

**Radio Development Between 1921 and 1922:**

**A microanalysis of regulatory development**

**Fritz Messere**

**Department of Communication Studies**

**State University of New York at Oswego**

The early days of broadcasting in the United States was a time that transformed wireless from a communication utility into the newest mass medium. In many ways the development of radio as a mass medium occurs during a relatively short time period. While it is true that inventors such as DeForest, Fessenden and Conrad experimented with the potential of radio as a service that could be used for mass purposes, the realization that broadcasting would be a success occurs during the early 1920s when the general public begins to realize radio's potential.

Like the Internet today, radio started out as something else, not as a mass medium (Hanson, 1). Early in the twentieth century, development of the industry stalled when patent disputes prevented companies from manufacturing the necessary components to make satisfactory equipment, but then the First World War accelerated innovation as the Navy assumed control of patents. After the war, the Radio Corporation of America (RCA) was formed to allow an American company to use the Alexanderson alternator. Soon after it pooled various radio patents and, as a result, put them to use to gain control of the channels of wireless communication for business and industry (Archer). These channels were previously controlled by British and German concerns. The notion that radio would develop into an entertainment medium, sustained by advertising, was still a few years off.

This paper will attempt to evaluate some of the policymaking during the early days of broadcast regulation under the Department of Commerce by examining some of the memoranda, news reports, and legislative ideas discussed publicly. The paper attempts to develop a frame that examines the period between after the First World War through the beginning of 1922 when industry, government and the public began to examine broadcasting's potential. Such a microanalysis can be valuable by framing issues, both social and political, along with foundational developments occurring at the birth of broadcasting. I hope that this analysis will provide insights as to why the development of regulation did not occur sooner.

### **The beginning of a new industry: collecting patent rights and allies**

While experimenters demonstrated different uses of wireless throughout the early years of the twentieth century various problems prevented the adequate manufacture of wireless equipment. RCA was formed

partly to help resolve this problem (Archer). The Radio Corporation of America by virtue of being created to hold American interests in radio also transformed itself from a global communication conduit to a manufacturing and entertainment conglomerate. In order to provide RCA with the necessary tools to emerge in the world arena as a competitor in wireless communication, forces within the government and industry leaders forged a plan that would give RCA enough resources to compete (Sobel 27, Harlow 474). RCA grew in ways unanticipated. The foundations for wireless point-to-point communication and the development of technological advancements made during and immediately after the world war also made broadcasting possible. However, the transformation of the Radio Corporation from an international communications company to a broadcasting company required a redirection in thought about the company and, more importantly, about what radio itself would become.<sup>1</sup> While we can point to technological innovations that were occurring after the war, it is essential to realize that such a transformation was possible because the basis for forming the Radio Corporation was not mandated through legislation; it can be examined as government policy without law.

Rosen says that Secretary of the Navy Josephus Daniels promoted the notion of a government monopoly in radio. Such a monopoly would require new legislation. During the world war naval officials urged Congress to pass legislation mandating government ownership of radio stations (23). In a 1917 article in *The Wireless Age* Lieutenant L. C. Hooper wrote, “I have come to the belief that the interference question is absolutely unsolvable except by Government ownership of coast stations (709).”

In 1919, Daniels again called for permanent control of all wireless stations by the Navy (Independent 386). His political influence was not sufficient to convince legislators that this would best serve the United States (Maclaurin, 103). However, Daniels, Roosevelt, then assistant secretary, and Commander Stanford Hooper strongly favored the creation of an American company to control international radio communication. In congressional testimony, Owen Young suggested that President Wilson arrived at a similar conclusion. Young testified:

He [Bullard] said that the President had reached the conclusion, as a result of his experience in Paris, that there were three dominating factors in international relations –

international transport, international communication, and petroleum – and that the influence which a country exercised in international affairs would be largely dependent upon their position of dominance in these three activities...(quoted in Sobel, 27)

Prodded by Commander Hooper and Admiral Bullard, the General Electric Company purchased a controlling interest in American Marconi from its British owners and formed the Radio Corporation of America in October 1919 (Hooper, 128; Rosen, 24). Owen D. Young, Chief Counsel for General Electric, was made chairman of the board of RCA and Edwin J. Nally and David Sarnoff, of the American Marconi Company, were made president and commercial manager respectively (MacLaurin 105). During the 1920s, Young, Sarnoff, and Bullard would all figure prominently in the development of radio broadcasting and would attempt to influence the future of radio.

