

Version 1.0 | Last updated 22 January 2020

Naval Blockade (of Germany)

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Blockades, part of economic warfare, had been employed throughout history. The Allied blockade (1914-1919), which aimed to prevent war supplies reaching Germany, ultimately also targeted the civilian population. It had its counterpart in the German attempt to block supplies to the Entente. Despite the blockade, Germany was able to trade overseas via neutral states. The Allies thus put pressure on the neutrals to limit exports to Germany. By 1918 Germany's imports had fallen to one-fifth of their pre-war volume, but was this due to the blockade? And what was the relationship between civilian mortality and blockade?

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Introduction

Naval blockades, imposed by surface or [submarine](#) fleets or by [mines](#), were part of broader economic [warfare](#), as had often been employed in history.^[1] Economic warfare means all the measures designed to weaken the enemy's economy. It involved preventing goods used in the war effort from reaching the enemy, above all munitions and [raw materials](#) for their production, but also [food](#) and everything needed to sustain the armed forces, thus ultimately targeting the civilian population.

A large part of the German population suffered hunger during the war, and between 478,500 and 800,000 civilians died from [diseases](#) related to hunger and malnutrition.^[2] These deaths have traditionally been attributed to the "British hunger blockade".^[3] However, it was not an exclusively British, but an Allied policy, executed by all the Allied navies, in which the Royal Navy had the predominant part. Naturally, both sides waged economic warfare, and therefore, both sides attempted to blockade each other. [Germany](#) tried to cut off supplies reaching the Entente, ultimately resorting to submarine warfare. The question of the causal relationship between civilian mortality and the blockade remains to be answered.

Before 1914, economic warfare was the British [government's](#) main strategic concept in case of European war. It rejected the idea of "sending a continental-scale army" to [France](#) and preferred to apply economic pressure on Germany by naval blockade. In hindsight, British military intervention with its land army in August 1914 appears inevitable, yet that was not how contemporaries saw it. The navy was [Britain's](#) main armed force, the guarantor of its globally-oriented economy and protector of its overseas trade. Upon becoming Secretary of State for War, [Horatio Herbert Earl Kitchener \(1850-1916\)](#) persuaded the cabinet to reverse its strategic thinking. But transforming Britain's small professional army, essentially a colonial police force, into the continental-scale mass army required for the new "[total war](#)" orientation, would require much time.^[4] Blockade was thus not only a long-term strategy to stifle the enemy's economy: it became also a necessary measure during the build-up of the army. Since 1905 the Naval Intelligence Department had worked on plans for blockade and economic warfare. This "would doubtless inflict in the end considerable losses on Germany ... But the effect would take time to produce".^[5] The consensus at the time, and ever since then, is that it would be a slow-acting strategy.^[6] In 2012, however, naval historian Nicholas A. Lambert argued that previous generations of [historians](#) were wrong in assuming that blockade "must be a slow-acting weapon"; his claim is that Britain had a "plan for fast-acting economic pressure", indeed that it had adopted "a national strategy of quick, decisive war comparable in function and objectives to Germany's infamous Schlieffen Plan".^[7] Evidence for this brave argument is sparse, and it is only sustained by ignoring the bulk of the documentation.^[8]

In view of recent innovations such as torpedoes, mines, submarines, and powerful coastal [artillery](#), the Admiralty decided in 1913 on "distant blockade".^[9] On the outbreak of war, the British and French established a blockade reaching from the English Channel to [Norway](#), cutting off Germany from the oceans.^[10]

Many in the Admiralty, including First Sea Lord [John Arbuthnot Baron Fisher \(1841-1920\)](#), were unhappy with the passive blockade; they favoured an aggressive naval strategy, such as amphibious operations to land an invasion force on the German coast.^[11] But the long-term strategy prevailed. [Winston Leonard Spencer Churchill \(1874-1965\)](#), First Lord of the Admiralty (i.e. minister), wrote: “We sit still in the steady cold blooded game & can I think keep it up indefinitely.”^[12]

Certainly, Allied economic warfare was effective so far as German commercial shipping was concerned. Within a week of the outbreak of war the German merchant fleet had been banished from the oceans: of its 1,500 ships, 245 were captured, 1,059 were confined in neutral ports, and 221 were restricted to the Baltic.^[13] Not strictly speaking blockade measures, these Allied actions, together with cutting Germany’s international telegraph cables, which made it more difficult for German merchants to communicate with overseas partners, rendered its overseas trade immensely more difficult.^[14]

The Blockade and the Neutrals

That did not mean the end of Germany’s international commerce: it could trade with neighbouring neutral states, and make use of neutral ships and merchants. Blockade policy therefore aimed also to exercise control over the seaborne trade of neutral states which might re-export cargoes to Germany. That affected the commercial rights of neutral states.^[15]

