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**Title: Made in the USA: Technological Corporatism, Infrastructure
Regulation, and DuPont 1902-1917**

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The turn of the twentieth century radically renewed industrial organization across the United States. Early American corporations -- centralized manufacturing hubs with journeymen and apprentices laboring under one roof -- were seldom prepared for the transformations that scientific management and structural reorganization would bring to social relations. At the helm of World War 1, DuPont became the epitome of broader national restructuring. Through a close relationship with American military industries and legislatures, the DuPont brothers came to represent Business as an inseparable component of the State. While labor historiography has primarily focused on organizers' relationship with regulators, important segments of its inverse - the relationship between Industry and lawmakers -- have been ignored. In the history of DuPont's growth lies the story of American labor's disintegration and the organized dismantling of the civil rights campaigns. The reasons for the supposed failure of American workers to build a mass socialist party cannot be discovered in the structures of accumulation or labor markets alone, but in the insinuation of industrial change into the total sphere of American life. This paper dissects the evolution of DuPont along with American labor. The important question is why and how a corporate-state came to possess such a pervasive and socially dominant nature. DuPont is the ideal case study to analyze how capitalism transformed and joined American politicians in suppressing labor movements, writing policy, and engineering social attitudes between 1902 and 1917.

DuPont and New Corporatism

In the late 19th century, railroads simultaneously transformed the geography of the American frontier and its organizational potential. Thirty years after the transportation revolution, DuPont drew on their corporate developments to build an organizational behemoth

that would inspire the majority of big business throughout the 20th century. The corporate managers who took over DuPont in 1902 entered a family business that had previously been operated through a loose network of firms, with a central figure delegating responsibilities to all factory employees. Upon restructuring, DuPont integrated ideas of scientific management into their bureaucratic organization. Vertical integration pushed for the development of an administrative middle-class, new accounting methods, and further segmented labor markets. With these innovations, the visible hand of management replaced the invisible hand of markets in regulating economic activity.

Most economic activity throughout America's 19th century rested corporate control in a quintessential patriarch. After narrowly escaping the guillotine during the Reign of Terror, Pierre Samuel du Pont and his son, Eleuthere Irenee du Pont moved to the United States.¹ Eleuthere, disappointed with the quality of gunpowder in the new country, decided to start a gunpowder mill near the Brandywine, in Delaware.² E.I. Du Pont De Nemours Gunpowder was incorporated in 1802; a year later, Eleuthere fulfilled his first government contract.³ Once a president of DuPont died, the firm would be passed down to the most competent descendant. Constant succession struggles throughout the 19th century made sure that the firm would continue operating as a family business; the company would continue to run under this model for almost 100 years.⁴

Workers played an integral role in the organization and operation of the firm throughout its early existence. All of the early mills were operated via a coordinated labor effort. In 1804,

¹ William H. A. Carr, *The DuPonts of Delaware*. New York, NY: Dodd, Mead & Company, 1964, 23.

² Ibid., 56.

³ Ibid., 68.

⁴ Gerard Colby Zilg, *Du Pont: Behind the Nylon Curtain*. Englewood Cliffs, NJ: Prentice-Hall International, Inc., 1974, 91.

two foremen appointed by Eleuthere oversaw the production of 44,000 pounds of black gunpowder.⁵ Since all DuPont employees lived and worked in a company town, the workers were closely tied to their employer. When a typhoid epidemic broke out among children of du Pont powder men in 1865, the president hired two physicians to care for the children and silenced the powder yard whistle, so they could sleep better.⁶ The number of salaried managers to oversee workers on the mill remained small. Owners managed and the managers owned. This relationship would remain until the 20th century.

