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“We want aluminium, not excuses!” Business-Government relations in the American aluminium industry, 1917-1958

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Introduction

Sun Tzu's classic military treatise, the Art of War, sternly warns kings, generals and other assorted policymakers that "If you expose the army to prolonged campaign, the state's resources will be inadequate".[1] Two and a half thousand years later, the modern state's attempt to gain control over raw materials that are vital for its war-making capabilities have received little attention from modern historians. The advent of modern industrialized warfare and strategic air power during and after the First World War turned the question of a steady supply of aluminium into one of the determinants of military capabilities for the next half century. This paper argues that this concern with aluminium as a strategic resource, rather than anti-trust, was the most important factor in the relationship between the American government and the domestic aluminium industry in the decades following the First World War.

The business-government relationship in the American aluminium industry is usually seen through the lens of the American government's efforts to break up the monopoly of the Aluminum Company of America (Alcoa).[2] The company came under scrutiny as early as 1911, during an intensive period of American trust-busting. Despite continuous attention from the Justice Department and the Federal Trade Commission over the next couple of decades, as well as several rulings against the company in the courts, Alcoa avoided the fate of American Tobacco and Standard Oil. Today the *United States v Alcoa* anti-trust suit that began in 1937 and lasted until 1957 stands as a towering landmark in American legal and business history. Unfortunately this high-profile anti-trust case tends to overshadow the profound importance of other factors that shaped the business-government relationship during this period. Instead of the hostility one would expect between a vertically integrated monopolist and an American government with an affinity for trust-busting, the government's need for aluminium laid the foundation for a close working relationship during the major wars over five decades. Alcoa promised not only to supply the Government with all the aluminium it needed, it would also help to plan for requirements and consumption of aluminium. This in turn gave Alcoa significant influence over the preferences of its largest customer, as well as some protection against the most stalwart anti-trust advocates. In the end, it was the company's failure to deliver the aluminium that was required for the war production programs that cost it its monopoly, not the anti-trust suit. Faced with shortages of this vitally important material, the government intervened by setting itself up as the largest producer of aluminium during the Second World War, thereafter using the spoils to set up the Reynolds Metals Company and Kaiser Aluminum as competitors for Alcoa. While the company was discredited by its abysmal performance in the

[1] Sun Tzu – The Art of War, Running Press London 2003:p.20

[2] George David Smith – From Monopoly to Competition; The Transformations of Alcoa, 1988-1986, Cambridge University Press 1988:p.60

early years of the Second World War, it was nevertheless invited back into the fold after the outbreak of the Korean War. This gave the company access generous subsidies to participate in the very same government expansion programs that brought competition into the American aluminium industry.

Aluminium as a strategic material

There are a number of factors that can make turn an ordinary commodity into a strategic material. David Haglund and John Kraft both highlight the demand side. For them raw materials chiefly become strategic for two reasons, either if they have essential military uses or if they are important for the orderly functioning of the economy as a whole. [3] The standard treatise on strategic materials, written by G.A Roush on the eve of the Second World War, stresses the supply side. In order for a material to be classified as a strategic, Roush emphasizes that the sources must be also considered to be vulnerable. [4] Later analysts have attempted to make construct more advanced models for the designation of strategic materials, including factors such as political risk, shipping losses, number of available sources and possibilities for substitution. [5] The numbers and types of factors that are considered, as well as the underlying perceptions of risk and vulnerability vary over time. But for our purposes it is sufficient to establish that aluminium was in demand both as a basic industrial metal and for purely military needs. The American government also experienced supply shortages that made it acutely aware of its vulnerability, thereby forcing it to intervene to secure its own requirements of aluminium.

Depending on the characteristics of the individual material, there are a number of policy tools available to implement a strategic materials policy. One of the most obvious alternatives is establish a stockpile of strategic materials that can be used to cover supply shortages in case of war or another emergency. The stockpile will then provide a buffer that can be drawn upon until a satisfactory supply situation can be re-established through military conquest or the development of

[3] John Kraft – Strategic Minerals and World Stability, in Gerald Mangone(ed) – American Strategic Minerals, Crane Russak, New York, 1984 pp1- 28 :p.1, David Haglund – "Canadian Strategic Materials and U.S Military Potential" in David Haglund, (ed) – The New Geopolitics of Minerals, University of British Colombia Press, Vancouver 1989, 159-188: p.161

[4] G.A Roush– Strategic Mineral supplies, McGraw-Hill Book Company, New York 1939: p.4

[5] For more detailed discussion of how the American armed forces calculate their requirements and the objectives for stockpiling of strategic materials, see Harry Yoshpe - Requirements: Matching Needs With Resources, Industrial College of the Armed Forces, Washington DC 1964:p. 99-113. For more recent attempts to discuss how the United States should deal with shortages, as well as models using a long list of criteria to determine whether a material is strategic, see Bohdan Szuprowicz – How to Avoid strategic Materials Shortages, John Wiley & Sons, New York 1981; Harold Bullis & James E. Mielke – Strategic and Critical Materials, Westview Press, Boulder 1985; Emery N Castle and Kent A. Price(ed) – U.S. Interests & Global Natural Resources; Energy, Minerals , Food, Resources for the future, Inc, Washington D.C, 1983 and finally, Rocco Paone - Strategic nonfuel minerals and western security, University Press of America, Lanham 1992

new sources of supply. Government support for research is also an important tool, as substitution or utilization of lower grade ores may reduce the deficit. Another option is to stimulate exploration and establishment of new production facilities through the use of subsidies, or to protect the existing industry through the use of tariffs. Usually these strategies are employed in combination. While some have argued that the designation of 'strategic material' is only used to rationalize subsidies for American industry, this paper will demonstrate how strategic materials concerns may also lead the government to take actions that have a negative impact on either individual companies or the industry as a whole. [6]

Aluminium is a strategic material both in terms of its critical role in the production of military end items, as well as its importance for the economy as a whole. Due to the American emphasis on strategic air power during the Second World War and later, the supply of aluminium directly impacted on the ability to apply military power. [7] On average, the propeller of military aircraft from the Second World War contained 25% aluminium, and the fuselage consisted of 70% aluminium.[8] During the period covered in this paper, aluminium went from being a rather esoteric material to one of the most basic industrial metals alongside copper and steel. Aluminium was also highly important as a substitute for other scarce materials.[9] Aluminium is one of the most abundant elements in the earth's crust, so it is rather surprising that it can be designated as a strategic material at all. The production of primary aluminium is a complicated two-step process dependent on input of capital, technology, electricity and other minerals such as bauxite, natural cryolite and fluorspar. The rule of thumb is that four tons of bauxite through the Bayer process will yield two tons of aluminium oxide (alumina). Through the Hall-Héroult electrolytic process the two tons of alumina will then be reduced to one ton of primary aluminium. The aluminium industry also requires continuous supply of electric power, something that made it especially vulnerable to sabotage and uncontrolled fluctuations in the electricity supply.[10] It is telling that aluminium was considered to be important enough to be stockpiled both in ore form as bauxite and as a primary metal. While the policy mix designed to

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[6] For one argument along these lines, see Mancur Olson - "American Materials Policy and the 'Physiocratic Fallacy' *Orbis* VI (Winter 1963) 670-688: p.672, 680.