The initial list of “absolute contraband” of August 1914, i.e. forbidden cargoes, included arms, explosives, warships, and other items for use in war. “Conditional contraband” included goods such as food and fuel, if they were destined for the armed forces. In autumn 1914, the British government expressly did not intend to starve the German civil population.^[16] The lists were refined, and an extensive list of 23 December 1914 included further materials for explosives.^[17] Only after Germany had declared the seas around the British Isles to be a “military area” (Germany’s first phase of unrestricted submarine warfare) in February 1915 did Britain and France impose a ban on all goods of German origin or destination.^[18]

The British government was soon aware that Germany was using the neutral states for the import of contraband. Thus [US](#) exports to [Sweden](#) showed a sudden, enormous expansion, at the same time as US trade with Germany dropped.^[19] There were significant increases in exports to [Denmark](#), [Norway](#), and [Holland](#). The decrease in exports from New York to Germany, from 90.7 million dollars from August 1913 to September 1914 to 5.8 million dollars over the same period in 1914-1915 was almost exactly matched by the increase in exports to Denmark, Norway, and Sweden from 20 million to 104 million dollars.^[20] By mid-1915 the British government realized that blockade policy was thus not working properly.^[21]

The French [government](#) was even more worried about supplies reaching Germany via the neutrals.

They demanded a declaration that “all articles that could possibly be used for munitions – cotton included – would be treated as contraband.”^[22] At an Allied conference in Paris in June 1915 to discuss the neutral states’ evasion of contraband agreements, the French proposed limiting neutral imports to their pre-war levels.^[23] Agreements were thereafter reached with the Netherlands, Denmark, and Sweden, allowing them to import pre-war quantities of essential items.

Another headache for the Allies was the redirection of trade patterns by the neutrals adjacent to Germany, who sold their own produce to Germany and imported food from overseas instead. In the first half of 1916 5 million gold marks’ worth of food arrived daily from the Netherlands, which made up the gap with imported food. This may have amounted to as much as 28.5 percent of German imports by value – see Table 1: Germany: balance of trade, 1913-1918. Without such imports from the neutrals, German Chancellor [Theobald von Bethmann Hollweg \(1856-1921\)](#) confessed to a secret meeting of politicians, Germany would have been defeated in early 1916.^[24] By autumn, however, the British had persuaded the Dutch to accept limits on their exports to Germany. The policy of “starving Germany”, i.e “keeping from her foodstuffs and raw materials” was beginning to bite.^[25]

Germany’s resumption of unlimited submarine warfare in February 1917 imperilled Dutch overseas trade, and the entry of the United States (US) into the war in April tightened the screw further. After intense Anglo-American negotiations, the US [government](#) decided to emulate British measures of economic warfare; from July 1917, the US implemented a virtually total trade embargo on the Netherlands. In 1918 Dutch food exports to Germany dwindled to nothing.^[26]

Overall, the blockade was tightening. On 1 March 1917, Lord [Robert Cecil \(1864-1958\)](#), the Minister for the Blockade, reported to the House of Commons that “for some months past no substantial quantity of goods” had been imported to Germany, either directly from overseas or via Scandinavia and the Netherlands, although he was unable to quantify the effect in Germany.^[27]

Blockade Policy Execution

Blockade policy went through three phases: initially, restricted blockade; from 11 March 1915, unrestricted blockade to prevent all goods entering or leaving Germany; and unrestricted blockade with American collaboration after April 1917.^[28] (see image: North Atlantic patrol lines, map)

In practice the blockade entailed a continuous patrol of the entrances to the North Sea. The Royal Navy Tenth Cruiser Squadron, consisting at first of eight, soon expanding to forty, vessels, was for three and a half years “the most continuously active naval force of any participant in the Great War.”^[29] Its initial force of old cruisers was badly battered by the winter weather in northern waters and by U-boat raids. It was replaced by lightly armed merchant cruisers, better suited to survive in such harsh conditions. Its function was to intercept all merchant ships sailing in the waters between Scotland, Norway, and Iceland. Traffic through the English Channel was easily controlled by the

Dover patrol, so ships trying to evade the blockade would – at high risk of interception – attempt passage through northern waters.^[30]

The order-in-council of 11 March 1915 *de facto* established a complete blockade of Germany, although in [international law](#) it did not meet the formal definition of blockade, which required naval patrol outside enemy ports. Even if that were possible, it would be useless: as a memorandum to the Imperial War Conference stated, “German commerce would flow freely through the neutral ports”.^[31] The Entente therefore avoided using the term in public, but in February 1916, conceding to reality, the government created a Ministry of Blockade. A classic case of war being too important to be left to the generals, this signified Foreign Office control over blockade policy, which was essential for the delicate negotiations with the neutral states, despite Admiralty pressure and a vociferous [press](#) campaign for a more ruthless policy.^[32]

Those ships that were intercepted (many were in fact allowed to continue their journey without close inspection) were sent to Kirkwall, later to Lerwick or Stornoway, for customs to investigate details of cargo, origin, destination, ownership, and consignees. Some neutral ships voluntarily entered British ports for examination. Details were telegraphed to London, where the interdepartmental “contraband committee” considered the evidence. The decision would be to release ship and cargo, to unload that part of the cargo deemed prohibited goods, or to send both ship and cargo to the prize court as enemy property or of enemy origin.

