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OF  
THE 1911 GENERAL ELECTRIC LAMP CASE

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by

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The views expressed in this paper are those of the author and therefore do not necessarily reflect the position of the Federal Trade Commission.

## I. INTRODUCTION

The General Electric case of 1911 is an example of a lost opportunity to increase competition because the Justice Department and the Court failed to decrease real concentration in the electric lamp industry.<sup>1</sup> As a result of the case, General Electric, the largest firm in the industry, was actually merged with National Lamp, the second-largest in which the former had an interest. It is very possible that had this merger not taken place and had National Lamp become an independent firm, the lamp industry would have been more competitive.

This paper will explore this question by analyzing the case and discussing its long-term effects. In section II the development of the lamp industry is briefly recounted; section III describes the case, and section IV essentially demonstrates that National Lamp could have become a competitive force in the market had it not been merged with General Electric. Finally, the conclusion discusses the long-term effects of the case.

## II. THE LAMP INDUSTRY

General Electric's dominance of the electric lamp industry actually did not originate with the patent of its leading founder, Thomas Edison (1881). More important were a series of patents from the company's laboratories relating to the use of tungsten as

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<sup>1</sup> See U.S. v. General Electric Co. et al. (1911), 1 D & J 267. Here the term "lamp" refers to the item popularly called a light bulb. "Lamp" is the industry term for light bulb.

a filament material (see Bright 1974, pp. 183-98). In 1909, General Electric obtained the Just and Hannaman patent on using tungsten as a filament, and by 1911 one of its employees, W. O. Coolidge, made such a lamp practical by developing ductile tungsten. This effort gave General Electric a superior product and helped to consolidate its control of the market.

Another important factor was the 1911 consent decree that allowed and even forced the firm to merge with National Lamp, the second-largest firm in the industry. To see how this happened, we need to examine conditions prior to these developments. In the period after the original lamp patents expired in 1894, many firms entered the market, because while total production increased, manufacturing techniques remained of the handicraft variety. These techniques required skilled workers to blow the glass bulb sleeves<sup>1</sup> and place the mounts and bases on the lamps by hand.<sup>2</sup> Consequently, small firms could compete with General Electric and Westinghouse, the two largest producers, because the latter enjoyed no scale advantages in production.

On the other hand, these firms soon encountered disadvantages of another kind. Due to widespread experimentation and changes in

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<sup>1</sup> A number of terms have been used to refer to the glass bulb part of the lamp. "Bulb sleeve" seems to be as descriptive as any of the alternatives.

<sup>2</sup> The mount consists of the part of the lamp that supports the filament and the wires connecting the filament with the source of electricity. The base is the metal part of the lamp that is inserted or screwed into the fixture.

marketing, research, and financing, the small firms found that their operations incurred high overhead cost. To solve this problem, several of them banded together into a larger organization, called the National Lamp Company, in 1901. Each firm continued to operate its plant separately, but the group pooled the costs of various research, engineering, and marketing functions. To set up the research and engineering facilities, the firms needed financing. This problem was solved when General Electric purchased the majority of the stock in the company. Although General Electric was not active in the management of National Lamp, it granted licenses to National and other firms for many of its patents and technologies.

### III. THE 1911 GENERAL ELECTRIC CASE

In the first decade of this century, the Justice Department investigated several highly concentrated industries where publicity had been focused on the practices of the largest firms; among these industries were steel, petroleum, tobacco, and electric lamps. The focus of these cases was on these various trade practices and the high market share of one firm or one group of related firms. Three of these cases were decided in 1911, petroleum and tobacco by the Supreme Court and lamps by a consent degree. The first two cases resulted in extensive divestiture by

the largest firms. Ironically, the lamps case had an opposite effect; the two largest firms were merged.<sup>1</sup>

Because of this action, the case failed to have a significant long-term procompetitive impact. The case, however, has not been discussed much in the literature.<sup>2</sup> The Government's charges were numerous:

. . . The subsidiary relation of National to General Electric, notwithstanding which it was represented to the public as a competing organization, was impugned by the government. The price-fixing and market-sharing agreements with Westinghouse, with National, with the members of the Incandescent Lamp Manufacturers Association, and with other lamp producers were attacked as restraining trade. The pyramiding of patents on improvements in machinery and production processes as well as on detail improvements in lamp design and on improvements in filament materials was alleged to maintain for General Electric and its group a substantial monopoly of the carbon-filament lamp after the basic patent on it had expired. It was also charged that the acquisition of patents by General Electric and National was illegally suppressing competition in tantalum and tungsten lamps. In addition, the dealer contracts tying the distribution of carbon lamps to the new metallic-filament lamps were attacked. The practice of requiring prices fixed by General Electric to be maintained to the retail level for both carbon and metal-filament lamps was also complained of as a restraint of trade, as were the preferential agreements which had been made with the glass, base, and machinery manufacturers (Bright 1949, pp. 156-57).

