

**Intro:**

**Chapter One: Creation**

Telephone  
Bell and Western Union—  
AT&T circa 1900 Vail/Fish/ Morgan  
Gilded Age of banking and industrial revolution  
Telegraph & Railroad/National network that paved the way  
Electric Utility Industry  
Radio /Military to commercial/KDKA HP Davis  
Novelty/Innovation/social implications  
Movie picture show

**Chapter Two: Consolidation**

Vail's concept of "wasteful duplication" and "natural monopoly"  
Territory swapping  
Forced interconnection  
Commercial use of radio and subsequent growth/consolidation  
RCA/ATT/GE/Westinghouse  
The role of standards/manufacturing  
DOD/ Congress protection of industry

**Chapter Three: Signs of Change**

Growth of global radio/demise of telegraph  
Cultural acceptance/dependence  
Microwave technology  
Television growth  
NASA to the moon  
Carterphone/hushaphone  
Computer Inquiry  
Satellite industry

**Chapter Four: The Perfect Storm**

FCC and jurisdictional issues  
INTELSAT/DOMSAT  
MCI Decision  
AT&T  
Copyright battles/signal importation/leapfrogging  
*Carter Mountain* decision  
*CATV Fortnightly Corp v. United Artists*  
CPB  
Computer Inquiry/fax machine  
DATRON/IBM  
SPECTRUM  
Cable TV and FCC Authority

## Competition

### **Chapter 5: Setting up OTP; Wheels start to turn; actions and reactions to the perfect storm**

What were the main objectives?  
Why/how were they important?  
What was the plan of attack?  
Who fought it, why? What else were you up against?  
How did you pull it off?  
How did things shape up after that?  
Issue by issue? Department by department?  
Historical context

### **Chapter 6: OTP "Cable, Turning TV into a Magazine Rack" BUN and Open Skies**

Industry Structure-- proposed changes  
Spectrum issues  
State vs. Fed regulation  
FCC and jurisdictional issues  
Separations principle  
Vertical integration  
Content controls  
Capacity issues  
Rate of return models  
The utility question  
Cable's struggle for funding/programming/respect  
Franchise agreements  
Signal importation; melting the freeze  
Manufacturing; equipment/technology/rights of way  
Social factors

### **Chapter 7: OTP "Over my dead body"**

The story of AT&T during those years  
Congressional Testimony  
MCI/microwave/private lines  
Computer Inquiries/terminal exchange rules  
IBM/Arpanet  
Rights of way issues  
Price fixing/rate of return  
Manufacturing/Western Union/Bell Labs  
DOD factor  
Judge Green/the personalities factor

**Chapter 8: OTP Satellites**

INTELSAT/DOMSAT/COMSAT

DOD

Commercial applications

International agreements impacting domestic policies

Technology growth

Funding issues/competition

Social implications/impact of Apollo and man on the moon missions

The Commies/eastern Europe/developing countries

FCC and jurisdictional issues

**Chapter 9: OTP ---CPB**

The funding/the fights/the philosophy of

Sloan/Killian factors

1<sup>st</sup> Amendment implications

**Chapter 10 OTP The role of the press and beaurocrats**

**Chapter 11 Post OTP years**

Break up of Bell

Open Skies

FCC

**Chapter 12: The Future: Ubiquity**

**Chapter 13: Conclusion**

**Themes**

Competition vs. Natural Monopoly vs. municipal/franchise agreements  
Manufacturing vs. price controls vs. rate of return regulation  
Innovation vs. regulation

Creation

Consolidation

Competition

Innovation/Ubiquity

Epilogue

wired	wireless
broadcast	private
innovation	standards
unregulated	regulated
novelty	invisibility
cost	price

resources: spectrum, right of way, switches  
politics: public airwaves, uses of monopoly