The blockade manifestly interfered with neutral ships and neutral property; conflict could have erupted at any time, with the risk that neutral states such as Sweden, already more sympathetic to Germany, or the Netherlands, closely integrated with the German economy, might abandon [neutrality](#) and enter the war on the side of the Central Powers. British Navy boarding parties therefore always tried to maintain courtesy and fairness towards neutral crews. Germany’s strategic position by contrast left its U-boat captains with the stark choice whether or not to sink a neutral ship.^[33]

Yet how did the Royal Navy know which ships to intercept? It would have been impossible to seize and check all ships entering European waters. Trade intelligence, a much neglected part of a topic usually confined to the story of double-agents’ military [espionage](#), was an essential prerequisite for the Allied blockade. Informants supplied data necessary for economic and statistical analysis and details of cargoes, dates, times, and routes of shipping. A vast network of observers to track cargoes and shipping, and provide intelligence on banks, insurers, suppliers, and merchants in the United States and other neutral countries, plus consular staff, clerks, and typists, worked together to produce copies of ships’ manifests, details of contraband, and weekly summaries. This information not only enabled the navy to select ships for inspection and helped the contraband committee to decide on the fate of cargoes and companies, but also allowed the British government (through its trade clearing house, a body to collect and report on trade intelligence, and its successor the war trade intelligence department) to assess the effectiveness of the blockade.^[34]

Germany and the Blockade

Had German experts not foreseen such developments? In the period 1912-1914 the *Reich* Department of the Interior produced several memoranda on the question of Germany's food security. As a result of increased agricultural productivity Germany was held to be in a position to feed itself in case of war.^[35] Germany had to import only a small proportion of its food. Pre-war estimates ranged from 10 to 20 percent. A group of food supply experts appointed at the outbreak of war, the Eltzbacher commission, concluded in December 1914 that Germany imported 20 percent of its food by calorific value, 20 percent of its animal protein, and 42 percent of fats. It was merely a matter of changing nutrition habits, and any deficit could be overcome. Germany could thus "withstand a war lasting for many years".^[36] There is no good reason to doubt these figures, but C. P. Vincent and Belinda Davis claimed at least one-third of food was imported.^[37]

Many historians attribute the shortage of food in Germany to the blockade.^[38] Yet most have been content merely to assert this causal connection. Only a few economic historians have challenged prevailing assumptions. Avner Offer argued that while the German people ate less and sometimes suffered hunger, they did not starve.^[39] Stephen Broadberry and Mark Harrison stated that

...there might still be plenty of food, but it was in the wrong place. The farmers preferred to eat it themselves than sell it for a low return ... There was still enough food for everyone to have enough to eat; the localized shortages that began to spread were famines that arose from urban society's loss of entitlement, not from the decline in aggregate availability.^[40]

This is correct, but it is not the whole picture, for there was a real decline in food production. The area of land under cultivation fell over the course of the war, by 32.3 percent for wheat, by 23 percent for rye, and 31.3 percent for potatoes.^[41] Hardly surprising, since two-thirds of the male labour force in agriculture joined the army.^[42] Women, children, old men, and prisoners of war were unable to compensate for the lack of labour. In addition, the army requisitioned horses, depriving farms of their draught animals.

The question of fats, which are vitally important in the diet, especially for physically demanding labour, illustrates the problematic nature of the popular argument that the blockade caused hunger: "In 1917", one historian has written, "the Germans procured 5,181 tons of fats from imports through the blockade. During the first ten months of 1918, this figure was only 1,928 tons."^[43] Yet 5,181 tons was an insignificant quantity, amounting to only 77 grams per person per year. In 1917 the fat ration was 100 grams per week for normal consumers, in 1918 70 grams (workers doing heavy physical labour and pregnant women received extra).^[44] Total annual consumption of animal and vegetable fats before the war was almost 2.6 million tons.^[45] The blockade thus made very little difference. The problem lay elsewhere.

Towards the end of the 19th century, Germany had become ever more dependent on imported fats and oils, having replanted almost all the oil-seed growing farmland with sugar-beet. On average, in 1912 and 1913, Germany's consumption of animal and vegetable fats and oils amounted to 1,860,000 tons, but its domestic production accounted for only 1,105,000 tons. In particular, 97 percent of vegetable fats and oils were imported over this period. The main sources for oil-seed plants were the British Empire (almost 50 percent), the French African colonies, Argentina, the Dutch East Indies, and [China](#). [India](#) alone provided 70 to 80 percent of rapeseed.^[46]

Yet the German expert in the field in the 1920s, Kurt Riebel, wrote of the "English-French blockade" which deprived Germany of its imports of oil-seeds and manufactured oil and fats. This illustrates how "blockade" became a key feature of [culture](#) and [propaganda](#).^[47] Riebel was not being thoughtless. He knew where the imports came from. What contemporary German experts and generations of historians have repeatedly called "blockade" was not blockade at all: it was the Allies' refusal to sell their resources to the enemy. "Blockade" expressed for German writers a common assumption about the past war and the future: it was unfair and immoral, in their view, that the Allies used their control of global resources to defeat Germany. In future, Germany would have to ensure self-sufficiency to compensate for its enemies' maritime superiority. That is exactly what some experts counselled at the end of the war, anticipating the later debates that were to culminate in the [Nazi](#) policy of autarky.^[48] Deconstructed, the term "blockade" reveals the fundamental flaw in Germany's bid in two wars for world power status.