In the 1870s, the new administration of railroads would create serious changes in business organization. The railroad industry was the first to be administered through extensive hierarchies and the first to compete in a modern oligopolistic manner. Nearly all American railroads were single-track lines, continuously delivering goods throughout the country. To assure fast, regular, and carefully scheduled movement of a wide variety of goods shipped from hundreds of locations, railroad managers designed a line-and-staff system of administration. The managers responsible for the movement of trains were the line officers, acting on the line of authority running from the president to the general manager, to the general superintendent, to the division superintendent.⁷ To prevent what railroad managers saw as ruinous competition, the largest firm formed regional federations such as the Southern Railway & Steamship Association in 1875, and the Eastern Trunk Line Association, in 1877.⁸ The cartels started to pool and divide profits according to an agreed upon ratio. These particular changes served as a blueprint for the business that followed.

⁵ Ibid., 75.

⁶ Carr, *The Du Ponts of Delaware*, 207.

⁷ Richard C. Edwards, *Contested Terrain: the Transformation of the Workplace in the Twentieth Century*. New York, NY: Basic Books, 1996, 58.

⁸ Ibid., 61.

DuPont implemented old forms of organization and developed new forms of control after a long succession fight in 1902. Since Eugene du Pont became president of the firm in 1889, the company was authoritatively organized around two horizontal combinations: the Gunpowder Trade Association and the Eastern Dynamite Company.⁹ All of the major chemical companies -- Du Pont, Laflin & Rand, and Hazard -- owned stock in the organization but did not oversee its cumulative production.¹⁰ After Eugene du Pont died from pneumonia in 1902, three du Pont cousins -- Coleman, Alfred, and Pierre -- bought the firm for \$15,360,000 in notes and stock options.¹¹ Alfred and Coleman were trained engineers who managed the Johnson and Lorain Steel company that built steel track and electric-powered equipment for street railways; they adopted the most advanced administrative practices on the railroads and quickly integrated the firm.¹² The three cousins, provoked by advances of scientific management, utilized new cost and control systems to constantly run mills at full capacity. Under their leadership, DuPont became the first modern corporation in the United States.

The cousins combined DuPont's loose network of small firms under one corporate roof. Alfred du Pont decided that buying competitors was too costly and requires the purchase of too much unused plant capacity. So in 1903, DuPont merged the Gunpowder Trade Association and the Eastern Dynamite Company.¹³ The aim was to run the workers at maximum capacity and achieve unit costs that industry competitors could not match. The merged firms required an updated form of organization and control.

⁹ Alfred Dupont Chandler, *The Visible Hand: the Managerial Revolution in American Business*. Cambridge, MA: The Belknap Press, 2002, 417

¹⁰ Ibid., 417

¹¹ Carr, *The Du Ponts of Delaware*, 228.

¹² Chandler, *The Visible Hand*, 417

¹³ Ibid., 441.

The advent of scientific management offered DuPont new ways to organize gunpowder production around a system of managerial control. In the 1890's, a young inventor and manager, Frederick Winslow Taylor became a successful proponent of management derived out of "science", rather than personal relationships.¹⁴ He diagnosed that the main problem of production was "soldiering", meaning the workers chose to produce less than their maximum capacity.¹⁵ Taylor attempted to compute the optimal time for industrial tasks by analyzing and timing every action a worker performs inside a factory.¹⁶ Systematic management was a rebellion against tradition, empiricism, and the assumption that common sense, personal relationships, and craft knowledge were sufficient to run a factory. The revisionists' answer was to replace traditional managers with engineers and to substitute managerial systems for ad hoc evaluations. In 1901, Taylor argued that "What constituted a fair day's work will be a question for scientific investigation instead of a subject to be bargained and haggled over."¹⁷ While the new ideology seldom had an effect on actual management, it changed the understanding of how corporate resources can be applied to control all problems in a systematic way. DuPont managers had drawn up a list of necessary lessons: control must come from a hierarchical structure, it must be concerned with work itself, there must be positive rewards for proper work, and management itself must be subject to systematic control.¹⁸

DuPont set up new administrative departments to coordinate production throughout all of the newly merged firms. More than one hundred firms were now run through three "operating

¹⁴ Naomi R. Lamoreaux, *Coordination and Information: Historical Perspectives on the Organization of Enterprise*. Chicago, IL: University of Chicago Press, 1995, 36.

