
Freedom's Arsenal

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Ferdinand Porsche visited the United States to study American mass-production techniques in both 1936 and 1937. His entourage on the second trip included Bodo Laffrentz, chief aide to DAF head Robert Ley, and Jacob Werlin, the Führer's adviser on automotive affairs. Porsche met with Henry Ford and discussed the KdF-Wagen. Ford declined an invitation to visit Germany. The envoys mounted a campaign to recruit American-trained German nationals working in the United States and American citizens of German descent to return to Germany to work in the KdF-Wagen plant. The campaign was carried out through 1938 by German consuls in American cities. About twenty technicians were signed up.

When war was declared between Germany and the United States, Porsche wondered how Germany could possibly expect to win, given the great American superiority in mass production that he had witnessed. As late as the outbreak of World War II, the German automobile industry was hopelessly fragmented among some seventeen small firms. Although Hitler's panzer divisions wrote a new chapter in the history of mechanized warfare, the German automobile industry—including the American-owned subsidiaries Opel AG and Ford-Werke AG—produced only 32,994 commercial motor vehicles and a total of only 289,271 motor vehicles of all types during the first six months of 1939. The totalitarian Nazi regime never succeeded in rationalizing the German automobile industry. Even military truck production was not fully standardized until the last year of the war. The superiority of Ford trucks produced in Canada and at Dagenham early became evident to the Germans. On December 15, 1941, for example, Rommel wrote an order to his Afrika Korps commanders: "For desert reconnaissance only captured English

trucks are to be employed, since German trucks stick in the sand too often.” Thus Germany was ill prepared to fight the global automotive war that it had initiated.

The Nazis Take Over at Ford-Werke and Opel

On November 28, 1938, Field Marshal Hermann Goering announced that the German army needed 100,000 trucks and could no longer depend upon the voluntary efforts of the German automobile industry to supply them. “It will now be necessary for me to interfere,” he said. He had Ford and Opel trucks especially in mind. Ford-AG “was now cooperating closely with Hitler’s regime,” Mira Wilkins and Frank Hill relate, “and, as the summer [of 1939] drew to a close, would become serviceable to him in time of war. As a symbol of its wholly German identity, the company changed its name in July 1939 from the Ford Motor Company AG to Ford-Werke AG.” A new truck assembly plant near Berlin turned out “troop-transport-type” vehicles for the Wehrmacht. And the Ford Cologne plant counted on Nazi government contracts for a quarter of its German domestic sales. Wilkins and Hill go on to observe that the Nazis “made them pay dearly for it. They forced the company to manufacture in Germany of German materials practically all the cars it sold there, they compelled no small degree of standardization, set up an export policy that required galling accommodations from both Dagenham and Dearborn, blocked remittances of profits earned in Germany, and imposed truck developments that served their military purposes.” With the rapid Nazi conquest of Europe, Hitler came to control the Ford operations in eight countries on the Continent by late 1940. Following the German declaration of war against the United States on December 11, 1941, Hitler seized these Ford European plants as “enemy property.” Without the knowledge of Ford-U.S., the German management of Ford-Werke AG for some time before this had been “secretly engaged in the production of war materials.”¹

General Motors has gone on record that after the German invasion of Poland all American personnel resigned from Opel, ending GM control over the day-to-day operations of the firm, and that even nominal GM representation on the Opel board of directors ended with the German declaration of war against the United States. GM claims that “as early as October 1939, the German government had prohibited the transmittal of financial or operational reports from Opel to General Motors” and that “a meticulous search has disclosed no communications whatsoever between Opel and General Motors Corp. after September 2, 1941.” A Ger-

man board of managers appointed by the Nazi government ran Opel after September 3, 1939. A German custodian was formally appointed in 1942 to oversee Opel by the Reich Commissioner for Treatment of Enemy Property. Only under these conditions did Opel become integrated into the Axis war effort as an important supplier of trucks, half-tracks, and aircraft engines.²

Neither GM nor Ford, however, has contested that its German subsidiaries played key roles in the Axis war effort or that it legally continued to own those subsidiaries. It has been estimated that the GM Ruesselsheim factory assembled about 50 percent of all the propulsion systems for JU-88 medium-range bombers produced between 1939 and 1945 and that the Ruesselsheim plant helped develop the propulsion system for the ME-262, “the world’s first operational jet fighter.” It has also been estimated that “GM and Ford German subsidiaries built nearly 90 percent of the armoured ‘mule’ 3-ton half-tracks and more than 70 percent of the Reich’s medium and heavy-duty trucks. These vehicles, according to American intelligence reports, served as ‘the backbone of the German army transportation system.’” Thus, unintentionally through their Nazi-controlled subsidiaries, “GM and Ford became principal suppliers for the forces of fascism as well as the forces of democracy.”