One key question, therefore, is where Germany's food imports came from. In 1912, it imported 2,297,422 tons of wheat, of which [Russia](#) supplied one-quarter. Germany harvested 4,655,956 tons itself in 1913 and imported 2,545,959 tons, one-fifth of which, 519,518 tons, came from Russia, 1,005,864 tons from the USA, 318,571 tons from [Canada](#), and 94,933 tons from [Romania](#).^[49]

Traditionally, rye was the most important bread grain in Germany. Germany produced so much rye – over 12 million tons in 1913 – that it was a net exporter: it imported 352,542 tons, and exported 934,463 tons.^[50]

Germany imported about 6 million tons of animal fodder annually before the war.^[51] A great deal of this came from Russia, e.g. almost half the total of 1,414,256 tons of bran.^[52] Meat production was thus vulnerable, and the consumption of meat dropped to very low levels by the end of the war.

The "turnip winter" of 1916-1917 is notorious in German memory as the low point in food supply, when the lack of potatoes forced people to turn to the swede turnip, which is neither nutritious nor palatable. Food supply improved somewhat after the harvest of 1917, with potato and grain production far higher; but although the calorific value of the food supply was higher in 1918, in qualitative terms the diet was poorer still, with less fat and less protein.

The conclusion is inescapable: not the blockade, but going to war against its main suppliers

drastically reduced food imports. However, even this had a relatively minor impact on total food supply. An examination of the geographic distribution of food shortages will show that [urban](#) areas (big cities like Berlin and urban conglomerates like the Ruhr region) suffered the worst shortages; small towns and villages had a greater proportion of their population with their own plots of land to keep a pig or some rabbits, and grow vegetables. Country districts and their farming population were best supplied and kept back food stocks for their own consumption or to sell illegally; moreover, [rural](#) areas and especially east German provinces simply refused to meet their requirements to deliver food to the cities. One German author states plainly on the basis of thorough research that responsibility for the catastrophe of the “turnip winter” of 1916-1917 lay with the farmers in the agrarian surplus regions who hoarded their potatoes or fed them to their livestock rather than send them to the starving urban areas.^[53]

The overall context was paramount: the distortions caused by the [war economy](#) and the power structure. The army took first priority; combat troops did not suffer serious nutritional deficiencies.^[54] Other privileged groups were farmers, with their own private supply, and the wealthy who could always buy on the black market. That left about two-thirds of civilian society which went short of food from 1915. The incompetence of the state contributed to the misery: setting maximum prices for food merely induced farmers to withhold their produce from normal markets and sell it privately.^[55]

The great increase in agricultural yields in the two decades before 1914 had been the result of the application of scientific methods, farm mechanization, and above all artificial fertilizers. True, Germany had to import all its saltpetre (sodium nitrate) from Chile, which was now effectively blockaded. Yet this was only one of three major classes of artificial fertilizers, next to phosphates and potassium; of the latter Germany possessed large deposits (in [Alsace-Lorraine](#) and Stassfurt), and the former was derived from steel production.^[56]

Much of the increased production of grain and potatoes went into animal feed. High meat consumption posed a severe problem. By 1911, Germany’s per capita consumption was 52.3 kilograms of meat per year, outdone only by Australians (111.6 kilograms) and Americans (54.4 kilograms).^[57] [Max Rubner \(1854-1932\)](#), the nutritionist, addressing the *Reichstag* in December 1914, stated that although many now feared that the blockade might starve Germany into defeat, he was optimistic that if Germans switched to a low-meat, low-fat diet, the nutrition import deficit could be almost entirely made good.^[58]

The distortions of the war economy were not restricted to food. Two of the most important industrial products, iron and coal, were seriously affected. Iron production depends on the availability primarily of iron ore, coal, and limestone, all of which Germany had in abundance; another production factor, scrap iron, grew in importance, and also in availability.

However, Germany’s output of iron and steel fell. By October 1918 steel production was 80 per cent of the level of the first half of 1914, and iron only 60 per cent.^[59] Some historians suggest this, too,

was the result of the blockade, which is nonsensical.^[60] Domestic ores, on which Germany now had to rely to a greater extent, had a lower concentration of iron, which contributed to the fall in production. Importing high-grade ore from Sweden was not hindered at all by the blockade, but was costly in foreign currency. Moving iron ore from Lorraine became difficult because of the priority for military transport. Moreover, the production of ore from both German and occupied Lorraine remained below the peace-time level because of the labour shortage.^[61]

Under the impact of the Allied offensive on the Somme, the army demanded a great increase in iron and steel output, but the association of iron and steel producers warned in August 1916 that although raw material supply was sufficient, the lack of workers placed limits on any improvement.^[62] The increase in production demanded by the Hindenburg Programme (August 1916) was predicated on the availability of labour. But by that time, two-thirds of the original workers in the iron industry were at the front. Their partial replacement by prisoners of war, youths, and women inevitably meant lower productivity.^[63] Substantial increases in output were achieved for a time, but could not be sustained owing to restrictions in the supply of labour and fuel.