7 Nicholas Spykman – America's Strategy in World Politics, Archon Books, Hamden Connecticut 1970 [1942]:p.294

[8] John DeMille – Strategic Minerals; A summary of uses, World Output, Stockpiles, Procurement, McGraw-Hill Book Company, New York 1947:31

9 Edward Mason, – "Raw Materials, Rearmament, and Economic Development" *Quarterly Journal of Economics*, Vol.66, No3 (Aug 1952), 327-341: p.331

10 National Security Resources Board Power-for-Aluminum Task Group – Memorandum, 10 September 1948, National Archives Records Administration, Record Group 304, NSRB, 47-49\Box 26, 334 O - 334 R\Power for Aluminum Task Force. All records in the National Archives in College Park, Maryland, will hereafter be referenced with NARG as a prefix to the record group number

protect the American supply of aluminium changed over the years from an emphasis on bauxite to aluminium, and from stockpiling to expansion programs, they nevertheless remained closely linked.

Setting the Stage: Alcoa and the First World War

In May 1911 the Department of Justice charged Alcoa with violations of the Sherman Act through unlawful participation in foreign cartels. This marks the beginning of the American government's active engagement in the aluminium industry, starting an anti-trust imbroglio that that eventually would span five decades. The moment was inauspicious for Alcoa, as Standard Oil and American Tobacco were broken up the same year. Alcoa was acquitted of the charges of having built its monopoly illegally, thereby allowing it to emerge almost unscathed from its first run-in with the government. This nevertheless sent a powerful signal that the government hereafter would take an active interest in the development of the monopoly. The company thereafter always took great care to avoid any moves that could put it in the crosshairs of the Department of Justice. [11]

The First World War radically changed both the prospects for Alcoa as a company and aluminium as an industrial metal, thereby altering the foundation for future business-government relations in the American aluminium industry. Instead of dissolution, the company profited from increasing demand as aluminium increasingly became the metal of choice for products where light weight was essential, ranging from automobile parts to canteens and meat cans for the individual soldier.[12] The First World War also foreshadowed the tremendous importance of aluminium in the future, as aluminium increasingly replaced wood and other materials for most aircraft components. With the development of long-range bombers like the Italian Caproni Ca. 36 and the raids of the German Gotha bombers over London in the summer of 1917, the nature of modern warfare was about to change forever. This was not of immediate importance for the present war however, as no American aircraft had landed on European soil prior to the armistice.[13] While only about 10% of American military demand for aluminium was related to military aviation, American aluminium still made its mark on the battlefields of Europe. The US not only supplied the war industries of the

[11] Smith 1988:112

[12] See for instance P. F. Archer, Assistant Quartermaster, the Marine Corps to E.C. Thurston, War Industries Board, October 5 1918, NARG 61, War Industries Board\Correspondence and Papers on aluminium\Box 169\Aluminium Requirements, Marine Corps

[13] H.P Willmott – Første Verdenskrig, N.W. Damm og Søn, Oslo 2005: p.200

Entente powers with aluminium, American metal also went into the production of Ammonal, a high explosive made of ammonium nitrate and aluminium powder. [14]

The war elevated aluminium into the ranks of the strategic materials, and it also altered the relationship between Alcoa and the government. In the spring of 1916, President Woodrow Wilson took the first steps to prepare American industry for entry into The Great War, with the creation of the Council for National Defense, assisted by an Advisory Commission appointed later the same year. After the American entry into the war on April 5 1917, Wilson created the War Industries Board to oversee the mobilization of the economy. While the War Industries Board struggled initially, it eventually emerged under the leadership of Bernhard Baruch as a nexus for centralized control over the domestic economy. This level of control was achieved through a substantial blurring of institutional lines between government, business community and the armed forces.[15] The government relied heavily on business executives to man the various positions within the emergency agencies, and consequently offered an important venue for a two-way learning process in which the government and industry representatives got intimately acquainted.[16]

While the American mobilization effort at first was a rather pell-mell affair, it gave Alcoa its first experience of working closely with the government to supply the American war machine. The War Industries Board operated through a series of commodity committees, and Alcoa's President, Arthur Vining Davis, was appointed chairman of the War Industries Board Aluminium Committee. In terms of business practice, Alcoa also avoided being placed under the priority system by giving preferences for both for direct shipments to the Government and other suppliers bound to it by contract. Less than two of months after the American entry into the war, Alcoa also reported that plans were well under way to increase production by 10 mill pounds. [17] Alcoa derived many benefits from its close working relationship with the government, and when the War Industries Board received offers of processed aluminium powder for the Army from other fabricators, Davis was informed and given the opportunity to take on the job instead.

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[14] Business and Defense Services Administration – Materials Survey: Aluminium, compiled for the Office of Defense Mobilization, Department of Commerce, Washington D.C. 1956: p.VII-1. Hereafter quoted as ODM 1956.

[15] Paul Koistinen – Planning War, Pursuing Peace, The Political Economy of American Warfare 1920-1939, University Press of Kansas, 1998: p.xv

[16] Robert Cuff - "A 'Dollar-a-Year Man' in Government: George N. Peek and the War Industries Board", *The Business History Review*, Vol. 41, No. 4. (Winter, 1967), pp. 404-420.

[17] Council of National Defense Committee on Raw Materials, Subcommittee on Aluminum - "Survey of Aluminum Situation from May 1, 1917 to May 1, 1918". May 23, 1917, NARG 61, War Industries Board\Correspondence and Papers on aluminium\Box 172\Aluminum, price fixing.