The situation grew even more ludicrous with the cessation of hostilities. The Soviet occupation forces dismantled the GM Opel plant at Brandenburg and moved all of its machinery and equipment to the Caucasus to satisfy Soviet claims for reparations against Germany, while GM and Ford demanded and received from the United States government reparations for damage inflicted on their Axis properties by Allied bombing. “By 1967 GM had collected more than \$33 million in reparations and federal tax benefits for damages to its warplane and motor vehicle properties in formerly Axis territories.... Ford received a little less than \$1 million, primarily as a result of damages sustained by its military truck complex at Cologne.”

The Failure of Nationalization in Japan

In Japan, recognition of the usefulness of the motor vehicle came in 1923, when the Kanto earthquake destroyed the railway line between Tokyo and Yokohama. Following this disaster, a thousand Model T truck chassis were ordered by the government for the Tokyo transportation system. The Ford Motor Company of Japan was incorporated in Yokohama in 1925, to assemble trucks and cars in Japan from components shipped from Detroit. General Motors Japan of Osaka began to assemble Chevrolet

trucks and cars from American-made components in 1926. A 50-percent ad valorem duty was evaded by assembling in Japan, but the tariff on components still was 30 percent.

Ford and General Motors shared about 90 percent of the Japanese market up to the enactment in 1936 of the Motor Vehicle Business Act (or Law Regarding Automobile Manufacturing Enterprise), after which their combined share dropped to about 75 percent. That act reflected the ongoing effort of the military after the September 1931 Manchurian Incident to establish a Japanese-controlled motor vehicle industry. It mandated that all motor vehicle manufacturers producing more than 3,000 units annually be licensed by the government; that half of the capital, management, and stockholders of the licensed manufacturers be Japanese; and that the licensed manufacturers agree to supervision by the Japanese government, especially regarding military orders and objectives. The tariff on imported motor vehicles was raised to 70 percent. Despite these oppressive conditions, both Ford and GM sought and obtained licenses. Ford sought to meet the Japanese ownership mandate by raising new capital for expansion from its Japanese dealers; GM sought mergers with Nissan and Toyota. Both efforts were to no avail. Operating under ever tighter restrictions and production quotas, Ford and GM together ultimately produced an estimated 250,000 total units before the military-controlled government forced them to close their Japanese plants in 1939. An estimated 51 to 60 percent of their Japanese output had been trucks. And these trucks formed the backbone of the Japanese army transportation system in the China campaign.

The Japanese army had exhibited an interest in adopting motor vehicles as early as 1907. And beginning with the Military Motor Vehicle Subsidy Act of 1918, the Japanese government offered subsidies to Japanese-owned automobile manufacturers to produce motor vehicles suitable for military use. Yet few were produced before 1936, because the well-established *zaibatsu* (family-owned business groups), to whom the military were hostile, remained reluctant to risk capital to compete with Ford and GM. Consequently, the military established alliances with newer business groups—principally Toyota and Nissan in the case of motor vehicles.

Kiichiro Toyoda's Toyoda Automatic Loom Works formed a Motor Vehicle Division in 1933, which became the Toyota Motor Company, an independent company, in 1937. The Tobuta Casting Company and Nippon Industries in 1933 formed the Motor Vehicle Manufacturing Company to manufacture a small passenger car with a 750-cc engine called the Datsun. The firm changed its name to the Nissan Motor Company in 1934. Toyota and Nissan became the first Japanese-owned motor vehicle manufacturers licensed under the 1936 act. Trucks accounted for

79.6 percent of Toyota's 1936 production of 1,142 units, 91.1 percent of its 1939 production of 11,931 units. The Datsun passenger car had accounted for 69 percent of Nissan's total 1935 production of 3,800 units. But production of the Datsun was suspended by governmental order in 1938, and truck production came to account for 92.3 percent of the 17,781 units produced by Nissan in 1939. Together, Toyota and Nissan accounted for 89.5 percent of motor vehicle production by Japanese-owned firms in 1939. This declined to 73.1 percent in 1941, when total Japanese motor vehicle production peaked at only 46,468 units.

