishing a wireless system that extended across the whole of the country was essential. He argued that TSH was crucial not only because it defied saboteurs but also because it allowed Carranza's forces to communicate with foreign centers of supply and the outer world in general. Bonillas added that the wireless network was more than twice as large as it had been before the Revolution and that the Constitutionalist government had consistent contact with stations in Veracruz, Chihuahua, Quintana Roo, Baja California, and Sonora. To obtain the required equipment, the Constitutionalists had dispatched agents to the United States to secure the "most modern appliances and inventions." In the same breath, Bonillas mentioned that government officials had taken over the wireless operation at the Cananea copper mine in Sonora, which had been established by the American Copper Company.[48] His statement reveals not only the importance of radio to the Carrancistas but also how Carranza had turned to U.S. wireless equipment while simultaneously restricting the use of the same technology by Americans in Mexico.

Publications by engineer Modesto C. Rolland, another close advisor to Carranza, mirrored Bonillas's comments. In 1917, he argued that "the wireless service has been improved to such an extent that we are able to make the assertion that the entire Republic is covered by stations that control the country in a far more efficient manner, proportionately, than the same service does in the United States."[49] Although a bold and perhaps overstated claim, the Constitutionalists had, indeed, made significant headway in expanding wireless communications across the nation.

Carrancistas went beyond using radio for combat, revitalizing the Díaz administration's nationalist goal of connecting frontier territories. Rolland played an important role in this initiative as well. In 1919, he headed a commission designed to report on economic and

48. "Mexico Being Reconstructed, Says Peace Envoy," *New York Times,* November 5, 1916, SM 9.

49. M. C. Rolland, *A Reconstructive Policy in Mexico* (New York: Latin-American News Association, 1917), 7.

infrastructural conditions in the Northern District of Baja California. Another underlying goal of the mission was to bring the region, which had remained largely independent during the Revolution, under federal control. Rolland argued that one of the best methods for establishing a stronger government presence was through wireless communications. Touring the area's radiotelegraphic operations, he praised them as one of the best investments. Carranza officials had also recently built powerful radio offices in La Paz in the south and in Mexicali, the capital of the north. Constitutionalists took advantage of a number of locally built stations in the Northern District of Baja California, including in Ensenada, Tijuana, Tecate, and Los Algodones. These wireless outposts not only linked this territory, but, running through Mexicali, also "intimately united this remote region with the center of the republic which had lamentably lived disconnected due to a lack of efficient communication."[50]

Rolland additionally warned that northern Baja California had become too reliant on using the United States to relay information. This became especially problematic when American officials placed stricter regulations on communications during World War I. Rolland argued that without the Mexicali station, the Northern District of Baja California "would become almost in complete isolation due to the severity of the measure employed by the neighboring nation."[51] These stations increasingly brought the peninsula into the federal system.

The acquisition of already existing stations was an important component of Carranza's communications policy. He and Manuel Rodríguez Gutiérrez, Bonillas's successor as minister of communications, issued the Decree about the Installation and Functioning of Radiotelegraph Stations, October 19, 1916. It specifically clarified wireless guidelines and the penalties for breaking them. According to the new executive order, radiotelegraphy was a public service exclusively under the control of the federal government. In turn, no station could operate or be established without Carranza's authorization. If operators ignored the regulation, they faced a 500 to 1000 peso fine and/or 1 to 11 months in jail, and the confiscation of their equipment to "the Nation." [52] The decree also outlawed the divulging of government information transmitted via radio. State control of

50. Modesto C. Rolland, *Informe sobre el Distrito Norte de la Baja California* (Mexicali: Universidad Autónoma de Baja California, 1993), 38–39.

51. Ibid, 51.

52. "Que la reglamentada la instalación de estaciones," *El Economista,* October 26, 1916, 1.

the medium was further codified in law in Article 28 of the 1917 Constitution, which disallowed private or government monopolies excepting those "relating to the coinage of money, to the postal, telegraphic and radiotelegraphic services."[53]

These laws were based on legislation and policies dating back to clauses on public works in the 1857 Constitution, but they made a new statement to a number of people. For one, these rules targeted foreigners, especially Americans, who operated radio apparatuses. The American bombardment and capture of Veracruz in 1914 and the invasion of General Jack Pershing's Punitive Expedition in 1916 inflamed nationalist sentiment among Constitutionalist leaders. Carranza's wireless laws targeted American soldiers, warships, and a myriad of reporters who used radio to report news of events back to the United States. Radio operations in American-owned mines had also provoked revolutionaries who saw them, often correctly, as sending information to business and government agents in the United States.[54] These regulations additionally focused on the continued resistance faced from Villa, Zapata, and uncooperative governors such as the Northern District of Baja California's Esteban Cantú, providing a legal framework for expropriating enemy radios and impeding the formation of operations not in line with Carranza's policies. Throughout 1916 and 1917, Carranza officials shut down and confiscated the radios of adversaries across much of the country.[55]

Another important factor in radio expansion was World War I (1914–1918), which engulfed Europe and the United States. This conflict increased the belligerents' interest in radio development around the world, including in Mexico. For one, American officials placed stricter rules on communications through their country. Affected by these more stringent policies, Germans partnered with Carrancista communications specialists to build a massive transmitter and receiver on the presidential grounds of Chapultepec and in the Federal District neighborhood of Ixtapalapa. Germans thus provided a continued source of equipment and training during the 1910s. In turn, Mexican communications officers helped spread German news about the war to their agents in Mexico and additionally to the

53. *The Mexican Constitution of 1917 Compared with the Constitution of 1857,* trans. and arr. by H. N. Branch (Philadelphia: The Annals of the American Academy of Political and Social Science, 1917), 25.