The lack of workers became especially critical in the course of 1918. By August, although iron and steel production was still sufficient for munitions, the lack of labour reached crisis point, especially for the supply of limestone; iron plants could no longer be maintained for lack of skilled workers; in October the supply of scrap metal dried up; and there was a steep fall in the mining and transport of ore from Lorraine, depriving Germany of 65 per cent of its domestic supply. Iron and steel production fell swiftly, and although this was not directly decisive for Germany's capitulation, the collapse of production was imminent and the war economy would have ground to a halt within a very short time.^[64]

German coal production also fell, and it was in short supply for the food processing industry and for domestic consumers. The causes were the shortage of labour, despite prisoner of war and foreign labour, the shortage of investment, and the shortage of pit props because of the demand for timber at the front.

Oil was fast becoming a crucial source of mobility in the war. Germany had to import 90 percent of its requirements, from Austrian Galicia and Romania (together 27 percent), and the rest mainly from the US.^[65] The blockade prevented most overseas oil from reaching Germany, which was able to make up only some of the deficit from the occupation of Romania.

Did the Blockade Affect German International Trade?

The answer seems obvious. The blockade clearly impeded the flow of imports and exports, with varying degrees of effectiveness that depended on the ingenuity of neutral shippers and the resolve of the Allies in the application of pressure. By 1918 Germany's imports had fallen catastrophically to less than 39 percent of their pre-war value, and only one-fifth of their pre-war volume (the difference

probably reflecting the rise in prices for imports).^[66] Yet the blockade was not the only reason for the decline in German trade.

The incarceration of the German merchant fleet immediately denied Germany many essentials, such as Chilean saltpetre, essential for the manufacture of explosives, as well as fertilizer.^[67]

The following table shows that there was another impediment to German imports.

	Billion marks at current prices			Billion marks at constant prices (i.e. gold marks)		
	Exports	Imports	Balance	Exports	Imports	Balance
1913	10.1	10.8	-0.7	10.1	10.8	-0.7
1914	7.4	8.5	-1.1	7.5	8.5	-1.0
(Aug. to Dec.)	1.4	2.1	-0.7	1.5	2.1	-0.6
1915	3.1	7.1	-4.0	2.5	5.9	-3.4
1916	3.8	8.4	-4.6	2.9	6.4	-3.5
1917	3.5	7.1	-3.6	2.0	4.2	-2.2
1918	4.7	7.1	-2.4	2.8	4.2	-1.4
Aug. 1914 to Dec. 1918	16.5	31.8	-15.3	11,7	22.8	-11.1

Table 1: Germany: balance of trade, 1913-1918^[68]

A country that wishes to import goods has to pay for them through exports, gold, or liquidating foreign assets. By far Germany's largest export market before the war was Britain, to which Germany exported in 1913 goods to the value of 1,438 million marks. Next were Austria-Hungary, with 1,104 million marks, Russia, with 880 million, and France, with 789 million marks. The crucial point is that 5.7 billion marks out of 10 billion marks of exports went to countries with which Germany was at war by 1917.^[69]

Germany's exports fell to about 25 percent of the pre-war level. Going to war against one's trading partners was roughly half the cause.^[70] The blockade certainly accounted for some of the other half. At the end of 1915 the British Foreign Office was able to report that the navy had managed to reduce German and Austrian exports to the US by a substantial amount, from 124 million dollars in the seven months from March to September 1914 to only 22 million dollars for the same period in 1915.^[71] But since production for the armed forces took priority, and the German government restricted or banned the export of many goods, there was very little spare capacity for exports. Germany's export potential was thus being squeezed by three irresistible forces.

The German Response

Import substitution is the standard response to shortages, and Germany was able to increase the production of many previously imported goods. The prime example is raw materials for fertilizer.

The blockade is often thought to have reduced agricultural production by depriving it of fertilizers, notably, as we have seen, Chilean saltpetre. Shortly before the war, however, the chemist [Fritz Haber \(1868-1934\)](#) had developed a process for the fixation of atmospheric nitrogen to produce ammonia; [Carl Bosch \(1874-1940\)](#), at the *Badische Anilin- und Sodafabrik* (BASF) turned Haber's process into industrial production, and by July 1914 was producing the annual equivalent of 6,000 tons of nitrogen in the form of ammonium sulphate. With a state guarantee of high profits, the BASF increased output to 200,000 tons per annum. Together with another new process to manufacture calcium cyanamide, by the end of 1915 industry was producing 90 percent of the nitrogen for explosives, and 70 percent of the demand for agriculture.^[72] Import substitution based on German scientific innovation was thus a success.