One problem for Alcoa during the war was that the price of aluminium was fixed by the government. Davis complained both publicly and within the War Industries Board Committee that Alcoa was forced to cut the prices at the same time that production and labor costs were rising.[18] Nevertheless, Davis and Alcoa got along splendidly with the Price Fixing committee under the chairmanship of Robert Brookings. Rather react to Davis' complaints or counter with the threat of anti-trust, Brookings plainly stated that the government had to work with the monopolist. Brookings also congratulated Davis on his handsome profit margins, and told him that if the price ceilings proved to be too much of a problem, some government support would be considered along the lines of the subsidies already in place for the copper industry. Alcoa also got a say in how the price fixing system operated. While the committee ordinarily set the prices for a three month-period, Davis preferred stability to the possibility of having the prices raised after one quarter. When Davis demanded to have the prices fixed for a six month period instead, Brookings simply replied "We will fix this just as you would like to have us fix it." [19]

The 1920s: Quiet during the roaring twenties

Alcoa emerged from the war with a vastly expanded productive capacity, poised to break into new markets with their aluminium. It was a good time for the company, as the looming threat of anti-trust was dispelled in the generally amiable relationship between big industry and the government. Smith comments that during this decade monopoly growth was not only possible, it was almost considered respectable. [20] The actions of the government seem to bear this out, as there were several openings for reopening the anti-trust case against the company. For instance Alcoa had been accused of using its position during the war to squeeze its only sizable competitor in the rolling of aluminium sheet, the Bremer-Waltz Corporation.[21] Instead of facing a new anti-trust trial targeting Alcoa's monopoly in the reduction of primary metal or its attempts to squeeze independent fabricators downstream, the company got away with an investigation by the Federal Trade Commission, a weak agency under pro-business leadership. Alcoa suffered some bad publicity before the Federal Trade Commission dismissed all charges, but negative PR was a far cry from the threat of dissolution. The company probably also benefited from the fact that the wealthy banker

[18] Smith 1988:127

[19] "Meeting of the Price Fixing Committee of the War industries Board with a Representative of the Aluminum industry for the Purpose of Fixing the Price of Aluminum" , August 20, 1918, NARG 61, War Industries Board\Correspondence and Papers on aluminium\Box 170\minutes of price fixing committee. The folder is without clear identification in the box.

[20] Smith 1988133

[21] J.L.T Walz to War Industries Board, Bureau of applications and Issue, Priorities Division, September 5, 1918, NARG 61, War Industries Board\Correspondence and Papers on aluminium\Box 170\

Andrew W. Mellon was the Secretary of the Treasury from 1921 to 1932. Mellon had been that intimately connected with the company since he extended his first loan to the enterprise in 1889, and had since held positions as both company treasurer and a member of the board.

The 1920s were a quiet period also in terms of strategic materials policy. It was only when pondering the experiences from the war that Congress recognized that supply difficulties for different raw materials had hampered the production effort. The National Defense Act of 1920 gave the Assistant Secretary of War the responsibility for "[...] the assurance of adequate provision for the mobilization of material and industrial organizations essential to wartime needs."[22] The so-called Harbord Committee also prepared a list of 28 different materials that created supply problems for the American war effort in the First World War.[23] Bernhard Baruch was also disturbed by his experiences with supply shortages of strategic materials, and emerged as the most loquacious proponent of a stockpiling program for strategic materials. [24] The former Secretary of Commerce, William Redfield, also warned that American production capacity hinged on uninterrupted supplies of strategic materials from areas like India, Ceylon, Malaya and Sumatra.[25] Despite these very public warnings from respected former officials, the idea that the United States still had ample supplies of all the necessary resources dominated both the public, industry and the government well into the 1920s, and in Rocco Paone's words even "enriched the traditional xenophobic sentiment that spirited the foreign policy of the United States. "[26] Under these circumstances all efforts to either plan or to take serious measures to protect the American supply of strategic materials were doomed to failure.

The 1930s: The dog that did not bark

Anti-trust and strategic materials concerns had been put on the back burner throughout the 1920s, but both the domestic and the international political climate would be less propitious during the next decade. The Great Depression swept the Democrats into office, but already in 1931 Alcoa had become embroiled in a private anti-trust suit with the Baush Machine Tool Company. [27] While Alcoa

22 Harry Yoshpe –" Economic Mobilization Planning Between the Two World Wars", *Military Affairs* Vol. 15 No 4 (winter, 1951) 199-204: p.202

23 Franklin Huddle – "The evolving National Policy for Materials", *Science, New Series*, Vol. 191, No 4228, Materials Issue (Feb. 20, 1967), 654-659. See also Haglund 1986:225

[24] Bernhard Baruch – American Industry in the War, A Report of the War Industries Board (March 1921). Prentice Hall, New York 1941.

[25] William Redfield – Dependent America, Houghton Mifflin, New York 1926

[26] Rocco Paone – Strategic Nonfuel Minerals and Western Security, University Press of America, New York 1992:p55

[27] Smith 1988:195

chose to settle after a lengthy process of trials and appeals, the case was a harbinger of the problems that lay in store for the company would be facing over the next decades.

While the great anti-trust case wasn't brought before the courts until 1937, the new brooms in the Roosevelt Administration took an immediate interest in the aluminium industry. The first public hearings were being held within Roosevelt's first year in office. During these hearings the officers of Alcoa testified that they not only controlled 100% of the domestic reduction capacity for virgin aluminium, but that they also sat on the greater part of all known reserves of bauxite.[28] This fact was duly noted by the National Resources Board and its Planning Committee on Minerals Policy. While the Committee noted that concentrated ownership in some cases could help industries grow past the pioneer stage, and that most mineral monopolies faced competition from other minerals, it nevertheless concluded that unless an industry was operating under public regulation, competition was necessary and anti-trust laws should be vigorously enforced. [29] The odds were rapidly stacking up against Alcoa, and in 1937 the company was charged with violations of anti-trust legislation in the *United States v Alcoa* lawsuit.