Young's business methods to put RCA on a sound footing were legalistic and political. He entered into a cross-licensing agreement with American Telephone and Telegraph, the principal patent-holder for the Deforest Audion (Archer, 195). The two companies agreed that current and future radio patents would be made available to each other for a period of 10 years. During this time, Young did not envision RCA to be a manufacturing corporation. Tubes and radio sets would be supplied by General Electric and sold under the RCA brand (MacLaurin 105). Soon thereafter, RCA consolidated patent rights from Westinghouse and other companies giving it the ability to develop a complete communications system.

The creation of RCA, at the behest of the Navy, is an excellent example of policymaking without law and it points to the fact that such policymaking can and does have unintended consequences. The development of broadcasting was not anticipated by legislators when they conceived of the Radio Act of 1912. This modest piece of legislation can be seen as liberal jurisprudence because it conferred upon the Secretary of Commerce certain tasks and powers that the legislature would exercise if it were not impracticable (Lowi, 92). As a result too much within the act is vague and not well defined. Within 10 years of its passage, the act would fail and events would begin to spiral out of the control of government.

## **Conceptualizing the radio model**

A schema illustrating development of a new industry requires a model or metaphor that helps to conceptualize the debate and the actions of the various stakeholders. Such schema have been done with various technologies and specifically with broadcasting. For example, Mander (1984) looks at the public debate surrounding the broadcasting industry during the 1920s. Her insights are powerful and may be accurate. She writes:

“The locus of federal power over state power in regulating radio rested on the commerce clause of the U. S. Constitution. The point is significant because the commerce clause provided an over-arching model by which broadcasting’s future was envisaged: a market model (173).”

Mander continues by providing examples illustrating three over-arching models that could be used to conceptualize many of the issues surrounding the regulation of radio and to provide a frame in which to envision the future of the industry and its significance in society. Her descriptions of three models used to conceptualize the debate about radio, 1) the transportation model, 2) the public utilities model, and 3) the newspaper model, are quite useful for comparison in evaluating the discourse that legislators and industry leaders used as they moved toward some accommodation for regulating the medium. She concludes that from its inception broadcasting was not regulated as a symbol-producing medium (the newspaper model) but that the over-arching model, the market model, was rooted in our prior conceptualizations of transportation. She uses railroads and telegraph as illustrations of how the development of prior regulatory policies could be inscribed within the transportation model.

While this analysis is certainly illuminating, it is problematic in two ways. First, it supposes that the development was linear and the industry developed from its inception through its mature development as wireless telegraphy. We know, of course, that it did not. Radio did start out as a wireless device, but the development of broadcasting was a marked change from point-to-point to a mass medium. Broadcasting quickly eclipsed wireless communication in its importance and RCA’s transformation into a communications conglomerate is a direct reflection of this fact. This transformation of the use of wireless is important to note since some scholars claim that the large corporations like RCA had undue influence in determining the establishment of the broadcast model in the United States (McChesney).

The very nature of broadcasting perplexed legislators as to how to treat its development. For example, during the First Radio Conference Secretary Hoover uses the public utility model as a reference point for regulating the new industry. However, we know that later radio conferences do not see broadcasting in this light (Benjamin, 1988).

However, there is a second more important aspect that suggests why radio cannot be easily categorized. The development of radio using the transportation model imposes a superstructural analysis on events after the fact; it provides a macrohistorical viewpoint that supposes that the events and people involved in the policymaking decision occurred or acted in a certain way. The development of broadcasting was much more haphazard. Historian Georg Iggers (1997) suggests that if “one wishes to rescue the unknown from oblivion, a new conceptual and methodological approach to history is called for that sees history no longer as a unified process, but as a multifaceted flow with many individual centers” (103).