Despite pre-war calculations that stocks of imported raw materials for industries in the Ruhr, especially rubber and non-ferrous metals, would last for only three months, import substitution, exploitation of the resources of occupied territory, and the halting of exports and home consumption, all helped to stretch resources.^[73] The stocks of rubber (together with those uncovered in [Belgium](#)) turned out to be relatively large.^[74] Production of non-ferrous metals trebled during the war.^[75] In 1918, Germany still had sufficient stocks of non-ferrous metals to continue munitions production for at least another year.^[76]

German Economic Warfare

The invasions in 1914 brought rich territories under German control. The ten [occupied](#) departments of northern France accounted for 20 percent of its wheat harvest, 30 percent of its output of linen and clothing, 60 percent of its steel, 74 percent of its coal, and 92 percent of its iron.^[77] Not content with having exploited the coal and industrial production of Belgium, in 1917-1918 the German occupation dismantled valuable industrial equipment, motors, and machine tools, and hauled them to Germany along with stocks of metals and raw materials, including scrap metal, increasingly vital for steel production. This continued until the last weeks of the war, culminating in the pillage of the iron and steel plants of Charleroi and Liège.^[78]

German naval policy in the years before 1914, which often appears to have been a systematic attempt to challenge British supremacy, was less well thought-through and consistent than is often claimed. Its dominant assumption was to prepare for war against France and Russia; Grand Admiral [Alfred Peter Friedrich von Tirpitz \(1849-1930\)](#), the secretary for the navy, did not believe the United Kingdom would enter the war. Operational planning for [naval warfare](#) against Britain did not begin until 30 July 1914.^[79] The German Admiralty was torn between two strategies: wage cruiser warfare

against British merchant ships, or try to detach a part of the Royal Navy by some deceptive manoeuvre to destroy it, and thus even up the balance between the two fleets. Submarine warfare had only a subordinate place in planning when the war started.

The opportunity for cruiser warfare arose in the far east, when the German East Asia Squadron under the command of Rear-Admiral [Maximilian Johannes Maria Hubert Reichsgraf von Spee \(1861-1914\)](#), enjoying local superiority, spectacularly sank many merchant ships and two Entente warships, before escaping across the Pacific to South American waters. After defeating a poorly-led British [attack at Coronel](#) (Chile) in November, Spee took a rash decision to raid the [Falkland Islands](#), where British battle cruisers inflicted a crushing defeat on 8 December, sinking almost the entire squadron, including the renowned *Gneisenau* and *Scharnhorst*. The Falkland Islands battle was “the most decisive naval engagement of the war”, marking the end of the German cruiser threat to Allied shipping. By January 1915, only 273,000 tons, or 2 percent of British merchant ships, had been sunk.^[80] Ultimately, the German Navy lacked the military and economic resources to wage cruiser warfare. It resorted to submarine warfare by default.

In January 1915 Admiral [Hugo von Pohl \(1855-1916\)](#), Chief of Admiralty Staff, argued in a memorandum that owing to the failure of the land war a new strategy was imperative. German naval warfare had not managed to do any significant damage to British [sea power](#). The German strategy of not putting its main fleet at risk of destruction was playing into British hands. Pohl therefore insisted that the [High Seas Fleet](#) should be prepared for action: submarine and mine warfare should impose a “blockade” around British coasts to cut its vital nerves, its commerce.^[81] The result was the first round of “unrestricted submarine warfare”, in which merchant ships would be destroyed without warning, commencing on 22 February 1915.^[82] After the [sinking of Lusitania](#) in May with the loss of 1,198 lives including 128 US citizens, [Wilhelm II, German Emperor \(1859-1941\)](#) prohibited attacks on passenger ships, and in September U-boat warfare in the waters around the British Isles was suspended.

After the shock of the [Somme](#) in 1916, the new Chief of Admiralty Staff, Grand Admiral [Henning Rudolf Adolf Karl von Holtzendorff \(1853-1919\)](#), argued for resumption of unrestricted U-boat warfare, to sink all ships en route to the United Kingdom, Allied or neutral. By destroying 600,000 tons of ships per month, “at least two-fifths of neutral shipping will be deterred from sailing to Britain”. After five months, maritime traffic would decline by 39 percent; economics and the “psychological impact of panic and terror” would mean that “England would not be able to tolerate this”.^[83] With food reserves already low, supplies would run out within three months. There would be a crisis in the balance of payments, steep price rises, widespread hunger, and riots; Britain would be forced to sue for peace.^[84]

In the first six months of the campaign, commencing on 1 February 1917, the predictions came true: in the first four months an average of 629,862 tons of shipping were destroyed, in the next two, an average of 506,069 tons.^[85] The British Navy was convinced that catastrophe was looming. The

First Sea Lord, Admiral Sir [John Rushworth Jellicoe \(1859-1935\)](#), said in April 1917 that the Germans “were winning”, and at the war cabinet he warned that “disaster is certain to follow”. Churchill was later to write: “The U-boat was rapidly undermining not only the life of the British islands, but the foundations of the Allies’ strength; and the danger of their collapse in 1918 began to loom black and imminent.”^[86]