The Committee represents a highly interesting point of departure because its members represented the concerns of the government with both anti-trust and strategic materials. The Committee on Minerals Planning sorted under the staunch anti-monopolist Harold Ickes, who as Secretary of the Interior was the ex officio of Chairman of the National Resources Board.[30] Another member who shared these sentiments was Leon Henderson, a prominent New Dealer. The committee also included Herbert Feis, the Economic Adviser to the State Department. Feis was an ardent supporter of stockpiling and a driving force behind the Interdepartmental Committee on Strategic Materials. Together with a few other likeminded officials, Congressmen and members of the armed Forces, Feis worked relentlessly to secure American supplies of strategic materials like rubber, oil and tin. [31] While trust-busting became a key issue for the Roosevelt administration in the

[28] Draft Report Part II, section V "Minerals and the Problem of monopoly", note 1, RG 187, National Resources Planning Board\Unpublished Reports of the NRPB, 1936-1942, Minerals General - Planning, Regional\Prel. Drafts of 'Planning for Mineral Policy', Oct 1934,

[29] National Resources Board – A Report on National Planning and Public Works in Relation to Natural Resources and including Land Use and Water Resources, Part V, Report of the Planning Committee for Mineral Policy, December 1, 1934, NARG 187, National Resources Planning Board\Published Reports of the National Resources Planning Board, 1937-43, Public Works\Box 11

[30] The organizational history is quite messy, with the National Planning Board, The National Resources Board and the National Resources committee superseding each other, with the Committee on Minerals Policy discontinued and its functions eventually transferred to the National Resources Committee. For a short breakdown of the administrative history, see National Resources Committee – Planning Our Resources, March 1938 RG 187, National Resources Planning Board\Working Reports of the NRPB and Regional Offices, 1934-42\Box 9, MRB, NRC, Speeches

[31] Herbert Feis – Seen from the E.A, Three International Episodes, Alfred A. Knopf, New York 1947.

second half of the 1930s, the efforts at creating a viable strategic materials policy didn't resonate as well within the administration. Secretary of State Cordell Hull was wary of being seen to embrace autarkic practices. President Roosevelt consistently vetoed stockpiling bills originating in both Congress and from within the Administration as "not in accordance with the financial program of the President". [32] Roosevelt kept his eye firmly focused on his domestic programs, and it wasn't until spring of 1939 that he ceased his active resistance against stockpiling measures.[33] Despite the President's determination to scuttle all attempts at stockpiling, there was an increasing awareness that the supply of certain materials that could only be found outside the United States were essential for the war-making potential of the state. For instance, the debates over sanctions against Italy during the Ethiopian debacle lead many policymakers to ponder if these economic weapons could be turned against the United States.

This awareness of potential supply shortages of foreign-produced minerals also contributed to growing concerns over domestic production of strategic materials. The armed forces, not entirely without prodding from Alcoa, also came to realize that it would require a lot of aluminium for aircraft and other military hardware in the future.[34] The War Department designated aluminium as a critical material in 1932, and in 1936 it was formally designated as a strategic material. This had little impact in terms of stockpiling purchases in the short term. A fully fledged stockpiling program wasn't inaugurated until after the signing of the *Strategic Materials Act* of 7 June 1939, and then there were other materials that were deemed to be of more immediate importance.[35] Secondly, in the same year the Army-Navy Munitions Board had introduced a new set of definitions of strategic and critical materials that emphasized that the primary sources of supply had to be located wholly or in part outside of the US. [36] Since Alcoa claimed it had a more than sufficient production capacity as well as

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[32] EA:RV:GMH SS, "Creation of Stock Piles of Strategic Materials" November 6, 1936,Library of Congress\Herbert Feis Papers\Box 125\Strategic Materials 1936, See also Daniel Bell to Cordell Hull, June 3 1938, NARG 59, Department of State, Central decimal file, 811.24.115

[33] Alfred Eckes - The United States and the Global Struggle for Minerals, Texas University Press, Austin 1979:p.77

[34] Paul Koistinen – Planning War, Pursuing Peace; The political economy of American Warfare, 1920 – 1939, University of Kansas Press, Lawrence 1998:120

[35] The earliest positive commitment came in 1938 with the appropriation of 3,5 million dollars to the Navy Department to accumulate reserves of critical and strategic materials. In 1940 an additional 500,000 dollars were appropriated, resulting in an expenditure of only about 4 million dollars by 1941 by the Navy Department for its own use. There was no aluminium however, as the Navy focused on tin, chromite, manganese ferrograde ore, tungsten ore, along with other commodities such as silk, optical glass and manila fiber. See H.M Shaffer to Dr. Leith "Navy Stock Pile of Strategic and Critical Materials", June 10, 1940, NARG 225, Records of the Joint Boards\Army and Navy Munitions Boards\Correspondence Concerning Stockpiling 1939 - 1936\Box 3\Navy Reserve Material up to 1942. See also John Dunn– "American Dependence on Materials Imports the World-Wide Resource Base" *Journal of Conflict Resolution*, Vol. 4, No.1 (Mar 1960), 106-122: p.108

36 The definitions are quoted by Spykman 1970 [1942]:p.293

vast amounts of metal in store, Army Navy Munitions Board bumped aluminium back down from the strategic to the critical list in January 1940 and decided not to purchase any.

The designation of aluminium as a strategic material thus came too early for any real measures to be taken, and was revoked about the time when the government finally acquired the authority and the appropriations to do something about it. So, despite the failure to stockpile aluminium, did the strategic materials policy have anything to say for Alcoa in the interwar years? The answer is yes. With aluminium on the War Department's list of strategic materials, both the Navy and especially the Army Air Corps began taking a more active interest in the metal. There was frequent contact between the company and the armed forces, and one Alcoa official even served as a reserve officer in a aluminium committee that was established by the Office of the Assistant Secretary of War. The planning effort was poorly organized, and both Alcoa and the armed forces spectacularly underestimated the need for aluminium in the coming war, something that would later reflect badly on Alcoa. In the meantime, the fact that aluminium was classified as a strategic material gave Alcoa some protection against the trust-busters in the Roosevelt Administration. When the Justice Department filed its suit in 1937, it specifically requested a report written by written by an Army Air Corps Officer named Alfred Hobley. The report was based on extensive statistics and literature provided to Hobley by Alcoa. The War Department feared that disclosure could alienate Alcoa as well as representatives of other industries, and when the Department of Justice subpoenaed a copy of the report from Alcoa, Assistant Secretary of War Louis Johnson personally told Alcoa not to comply. Neither the Department of Justice nor the court ever saw a copy of the report. [37] Alcoa had thereby gained a powerful ally in the fight against the government's anti-trust lawyers. The company was naturally well aware of the value of this support, which it demonstrated further by attempting to get the War Department to support Alcoa's quest to for more favorable tariff policies. The company naturally also benefited from being able to influence the calculations of the armed forces of whether the supply matched the requirements. Alcoa dreaded the prospects of meeting a new post-war period with overcapacity, and assured the government that they were able to supply all the governments' needs without further expansion. This contributed heavily when the Army-Navy Munitions Board decided to downgrade aluminium to a critical material in early 1940.