After the Pearl Harbor attack, with the shift of Japanese military effort from the mainland of China to the islands of the South Pacific, Japanese motor vehicle production, under the control of the army, steadily declined, to a mere 6,754 units in 1945. C. S. Chang observes that, unlike the situation in Germany, this almost total collapse of the Japanese industry "was not a direct result of bombing by the U.S. Air Force. The industry was never a prime target of air attack." Rather, the collapse primarily resulted from a shift in the allocation of scarce raw materials from motor vehicle to aircraft production. "When the main battlefield was China, motor vehicles played a very important role," Chang writes. "However, when the battlefield shifted to the Pacific after World War II began, priority was given to the production of airplanes for the control of scattered areas there." Unlike the United States, Japan had an inadequate supply of steel to produce both trucks and planes. Chang concludes, "Lack of truck transportation—due to decreased production of trucks—undoubtedly contributed to the failure of the Japanese army to solve its logistics problems during the war. It brought, for example, a production decline in many fields of war materials. . . . Raw materials could not reach manufacturers, and the railway system had been damaged by bombing."³

Mobilization for the Allies

The Axis powers all made the fatal error of counting on quick victories after bold surprise attacks and lightning-paced offensives. They did not anticipate the drawn-out war of logistics that developed. Japan was even more ill-prepared to fight it than Germany. Italy was ill-prepared even for its mechanized assault on spear-throwing Ethiopians. After the *New York Times* reported in October 1935 that Ford-U.S. had recently sent some 2,200 trucks to Italian Africa, Henry Ford canceled shipment of 800 more that the Italians had paid for in advance, bogging down the drive to Addis Ababa. "Had Ford known about and acted to forbid the orders from the start," note Wilkins and Hill, "and had the League [of Nations] dealt as

effectively with [the supply of] other commodities, Mussolini's venture into Ethiopia would have been deep in trouble." ⁴

The Axis powers stood no chance of winning a war of logistics in which the motor vehicle and mass production played the key roles. Total combined German, Italian, and Japanese motor vehicle production in 1938, the last peacetime year of full production, was only 436,918 units, versus 444,877 units for the United Kingdom alone and an additional 166,088 units for Canada. Thus, even without conversion of the massive U.S. industry to the Allied war effort, the British Commonwealth nations had a decided edge, especially since the Axis motor vehicle industries were operating at full strength while the U.K. and Canadian industries, like the U.S. industry, had excess plant capacity.

Despite proclamations of neutrality from Dearborn, Ford's British Commonwealth plants were quickly converted to war production during the fall of 1939. The Dagenham plant was camouflaged to protect it from enemy bombers, as production shifted to Fordson tractors, ambulances, trucks up to five-ton capacity, and auxiliary V-8 engines for a variety of military uses. Later the production of Bren carriers and tank trucks was also undertaken there. A new Ford "shadow factory" (secondary production site) was constructed near Manchester to build Rolls-Royce Merlin aircraft engines.

Ford-Canada joined with the Canadian Department of Defense in late 1939 to develop a series of motor vehicles for the military, including four-wheel-drive vehicles, and from the beginning of the war supplied trucks to the Canadian and British forces. Wallace R. Campbell, the head of Ford-Canada, claimed that after the fall of France and the almost complete destruction of British equipment at Dunkirk, Canada became "the most important source of mechanical transportation to the empire." Wilkins and Hill relate that when Hitler sent Rommel to Africa in 1941, "Canadian-built trucks and carriers, along with British-built Ford units, were the mainstay of the African army defending Egypt." ⁵

In the United States, meanwhile, President Roosevelt had appointed William S. Knudsen, president of General Motors, to the chairmanship of the National Advisory Defense Committee (NADC). Knudsen left GM to assume his new duties at no salary on May 28, 1940; he resigned as GM president and member of its board of directors to avoid any suspicion of conflict of interest. In late November, at a secret meeting in New York with over one hundred auto industry executives, he called on American automobile manufacturers to give their full cooperation to U.S. defense plans.