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<sup>1</sup> See U.S. v. General Electric Co. et al. (1911), 1 D & J 267.

<sup>2</sup> One authority simply states that "the 1911 antitrust action did not significantly change the situation in the American lamp industry" (Bright 1949, p. 159).

Even though the companies were prepared to defend themselves in court, they eventually entered into a consent decree. It enjoined General Electric and the other firms from the following practices: exclusive dealing arrangements with machinery makers, fixing retail and wholesale prices, allowing price differences not based on quality, tying agreements for different types of lamps, tying agreements on discounts and patents, predatory price discrimination, and resale price maintenance.

The decree did little to lessen General Electric's patent control of the metal-filament lamps. A. A. Bright states:

. . . Moreover, the decree expressly stated that patent licenses might specify any prices, terms, and conditions of sale desired, although they could not fix resale prices. That permission left an enormous opening for continued control over the incandescent-lamp industry by General Electric, and the industry leader took full advantage of it in later years. Since the GEM, tantalum, and tungsten lamps were rapidly replacing the ordinary carbon lamp, an open market for carbon lamps was not of much importance . . . . (Bright 1949, p. 158).

Consequently, General Electric was to continue its dominance of the industry through control of the tungsten lamp.

The provision that may have had the most impact upon the future of the lamp industry directed General Electric to incorporate the National Lamp Company into its lamp division. On the face of it, the decision not only perpetuated but also strengthened an already anticompetitive situation.

The logical course would have been to have General Electric divest itself of its interests in National Lamp, but the

Government contended that General Electric "had combined and conspired to restrain commerce by concealed stock ownership of bogus independent companies. . . ." (Commerce Clearing House, Inc. 1952, p. 86).<sup>1</sup> General Electric and National Lamp often conspired to fix prices, and a spirit of cooperation existed between them. There is evidence, however, that National Lamp would have been able to survive in open competition with General Electric. Therefore, by ordering the merger the Government not only increased the nominal concentration level in the lamp industry but also passed up a chance to increase competition. The Herfindahl index was increased from 3390 to 6590. As shown in table 1 for concentration figures, the market share of the largest firm rose from 40 to 80 percent.

#### IV. EVIDENCE ON THE EFFECT OF THE CASE

It is very likely that National Lamp could have been a viable independent firm if the Justice Department had ordered General Electric to spin off its holdings. To assess this problem, the resources held by National Lamp in 1911 will be analyzed. These resources were of three types: management personnel, physical plants, and claims on patent and research assets.

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<sup>1</sup> This writer examined the available Justice Department files on the case, but any material that could shed further light on the thinking and motivation of the Department on this case was either destroyed or lost.



Table I.--Market-share breakdown in the U.S. electric-lamp industry as of 1910 and 1912  
 (before and after the 1911 General Electric case)

<u>Company</u>	<u>Market share</u> (percent)	
	<u>before (1910)</u>	<u>after (1912)</u>
General Electric	42	80
National Lamp Company	38	--
Westinghouse	13	13
Other General Electric-National licensees	4	4
Independent lamp firms	3	3

Source: Bright (1949), p. 151.

That the management personnel at National Lamp were good can be seen from the fact that General Electric allowed the National management to operate as a separate division until 1926. Also, when the divisions were consolidated, National personnel were picked to head the lamp division. The founders of National Lamp, F. S. Terry and B. G. Termaine, remained in control of the National Lamp Division under General Electric tutelage until the consolidation of the two divisions in 1926. Terry closed his career as a General Electric vice president and Termaine as a member of the Board of Directors. After consolidation, the first two managers of that division, T. W. French (1926-34) and Joseph E. Kernley (1934-45), were former National Lamp personnel. Apparently, National Lamp had such good management that General Electric ran it as a unit until 1926, and even after it was consolidated into the General Electric Lamp Division, its managers continued to be very influential.