## Threads

KDKA model – broadcasting for the public to sell radio sets

- HP Davis – Westinghouse – first to glimpse commercial broadcasting. Davis saw an advertisement – Conrad was periodically transmitting phonographs, etc. People were building radios to listen to him. One day, in the evening Pittsburgh Sun (Sept. 29, 1920) there was an ad for the Horne Department Store, \$10 buys a radio set to listen to Conrad.<sup>1</sup>
- HP Davis wanted to be able to broadcast the upcoming election returns, directed his staff to get a station up and running in time.
- KDKA, a Pittsburgh Westinghouse station, “commenced operations” on Nov. 2, 1920.<sup>2</sup>
  - Early programs<sup>3</sup>
- Westinghouse distributed a number of simple sets to friends, colleagues to get people listening to that first broadcast.
- HP Davis created the industrial model (“free” service available to the public) for commercial radio broadcasting. Regular broadcasts to encourage people to tune in.
- Davis quote (1927) on the idea of radio broadcasting for Conrad’s. Radio as a confidential medium was wrong, radio was meant for communicating with many.
- 1920 station, KDKA, as a way to explore this idea.<sup>4</sup>
- Westinghouse wanted to sell radios.<sup>5</sup> Same with RCA.
- Get: HP Davis lectures at the Harvard Business School.
- Get: Publications writing about the Nov. 2 broadcast. Pittsburgh Post, Pittsburgh Sun, NY Times. Was there a public sensation created after the Nov. 2 broadcast?
  - NY Times article about KDKA the morning after the Harding election.<sup>6</sup>
  - Delay in press: March-May 1922, newspapers promoted the boom in radio.<sup>7</sup>
    - NY Times article talking about how the east was “mad about radio.”<sup>8</sup>
  - Spot-check NY Times, Literary Digest, Review of Reviews to see what the coverage was like in between 1920 and spring 1922.
- Manufacturing and sale of radio receivers to the public – creation of consumer electronics industry.
- Davis later created the Westinghouse network that was a model for NBC. Davis became chairman at NBC.
- Fantastically rapid growth of radio stations and set-sales.
  - List of radio stations by license date.<sup>9</sup>
  - RCA July 2, 1921 – station set up to broadcast a boxing match / fight – WJY (later changed to WDY on Dec. 14, 1921).<sup>10</sup> Lasted until Feb. 24, 1922, when RCA began to share operating costs at Westinghouse’s WJZ.<sup>11</sup>

---

<sup>1</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 202 (1938); SUSAN J. DOUGLAS, INVENTING AMERICAN BROADCASTING 1899-1922, 299-300 (1987).

<sup>2</sup> PHILIP T. ROSEN, THE MODERN STENTORS 7 (1980); ERIC BARNOUW, A TOWER IN BABEL 68 (1966).

<sup>3</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 210-13 (1938).

<sup>4</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 200-01 (1938).

<sup>5</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 202 (1938).

<sup>6</sup> ERIC BARNOUW, A TOWER IN BABEL 97 (1966).

<sup>7</sup> SUSAN J. DOUGLAS, INVENTING AMERICAN BROADCASTING 1899-1922, 303-12 (1987).

<sup>8</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 252 (1938).

<sup>9</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 241 & Appendix 393 (1938); ERIC BARNOUW, A TOWER IN BABEL 91 (1966).

- Early 1922, RCA took over sale of receivers from Westinghouse.
- Jan 1, 1923, Sarnoff becomes RCA President<sup>12</sup>
- Westinghouse started more stations
  - WJZ – created by Westinghouse in Newark, NJ, Oct. 1921.<sup>13</sup> First full-time commercial broadcast station in NY?<sup>14</sup>
    - October 5, 1921 – first broadcasts were the World Series Yankees-Giants games.
    - AT&T refused to provide telephone lines for the broadcast.<sup>15</sup>
  - WBZ – October 1921 – Springfield, MA<sup>16</sup>
  - KYW – Chicago Nov. 11, 1921 – focused on opera<sup>17</sup>
- AT&T
  - WBAY - July 25, 1922 station goes on air<sup>18</sup>
  - August 16, moved WBAY to WEAJ
- Set sales
  - Waiting lists of 4-6 months for receivers.<sup>19</sup>
  - 1923 - \$136M spent on radio sets and parts, 1924 - \$358M.
  - With crystal sets you listened to the strongest signal.<sup>20</sup>
  - Autumn 1922, RCA-manufacturers deal.<sup>21</sup>
- Effort to create consumer electronics industry, big companies wanted to have programming as a means to sell equipment.