The Watershed

While the anti-trust suit was filed in April 1937, the end of Alcoa's monopoly did not become inevitable until May 16 1940, when President Roosevelt asked American industry to produce 50.000 aircraft annually. The demands of war rapidly turned the American aviation industry into the

[37] Koistinen:p.116-120

greatest single industry in the history of the world. [38] This required a correspondingly large increase in aluminium production, something which Alcoa proved unable to understand, let alone provide. But Alcoa still had excellent connections, and competitors had a hard time breaking into the industry against the opposition from the Alcoa-friendly businessmen that staffed the National Defense Advisory Commission. It took the personal intervention of Senator Lister Hill to secure a loan for Reynolds Metals Company from the Reconstruction Finance Corporation in 1940. Alcoa was not without its share of friends in Congress either, and the first congressional report on strategic materials struck a conciliatory tone, finding no fault with Alcoa. It even went so far as ask for a moratorium on the anti-trust case, by stating that "Whatever may be the merits of the any controversy between so-called monopolies and the administration […] this fact is outstanding, that this is no time to squabble over monopoly nor attempt to place blame, when planes are so sorely needed". [39]Alcoa was cleared in the anti-trust case of by Judge Caffey in 1942.

The need for planes was what eventually broke the Alcoa monopoly, as anti-trust was replaced by anti-Axis. The critical shortages subjected both Alcoa and the responsible government agencies, in particular the Office of Production Management, to scathing criticism from the public, Congress and other parts of the Administration. The cooperation between Alcoa and the Office of Production management itself became a point of contention. A report issued by the Senate Committee to Investigate the National Defense Program, also known as the Truman Committee, accused Alcoa of finagling the Office of Production Management with assurances of the adequacy of supply in order to retain its monopoly position.[40] Alcoa was also accused of curtailing production to maintain the price level. Secretary of the Interior Harold Ickes also came out swinging, stating for the record that "when the story of this war comes to be written, it may have to be written that it was lost because of the recalcitrance of the Aluminium Co. of America".[41]

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38 Sidney Robbins and Thomas Murphy – "Economics of Scheduling for Industrial Mobilisation", *The Journal of Political Economy*, Vol. 57, No 1 (Feb. 1949), 30-45: p.31 See also ODM 1956:VII-3

[39] Strategic Materials, Interim Report pursuant to H.Res 162, 77th Cong., 1 sess, House of Representatives July 21 1941, [Report no 982], NARG 169, Records of the foreign Economic Administration, Office of the Administrator, Records Analysis Division\Historical monographs prepared by division\Box 1\Chap II - Early measures to meet the need

[40] Charlotte Muller - "The Aluminium Monopoly and the War"*, Political Science Quarterly* Vol. 60 No.1 (Mar 1945), 14-43:p. 22-23

[41] Minority Report, Section IV, Interim Report pursuant to H.Res 162, 77th Cong., 1 sess, House of Representatives July 21 1941, [Report no 982], NARG 169, Records of the foreign Economic Administration, Office of the Administrator, Records Analysis Division\Historical monographs prepared by division\Box 1\Chap II - Early measures to meet the need

In times of war, the government usually relies on established companies as suppliers of war material. The assumption is that their technical know-how and superior managerial skills make them more likely to deliver the goods.[42] Thus the monopoly sector firms in most cases strengthened their power and autonomy during the war. [43]In the aluminium industry, production of aluminium was deemed to be too important to be left in the hands of Alcoa. Senator Harry Truman summed up the government's position : "We want aluminum, not excuses".[44] The government implemented the Controlled Materials Plan, an ambitious scheme to control the use of copper, steel and aluminium that symbolizes the historical high-water mark for American experiments with a command economy.[45] Mere controls were not sufficient however, and through the Defense Plant Corporation, a subsidiary of the Reconstruction finance Corporation, the government embarked on an ambitious expansion program for the aluminium industry. The construction schedule and the supply of different materials were so tight that coin silver was withdrawn from the Treasury as a substitute for copper in the bus bars for the new aluminium plants. [46] The Defense Plant Corporation became far the largest producer in the United States, controlling 668.000 tons of smelting capacity which accounted for 55% of American production. Despite the widespread anger and frustration with the company, there was no way to get around Alcoa. The Defense Plant Corporation had to rely on Alcoa to help build and manage 80% of the capacity, thereby offering the company an opportunity to redeem itself.

Alcoa suffered yet another blow just as it was working feverishly to re-construct its battered reputation. The Department of Justice had appealed the 1942 ruling, and in March 1945 judge Learned Hand found Alcoa guilty of holding an unlawful monopoly under Section 2 of the Sherman Act. Alcoa had lost the case, but it had not yet definitely lost its monopoly position. While the judge reversed the not guilty verdict of 1942, the question of a remedy remained, and so Alcoa avoided the threat of dissolution by court order. Reynolds Metals had managed to clear the high barriers to entry with its 80.000 tons of primary capacity, and the Olin Corporation had operated a 20.000 ton

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42 Miller, John Perry – "Military Procurement Policies: World War II and Today", *The American Economic Review*, Vol. 42, No 2 (May 1952), 453-475: p.468

[43] Gregory Hooks – Forging the Military-Industrial Complex; World War II's battle of the Potomac: University of Illinois Press, Chicago 1991:p.197

[44] David McCullough – Truman, Simon &Schuster Paperbacks, New York 1992:p.287

[45] Robert Cuff – "From the Controlled Materials Plan to the Defense Materials System 1942-1953" *Military Affairs* Vol.51, No 1 (Jan 1987),1-6

[46] Donald Nelson – Arsenal of Democracy; The Story of American War Production, Harcourt, Brace and Company, New York 1946: p.355

government smelter during the war, but neither could pose a serious threat to the dominant position of Alcoa by themselves. The government had to handle it in a different manner, and it did so in a big way. The Surplus Property Act of 1944 called for disposal of the aluminium facilities in a way that would promote competition. [47] Reynolds Metals Company knew an opportunity when it saw one, as did the entrepreneur Henry Kaiser. Reynolds Metals and Kaiser Aluminium both secured leases on smelters built by the Defense Plant Corporation. They got very favorable terms and the leases were eventually converted into purchase agreements. Both companies expanded aggressively, and soon emerged as vertically integrated competitors to Alcoa.