Henry Ford had developed the hallucination that Roosevelt was a warmonger controlled by General Motors and the du Ponts and that

United States involvement in World War II was part of a conspiracy to get control of his company. He already had reneged on an early June 1940 agreement with Knudsen to undertake the manufacture of Rolls-Royce airplane engines for the British, and was consequently under attack by the press, especially in the U.K. His son Edsel and deputy Charles Sorensen, however, managed to obtain his reluctant consent to participate in an aircraft-engine program for the U.S. Air Force. His failure to comply voluntarily in this, they knew, would invite the governmental takeover that his paranoia led him to fear.⁶

On November 1, 1940, the Ford Motor Company signed a contract to make Pratt and Whitney airplane engines for the U.S. Air Force, while Packard undertook production of the Rolls-Royce engines for the Royal Air Force. In February 1941 the government approved Ford plans for a vast bomber plant at Willow Run, near Ypsilanti, Michigan. Snags in getting “Will-It-Run” into production delayed acceptance of the first B-24 bombers completely assembled by Ford until September 1942. By then the Ford Motor Company, along with the rest of the American automobile industry, had completely converted to war production and was playing an indispensable role in the war effort. Henry Ford feared that the military personnel at Willow Run were spies sent by Roosevelt to assassinate him and took to carrying an automatic pistol under the cowl of his car.

Following Edsel’s untimely death on May 26, 1943, Henry Ford again became president of the Ford Motor Company. Aware of Ford’s mental incompetence, Roosevelt toyed with the idea of removing him and having the government operate the company for the duration of the war. It took threats by Edsel’s widow and Clara Ford that they would sell their shares of Ford stock out of the family to induce Henry Ford finally to step down in favor of his grandson Henry Ford II, a few weeks after the Japanese surrender in September 1945.

Knudsen was made codirector—with Sidney Hillman, president of the Amalgamated Clothing Workers—of the Office of Production Management (OPM) in January 1941, to coordinate defense production, purchasing, and priorities in consultation with Secretary of War Henry L. Stimson and Secretary of the Navy Frank Knox. The OPM was under the Supply, Priority, and Allocations Board (SPAB), chaired by Vice-President Henry Wallace. When the SPAB was abolished in early 1942, its functions were taken over by the War Production Board (WPB), chaired by Donald M. Nelson. Knudsen was “demoted” to lieutenant general and director of war production in the War Department. He resigned from the army in June 1945, to return to GM as a member of its board of directors.

Charles Erwin (“Engine Charlie”) Wilson had replaced Knudsen as

president of General Motors on January 6, 1941. Unlike Ford, GM had maintained contact with the War and Navy departments since 1933 regarding its production allotments and the types of contracts on which it would bid in the event of war. By American entry into the war GM already had undertaken over \$1.2 billion in defense contracts for the Allies. "In the five years of war production, General Motors . . . turned out \$12.3 billion worth of military supplies, only one-third of it comparable in form to its civilian production," reports Ed Cray. "The conversion from peacetime to wartime production, beginning with the prewar planning of 1940, had been a gigantic task made the harder by the company's agreement to take on government contracts for only the largest, most difficult projects." Its first contract went to Chevrolet in April 1940 to produce 75-millimeter high-explosive shells. GM assigned government contracts top priority even before American entry into the war. And the corporation made a critical policy decision that it would ask for only a 10-percent pretax profit—half its average peacetime gain. "If the corporation ever had a supreme moment," Cray concludes, "a period of unqualified contribution to the commonweal, it was during the war years of 1940 through 1945. General Motors was second only to E. I. du Pont de Nemours in expansion for the war effort, spending \$911 million for new factories and tools, \$809 million of that from the public treasury." Still, during the war GM made after-tax profits of over \$673 million and increased its productive capacity 50 percent. "A tendency to unguarded loquacity later made Wilson a controversial secretary of defense in the Eisenhower administration, but he was one of the great presidents of General Motors," John Rae notes. "At the end of 1943 he was able to report that every defense contract given to General Motors was in production, on schedule, and yielding more output than the government had considered possible."⁷