Much has been written about the early days of radio and scholars have focused on a variety of the aspects of the development of broadcasting. Archer (1938) looks at the earliest days of wireless and Rosen (1980) examines the federal government and radio broadcasters while both Sloten (2000) and Winston (1998) look at technology surrounding the mass media. Barnouw (1966) provides a broad landscape as do other scholars such as Sterling and Kitross (1990, 1978). However, I think it is important to note that Douglas (1987) filters the growth of the radio industry through the mesh of social construction, arguing that the discussion within the popular press influences the outcome of broadcasting’s development as heavily as the interactions between the individuals and institutions involved. These examinations provide many insights into the nature of the development of broadcasting that some other histories ignore.

### **Analysis of regulation without legislation**

Could a new analysis, one that uses a microanalytical approach to decision making, provide new insights into the building of a regulatory frame for broadcasting during the formative years? It is my intent in this paper to look at a few of the day-to-day policymaking events of 1921 and 1922 that led toward the passage

of the Radio Act of 1927 to test the notion that without clearly defined legislation, regulating a nascent technology is much like steering a ship with “a weak rudder” (Hoover, 1952, p. 139). The delegation of power without clear boundaries and authorities becomes pathological in its nature and the outcomes become difficult to predict. One assumption made here is that the original legislation passed for wireless, point-to-point communication, the Radio Act of 1912 reflected a different reality to legislators, experimenters and entrepreneurs than did the Radio Act of 1927. We know that broadcasting became an unintended consequence of the development of wireless communication. But, once started, the synergy of the industry, its proponents and broadcasting’s rapidly growing listening public propelled the nascent industry toward adolescence, quickly outgrowing the swaddling clothes of that early legislation. At the same time that the infant moves towards adolescence, it appears that its parents and guardians are at a loss to determine the best method of regulation. Calls for new legislation occur but overarching legislation is still several years away. Within this vacuum, ad hoc decisionmaking is attempted by the Department of Commerce.

There are excellent treaties on the radio conferences and the regulation of broadcasting during the era leading up to the Radio Act of 1927. They describe the agenda and outcomes of those meetings well. However, it is more difficult to assess other influences on policymaking: the impact of ad hoc process of discussion, the development of influence of a powerful new corporation, of trying to standardize policy without viable legislation and the interplay between government and other parties interested in radio. Certainly congressional leaders like White and Dill inscribed their names on proposed legislation during the period but many of their attempts to pass legislation were unsuccessful. It was Herbert Hoover, then Secretary of Commerce, who guided broadcasting during its rocky infancy, often with the tacit consent of Congress. McChesney says that Hoover “established himself as a figure of paramount importance in the development of the industry” (13).

What is the significance of Hoover’s contributions and political maneuverings during the early days of radio? It would be difficult, within the few pages of this paper, to attempt to assess his impact on the regulatory process that occurred on a daily basis. One can argue that McChesney is correct in assuming

that the radio conferences were intended to provide the broadcaster with an opportunity to develop self-regulation (13). Or, using a different lens, one might be correct to assume that a close-knit relationship arose between the regulators and the regulated who worked together to develop an “associative state” to meet the needs of the service to the public while ensuring steady economic expansion of the industry (Benjamin 221).

I would argue that regulation during the early part of the Hoover era was evolutionary. Interestingly, we already know that Hoover attempted to regulate broadcasting by developing a collective mindset among the leaders of the broadcasting industry by calling them together at annual conferences (Benjamin 1998, Johnson 1970). To do this Hoover had to transform the Department of Commerce and clearly establish its primacy for regulatory control of the new uses of wireless. And, he was able to do so because there was no good regulatory law for radio. Lowi reminds us that a good law eliminates the political process at certain points because it focuses politics on Congress, the president and the courts (93). Creation of new legislation during this period, whatever it stripe, would have prevented the informal policymaking that occurred at the Department of Commerce during the formative period of radio. Well written legislation would have “provided delegation to some body the ‘full ambit of authority’ – executive, legislative, and judicial – into a single administrative body” (96). Such was not the case with the Radio Act of 1912 and what transpired during the early days of broadcasting reflected the pathology of regulation without law.