54. Superintendent of Radio Service, "Memo. for Aid for Operations," Washington, D.C., February 19, 1915, RG 59, fold. 812.74/33, U.S. Nation Archives, College Park , Maryland, hereafter cited as USNA.

55. José de la Herrán, "La radiocomunicación en México; Efemérides de sus comienzos," April 1995, Mexico City, unpublished document.

neutral country of El Salvador, where the Carranza government built a radio station.[56]

Though limited by continuing warfare and U.S. expansionism, Carranza also used radio in his foreign relations. He constructed a wireless link to El Salvador, the one longtime friend of Mexico in Central America, in exchange for continued solidarity and ammunition. Together they kept tabs on mutual enemies, especially Guatemala's legendarily paranoiac strongman, *el señor presidente* Manuel Estrada Cabrera, and spread nationalist and anti-imperialist propaganda.[57] Constitutionalists, with the aid of German engineers, also established radio communications with the United States, Germany, Japan, and a number of countries in South America.

Carranza, in many ways, laid the groundwork for the communications policies of the subsequent administrations of Álvaro Obregón and Plutarco Elías Calles (1924–1928). Both of the latter presidents expanded Carranza's initiative of gifting radio equipment to Central America. By strengthening partnerships in the region, they hoped to heighten the nation's position and respectability as an independent power. Also similar to their predecessor, the governments of Obregón and Calles allowed for increased radio imports from the United States, while simultaneously impeding American control of wireless services. These trends continued not only with TSH, but also during the rise of broadcasting in the early 1920s.

TSH in the Early 1920s: Internal Rebellion and Foreign Relations

Focusing predominately on broadcasting, scholars have neglected the Obregón administration's expansion of other forms of wireless. This growth, however, was important to foreign policy considerations and new military operations. Indeed, the threat of insurrectionary communications and the expansion of the American radio industry had a massive effect on regulations during the first years of broadcasting.

56. Friedrich Katz, *The Secret War in Mexico: Europe, The United States, and the Mexican Revolution* (Chicago: University of Chicago Press, 1984), 416–422; "Llegaron a El Salvador los telegrafistas mexicanos," *El Pueblo,* January 8, 1917, 1; Heinrich von Eckardt to Cándido Aguilar, Mexico City, January 15, 1917, caja 17-9-278, ASRE; Heinrich von Eckardt to Cándido Aguilar, Mexico City to Querétaro, January 31, 1917, caja 17-9-278, ARSE.

57. Jürgen Buchenau, *In the Shadow of the Giant: The Making of Mexico's Central American Policy, 1876–1930* (Tuscaloosa: The University of Alabama Press, 1996), 126–127; Miguel Angel Asturias, *El señor presidente* (Madrid: Cátedra, 1997).

Obregón's experience as a general had already taught him that radio was not only useful but also dangerous. While under the control of the forces of Victoriano Huerta in 1914, the wireless facilities on the Isla Madre María caused a number of difficulties for Obregón's Army of the Southeast until his soldiers successfully dismantled the station.[58] His own rise to power provided another lesson in how radio could be a threat from within. In 1919, Carranza faced not only continued resistance from other surviving revolutionary factions, but also the fracturing—once again—of his own Constitutionalist forces. And although this fissure had been in the making for some time, the presidential succession of 1920 proved to be the breaking point. Hand-picking engineer Ignacio Bonillas, the former minister of communications and ambassador to the United States, as his successor, Carranza alienated powerful military commanders who possessed their own designs for the presidency. Although multiple generals initially jockeyed for presidential candidacy, including Salvador Alvarado and Pablo Gónzalez, Obregón—with the backing of a powerful Sonoran contingency—ultimately led the new revolt against Carranza and Bonillas.

Radio operators played an important role in this battle for power. Within the communications department, as with the Constitutionalist forces in general, officials split into factions: Carrancistas, Obregonistas, and those who tried to mediate between both sides. These agents, in turn, fought an internal propaganda and intelligence war, communicating with foreign countries and carrying out acts of espionage and counter-espionage within the fracturing government.[59]

The danger of TSH became apparent once again during the 1923–1924 De la Huerta Rebellion. Similarly caused by a dispute over presidential succession, this revolt united many military and political leaders in an attempt to overthrow the fragile Obregón government. Anyone who owned a radio became a threat because both sides possessed operators relaying intelligence about enemy movements and plans. The commander of the military forces in the Federal District, Arnulfo Gómez, called radio "the principal enemy of the government," and newspapers regularly published intercepted Delahuertista

58. Álvaro Obregón, *Ocho mil kilómetros en campaña* (México: Fondo de Cultura Económica, 1959), 126–127.