The expectation of British collapse was premature. The introduction of the convoy system with warship escorts proved highly effective, and the number of sinkings by U-boats dropped. Of the 16,693 convoy ships that departed for or from the United Kingdom, 99.1 percent arrived safely.^[87] Other measures included import substitution, food [rationing](#), the substitution of wheat by other foodstuffs, a big increase in the area of land cultivated for grain, vegetables, and potatoes, and the introduction of a more efficient command economy than in Germany. Moreover, Britain still had access to the vast resources of North America: virtually inexhaustible credit, and ample grain.^[88]

First Quartermaster-General General [Erich Friedrich Wilhelm Ludendorff’s \(1865-1937\)](#) hope that U-boat warfare would relieve pressure on the Western Front was dashed. So successful was the Entente response that General [Karl Eduard Wilhelm Groener \(1867-1939\)](#) wrote in November 1917 that the U-boat campaign was making no impact on the warfare of the British and French: “On the contrary, they have more munitions and guns at their disposal than ever.”^[89]

Conclusion

Did the blockade win the war? It is a paradox that the blockade was practically total by 1918, yet food supply in Germany was better than the previous year. Contrary to common assumption, [civilian morale](#) played no part in the decision of the German high command to end the war.^[90] As Dr. [Albrecht Philipp \(1883-1962\)](#), deputy of the German National People’s Party (DNVP), told the *Reichstag* investigation committee on the causes of Germany’s defeat in 1927:

The food position in Germany was in every respect fearful, ever since 1916, but not so bad as to justify suddenly abandoning the war in the autumn of 1918. Nutrition, in 1918, was certainly insufficient, but it was appreciably better than it had been during the turnip winter of 1916/17. There was also no sign that a continuation of the war through the winter of 1918/19 would have seriously worsened the nutrition of the German people.^[91]

The Allies won on the battlefield. Their superiority in [logistics](#) was crushing, while German logistical weakness in crucial areas was becoming manifest: the shortage of lubricants, petrol, and rubber was seriously affecting the army’s mobility. The end of the supply of these materials was within sight: as Army Group Commander Field Marshal [Rupprecht, Crown Prince of Bavaria \(1869-1955\)](#) admitted in mid-October 1918: “There is a lack of fuel for the lorries, and if the Austrians abandon the alliance and we don’t get any more petrol from Romania, our air force will be grounded within two months.”^[92] Not only was the cohesion of the army disappearing, as Ludendorff feared at the end of September: it was facing a threat to its freedom of manoeuvre. An army that is paralysed is in peril of complete

disintegration.

Economic warfare, which targeted the entire enemy economy and its civilian population, represented a step on the road to total warfare in the 20th century. It was not against the letter of international law or the tradition of warfare, but it was contrary to the spirit of international law, which was to protect civilians from war.^[93] The economic war waged by the Central Powers had little chance of threatening the Allies' command of global resources, except briefly in 1917. Their blockade of Russia was one factor in its defeat, alongside several more important ones. Comparison with Russia demonstrates the illogicality of the hunger-blockade thesis. Here, food shortages in the cities were a critical problem by 1916, yet Russia had been a major exporter of food before the war.^[94] The reasons were the collapse of the transport system, the shortage of farm labour owing to conscription, the requisitioning of horses, and the failure of rationing.^[95]

Germany was able to use the adjacent neutral states to obtain essential imports, but with sharply declining quantities as from mid-1916. Its strongest asset was its command of the labour and resources of occupied Europe. Although smaller than Allied global resources, these were considerable; it remains a task of research to assess their value.

Allied economic warfare meant securing access to global resources. Their denial was one of the causes of the reduction in German food supply, along with several endogenous causes, notably the lack of farm labour and draught animals, a reduction of land under cultivation, and a shortage of coal for transporting and processing food. Taken together, the blockade and the broader measures of economic warfare contributed at most half of the exogenous effect on German food supply; endogenous factors probably accounted for greater declines in food availability. The shortages of key industrial raw materials and oil, partly caused by the blockade and partly by the Central Powers' declining ability to pay for imports, but mostly by their enemies' ownership of the resources, were more decisive in shifting the military balance than food shortages.