### **The transformation of Commerce and radio oversight**

When Herbert C. Hoover accepted the position of secretary of commerce and labor, he was determined to make the cabinet post one of importance. Johnson notes that Hoover’s move to increase the efficiency in the department included removing political appointees in favor of qualified personnel, hiring extra personnel at his own expense, and putting in long hours (61). Hoover was a modern man and intended to apply modern managerial skills to his new post.

In an early press release Hoover discussed his plan for the backwater department known as Commerce.



“ In order to do service to the greatest advantage I wish to establish a wiser and better organized cooperation with the trade and commercial associations, and will in a short time present some plans to this end.” (HHPL)

When Hoover assumed control of Commerce, radio was little more than a ship-to-shore telegraph system and broadcasting with voice was still experimental (139). Regulatory mindset in Congress towards radio is reflected in House Resolutions 7 and 461, which would authorize the Secretary of the Navy to operate government-owned radio stations for the use of the general public (H.J. Res. 7 and 461). Broadcasting is not discussed in either resolution. In April of 1921, Commerce staff members prepare a memorandum for Hoover analyzing Representative White’s draft radio bill. White’s draft legislation would provide the Secretary of Commerce with “full power to regulate radio communication in the United States” and also “formulate and publish regulations...concerning methods of operation, procedure wave lengths, radio interference and power used by the various classes of radio stations” (draft legislation, HHPL). In White’s legislative draft, the right of the Navy to control radio is absent except for an analysis of the relationship between Navy control of coastal stations and the responsibility of Commerce to oversee the charges of settlement for international radio accounts (Memorandum 4/13/21, HHPL). Hoover forwards this memo to Senator Kellogg, informing the senator of Congressman White’s proposed legislation. Clearly there has been a reconsideration of how wireless should be regulated and who should do the regulations.

In a second Commerce analysis of the draft legislation, dated April 21, the writer notes that the draft makes a radical change in principle from the Act of 1912, establishing 19 regulations that the Secretary of Commerce is directed to enforce (Memorandum 4/21/21, HHPL). The analysis expressed the concerns of the Department of Commerce that the bill would create administrative problems for the agency. In the noted concerns of the draft legislation is the fact that Commerce would be responsible for all licensing of amateur receiving equipment. The writer makes a point that the agency is concerned with regulation of commercial rates for radio and notes that at some future time regulation would shift from the Bureau of Navigation to a separate Bureau of Radiocommunication (sic) within Commerce. Clearly White’s bill is meant to rectify Congress’s earlier mistake of writing weak legislation, but the measure still reflects the idea that radio is a wireless point-to-point communication system.

Although Commerce did license 32 broadcast stations in 1921 (Johnson, 76), the model expressed in draft legislation is the basic transportation model that Mander asserts. Hanson (1996) notes that the industrial view of radio at the time was essentially the same. RCA executives viewed their market based on the one-to-one or one-to-few communication model, in competition with submarine cables. Plans for RCA's success was based on the well-established revenue model, fee for service (3). The service was transport of messages. In fact, in 1921, RCA is still building 'Radio Central' an extremely high-powered telephonic transmission system based on the Alexanderson alternator. (NYT 11/21 pg?).

A fundamental change in the industry occurred in 1922 and, as a result, so too in the way in the Department of Commerce viewed radio. When interest among the American public shifted from radio being an experimenter's technology to a mass medium, radio made a very sudden transition from a clear-cut business model to one where both the industry and the Department of Commerce knew there was incredible demand but couldn't see what the revenue model would be (4). Mander's transport model now vanishes.

In early February Hoover notified President Harding that use of wireless telephony (not telegraphy) had suddenly become important (Johnson, 80) and in a press release says he believes some form of "ether cops" will have to be established (NYT 2/10/22). Several weeks later he convenes the first of the famous radio conferences.