59. Multiple letters by Obregonista Trinidad W. Flores speak to the use of wireless communications within Mexico and with foreign countries. In Álvaro Matute, ed., *Contraespionaje político y sucesión presidencial: Correspondencias de Trinidad W. Flores sobre la primera campaña electoral de Álvaro Obregón, 1919–1920* (México: UNAM, 1985).

messages.[60] And the rebels did use wireless abundantly. They controlled, at times, the stations in Veracruz, Túxpam, Salina Cruz, Campeche, and Mérida, among others. They also took Telefunken-model portable radios from Guadalajara, where General Enrique Estrada Reynoso led the rebellion's western forces. Not only did the Delahuertistas set up spies in Mexico City and communicate freely between places, including Jalisco, Veracruz, and Oaxaca, but also the rebel director of publicity, Otilio González, operated an impressive wireless propaganda campaign aimed at audiences at home and in the United States.[61]

In response, government officials did a number of things. They restricted radio communication with rebel-controlled areas, jammed messages using the Chapultepec office, transmitted pro-government propaganda over newly established broadcasting stations, and listened in on rebel communications from TSH posts still under federal control. The Obregón administration also closed down broadcasting stations whose owners were suspected of sympathizing with the rebellion, including Martín L. Guzmán's station *El Mundo*. The military further ordered Mexico City residents to register their radio equipment.[62] According to General Gómez, "owners of radio apparatus who failed to register with the government would be treated as spies."[63] The government publically expressed a strong fear of the technology, which colored people's perceptions of the medium and alarmed the newly operating commercial stations and amateur broadcasters.

To uncover insurrectionary operatives in Mexico City, the Obregón government used their own spies to search the urban airwaves for renegade messages and to locate their origin. José Soto, who worked as one of these federal spies, used the information from

60. "Formal batida contra los aparatos radiotelefónicos," *El Universal Gráfico,* January 16, 1924, 2; "Un radiograma interceptado," *El Universal Gráfico,* January 18, 1924, 2; "Radio Operators Warned," *New York Times,* January 17, 1924, 3; "La recepción por radio no está prohibida en Mexico," *Excélsior,* January 27, 1924, II 6.

61. F. L. Pineda to Gral de Div. P. E. Calles, Torreón to Mexico City, February 21, 1924, exp. 122, inv. 675, leg. 1, Archivo Plutarco Elías Calles, Fideicomiso Archivo Plutarco Elías Calles y Fernando Torreblanca, Mexico City, hereafter cited as FAPECFT; J. O. Mauborgne, Technical Advisor to American Delegation, Memorandum for the Military Attaché, Mexico City, "Inter-American Committee on Electrical Communications Mexico City, American Delegation," July 23, 1924, exp. 090101, inv. 31, leg. 1, Fondo Espías, FAPECFT; "Rebels Predict Assault on the Capital, *New York Times,* February 22, 1924, 4.

62. Virginia Medina Ávila and Gilberto Vargas Arana, *Nuestra es la voz, de todos la palabra: Historia de la radiodifusión mexicana, 1921–2010* (México: dgapa/FES Acatlán, 2011), 104.

63. "Radio Operators Warned," *New York Times,* January 17, 1924, 3.

radio licenses, in addition to his own equipment, to uncover subversives. On one mission in January 1924, he scanned the affluent neighborhood of Santa María la Ribera. He listed thirty-nine households with receptors in an eight-street area.[64] His superiors specifically asked him to target Jorge Carregha, "a known conspirator," who lived between Alamo Street and Chopo Street. Not only did a number of Delahuertistas meet at Carregha's house, he additionally possessed a radio transmitter and receiver used to communicate with rebel leaders.[65] Soto also vigilantly watched the house of Ignacio Flores, a suspect connected to Carregha, who lived on Flores Street, owned a well-mounted transmitter, and had frequent visitors who came and left in automobiles during the night.[66]

The persisting security threat posed by radio influenced the way that state leaders saw and interacted with the medium. Although economic motivations became increasingly prominent, the issue of insurrectionary communications continued to be a threat throughout the Obregón administration. As a result, the government maintained a strict vigilance over radio, at least to the degree that their fragile position permitted.

Despite safety concerns, Obregón pushed to increase radio operations. Even though the government struggled to maintain its own costly operations, officials expanded on Carranza's initiative to use radio to influence Central America. Using materials obtained from the German company Telefunken, the state provided for the construction of multiple wireless towers across the isthmus.[67] The willingness of the government to spend large parts of the budget on communications—totaling in the hundreds of thousands of dollars—with other nations, suggests the importance of the medium to foreign policy concerns.[68] In fact, the stations were more advanced than many of Mexico's, which were in the process of being revamped. Obregón hoped that these donations, though costly, would establish a stronger influence in the region, create a more efficient dialogue among the different Latin American nations, and impede U.S. radio companies.[69]

64. José Soto to El Jefe del Departamento Confidencial de esta Secretaría, January 16, 1924, Mexico City, Ramo Gobernación, caja 5, exp. 44, AGN.