The output of the American automobile industry doubled even as the war brought great curtailment in civilian automobile use. The manufacture of motor vehicles for the civilian market ceased on February 22, 1942, despite the reluctance of automobile manufacturers faced with an expanding market for the first time since the 1920s. Tires and gasoline were severely rationed for the duration of the war, and a 35-mph national speed limit was imposed. Motor vehicle miles of travel decreased from 334 billion in 1941 to 213 billion in 1944; highway expenditures fell from their 1938 high of \$2,675,000 to a 1944 low of \$1,349,000; and receipts from special motor vehicle use taxes dropped from \$2,041,000 in 1941 to \$1,613,000 in 1944. Cars that had been nursed through the Depression long after they were ready to be junked were patched up further to survive through the war. Consequently, the wholesale value of replacement parts for the domestic market, \$718 million in 1941, rose to a new

high of \$778 million in 1944 after a \$472-million low in 1942. Factory sales of passenger cars dropped to a mere 139 units in 1943 and 610 units in 1944, while truck and bus sales declined from slightly over 1.06 million units in 1941 to 699,689 units in 1943 and 737,524 units in 1944.

The Automobile Manufacturers Association sponsored the formation of the Automotive Council for War Production (ACWP) shortly after the Japanese attack on Pearl Harbor. Twelve divisions of the ACWP coordinated the conversion of the industry's resources to the war effort. Alvan Macauley, president of both the AMA and the Packard Motor Car Company, became chairman of the ACWP. Its chief executive officer was George K. Romney, then managing director of the AMA.

Chrysler became the leading producer of tanks. Willys-Overland and Ford were the leading producers of some 2.5 million military trucks, most four-wheel-drive, and 660,000 four-wheel-drive jeeps. Raymond Flower and Michael Wynn Jones call the jeep—the name is an elision of GPV, for “General Purpose Vehicle”—the “crowning success of the war.” Developed first by Bantam and then by Willys-Overland in response to a U.S. Army-sponsored competition, the jeep “became the backbone of all Allied military transport. . . . This plucky little machine seemed willing to go anywhere, do anything, and came to be regarded with great affection by the troops.”⁸ After the war, surplus military jeeps inaugurated a market for off-road recreational vehicles that persists into the present.

In addition to turning out several million motor vehicles of various types, before the war ended the American automobile industry had produced for the military 4,131,000 engines, including 450,000 aircraft and 170,000 marine engines; 5,947,000 guns; and 27,000 completed aircraft. Altogether, American automobile manufacturers made some seventy-five essential military items during World War II, most of them unrelated to the motor vehicle. These military materials had a total value of \$29 billion and constituted one fifth of the nation's entire war production. American superiority in mass-production techniques—techniques developed in the automobile industry—was indeed the main reason for the Allied victory.

The Insolent Chariots

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Despite the postwar seller's market for cars, not one new firm was able to get off the ground. Closure of entry into the American automobile industry was now complete. Twenty-two million dollars proved insufficient for flamboyant promoter Preston Tucker to get into production his radically designed rear-engined Tucker Torpedo at a cheaply leased Dodge aircraft plant. The Kaiser-Frazer Corporation failed despite the assets of the Graham-Paige Motor Car Company, the resources of shipbuilding and steel magnate Henry J. Kaiser, stock issues totaling \$54 million, a \$44-million loan from the Reconstruction Finance Corporation, and \$30 million in bank loans. Formed shortly before the end of the war in 1945, Kaiser-Frazer produced some 745,928 units before folding in 1955, but in its best years, 1947 and 1948, was able to capture only 5 percent of the U.S. market as the leading independent. Its assembly operations at the converted Willow Run aircraft plant acquired from Ford were inefficient, and it had paid premium prices for its raw materials. But the main reason for failure was insufficient capital. Henry Kaiser estimated later that the company's initial stock offering should have been for three times the amount. John Rae reports that "the most reliable estimates for what would have been required to make a start in the 1950s run from a quarter of a billion to over a billion dollars, exclusive of the dealer organization, and the lower figure was considered very risky."¹

The Mature American Industry

The American automobile industry further solidified into a joint-profit-maximizing oligopoly dominated by General Motors. The pattern that