In his address to the attendees at the First Radio Conference he declares,

"We have witnessed in the last four or five months one of the most astounding things that have come under my observation of American life. This Department estimates that today over 600,000 persons (one estimate being 1,000,000) possess receiving sets, whereas there were fewer than 50,000 such sets a year ago. We are indeed today upon the threshold of a new means of widespread communication of intelligence that has the most profound importance from the point of view of public education and public welfare." (Hoover, 140).

The sudden interest in radio changed the nature of the debate about regulation almost overnight. *The New York Times* writes that

"Although radio telephony and its phraseology, broadcasting, serial antennae and wave length, are almost as common topics of conversation today as the Eighteenth

Amendment...it is extremely hard to write in popular terms... of the sciences and its extraordinarily rapid growth” (NYT 2/19/1922).

The recommendations of the Resolution Committee at the first conference have discarded the transportation model of regulation by declaring that, “radio communication is a public utility and should be regulated and controlled by the Federal Government” (HHPL, First Radio Conference).

Naturally, one of the recommendations was that new legislation gives the Secretary of Commerce adequate authority to regulate broadcasting. This shift in language is also reflected as a shift in the way in which legislators now begin to discuss the future of radio regulation. Wallace H. White Jr. declares that he is preparing to introduce a new bill based on the conclusions of the radio conference. He says, “We will have to grant franchises to public service corporations” (NYT 2/26/1922, 29). Hoover agrees saying, “It is a problem of regulation if we are to get the maximum use. Regulation will need to be policed, if there is not to be great prejudice to the majority...” (NYT, 2/28/1922, 16). Previous language by legislators that treated the Navy as an important partner in wireless is absent from the recommendations of the conference. The final report “recommends the appointment by the President of an advisory committee to the Secretary of Commerce to consist of twelve members, half of whom shall be from the Government and half from civil life” (NYT 4/28/1922, 26). While representatives of the Navy, Agriculture and other government departments take part, it is clear that Commerce now dominates government interest in broadcasting.

The public was also involved in these discussions, but up to early 1922 that largely meant members of the American Radio Relay League and other experimenters who operated their own small stations or avidly listened at night for distance CQ signals. In fact, in 1921, Hoover sends a message to the ARRL annual meeting saying,

“The Department of Commerce is by the authority of Congress the legal Patron Saint of the Amateur Wireless operators. Outside of its coldly legal relations the Department wishes to be helpful in encouraging this very important movement” (Johnson, 74).

Similarly, the Radio Corporation wanted support of this vocal group representing members of the general public. Dr. E. F. Alexanderson, RCA’s Chief Engineer and inventor of the famed alternator told members of the ARRL, “The Radio Corporation’s engineers will cooperate with the amateurs...by suggesting to the

Government that adequate wave lengths be set aside for their stations” (NYT 2/18/1922, 7). But, faster than either members of government or members of the industry anticipate, radio turns away from the point-to-point model and into a mass medium. Within a month of the first conference the *New York Times* exclaims, “Almost overnight the general public has suddenly become familiar with the intricate mechanism of such (wireless) apparatus” (NYT 3/26/1922, 105).

The overnight explosion of interest in broadcasting had an unintended effect on the industry and transformed the way the Radio Corporation thought about its future. In the 1922 Annual Report of RCA, the writers expressed amazement and commented that “the engineers and scientists had anticipated the development of wireless telephony for communication purposes, but no one had visualized the phenomenal expansion of wireless telephony as used today for broadcasting” (Quoted in Hanson, 5).

The public was also transformed, caught up in what Hanson describes as *the Euphoria of 1922*, a cyclical combination of hype, media coverage and public fascination with anything related to broadcasting began. Susan Douglas reminds us that by 1922, the press responded to the tidal wave of interest with interpretive articles on the social impact of broadcasting. Popular magazines of the day inaugurated radio sections and new magazines such as *Radio Broadcast* sprang forward to cater to the devotee (304).