65. El Jefe del Departamento to José Soto, January 14, 1924, Mexico City, Ramo Gobernación, caja 5, exp. 44, AGN.

66. José Soto to El Jefe del Departamento Confidencial de esta Secretaría, January 16, 1924, Mexico City, Ramo Gobernación, caja 5, exp. 44, AGN.

67. Mejía Barquera, *La industria de la radio*, 23.

68. Ibid.

69. "Sección Editorial," *La Gaceta* (San José, Costa Rica), September 18, 1923, Ramo Presidentes Obregón-Calles, exp. 223-C-4, AGN.

For example, following the groundbreaking for the radio station donated to Costa Rica, the local press proclaimed—contrary to American interests—that Costa Rica would build a nationalist wireless system, structured on a government monopoly of services.[70] Over the objections of a number of envoys who believed that libraries would be a less expensive and better way to facilitate propaganda, Obregón, Secretary of Foreign Relations Alberto J. Pani, and SCOP Director Amado Aguirre followed through with their plans to build stations in Costa Rica, Guatemala, Nicaragua, and Honduras.[71]

One goal of this expensive gifting campaign was to strengthen a Latin American bloc against the U.S. political-business alliance attempting to dominate hemispheric communications. By 1923, Aguirre and Obregón knew that the Inter-American Committee on Electronic Communications was going to be held in Mexico City in 1924. Convention participants publicly stated that the goal of the meeting was to improve Pan-American telegraph and broadcasting operations, but another consideration soon became apparent as the delegates of the fourteen countries divided into two camps. On one side, the United States promoted private capital-driven communications development with limited government intervention. On the other side stood the Latin American representatives who pushed for a more state-directed policy toward radio. Ignoring the subtleties of the issue, U.S. spokesmen claimed that the argument revolved around commercial versus state-run radio.[72] But the Latin American stance against U.S. policy did not mean that all of its members opposed the development of private communications industries within their perspective countries. Quite to the contrary, in Mexico at least, the push for greater regulation of wireless telegraphy and radiocasting was aimed at protecting the growth of the newly established domestic commercial broadcasting industry and the longstanding sovereignty of Mexican wireless communications. The problem was that Latin American governments feared the

70. Ibid.

71. Obregón to the Secretary of the Treasury and Public Credit, Mexico City, March 15, 1923, Ramo Presidentes Obregón-Calles, exp. 223-C-4, AGN; Juan de D. Bojórquez to Obregón, June 4, 1923, Ramo Presidentes Obregón-Calles, exp. 223-C-4, AGN; The E. E. and M. P. of Mexico to the Secretary of Foreign Relations, Managua to Mexico City, March 15, 1923, Ramo Presidentes, exp. 429-R-7, AGN; Amado Aguirre to Alvaro Obregón, Mexico City to El Fuerte, Jalisco, Ramo Presidentes, 23 Oct. 1923, exp. 223-C-4, AGN. They also revamped the station in El Salvador.

72. See the comment by U.S. delegate Allen H. Babcock in *Inter-American Committee on Electrical Communications: City of Mexico, May 27–July 27, 1924* (México: Secretaría de Relaciones Exteriores, 1926), 269.

domination of American businesses at the expense of native companies and governments.

All Latin American delegates in attendance voted against the position of the United States and accepted the guidelines set in place by the Mexico City conference. The American representatives abstained from voting. The guidelines established at the 1924 meeting, however, had little lasting impact on international communications policies. Only four of the attending nations ever ratified the agreement.[73] Instead, state officials from most of the participating nations decided to wait until the next meeting, which was announced in 1925 and took place in Washington, D.C., two years later. But the 1924 conference exhibited the government's long-held unwillingness to allow U.S. corporations to control Mexican radio. The meeting also helped create a framework that the legislature used for federal radio legislation, especially the 1926 Law of Electronic Communications, which provided the government with more regulatory power over broadcasting.[74] The same year, Mexico and a number of Central American nations signed new bilateral treaties on radio communications.

The Rise of Broadcasting and Its Connection to the Past

As previously mentioned, the position of Mexican delegates at the 1924 Inter-American Committee on Electronic Communications was formed not only to impede U.S. expansionism but also to protect commercial broadcasting operations. Businesses and government leaders worked together to use this new form of radio to expand the economy and to further consolidate the nation. Yet few authors have focused their attention on the first decade of broadcasting. These years were crucial in the subsequent rise in power of broadcasting in the 1930s and the collusion between an increasingly authoritarian government and a largely monopolized commercial radio industry. Even less recognized are the connections and continuances between TSH and broadcasting.[75] Many of the developers of broadcasting originally worked with wireless technology during the Revolution. Military and bureaucratic leaders who fought with Carranza became important figures in state and commercial radio and in its regulation.

73. James Schwoch, *The American Radio Industry and Its Latin American Activities, 1900–1939* (Urbana: University of Illinois Press, 1990), 73.

74. Mejía Barquera, *La industria de la radio*, 30–31; Hayes, *Radio Nation*, 37

75. For a brief discussion of this point, see Rosalía Velázquez Estrada, "La Radiodifusión mexicana: encuentro con su pasado (1923–1945)," in *Miradas sobre la nación liberal: 1848–1948: Proyectos, debates y desafíos,* Libro 2, *Formar e informar: la diversidad cultural*, coord. Josefina Mac Gregor, (México, UNAM, 2010), 275–283.