The Post-war lull

The government's concerns with strategic materials continued during the early post-war years, but stockpiling policies and expansion programs received little priority under President Truman's strict economic policies in the late 1940s. The newly re-constituted Munitions Board that had been charged with the stockpiling program deemed the newly expanded domestic aluminium smelting capacity to be more than sufficient, especially when considered in combination with the possibility for increasing imports from Canada. The Munitions Board opted for a cheaper stockpile of bauxite instead, hoping thereby to gain a maximum of security for a minimum of cash. This caused some consternation within the administration, but also in the aluminium industry where Reynolds was the most insistent in its calls for a stockpile of aluminium. The Industry Advisory Committee on Aluminium and Magnesium called for a stockpile in about once every six months (October 47, April 1948 and again in November 1948). As civilian demand grew far beyond what anyone had anticipated, many officials became increasingly worried about whether the industry would be able to supply the armed forces in addition to the civilian demand. [48] In June 1949 a report from the industry advisory committee warned that the United States faced a 250.000 ton deficit during the first two years of an eventual war. After conducting its own study of the mobilization requirements for aluminium, the Munitions Board established an interim stockpiling objective of 250.000 tons on November 17 1949. [49] While the government made no direct purchases in the market after this

[47] Duncan Campbell – Global Mission; The Story of Alcan, vol. I, T.H Best Printing Company Limited, Canada 1985:p.408. Walter Adams – "The Aluminum Case: Legal Victory -- Economic Defeat" *The American Economic Review,* Vol 412, No. 5 (Dec1951), 915-922. See also DeMille 1946:p.40-43

[48] Meeting of Power-For-Aluminium Task Group With Executives of Permanent Metals Corporation, September 10, 1948 NARG 304, General Correspondence of NSRB, Sept. 47 - June 1949\Box 26, 334 O - 334 R\Power for Aluminum Task Force

[49] Fifth Amendment to Current list of Strategic and Critical Materials as Revised, 20 August 1948. NARG 330, Secretary of Defense, Munitions Board\Box 126, MB 231 to MB 285\MB 274

decision, Reynolds and Kaiser both got contracts for deliveries of metal to the stockpile in lieu of cash payments for their DPC smelters.[50]

While Reynolds and Kaiser enjoyed the blessings of governmental support, Alcoa was fighting to re-establish itself as the leading competitor in the post-war industry. With two aggressive competitors claiming ever larger shares of the rapidly expanding markets, Alcoa could not afford to be forever cast in the role as the government's bête noire of the aluminium industry. In March 1947 the company petitioned for a ruling to end the charges of monopoly, and the same year it made a bid for a surplus smelter. Unfortunately for the company the government countered with a petition claiming that Alcoa still held monopoly power, and was actively seeking to extend it. A new round of litigation ensued. Judge Knox handed down his decision on June 2 1950, and found Alcoa to be an impressive industrial power that still held "monopoly potential" through its control over the Alcan. As a remedy to this threat against the newly established competitors, the court ordered that for the first time in history, American investors had to relinquish control over a foreign company. The court shied away from more radical measures such as ordering the dissolution of Alcoa, especially as it had to avoid hamstringing one of the major producers of a vital commodity "in times of international tension".[51] Instead the judge hoped that Alcan would compete vigorously in the American markets, and prove itself to be "fully worthy of Alcoa's steel".[52] The same month Alcoa finally resolved its issues with the Department of Justice over its plans to acquire the St.Lawrence smelter after nearly three years of wrangling.[53]

Only three weeks later, on June 25 1950, North Korean guns began thundering in "The Land of the Morning Calm". While the outbreak of the Korean War gave rise to an immediate increase in demand for aluminium, the most important effect came from the changes that were made in American long-term political and military strategies for fighting the Cold War. The Soviet Union was increasingly perceived as bent on expansion by the force of arms, thereby presenting American planners with the challenge of creating a mobilization base able to withstand the pressures of a global war. Under the *Defense Production Act* of September 8, 1950, a comprehensive program for industrial mobilization was inaugurated. The President gained the authority to set military priorities for the production of essential commodities and to control prices. [54] Under the new defense

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50 Staff paper, 16 des. 1949 NARG 330, Secretary of Defense, Munitions Board \Box 126, MB 231 to MB 285\MB 274.1

[51] Smith 1988:270-3

[52] Campbell 1985:413

[53] ODM 1956: VII-12

54 Chong-do Hah and Robert Lindquist – "The 1952 Steel Seizure Revisited: A Systematic Study in Presidential Decision Making" *Administrative Science Quarterly*, Vol 20, No 4 (Dec 1975) 587-605:589

mobilization program, a combination of control, expansion and stockpiling would secure the resources necessary to contain the Soviet Union by the application of military power.

All of this directly impacted on the relationship between the government and the aluminium industry. One of the new emergency agencies, the National Production Authority, immediately placed aluminium under allocation control during the fall of 1950. A new Controlled Materials Plan was implemented in the spring of 1951 to secure the supplies of steel, copper and aluminium. In September 1950 the Munitions Board asked Alcoa, Kaiser and Reynolds, as well as the two prospective producers Apex and Harvey, to attend a meeting to decide how to the American requirements for aluminium could be met. The 'Big Three' were cautious, questioning whether they could carry out an expansion of the scale that the government wanted. [55] The massive Chinese intervention in late November 1950 resulted in the declaration of a national emergency and the establishment of the Office of Defense Mobilization in mid-December. One of the first actions of the Office of Defense Mobilization was to announce a comprehensive expansion program for the aluminium industry, based on certificates of accelerated amortization for 85% of the new facilities over five years. The expansion program also featured a rather unique safety mechanism, as the companies received 'put rights' to sell any surplus aluminium from their expanded facilities to the government stockpile for a period of five years after completion. [56] The only thing the government demanded in return was the right of first refusal. These guarantees allowed the companies to secure 600 million dollars worth of loans on their own. The government itself also gave an explicit guarantee for a 76 million dollar loan to Reynolds Metals Company.[57]

The Korean War also gave added impetus to the stockpiling program. The Congress immediately appropriated vast sums for stockpiling purposes, and the government embarked on a crash program to fill the stockpile in case the Korean War escalated into a global show-down with the Soviet Union. The stockpiling objective for aluminium was raised to 700.000 tons, and the Munitions Board also introduced a 'danger point' at 350.000 tons which had to be accomplished as soon as possible. The actual inventory was only a fraction of these objectives, and the National Production Authority prepared to take "whatever action is necessary to assure delivery of aluminum to the