Perhaps most important was the impact that the sudden surge in the popularity of broadcasting had on the radio trust and the Department of Commerce. RCA had to reorient its manufacturing priorities and formulate a new way of thinking about the technology and the patents they controlled (Douglas, 303). The realization that radio was a powerful new medium was evident to leaders of government, the radio group and AT&T, but most of all to Sarnoff and others at RCA, who had the sudden realization that the company had the opportunity to grow beyond their wildest expectations (Sobel, 63). While the sale of sets could propel broadcasting initially, it was difficult to determine what would sustain the new medium in the long term. As early as 1922, many of the key companies were asking just such a question. Comments made by Hoover, Sarnoff and others at the time suggested some hostility towards advertising even though AT&T

had begun to interpret their rights under the RCA patent agreements as giving them exclusive rights to toll broadcasting, an issue that was not resolved until 1926 (Hanson, 9).

In his autobiography Hoover claims that from 1921 to 1923 more experience was needed before proper legislation could be drafted for regulation of broadcasting, but in letters to congressmen and in public speeches during that time Hoover frequently called for new legislation to control the chaos that was developing as a result of the rapidly growing industry (Hoover, 142, Johnson, 92). Other memoranda from Commerce papers indicate that the major corporations were willing to submit to some form of regulation in return for a more orderly advancement of broadcasting. For example, an RCA memorandum regarding the outcome of the 1922 conference declined the notion of developing detailed rules and regulations but suggested regulation set up under broad statutes for radio (HHPL, 4/17/1922). Similarly, in a confidential memorandum written to Carson, P.E.D. Naggle describes his interaction with AT&T's Vice-President, J.J. Carty, who said, "he thought the radio bill was very necessary...and would be disposed to favor anything in the way of legislation that the Secretary of Commerce wished" (HHPL, 11/27/1922). Both White and Kellogg responded to the suggestions made at the Radio Conference by introducing legislative proposals to Congress but none succeeded in gaining approval.

Rosen claims that Hoover's attempt to develop a complex extralegal arrangement for regulation caused him to become increasingly dependent upon the industry, thereby relinquishing part of the control he held over the development of radio as an industry (61). In the period 1921 and 1922, however, it seems apparent that there was no movement on the part of the radio trust to formulate long term plans for control of the industry, primarily because the spiral of events occurred much too quickly to formulate such a plan. Indeed, Smulyan says the radio receiver and transmitter manufacturing companies had learned the importance of stepping into areas of unexplored technology but suggests that it wasn't until the after the second radio conference that the radio trust was ready to formulate a plan to control broadcasting (42). This left a vacuum in regulatory oversight.

So, why did government fail to act in the face of this rushing tide of change? Is Landis correct in assuming that the administrative process is a modern day answer to the inadequacy of the judicial and the legislative process? (46) If this is so, then Congress' response to the chaos of the airways might have been characterized as "let Hoover figure it out."

It appears that the evolving nature of broadcasting's rapid advances in the early 1920s stalled Congress from developing adequate legislation until finally forced to do so by the Courts in 1926. Perhaps as Lowi suggests legislation destroys bargaining power and legislators wanted to retain their ability to bargain in the face of lightning fast technological advances (107). But isn't political logrolling just a political term for bargaining power? Certainly the legislation developed in the Radio Act of 1927 and the outcome that reified large broadcast interests was a product of logrolling by politicians and the large radio corporations (Messere, 2003)

The agenda setting and technological developments that created our system of broadcasting in the 1920s can provide us with insights into the developmental process of regulating new technologies in the absence of strong controlling legislation.