¹⁵ Edwards, *Contested Terrain*, 95.

¹⁶ Lamoreaux, *Coordination and Information*, 37.

¹⁷ Edwards, *Contested Terrain*, 90.

¹⁸ *Ibid.*, 110.

departments”: black powder, smokeless powder, and high explosives.¹⁹ The firm set up management headquarters along major product lines. Each department had their own vice presidents, directors, staff, as well as control and accounting personnel.²⁰ Central offices sharpened the distinction between ownership and management. The new managerial staff had no stake in the firm and rarely visited any mills; they concerned themselves primarily with improving worker efficiency.²¹ This focus on scientific management expanded the size of white-collar workers, drawing an imaginary line between factory employees and nonproduction labor.²² The expansion of nonproduction labor made workers a significant component of the firm’s cost. Updated methods of productivity-accounting had to be developed under the auspice of scientific management.

In 1903, Pierre du Pont pioneered a new method of industrial accounting that focused on the rate of return on capital invested. Prior to the 20th century, most firms utilized renewal accounting: earnings are calculated as a percentage of sales or costs.²³ Pierre argued that this criterion was incomplete because it fails to indicate the rate of return on capital invested. Under renewal accounting, a firm with low fixed costs and 10% profit would show higher return than a commodity sold at double its cost in an expensive plant. Pierre changed this tradition by calculating indirect costs of managers, foremen, and inspectors.²⁴ The accounting method reflected the intensity of resources used rather than what they produced. Under the new model, if costs can be kept constant, the rate of return on capital increased with throughput.

¹⁹ Chandler, *The Visible Hand*, 443.

²⁰ *Ibid.*, 444.

²¹ *Ibid.*, 445.

²² Edwards, *Contested Terrain*, 89.

²³ Chandler, *The Visible Hand*, 445.

²⁴ *Ibid.*, 445

The updated organizational structure and increased capacity made DuPont the most efficiently and effectively managed firm in the world. A managerial bureaucracy and accounting focused on return on capital increased DuPont's pace of accumulation. Within a generation, DuPont's managerial style became standard for the administration of all large-scale enterprises.²⁵ It allowed them to "efficiently" monitor production and distribute goods. The extra profits would be reinvested in competing firms, and by 1911, DuPont owned the majority of the gunpowder business. As the du Pont cousins expanded their rate of production and centralization, a vibrant antitrust movement would turn the firm's attention onto the national political sphere. This is where the knot between capital and government would be tied.

Corporate America

From 1907 to 1918, the du Ponts would come to accept that the fate of their firm relied on public opinion and national politics. The relationship between capitalists and regulators has been altered by the capitalist's dependence upon state regulation and economic stimulation. The antitrust lawsuit filed against the firm would precipitate a staunch legal battle that would dissolve a large portion of the enterprise. Simultaneously, World War I offered concrete proof of the government's ability to sustain and grow domestic industry. DuPont would work diligently to make sure the government's interests aligned with yearly profits. The historical association between capitalism and democracy cannot be presumed to persist automatically. The du Pont cousins became the most aggressive supporters of labor suppression, labor segmentation, and social engineering.

²⁵ Zilg, *Du Pont*, 125.

DuPont's first major corporate struggle against the government came as an antitrust suit. In 1907, the Justice Department filed the first of a long series of antitrust suits against the DuPont Company. This legal action was initiated by the Justice Department at the urging of the Buckeye Powder Company.²⁶ Until then, the federal government had not interfered with DuPont's formidable market control. Despite DuPont pleading guilty to suppressing competition, the firm was allowed to keep its monopoly on military munition. During the court hearings, various high ranking military officials took stand in defending DuPont. The Chief of Navy Ordnance, the chief of Army Ordnance, and a number of other generals testified that DuPont's monopoly on smokeless military powder was vital to national security.²⁷ Since the court could not reverse the vertical integration of over sixty corporations, the judge asked DuPont to come up with its own dissolution plan. The guilty were deciding their own punishment. In the end, the firm was split up into three separate firms: DuPont, Atlas, and Hercules.²⁸ At each stage of the case, DuPont sought to reduce sources of material and symbolic uncertainty imposed by the State. The corporate lesson was simple: if the government wasn't actively supportive, it was hampering corporate performance.