#### Corporate Agreements & Ownership

- 1921 patent pooling & cross-licensing agreement (executed only months before KDKA went on the air)
- RCA was GE (30%), Westinghouse (21%), AT&T (10%), United Fruit (4%), and Others (35%) in approximately mid-1921.<sup>22</sup>
  - By Jan. 18, 1923, AT&T has disposed of its stake in RCA.<sup>23</sup>
  - 1932 consent decree (DOJ) forced GE and Westinghouse to divest their RCA holdings.<sup>24</sup>
  - “It is interesting to note that whereas in the early days of broadcasting the government gave its blessing to the patent pool, later on this pool was condemned as a monopoly in restraint of trade.”<sup>25</sup>

<sup>10</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 219-20 (1938).

<sup>11</sup> CHRISTOPHER H. STERLING & JOHN MICHAEL KITROSS, STAY TUNED: A HISTORY OF AMERICAN BROADCASTING 68 (2002).

<sup>12</sup> Gleason?

<sup>13</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 217, 83-88 (1938).

<sup>14</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 217 (1938)???

<sup>15</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 279 (1938).

<sup>16</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 90 (1938).

<sup>17</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 88-90 (1938).

<sup>18</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 264-67 (1938).

<sup>19</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 251 (1938).

<sup>20</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 280 (1938).

<sup>21</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 280 (1938).

<sup>22</sup> ERIC BARNOUW, A TOWER IN BABEL 73 (1966).

<sup>23</sup> THOMAS PORTER ROBINSON, RADIO NETWORKS AND THE FEDERAL GOVERNMENT 8 (1943).

<sup>24</sup> THOMAS PORTER ROBINSON, RADIO NETWORKS AND THE FEDERAL GOVERNMENT 8 (1943).

- Sept. 9, 1926, NBC formed by RCA (50%), GE (30%), and Westinghouse (20%) – which provides the national programming.<sup>26</sup>

#### Patent usage, rights

- GE bought American Marconi assets, October-November 1919.<sup>27</sup>
- The 1920-1921 deal to pool the patents.<sup>28</sup>
  - Nov. 20, 1919: Cross-license GE-RCA.<sup>29</sup>
    - Text in Archer
  - July 1, 1920: GE-AT&T license agreement (w/ RCA in extension agreement)
    - AT&T grant reported in Archer,<sup>30</sup> GE grant not shown
    - Terms? Telephony & wireless
  - June 30, 1921: Westinghouse joined through agreements with GE & RCA, and AT&T
    - Terms:
      - Basically gave rights to the companies' traditional areas of business.
      - GE (60%) and Westinghouse (40%) given exclusive right to manufacture radio receivers<sup>31</sup>
      - RCA given exclusive right to sell the sets that GE and Westinghouse were manufacturing
      - AT&T got exclusive rights to make, lease & sell broadcasting transmitters<sup>32</sup>
  - Needed because of a stalemate.<sup>33</sup>
- The motivation behind the pooling agreements.<sup>34</sup>
  - Concern about the industry slowing down.
  - Navy concern about running afoul of patents.
  - AT&T's "primary desire . . . was to preserve its investment in telephone plant, and to extend its control over potentially competitive substitute and allied services." The pool, therefore, was structured such that "each party would remain in control of its primary fields of activity without threat from the others."<sup>35</sup>

#### AT&T entry & attempted monopoly<sup>36</sup>

- AT&T wants to get into broadcasting, but has to find a way to structure its business to make \$ using its patent rights through the pool

---

<sup>25</sup> THOMAS PORTER ROBINSON, RADIO NETWORKS AND THE FEDERAL GOVERNMENT 9 (1943).