### **Bibliography**

- America's Control of Wireless, *The World's Work*, May, 1922. 11-13
- Archer, G. (1938). History of Radio to 1926. New York: American Historical Society.
- Barnouw, E. (1966). A tower in Babel. New York: Oxford University Press.
- Benjamin, L. (1998) "Working it Out Together: Radio Policy from Hoover to the Radio Act of 1927," *Journal of Broadcasting and Electronic Media*, 42:2. 221-236.
- Bensman, M. (1969). *The regulation of radio broadcasting by the Department of Commerce, 1921-1927*. Unpublished doctoral dissertation, University of Wisconsin, Madison.
- Chambers, C. (1958). The Belief in Progress in Twentieth-Century America, *Journal of the History of Ideas*, 19, 197-224.
- Chernery, William, Monopolies of 1924, *The Independent*, September 1924, vol. 113 156-158.
- Compilation (1928) The Radio Industry: The story of its development. A.W. Shaw: New York, reprinted by Arno Press: New York.
- Douglas, S. (1987). Inventing American Broadcasting: 1899-1922. Johns Hopkins: Baltimore, MD.
- Eoyang, T. (1937). An Economic Study of the Radio Industry in the United States of America, reprinted by Arno Press: New York.
- Godley, Paul, A Kingdom for More Wavelengths, *Radio Broadcast*, January 1923, 91-93.
- Hanson, W. (1996). The Original WWW: Web Lessons from the Early Days of Radio, *Journal of Interactive Marketing*. 1-11.
- Herbert Hoover Presidential Library, Commerce Papers, Legislation – 1921.
- Herbert Hoover Presidential Library, Commerce Papers, Radio Conferences - National First, February 22, 1922.
- Herbert Hoover Presidential Library, Commerce Papers, Radio Correspondence, press releases.
- Herbert Hoover Presidential Library, 67th. Congress -House Resolutions.
- Hooper, S. (1922). Keeping the Stars and Stripes in the Ether, *Radio Broadcast*, 1: 125-132.
- Hoover, H. (1952). The Memoirs of Herbert Hoover: The Cabinet and the Presidency 1920-1933. MacMillian Co.: New York.
- Iggers, G. (1997). Historiography in the Twentieth Century: from scientific objectivity to the postmodern challenge. University Press of New England: Hanover, N.H.
- Interference Between Radio Stations: Its causes, effects and cures, *The Wireless Age*. 707-713.
- Johnson, G. (1970). *The first regulator of American broadcasting, 1921-1928, Secretary of Commerce Herbert Hoover*. Unpublished doctoral dissertation. University of Iowa, Iowa City.
- Landis, J. (1938). The Administrative Process. Yale University Press: New Haven.
- Lowi, T. (1979). The End of Liberalism: The Second Republic of the United States, Norton and Co.: New York.
- Macclaurin, W. R. (1949). Invention and Innovation in the Radio Industry, reprinted Arno Press: New York.
- Mander, M. (1984). The Public Debate About Broadcasting, *Journal of Broadcasting*, 28:2 pp?
- McChesney, R. (1993). Telecommunications, Mass Media and Democracy: The battle for the control of U.S. Broadcasting, 1928-1935. Oxford University Press: New York.
- New York Times Archives, dates various. 1920-1923.
- Radio Legislation, *The Outlook*, June, 1922. 363-364.
- Recommendations for Government Radio Control, *The Electrical World*, March 1922,

- Recommendations of Radio Conference, *The Electrical World*, March, 1923, 794.
- Rosen, P. (1980). *The Modern Stentors: Radio broadcasters and the Federal Government, 1920-1934*. Greenwood Press: Westport, CO.
- Slotten, H. (2000). *Radio and Television Regulation: Broadcast Technology in the United States, 1920-1960*. Johns Hopkins: Baltimore, MD.
- Smulyan, S. (1994). *Selling Radio: the commercialization of American Broadcasting 1920-1934*, Smithsonian Institution Press: Washington: D.C.
- Sobel, R. (1986). RCA, Stein and Day: Briarcliff Manor, NY.
- War Between Broadcast Stations, *Radio Broadcast*, October, 1922, 457-458.
- Wilhelm, Donald. Wanted: An American Radio Policy, *Radio Broadcast*, May 1922, 29-33.
- Winston, B. (1998). *Media Technology and Society: A history from the telegraph to the internet*, Routledge: London.



---

<sup>1</sup> The famous Sarnoff music box memo suggests that broadcasting was already under consideration by Sarnoff. Where this is historically accurate is the subject of some debate. Nevertheless, the industry and government are taken by surprise during this period.