World War I brought DuPont's corporate interests in line with governmental objectives. When war began in 1914, the federal government became incapable of producing sufficient quantities of munition on its own. To make up the deficit, the military relied heavily on DuPont as its chief supplier of explosives.²⁹ Before 1914, the Allies contracted DuPont for a total of 15,600,000 pounds of smokeless powder. Ten weeks later, the orders increased by over three

²⁶ Ibid., 126.

²⁷ Carr, *The Du Ponts of Delaware*, 224.

²⁸ Ibid., 243.

²⁹ Zilg, *Du Pont*, 158.

hundred and fifty percent.³⁰ Only DuPont, with a hyper integrated supply chain could fulfill the demand. The financial success from the war came with a halcyonic turn in public opinion.

The war provided a patriotic atmosphere within which DuPont could portray its competition as traitorous. In 1915, Coleman du Pont established the infamous National Security League to promote America's entry into the war.³¹ The league published vicious attacks on congressmen who opposed entering the slaughter. Labor movements were similarly portrayed as harmful to the war effort. Additional national interest forums like the National Civil Federation brought labor leaders into a "responsible" relation with corporations, sometimes forcing cooperation at literal gunpoint. The American Federation of Labor was forced to proclaim a ban on strikes for the duration of the war.³² Thus, the burden of suppressing labor shifted from individual employers to agencies of the federal government. The war produced two effects of lasting importance. First, DuPont established a secure position in the chemical industry. And second, class conflict pushed corporations to link personal interests more closely to state power.

In general, DuPont went to great lengths in forcibly shaping class interests. A large percentage of the American workforce were immigrants, making up an important pool of cheap labor for industrial production. So when Coleman du Pont funded the American Association of Foreign Language Newspapers, which acquired 400 foreign-language newspapers, the main goal was promotion of "Americanism."³³ The du Pont family also focused on breeding positive business sentiment within the American born population. Coleman became the leading force in creating the Boy Scouts of America. Early scout law required unyielding allegiance "to the

³⁰ Carr, *The Du Ponts of Delaware*, 285.

³¹ Zilg, *Du Pont*, 152.

³² Edwards, *Contested Terrain*, 65.

³³ Zilg, *Du Pont*, 169.

President, and to his officers, and to his parents, his country, and his employer.”³⁴ To Coleman, Americanism was capitalism and capitalism was DuPont.

Conclusion

Structural control and government collusion turned the conflict within the firm decisively in DuPont’s favor. The early bond solidified during World War I shifted much of the corporate struggle towards politics. When the working poor operated in the political arena to struggle for their survival, they confronted capital. The structure of capital accumulation and breadth of political resources has ensured that democratic rule is consistent with capitalist hegemony. As the accumulation process expanded on global and scientific dimensions, the prospects for successful accumulation became increasingly dependent on state support. As the antitrust movements have demonstrated, controlling the state has become both more essential and more precarious than ever.

History of DuPont’s modernization can serve both to understand and challenge labor suppression across the country. It was primarily through a concerted division of administrative labor that corporatization came on to take a distinctly American flavor. Eventually, global wars became the stimulus that brought monopoly leaders out of courtrooms and into war rooms, becoming both the cause and the profiteer of international slaughter. American corporations as we know them came to be on the backs of labor unions, soldiers, and pliant politicians. A serious project of social reform is required to make sure the mistakes of the early 20th century are not repeated.

³⁴ Ibid., 169.

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