<sup>26</sup> CHRISTOPHER H. STERLING & JOHN MICHAEL KITROSS, STAY TUNED: A HISTORY OF AMERICAN BROADCASTING 117 (2002).

<sup>27</sup> CHRISTOPHER H. STERLING & JOHN MICHAEL KITROSS, STAY TUNED: A HISTORY OF AMERICAN BROADCASTING 61 (2002).

<sup>28</sup> N. R. DANIELIAN, A.T.&T.: A STORY OF INDUSTRIAL CONQUEST 111-12 (1939).

<sup>29</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 185 (1938).

<sup>30</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 256 (1938).

<sup>31</sup> ERIC BARNOUW, A TOWER IN BABEL 81 (1966).

<sup>32</sup> Gleason? THOMAS PORTER ROBINSON, RADIO NETWORKS AND THE FEDERAL GOVERNMENT 8 (1943).

<sup>33</sup> GLEASON L. ARCHER, THE HISTORY OF RADIO TO 1926, 168 (1938).

<sup>34</sup> N. R. DANIELIAN, A.T.&T.: A STORY OF INDUSTRIAL CONQUEST 120 (1939).

<sup>35</sup> N. R. DANIELIAN, A.T.&T.: A STORY OF INDUSTRIAL CONQUEST 120 (1939).

<sup>36</sup> N. R. DANIELIAN, A.T.&T.: A STORY OF INDUSTRIAL CONQUEST 120- (1939).

- AT&T sets out to create a monopoly, but the public sentiment about monopoly shot down hopes of doing that.
- Lead to 1926 agreement where AT&T caved in the political pressure that gets them out of broadcasting. AT&T granted the radio companies access to the AT&T lines.
- The mantle of the toll venture passed to NBC. The term toll would now be quietly dropped from the vocabulary of radio.<sup>37</sup>
- Made NBC possible?
  - Red & Blue Networks<sup>38</sup>

#### Advertising, content, programs, copyright

- AT&T started advertising on radio.
  - AT&T asserted that its exclusive rights to make, lease & sell broadcasting transmitters (see patent pool) including the exclusive rights to sell on air advertising.<sup>39</sup>
- Sarnoff responded that radio should not be “debased by advertising but rather that it deserved endowment by wealthy individuals.”<sup>40</sup>
- Hoover was against advertising at first. “It was inconceivable that we should allow so great a possibility for service to be drowned in advertising chatter.”<sup>41</sup>
- Link between advertising & network/chain broadcasting
  - “It is axiomatic that advertising tries to reach more and more people.”<sup>42</sup>
  - In seeking larger markets, broadcasters could take two approaches – increase station power or network stations together.
  - “Radio advertising in the absence of unlimited power this made networks inevitable.”<sup>43</sup>
  - AT&T, because it claimed the exclusive right to broadcast sponsored programs, “took the lead in the development of network broadcasting.”<sup>44</sup>
  - AT&T also connected independently-owned stations to its network.<sup>45</sup>
  - AT&T / RCA advertising argument – RCA gave away air time in exchange for program sponsorship, AT&T asserted that RCA had no right to do this.<sup>46</sup>
- When did stations start selling time, as opposed to sponsorships

#### Spectrum (interference, allocations)

#### Dominance of larger stations

#### Competition, manufacturing technology, marketing, radio set sales

<sup>37</sup> ERIC BARNOUW, A TOWER IN BABEL 186 (1966).

<sup>38</sup> ERIC BARNOUW, A TOWER IN BABEL 191 (1966); THOMAS PORTER ROBINSON, RADIO NETWORKS AND THE FEDERAL GOVERNMENT 112-19 (1943).

<sup>39</sup> THOMAS PORTER ROBINSON, RADIO NETWORKS AND THE FEDERAL GOVERNMENT 13 (1943).

<sup>40</sup> PHILIP T. ROSEN, THE MODERN STENTORS 68 (1980).

<sup>41</sup> ERIC BARNOUW, A TOWER IN BABEL 96 (1966) (quoting Hoover’s Memoirs).