This fact exhibits a neglected link to a preceding era of wireless communications; it also shows a lack of autonomy between the private and state sectors in the creation of the broadcasting industry.

Radio prior to broadcasting was largely a state project, even if dependent on foreign manufacturers. The Obregón administration maintained a strong interest in radio, but amateurs, independent engineers, and local capitalists played a greater role in the development of the broadcasting industry. By 1920, enthusiasts outside of the government had conducted successful radiotelephone experiments in multiple parts of the country.[76] They acquired and built their own equipment, becoming some of the most innovative operators in the country. Together, these electronics experimenters formed a small but growing community of radio aficionados.

Many of these buffs found their inspiration abroad. The influence of the United States was especially important. Indeed, as communications scholar Joy Elizabeth Hayes correctly points out, "the birth of broadcasting in Mexico must be situated within the context of U.S. expansionism in Mexico and Latin America more generally."[77] With the government's blessing, American products poured over the border throughout the 1920s. Commercial broadcasts had commenced in the United States in 1920, and U.S. radio companies saw the Mexican public as a new market for their products. By 1921, American corporations advertised their receivers through Mexican partners who, in turn, advertised the "free" U.S. programs.[78]

Witnessing the growth of the broadcasting industry in the United States, proponents of commercial stations existed by 1922. That year, foreign and domestic companies sent the SCOP and Obregón proposals for the construction of radiocasting operations. One American, Dr. L. B. Raschbaum, a colorful character who lived at times in Mexico, promoted his plan to the president by stating that broadcasting would allow the government to talk directly to the people, educating them on hygiene, agrarian issues, and classical music. Raschbaum even went as far as to claim that radiocasting could solve the foreign debt problem. He hoped to sell American receivers throughout the country and then to transmit from the

76. De la Herrán, "La radiocomunicación."

77. Hayes, *Radio Nation,* 25.

78. Susan Douglas, *Inventing American Broadcasting, 1899–1922* (Baltimore: The John Hopkins University Press, 1987), 300; Hayes, *Radio Nation,* 27–34. A January 1924 newspaper article lists over thirty businesses in the Asociación de Comerciantes de la Ciudad de México that sold America radio products in Mexico City: "La recepción por radio no está prohibida en México, *Excélsior,* January 27, 1924, II 6.

Chapultepec station—or from his own operation, if the government would help him build it.[79]

Two domestic enterprises proposed constructing entire broadcasting chains across the whole country. They founded their idea on the constitutional article that allowed for the monopolization of radio, desiring to build a government-sponsored monopoly, sharing profit and costs with the government. Obregón refused these offers for multiple reasons. For one, they more or less limited the state to a supervisory role. The proposals did not leave room for the state to build its own stations, if it decided to do so in the near future. Another determinant was the government's unwillingness to be a financial partner.[80] Even more, one of the proposal's authors turned out to be a DGTN employee who had attempted to frame his boss in order to speed up the permit process, creating a departmental scandal.[81] Obregón also had to coordinate radio development with other items on an already ambitious and difficult agenda, one that included creating a stable government, obtaining U.S. recognition, expanding education, appeasing peasant and labor demands, ending the constant warfare, and fending off rivals. In the end, Obregón and the SCOP leadership decided on a plan of mixed commercial and state development, foregoing the constitutional article that allowed for the exclusive control of the medium by the government.

The first stations granted commercial licenses belonged to domestic capitalists. This is not to say that they did not have connections to foreign capital, for indeed they did. Some even sold American products. But all of them possessed their own substantial financial resources. They also worked in cooperation with the government while not requiring monetary assistance.

A number of these foundational figures in private broadcasting did not have a direct connection to state or military communications developed during the Revolution. Instead, some of the most important experimenters and capitalists acquired their interest in the medium

79. L. B. Raschbaum, "Proyecto para la instalación de la radio-telefonía como medio para desarrollar la instrucción y cultura del pueblo mexicano," July 14, 1922, Mexico City, exp. 74, inv. 4759, leg. 1, Archivo Plutarco Elías Calles, FAPECFT.

80. Amado Aguirre to Alvaro Obregón, October 16, 1922, Mexico City, Ramo Presidentes Obregón-Calles, caja 252, exp. 803-R-21, AGN.