55 ODM 1956:VII-13
56 Peck 1961:150
57 Samuel W.Anderson, Memorandum for John Steelman, Acting Director ODM and Henry Fowler, Defense Production Administrator 19 August, 1952, NARG 277, National Production Authority, Defense Production Administration Subject Files\Commodities\Box 34, Commodities 1951-52 to Asbestos, Crocidolite 1951-52\Aluminum (Admin),

stockpile".[58] However, electricity shortages and the requirements of both civilian and military industry ensured that 'The Big Three' only managed to deliver 7000 tons to the stockpile in the course of the first four months, far less than the 100.000 tons that were scheduled for the first half of 1951.[59] Apex and Harvey also withdrew from the expansion program, leaving the government in a quandary. The solution was a new round of expansion programs with the contracts signed in September and November 1951. The National Production Authority defined these projects as 'definite top priority' and resolved that "nothing is to be allowed to interfere with completion of the aluminum projects on schedule".[60] Harvey received another certificate but withdrew once again, leaving the certificate for a subsidiary of the copper giant Anaconda. In October 1952 another expansion program was announced by the Defense Production Administration. Prior to the third expansion round, there still was a deficit of 1 million tons in the American aluminium supply (established capacity and stockpile) for the estimated requirements of a five year war.[61] Consequently the target was set at 200.000 tons of new capacity which would cover the million ton deficit over five years. This shows the intimate connection between the expansion programs and the stockpiling program. In addition, the third round was only open for new entries into the industry, giving the government the opportunity to expand capacity, secure stockpiling supplies and promote competition in one fell swoop.

These rapid war-time expansion programs naturally had long-term consequences for the industry. The incentives for expansion were so strong that the traditional emphasis on low cost hydroelectric power was disregarded. The United States suffered from electricity shortages, and the lead times for the construction of new dams were simply too long. Reynolds built two gas fired smelters, while Alcoa built one and expanded another. After the opportunities for expansion based on natural gas were exhausted, the producers turned to coal, lignite and other forms of thermo-generated power. The government also subsidized the use of costly steam-generated electricity for

58 Thomas Nichols to Nigel Bell, 7 Mai 1951. NARG 277, National Production Authority, Policy Coordination Bureau\Subject File of the Assistant Administrator for Policy, 1951-53\Subject File, A\Box 1\Aluminum – Stockpile,

59 Vital Material Coordinating Committee, VMCC- 19, 18 June 1951, NARG 277, Defense Production Administration Subject Files\Committees, VMOC, Agenda and Summaries, Volumes I & II, 1951

60 Dean Bowman to Henry Fowler, Manly Fleischmann and all NPA Assistant administrators, 5 October 1951, NARG 277, National Production Administration, Office of the Administrator, Organizational Subject Files\Office of Assistant Admin\Box 3\Aluminum,

61 Malcolm Catlin,ODM to Russel Forbes, Defense Materials Procurement Agency, 6 March 1953, NARG 291 , Records of the Federal Property Resources Service\Defense Materials Procurement Agency Program Files 1949-58\FRC Box 6\DMPA Contracts, Book 1, A THRU M,

aluminium smelting, although within certain limits.[62] The government thus made a vital contribution when the American companies turned from its traditional reliance on cheap renewable hydro-power to the more expensive and exhaustible sources of fossil fuels. This decision naturally came back to haunt the industry later, when the rise in fuel and electricity prices after the oil shocks presented the aluminium industry with a tremendous structural challenge.[63]

The late 1950s: Awash in aluminium

When Eisenhower moved into the White House, the stockpile was very short on aluminium. President Truman had not only diverted deliveries of aluminium scheduled for the stockpile back to the industry, he had also authorized withdrawals from existing stocks on hand. The end of the Korean War made it far easier to purchase huge amounts of aluminium, and in May 1954 the government projected that the stockpiling objective for aluminium could be completed within the end of the year.[64] While civilian demand again rose faster than the forecasters anticipated, Eisenhower also introduced changes in the framework for calculating the stockpiling objectives. Due to the introduction of a minimum objective of one full year of consumption, the elimination of other countries as reliable sources of supplies in wartime, as well as a new set of long-term objectives catapulted the stockpiling objective to a massive 2,5 million tons of aluminium.[65] However, the Eisenhower Cabinet Committee on Materials Policy also laid down guidelines where only the minimum objective should be completed immediately by the way of direct purchases. Only long-term agreements and a counter-cyclical spot purchases under especially favorable conditions were to be used to reach the long-term objective. The unofficial minimum objective for aluminium was 1 million tons at the time, and the stockpile held 997.000 tons in addition to a Defense Production Act

62 Samuel W Anderson to Jess Larson, November 25 1952, NARG 291 , Records of the Federal Property Resources Service\Defense Materials Procurement Agency Program Files 1949-58\FRC Box 6\DMPA Contracts, Book 1, A THRU M.

63 OECD – Aluminium Industry, Energy aspects and structural change, OECD Paris 1983: page 78f. This trend was reinforced by the fact that the United States was rapidly becoming uncompetitive as a location for new aluminium smelters, and consequently the next expansion wave occurred mostly in the form of brownfield investments during the 1960s. While this second expansion wave helped realize economies of scale and alleviated the cost structure, it made the industry even more vulnerable as its smelting capacity was increasingly powered by fossil fuels.

64 ODM, Memo for IMAC, 4 May 1954, NARG 396, Records Relating to Emergency Preparedness\Interdepartmental Materials Advisory Committee, Records of IMAC Meetings 1953-73\ Box 1,THRU 9\ Meeting 04

65 Dwight D. Eisenhower to Arthur Flemming, Director ODM, 15 July 1954, NARG 396, Records Relating to Emergency Preparedness\Interdepartmental Materials Advisory Committee, Records of IMAC Meetings 1953-73\ Box 1,THRU 9\Meeting 09, See also James McClure– "Stockpiling of Strategic and Critical Materials" *Idaho Law Review*, Vol 19, 1983, 417- 453: p.438f, table 3

inventory of 37.000 tons.[66] In other words, no more aluminium was wanted or needed, and a greatly expanded aluminium industry appeared to be thriving without further need of government intervention. In June 1957 the anti-trust suit against Alcoa was brought to its conclusion when a Department of Justice request for continued judicial jurisdiction was overturned in the courts. The Department had contended that it was too early to tell whether the competition that had been established in the wake of the Korean War would last under normal conditions. But as Smith suggests, neither the Department of Justice nor the court were really interested in burdening themselves with the duty to monitor the industry for another couple of years.[67] An era of government-supported expansion and re-structuring of the aluminium industry was thereby brought to an end.