<sup>42</sup> THOMAS PORTER ROBINSON, RADIO NETWORKS AND THE FEDERAL GOVERNMENT 17 (1943).

<sup>43</sup> THOMAS PORTER ROBINSON, RADIO NETWORKS AND THE FEDERAL GOVERNMENT 18 (1943).

<sup>44</sup> THOMAS PORTER ROBINSON, RADIO NETWORKS AND THE FEDERAL GOVERNMENT 20 (1943).

<sup>45</sup> THOMAS PORTER ROBINSON, RADIO NETWORKS AND THE FEDERAL GOVERNMENT 20 (1943).

<sup>46</sup> ERIC BARNOUW, A TOWER IN BABEL 160 (1966).



Regulation (Hoover, Congress, 1927 Act, FRC, General Order 40, FCC, public interest)  
Industry wanted to be regulated, partly for interference reasons but also to consolidate their markets.

Network broadcasting (NBC, CBS, AT&T, Worldcom, Rates)  
The deal that got AT&T out of radio broadcasting.<sup>47</sup>

Public interest  
Theme of the myth of altruism, that radio should be guided by what the people wanted, has existed since the 1920s.<sup>48</sup>

---

<sup>47</sup> PHILIP T. ROSEN, THE MODERN STENTORS 89-90 (1980).

<sup>48</sup> SUSAN J. DOUGLAS, INVENTING AMERICAN BROADCASTING 1899-1922, 321 (1987).

# **Chapter Headings**

## *Introduction*

### ***Chaos, Competition, & Consolidation***

1. The Telephone & Theodore Vail
2. Communication Without Wires
3. World War I
4. Radio

### ***Monopoly Enthroned***

5. The 1934 Communications Act
6. The AT&T Monopoly
7. The Monopoly of the Three TV Networks

### ***Monopoly Undone***

8. The Gathering Storm
9. The Transformation of TV (OTP, Astra)
10. The Breakup of AT&T (OTP)

### ***A New Century***

11. Pipes and Wires
12. The Internet

## *Epilogue*

## *Introduction*

### ***Chaos, Competition, & Consolidation***

#### 1. The Telephone & Theodore Vail

Susan to supply

#### 2. Communication Without Wires

This section is about the invention and evolution of the wireless industry prior to the birth of radio broadcasting in the 1920s. The idea of communications through the “ether” without wires was mysterious and exciting. Guglielmo Marconi made the scientific experiments practical and established wireless telegraphy as a business. Technological progress was rapid, with multiple inventors and entrepreneurs contributing technologies that expanded usefulness from coastal ship-to-shore applications to transoceanic distances and locations where wires could not reach. The British Marconi Company<sup>1</sup> was the industry leader by (like AT&T) refusing to allow ships with its equipment to communicate with ships that used wireless sets sold by other companies. By WW I, General Electric and Westinghouse had developed or bought rights to improved technologies and were selling equipment to compete with Marconi. Wireless was telegraphy, but the vacuum tube made possible wireless transmission of voice. Apart from a few experiments, voice transmission was perceived to be a point-to-point application useful mainly for field operations or locations where telephone wires were not feasible. AT&T thought about using wireless voice to span the US when long distance wire transmission was difficult, but found it not to be useful in the telephone business. When WW I started, the importance of wireless for war efforts was quickly recognized and the government took over all US wireless activities. Wireless technology had developed dramatically, but its future in broadcasting was not perceived.

#### 3. World War I

This is a short section that pulls together telephone and wireless technologies to set the stage for the Radio and subsequent chapters. Key topics are: communications and national security; government takeover of wireless and telephone (telegraph?); government as promoter of expansion and standards; the patent suspension; the situation of the major companies following WW I; the patent agreements on the vacuum tube.