81. Telegraph from Cía. Radiotelefónica Nacional to Álvaro Obregón, Mexico City, September 11, 1922, Ramo Presidentes Obregón-Calles, caja 252, exp. 803-R-21, AGN; Alvaro Obregón to Amado Aguirre, Mexico City, October 14, 1922, Ramo Presidentes Obregón-Calles, caja 252, exp. 803-R-21, AGN. There is a good discussion of these proposals and the controversy in Fernando Mejía Barquera, *La industria de la radio*, 24–29.

directly from experiences in the United States. The life of Constantino de Tárnava Jr. provides the classic example. Born to Constantino de Tárnava de Llano and Octavia Garza Ayala, members of the Monterrey business elite, Tárnava Jr. came from a relatively wealthy family.[82] Two years after his birth, his father became a deputy director and the first treasurer of the Compañia Fundidora de Fierro y Acero de Monterrey, a large smelting operation backed by local, French, and Spanish capital.[83] Avoiding the revolutionary violence, Tárnava Jr. received his education in the United States, first attending Saint Edwards College in Austin, Texas, and later Notre Dame University in Indiana. Engineering classes in America whetted Tárnava Jr.'s interest in TSH and broadcasting. Arguably, he conducted the first ever broadcast in Mexico in 1919.[84] On October 9, 1921, he began experimental station 24-A, Tárnava Notre Dame (TND)—named after his Alma Mater—which provided news and music to other elitist fans, including Rodolfo de la Garza, the manager of the Bank of Nuevo León.[85] His station became officially licensed as CYO in 1923. [This, as well as XEH, are the specific call letters of the radio stations]. It later became XEH in 1939, and it remains the longest running station in Mexico today.

Members of the Azcárraga family share a similar story. In May 1923, Raúl and Luís Azcárraga, along with Felix F. Palavicini, a former Carranza cabinet member and director of the newspaper *El Universal,* founded CYL, the country's first commercial station. Raúl and Luís's brother, Emilio Azcárraga, later owned XEW, the nation's most influential broadcasting operation of the 1930s. Emilio had married the daughter of a senior shareholder of the aforementioned smelting company sometime in the early 1920s after making a small fortune selling Ford vehicles.[86] Emilio's son and namesake later became one

82. Juan Mora-Torres, *The Making of the Mexican Border: The State Capitalism, and Society in Nuevo León, 1848–1910* (Austin: University of Texas Press, 2001), 183.

83. "La Fundidora Monterrey, S.A.," website, http://www.monterreyculturaindustrial.org/fundidora.htm, accessed February 26, 2010; Fátima Fernádez Christlieb, *Los medios de difusión masiva en México* (México: Juan Pablos, 1982), 92–93.

84. The evidence for his 1919 broadcast does not exist except in some secondary literature; see Fátima Christlieb, *La radio mexicana: Centro y regiones* (México: Juan Pablos Editor, 1991), 60; Romeo Figueroa Bermúdez, *¡Que onda con la radio!* (México: Pearson Educación, 1997), 41–42; and Fernando Curiel, *¡dispara Margot, dispara!* (México: Premis Editora, 1987), 17–21.

85. Marvin Alisky, "Educational Aspects of Broadcasting in Mexico," Ph.D. dissertation, University of Texas, 1953, Austin, Texas, 24–26.

86. Alex M. Saragoza, *The Monterrey* Elite *and the Mexican State, 1880–1940* (Austin: University of Texas Press, 1990), 119, 140.

of the most significant media moguls in Latin America.[87] Like Tárnava Jr., the Azcárraga sons obtained their education in the United States.

Ernesto Pugibet, an eccentric businessman connected to French capital, founded El Buen Tono, a cigar and cigarette industry, during the Porfiriato. It remained one of the country's most significant manufacturers during the Revolution. A fan of modern technologies, he bought a blimp in 1909 to advertise his products. Although Pugibet died in 1915, the succeeding manager, José J. Reynoso, eagerly invested in radio, which he saw as a way to increase tobacco sales. Under his direction, the company inaugurated CYB in the fall of 1923. As a part of a campaign to advertise the station while selling products, El Buen Tono promoted a new brand, "Radio" cigarettes, which became popular in Mexico City during the mid-1920s.

These entrepreneurs, however, relied on former revolutionary communications officials to build and operate their equipment and to work as intermediaries with the government. Especially important was Colonel José Fernando Ramírez, who had joined Carranza's *Señarlos y Telefonistas* battalion during Carranza's presidency.[88] In addition to working for private companies, he operated JH in 1923, a broadcasting station controlled by the Department of War and Marine. Along with other military broadcasting operations, this station transmitted throughout the Obregón period, sometimes catering to a popular audience.[89] JH radiocasts of classical music and operatic pieces were a hit at the 1923 Grand Mexico City Radio Fair. JH broadcasters also assisted in the relay of a now famous boxing match between American Jack Dempsey and Argentine Luís Angel Firpo.[90] Widely anticipated across Latin America, this event increased popular interest in broadcasting not only in Mexico, but also in Argentina and likely in other Latin American nations as well.[91] JH also played music on other occasions, including when it teamed up with La Casa Parker, a private radio store, to provide a night of popular songs and marches by military bands in honor of the "ladies nominated to be the queens of the national celebrations

87. See Pával Granados, *XEW: 70 años en el aire* (México: Editorial Clio, 2000).

88. Ornelas Herrera, "Radio y contidianidad," 141.

89. Marvin Alisky, "Early Mexican Broadcasting," *The Hispanic American Historical Review* 34, no. 4 (November 1954), 521.

90. "Triunfo de la estación radiotelefónica de El Buen Tono, S.A.," September 16, 1923, *Excélsior,* II 1.