The major physical resources held by National Lamp in 1911 were the Nela Park Headquarters and Laboratory, its lamp plants, and the Providence Gas Burner Company. Since the last of these was the principal (if not the only) maker of lamp bases in the country, the control that National had on the supply of bases would have provided it with substantial bargaining power in negotiations for licenses on General Electric patents. The lamp plants were important assets as well. General Electric continued to use many of the National Lamp plants for years after the consolidation, and two of them are still in operation. In 1926,

the General Electric Lamp Division chose the Nela Park site in Cleveland, originally built by National Lamp, as the location for its own headquarters.

National Lamp's research and patent position in 1911 was not weak. National Lamp had a 40-percent interest in the Just and Hannaman patent on the tungsten-filament lamp, and while W. O. Coolidge was developing ductile tungsten in the General Electric laboratory, T. W. French and others at National Lamp were also working on drawn-tungsten wire (see Keating 1954, p. 81). It was at about the time of the decree that the Coolidge work succeeded. At least one of the people who subsequently developed the General Electric research and patent position was originally a National employee. He was Aladar Pacz, the inventor of nonsag tungsten filaments. While at National Lamp in 1906, he developed a tungsten filament suitable for use in physically small miniature lamps.<sup>1</sup> With the Nela Park Laboratory National Lamp would have been in a good bargaining position for General Electric patents.

Although General Electric's patent position was apparently stronger than National Lamp's, it still might have been in General Electric's interest to grant National Lamp licenses for various patents. Because other firms often have lower production costs, a patentee may choose to license other firms as a means of maximizing its own income (see Posner 1974, pp. 286-88). The fact that

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<sup>1</sup> A miniature lamp is a lamp that operates from a less-than-16-volt circuit regardless of physical size. Examples are flashlights and automobile headlights.

General Electric licensed its lamp patents to Westinghouse and a number of other firms lends credence to the assertion that it would have licensed an independent National Lamp.

Even if National Lamp had been viable, the General Electric lamp division would probably not have become merely a research and licensing agency, leaving the manufacturing to National and the other firms. The General Electric organization was strong not only in research and development personnel, but also in production engineers. Notable among them were J. W. Howell and W. R. Burrows. Howell developed a machine to make an airtight seal for the lamp. In 1901, Howell and Burrows invented a special machine to make mounts. From 1910 and 1920, Burrows developed the unit or machine-group system of manufacturing at the General Electric Harrison Lamp Plant in New Jersey.<sup>1</sup> He increased productivity from 9.5 lamps per man-hour to 18. Burrows' machine-group system alone would have kept General Electric a viable competitor in the manufacture of lamps. And there were other such people. So General Electric would very likely have continued as a lamp manufacturer even if an independent National Lamp had been instituted.

## V. CONCLUSION

The contention of this paper is that National Lamp might have become a viable competitor to General Electric and Westinghouse, and that the Court could have lessened concentration by having

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<sup>1</sup> See Rogers 1980, pp. 22-23, for a description of this system.

General Electric divest its interests in National Lamp. Whether this would have increased competition cannot be known with certainty, but it is possible that after the various patents had expired, four rather than three large wide-line lamp competitors would have emerged. It does seem ironic that in the year 1911, when the judicial system broke up the Standard Oil and tobacco trusts, it not only sanctioned but even ordered the merger of the two largest firms in the lamp industry.

Since 1911, the electric lamp industry has remained concentrated (the four firm ratio being 87 in 1972 and 89 in 1977).<sup>1</sup> Three subsequent antitrust cases have attacked such practices as patent license pooling (1926 and 1949) and the consignment system for wholesalers and retailers (1926, 1949, and 1973).<sup>2</sup> Apparently none of these cases lessened concentration, but they may have improved industry performance by enjoining practices that could facilitate collusion. On the other hand, National Lamp might have lessened General Electric dominance to point where the cases may not have been necessary. The more participants there are, the more difficult it is to set up any collusive scheme. Even if the presence of National Lamp would not have prevented the earlier collusive schemes, the remedies in the above cases might have been

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<sup>1</sup> It seems doubtful that economic of scale account for the recent concentration ratios (see Rogers 1980, pp. 64-93).

<sup>2</sup> See U.S. v. General Electric Co., U.S. 476 (1926); U.S. v. General Electric Co. et al., 82 F. Supp. 753 (1949); and U.S. v. General Electric Co., 1973 Trade Cases 1974 (New York: Commerce Clearing House, Inc., 1974), p. 74942.

more effective because the greater number of firms would have made any subsequent collusive activity more difficult. Certainly the 1911 case attenuated both tendencies by eliminating at least a potential independent actor.

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