At the very moment when the aluminium industry seemed poised to cross the threshold into some sort of Promised Land, buoyed by ever rising civilian demand and the end of government intervention and anti-trust measures, the market slumped. In hindsight there were noticeable signs of slackening demand from the final quarter of 1956, but it wasn't until the middle of 1957 that the crisis really hit home. The entry of Harvey, Anaconda and a joint venture between Olin and Revere added to a growing surplus, ensuring that the utilization rate for installed capacity fell to 78 % in 1958 and stayed below 90 % until 1963.[68] The producers of primary aluminium did not despair, they simply turned to their 'put rights' to the government stockpile and dumped more than 200.000 tons in 1957 alone. The Office of Defense Mobilization that now administrated the stockpiling program faced a veritable deluge of aluminium, with outstanding commitments for another half million tons from the 'Big Three'. The late-comer Harvey also held guarantees for an additional 270.000 tons from a smelter that still was under construction.[69] The Office of Defense Mobilization felt it had no choice but to ask President Eisenhower to terminate the contracts and settle the inevitable claims in court.[70] Eisenhower preferred to arrange the matter quietly however, and managed to arrange a voluntarily reduction in the deliveries to the stockpile.

These and other related problems with the strategic materials policy led the Office of Defense Mobilization to establish a Special Stockpile Advisory Committee under the chairmanship of Holman Pettibone in 1957. The committee concluded that the threat of supply shortages of strategic

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66 "Defense position in aluminum" ODM Memorandum for DMB meeting 90, November 9 1955, NARG 469 Office of Industrial Resources, Office of the Director\Records Relating to the Defense Mobilization Board\Box 1\Defense Mobilization Board (FOA) Sept - Dec 1955 (1 of 2) ,

67 Smith 1988:275

68 John Stuckey - Vertical Integration and Joint Ventures in the Aluminum Industry, Harvard University Press Cambridge Massachusetts, 1983: p.256

69 Peck 1961:158, table 24

70 FRUS 1955-57, Vol X:p.732

materials supply had been all but eliminated. [71]. The armed forces also finally managed to agree on a compromise on the estimated duration of an eventual war, reducing it from five years to three years. The new framework included estimates for two possible scenarios, a three year conventional war and a nuclear war. The larger of the two requirements estimates would then be used to calculate the stockpiling objectives, but nonetheless it lead to a hefty reduction of the stockpiling objectives.[72] Despite this recalibration of the entire stockpiling program, the American aluminium companies continued to ship their excess aluminium to the stockpile. During the first half of 1958 they delivered another 262 354 tons of aluminium to a stockpile that was already bursting in the seams. A year later the stockpile held more than 1,8 million tons of aluminium, with another 180.000 tons on its way. At the same time the stockpiling objective for aluminium was capped at 1,2 million tons, making almost 800.000 tons of aluminium surplus to requirements. [73] There was no immediate crisis for the industry however, as surplus aluminium was kept in the stockpile in the anticipation of any possible upward revisions of stockpiling objectives. As that became ever more unlikely, the Kennedy administration started preparing to get rid of the vast surpluses of metals in the stockpile. [74] The disposal program made little headway however, and the government retained the surplus throughout the Kennedy-period

Epilogue: The last laugh?

Concerns with shortages of aluminium had been what originally drove the government into an intimate relationship with the aluminium industry. But even when there were large surpluses of aluminium, strategic materials policy continued to shape the relationship between the government and the industry during the 1960s. As the United States gradually slid into the Vietnam War, the government it at least had the satisfaction of knowing that for the first time in history, the United States could march out to war with ample supply of vital war materials such as aluminium. This in turn provided policymakers with an unprecedented opportunity to direct the industrial mobilization

71 Special Stockpile Advisory Committee– Stockpiling for Defense in the Nuclear Age, 28 January 1958, NARG 396, 396, Records Relating to Emergency Preparedness\Interdepartmental Materials Advisory Committee, Records of IMAC Meetings 1953-73\Box 4, 43 THRU 56 meeting 46

72 "Major Policy Problems of the Stockpile of Strategic materials" 8 July 1959, NARG 396, Records Relating to Emergency Preparedness\Interdepartmental Materials Advisory Committee, Records of IMAC Meetings 1953-73\Box 5, 57 THRU 66, meeting 57

73 Stockpile Factoring Sheet for Aluminum, 14 October 1959 NARG 396, Records Relating to Emergency Preparedness\Interdepartmental Materials Advisory Committee, Records of IMAC Meetings 1953-73\Box 5, 57 THRU 66, meeting 60

74 Office of Emergency Planning, "Disposing of Excess Stockpile Materials, Report to the Executive Stockpile Committee" 20 September 1962, NARG 396, Records Relating to Emergency Preparedness\Stockpile Committee Reports 1962-63\FRC Box 3,

process without imposing direct controls. In 1965 the government still held 940 000 surplus tons of primary aluminium in the national stockpile, and another 528 000 tons in special inventories set up under the Defense Production Act. The companies had been negotiating with the government to buy back the metal to avoid having the stockpile overhang the market, but no deal was in place by the time Olin had decided to increase its prices for aluminium ingot. The rest of the industry was expected to follow. President Johnson, fearing inflationary tendencies, threatened via Secretary of Defense McNamara and Secretary of the Treasury Fowler to swamp the markets with the aluminium in from stockpile unless they agreed to cancel their plans to increase their list prices. [75] The companies had no choice but to give in. The outcome of this episode was actually rather positive for the industry. The government and industry representatives finally managed to agree on an orderly disposal program for the excess aluminium, thereby ending almost fifty years of concerns with aluminium as a strategic material.

Concluding remarks

For more than 40 years after American entry in the First World War, aluminium was a strategic material. Developments in technology and strategy have constantly altered the requirements, but the fear of supply shortages as an impediment to full utilization of the state's military potential has remained more or less constant. To factor in these elements reveals far more complex business-government relationship than if this period of history is viewed solely through the lens of anti-trust. Strategic materials concerns had a profound impact on the structure of the industry, both in determining the relationship between the monopolist and the government during the major wars of the period, but also provided the chief justification and the main tools to fundamentally alter the structure of the industry. The importance of aluminium in warfare has been a mixed blessing for Alcoa. On one hand it ensured government cooperation, markets and subsidies, but it also brought about the end of the monopoly. For the government the results were equally mixed: It had wanted aluminium and not excuses, but in the end it had to settle for both.

[75] Robert Cuff – "Stockpiles and Defense Escalation, 1965-1968", *The Public Historian*, Vol. 9, No. 4. (Autumn, 1987), pp. 44-64: p.60-4. Henry Fowler had an especially informed view on stockpiling policies, as he had been both Defense Production Administrator, The Director of the National Production Authority and finally Director of the Office of Defense Mobilization under Truman.