91. Robert Howard Claxton, *From Parsifal to Perón: Early Radio in Argentina, 1920–1944* (Gainesville: University of Florida Press, 2007), 1, 14–15; Beatriz Sarlo, *The Technical Imagination: Argentine Culture's Modern Dreams*, trans. by Xavier Callahan (Stanford: Stanford University Press, 2008), 105.

in the Federal District."[92] In addition, Fernando Ramírez and his associate José de la Herrán—the engineer and radio aficionado who actually built and lent his initials to JH—constructed transmitters and repaired equipment in 1923 and 1924 for CYB and another operation owned by the newspaper *El Mundo*.[93] They additionally wrote a four-part series in *Revista Mexicana de Ingeniera y Arcquitectura* "to be of the use to the enthusiasts who wish to construct receptors, transmitters . . . economically and efficiently."[94] Ramírez later worked for the DGTN.

Modesto C. Rolland, the former Carranza communications official and developmental advisor, worked tirelessly to expand the medium. In 1923, he headed the Liga Central Mexicana de Radio (LCMR), an important interest group composed of engineers, aficionados, businessmen, and former government officials. Other important members included Manuel Stampa, who had worked as the director of the Escuela Práctica de Ingenieros Mecánicos y Electricistas under the Carranza administration; engineer Salvador F. Domenzáin, who personally installed radio equipment for Secretary of Foreign Relations Alberto J. Pani; and Lombardo Toledano, who was a member of the labor party and in 1923 became the interim governor of Puebla.[95]

This body, led by Rolland, wrote the first broadcasting regulations in May 1923, which established commercial licenses, policies on taxation, and the distribution of airwaves between experimenters, commercial stations, and the state. A personal acquaintance of Obregón, Rolland wrote the president on a number of issues about radio development and acted as the spokesman for the LCMR and a number of business interests in their interactions with the government. As with his previous work under Carranza, he hoped that radio would create a stronger connection between the people and the Mexican nation.

This cooperation was on full display at the well-attended Mexico City Grand Radio Fair in June 1923. Largely organized by Rolland,

92. "Soberbio concierto de radio," ad, *Excélsior,* June 12, 1923, II 1; "La estación radiofónico de 'El Mundo' se encuentra a cargo de los más expertos técnicos de la República," *El Mundo,* November 7, 1923, 1.

93. "Una de la estación es de radio en Mexico," *Excélsior,* March 9, 1924, III 7;

94. J. Fernando Ramírez and J. de la Herrán, "Nuestra experiencia en radio," *Revista de Ingeniera y Arcquitectura* 1, no. 7–10 (September–December 1923): 430–35, 527–34, 599–605, 672–81.

95. Fernando Mejía Barquera, "Historia mínima de la radio mexicana (1920-1996)," *Revista de Comunicación y Cultura* 1, no. 1 (marzo-mayo 2007), http://web.upaep.mx/revistaeyc/radiomexicana.pdf, accessed February 17, 2010.

multiple radio companies and experimenters set up exhibits. President Obregón inaugurated the event, praising the recent establishment of commercial broadcasting. He additionally posed for press photos at a number of booths. Participants visited the elaborate stands and admired the goods, contests, and wacky costumes. In one of the most outlandish displays, women gave away El Buen Tono's "Radio" cigarettes while wearing mock antenna hats that looked like diamond-shaped kites. La Casa del Radio-*El Universal Ilustrado,* or CYL, gave away "Radio" sodas. In addition to broadcasting programs from Mexico, Cuba, and the United States, the LCMR held contests for the best radio devices built by Mexican nationals.[96]

The LCMR also championed broadcasting in public expositions and forums. They wrote weekly radio sections in the widely distributed *Excélsior* and *El Universal* newspapers, whose owners and managers helped establish the first commercial stations. LCMR members also held numerous conferences to exhibit their accomplishments and to educate the public about operating transmitters and receivers. In March 1923, alums and instructors from the School of Mechanical and Electric Engineering held a series of conferences on the technology to "illustrate the approach of the large number of aficionados that currently exist, principally to give clear ideas about the most important electrical phenomenon in the field."[97] In May of that same year, the LCMR held a gathering at the Center of Engineers, which they aired live. The transmission included the group's regular business and then a program that described how to transmit radio.[98] The LCMR continued to provide similar programs throughout 1923 and 1924. Members also invited the public to visit their meeting place and see their equipment in Mexico City, where they presented additional classes.[99] In addition to educating city residents, the group sponsored numerous amateur radio construction competitions. Although most members were generally from the middle echelons of society, they wanted radio to cross class boundaries and to create a unifying force across the country.[100] They promoted not only the emerging corporate stations but also the aficionados who built their

96. "La feria del radio fue inaugurado por el presidente de la república ayer," *Excélsior,* June 17, 1923, II 1; "La proxima feria de radio en la capital," *Excélsior,* May 27, 1923, III 9.

97. "Se organiza una serie de conferencias sobre radio-telefonía," *El Universal,* March 18, 1923, 6.

98. "Conferencia sobre la radiotelefónia, *Excélsior,* May 6, 1923, III 11.

99. Ibid.

100. "La Liga Central de Radio hace progresar la radiotelefónia," *Excélsior,* February 24, 1924, III 7.

own homemade devices. And although only a small minority of the population, these and other tech lovers propelled many of the initial efforts to popularize radio across the republic.