#### 4. Radio

This section describes the explosion of the radio broadcasting and radio manufacturing industries from KDKA in 1920 through the emergence of dominance of radio by the three national broadcast networks. The three main sections are: the simultaneous creation of the broadcasting and consumer electronics businesses by H. P. Davis and the growth of those industries in the 1920s, the development of federal government policy on public ownership of the airwaves by Herbert Hoover, and the emergence of advertising as the economic foundation of broadcasting

---

<sup>1</sup> As with Bell and AT&T, we need to adopt a simplified naming convention.

with a focus on William Paley. Key topics are: the nationwide excitement about radio; pioneering role of Westinghouse; RCA as sales arm for the “radio trust” of GE and Westinghouse; the competitive market for cheap radio sets; the simultaneous evolution of broadcasting, phonograph, & movies; AT&T’s effort to monopolize broadcasting and its powerful role in the movie business; radio chaos and competition; federal policy concerns; the FRC; the table of allocations; the inexorable rise of advertising; the dominance of content by the three networks.

### ***Monopoly Enthroned***

#### 5. The 1934 Communications Act

This is a short section describing the debate (or lack thereof) in enacting the 1934 Act that governed telecommunications, radio, and TV regulation for 40 years. It concludes the thread on the emergence of the telecommunications and broadcasting industries that initiated the electronic revolution, sets the stage for the next two chapters, and sketches the powerful role of the FCC.

#### 6. The AT&T Monopoly

This section traces the continuing growth and dominance of AT&T into the 1970s. Key points are: the stability of continuing centralized management; the consolidation of state and federal regulatory roles; economic power; World War II and integration with the Defense Department; the development of microwave and other new technologies; cross-subsidization of local and long distance services; political and economic power; and continuing antitrust concerns.

#### 7. The Monopoly of the Three TV Networks

This section sketches the growth of network radio in the 1930s and 1940s, the continuation of the business and regulatory model of three networks into TV, and the solidification of government control over content. Key points are: the power of the three radio networks over local stations; the power of network radio advertising; the table of allocations extended into TV; the production, networking, and startup costs of TV broadcasting; efforts at competition including Dumont, FM, and UHF; color; content regulation instead of antitrust; the public acceptance of its inevitability.

### ***Monopoly Undone***

#### 8. The Gathering Storm

This is a short section on the accumulation of technologies following WW II and the emergence of real demand for alternative services in telecommunications and TV. Key points are microwave; cross-subsidization; Intelsat; computer centers and data communications; cable TV; satellites;

## 9. The Transformation of TV (OTP, Astra)<sup>2</sup>

This section goes into how microwave, cable, and satellites undermined the economics of the three-network dominance of television. It deals at length with the OTP role. Another organizational scheme would have a separate chapter on OTP after chapters 9 & 10.

## 10. The Breakup of AT&T (OTP)

This section deals with MCI, Datran, cellular, etc, and the failure of the FCC model leading to the breakup of AT&T. key points are: Carterphone, fax, etc; MCI & McGowan with Topol and Milken; Datran and Wiley; domestic satellite competition as model for competition coexisting with monopoly; failure of FCC specialized carrier policy; OTP & DoJ join forces; the long proceeding; the breakup; the explosion of fiber & digital electronics; Arpanet and internet; 1996 Telecommunications Act & failed FCC policy for enforced competition.

## *A New Century*

### 11. Pipes and Wires

This is a short chapter on how fiber pipes, satellites, cables, wires, and wireless spectrum have become the basis for a competitive infrastructure where all kinds of content (telephone, TV, video, audio, text, internet) rides.

### 12. The Internet

This is a short chapter on the emergence of the internet as a content vehicle. Key points are: multiple paths for content from multiple sources to multiple users, so control of wires no longer confers power over content; electronic media content now no different economically than print from First Amendment perspective.

## *Epilogue*

Competition works. The regulatory structures of the Twentieth Century should be scrapped and the Twenty-First Century should be a century free of government direction of pipes and content.

---

<sup>2</sup> [Of particular interest to the development of the early policy narrative at OTP would be Mr. Whitehead's remarks at George Mason University School of Law, March 23, 2004, as listed in Bibliography I. Mr. Whitehead intended to write *Chapters 9 and 10* in the first voice.]