A number of other prominent broadcasters had revolutionary credentials. Doctor Adolfo Gómez Fernández, who organized some of the first entertainment-based broadcast programs and later established experimental and commercial stations in Sinaloa, had been a member of the military.[101] Amado Aguirre, former head of Carranza's military telegraphers, became Obregón's head of the SCOP. Aguirre oversaw the development of broadcasting, working closely with the owners of the first commercial stations. He, along with a motley assortment of journalists, composers, musicians, and poets, assisted with the inaugural broadcast of CYL in May 1923.[102] The Carranza administration paid for Manuel Persusquía Camacho's engineering studies in the United States. He later went on to work as a wireless inspector for the SCOP and to install and operate equipment for commercial stations XETF, XETR, XEX, XEAI, and XEAW. Félix F. Palavicini, a Carrancista intellectual and 1917 congressman, helped found CYL as director of *El Universal*.[103]

The operation at CYB-El Buen Tono provides another solid example of the link between the state and commercial radio operations. Although Obregón pressed for unpopular taxes on industrialists and catered more to worker demands then previous presidents, he generally supported El Buen Tono's management along with many other Porfirian-era enterprises. El Buen Tono's leadership, on the other hand, lured revolutionary technocrats by providing them jobs at El Buen Tono. Many of the most important members of CYB's management and tech staff worked, or had worked, for revolutionary governments. In addition to Colonel Fernando Ramírez, José de la Herrán and Captain Guillermo Garza Ramos worked as radio specialists in the military before and during their stint at El Buen Tono.[104] José Reynoso, the manager of the company, was a senator from 1917

101. Velázquez, "La radiodifusión mexicana," 278.

102. "Y llegó a comunicación sin cables: La primera transmisión de radiotelefonía en México," *Relatos e Historias de México,* July 2008, 81–83; "La primera estación radiotelephonica en la República," *El Universal,* May 8, 1923, 1; "Los artistas que tomaron parte en la inauguración, que anoche se efectuó, de la primera estación transmisora de radiotelefonia-'El Universal Ilustrado'-'La Casa del Radio'," *El Universal,* May 9, 1923, II 1; Miquel, *Disolvencias,* 171–195.

103. Rosalía Velázquez Estrada, "La Radiodifusión mexicana durante los gobiernos de Álvaro Obregón y Plutarco Elías Calles," tesis de licientura, Universidad Nacional Autónoma de México México, 1980, 66–67.

104. "Una de las estaciónes de radio en Mexico," *Excélsior,* March 9, 1924, III 7.

to 1920. In addition to providing sports equipment and movie shows for government schools, El Buen Tono gave municipal governments radio receivers so they could tune into CYB.[105]

Conclusion: A Marriage of Old and New

The first twenty-five years of wireless communications in Mexico not only produced a number of revolutionary changes, but also continued with the Porfirian past. European powers originally incorporated wireless communications to facilitate trade, connect empires, and modernize armies; Mexican officials mirrored their actions in the nation's frontiers. The Díaz administration did not build distant empires, but it did attempt—with some success—to bring territory and resistant populations already within the country's political borders under the control of state authorities in Mexico City. This was especially true of the work carried out in Baja California and Quintana Roo. Although the Revolution initially disrupted these plans, the conflict actually accelerated radio use. Early on, radio became an important component of intelligence gathering, propaganda, and foreign relations.

The Carranza administration revitalized the initiative to use radio to connect the nation. Carrancistas used TSH not only to consolidate control over territory gained from enemies but also to increase trade and the government's presence in the country's hinterlands and abroad—another trend adopted by later state officials. Radio technology, however, also proved to be a tool of internal division. It played a significant role in the revolt and subsequent rise to power of General Obregón and in a similar though unsuccessful coup by De la Huerta. Security concerns thus remained an important factor in radio use, including in the regulations first applied to broadcasting in 1923 and in decrees issued during the De la Huerta Rebellion.

The rise of broadcasting in the early 1920s forever altered how people perceived radio. A world away from the state-directed point-to-point form of communication, broadcasting technology allowed the voices of business leaders, artists, and government officials to reach a mass audience. Influenced by U.S. trends, a number of new experimenters, domestic capitalists, and revolutionary officials pushed the government to liberalize radio policies. This, in turn, greatly increased radio's influence on culture, economics, and politics. Young engineers

105. Letter from the municipal president of San Ángel, D.F. to the manager of El Buen Tono, 1924, caja 8, exp. 288, Fondo Ayuntamiento, Archivo Histórico del Distrito Federal, Mexico City.

and enthusiasts brought new life and insights to radio development, which business leaders recognized as a new way to advertise their products and to build customer allegiance. But many of the important figures who helped establish broadcasting, including José Fernando Ramírez, Modesto C. Rolland, and Amado Aguirre, had earlier experience with wireless technology. State officials additionally promoted protectionist policies in the international arena. The broadcasting industry started with a marriage of these coexisting movements—a union of revolutionary policies and soldiers, young students and professionals who came of age during the Obregón administration, and equally important, of Porfirian industries that survived the Revolution.