Epilogue

The blockade of Germany did not end with the armistice. The Allies maintained it to ensure that Germany was in no position to resume warfare. Working-class families in urban Germany suffered famine conditions for many months. Yet German claims that the Allies were deliberately starving German children out of vindictiveness were propaganda intended to continue the mobilization of hatred; they concealed the fact that the army held one and a half million tons of food and controlled 60 percent of the meat supplies, while farmers and large companies hoarded stocks of food.^[96] Undoubtedly, the [revolution](#), demobilization, and [social conflict](#) hindered a return to normal commerce and distribution. But that was only part of the story. Allied troops entering the [occupied](#) zones of western Germany in November-December 1918 reported that food in the countryside was plentiful, though there were shortages in the cities. The condition of the people was "better than German propaganda indicates", and food was cheaper than in France or Belgium. As the American

Third Army reached the Rhine on a stretch north and south of Koblenz, its units consistently reported that the fields were “well cultivated” and that “the people are not in want but on the contrary seem well fed and well clothed.”^[97] This indicates continued wilful neglect of the needs of the urban population and misallocation of resources by the German political authorities. Some historians have suggested that the government and the military authorities imposed an internal blockade against working-class regions engaged in social and political protest, above all in the Ruhr and central Germany.^[98]

Under the pressure of the German government’s claim of the threat of Bolshevik insurgence, the Allies partially relaxed the blockade in March 1919 to allow relief supplies, and lifted it finally in July, following the Treaty of Versailles.^[99] By agreement with the Allies (at Trier on 17 January and Brussels on 14 March 1919) Germany was allowed to import 200,000 tons of bread grain and 70,000 tons of pork. By the time of the signing of the peace treaty on 28 June, 346,029 tons of bread grain, flour, and fodder had been imported.^[100]

The history of the blockade did not end there. Determined to launch a war to wipe out the peace settlements of 1919 and establish Germany as a world power, the Nazi regime carefully examined the experience of 1914-1918. Anticipating that the blockade would be repeated in a future war, the “lesson” learned was that Germany had to avoid being cut off again from the supply of essential raw materials and food. This was to be achieved by a policy of autarky, in other words self-sufficiency as far as possible, especially with regard to food and the war economy, through import substitution and synthesis of raw materials such as rubber and oil. In addition, Germany would have to create a greater economic bloc which it would dominate and whose resources it would exploit: a radicalized version of the *Mittleuropa* concept which had been mooted in the First World War. [Adolf Hitler’s \(1889-1945\)](#) memorandum on the Four-Year Plan in 1936 emphasized the need for independence from imports and self-sufficiency. Military leaders and civilian industrialists shared these assumptions.^[101]

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Notes

1. ↑ This article is based in part on, but is by no means identical with, my chapter, Kramer, Alan: Blockade and Economic Warfare in: Winter, Jay (ed.): The Cambridge History of the First World War. The State, volume 2, Cambridge 2014, pp. 460-489. I should like to thank the press for permission to reuse material. I am grateful to Jonas Scherner for some valuable insights and David Walkden for a critical reading of the text.

2. † The lower estimate is by Jay Winter, in Winter, Jay / Robert, Jean-Louis: *Capital Cities at War*. Paris, London, Berlin 1914-1919, volume 1, Cambridge 1997, p. 517, footnote 34. The higher estimate is in Corni, Gustavo: *Famine*, in: Hirschfeld, Gerhard / Krumeich, Gerd / Renz, Irina (eds.): *Brill's Encyclopedia of the First World War*, Leiden et al. 2012, pp. 504-505. Roerkohl, Anna: *Hungerblockade und Heimatfront. Die kommunale Lebensmittelversorgung in Westfalen während des Ersten Weltkrieges*, Stuttgart 1991, pp. 312-323, and Vincent, Charles Paul: *The Politics of Hunger. The Allied Blockade of Germany, 1915-1919*, Athens, Ohio et al. 1985, p. 145, using German sources from immediately after the war, both cite the figure 800,000, although the latter admits the figure may be too high. Roerkohl carefully pointed out that the excess civilian mortality cannot be ascribed exclusively to the blockade, mentioning the grave failings of state policy and the power of interest groups, especially the agrarian lobby, and the distortions caused by the unlimited powers of the military, at the cost of food supply to the urban population.
3. † A study by the Reich Health Office of 16 December 1918, entitled "Damage to German Public Health by the Enemy Trade Blockade Contrary to International Law" claimed that the excess mortality of 762,796 civilians was due to the blockade: Schücking, Walter et al. (eds.): *Das Werk des Untersuchungsausschusses der Verfassunggebenden Deutschen Nationalversammlung und des Deutschen Reichstags 1919-1930. Verhandlungen, Gutachten, Urkunden. Die Ursachen des deutschen Zusammenbruchs im Jahre 1918. Der Innere Zusammenbruch*, series 4, section 2, volume 6, Berlin 1928, pp. 397-398.
4. † French, David: *British Economic and Strategic Planning 1905-1915*, London 1982, pp. 1-2.
5. † Offer, Avner: *The First World War. An Agrarian Interpretation*, Oxford 1991, p. 227, quoting from a memorandum of 1905.
6. † Kennedy, Greg: *Intelligence and the Blockade, 1914-1917. A Study in Administration, Friction and Command*, in: *Intelligence and National Security* 22/5 (2007), pp. 699-721, here p. 700.
7. † Lambert, Nicholas A.: *Planning Armageddon. British Economic Warfare and the First World War*, Cambridge, M.A. 2012, pp. 3, 501.
8. † By omitting the decisive stages of the period from early 1916 to late 1918, Lambert tells a story of the failure of economic warfare. Moreover, by ignoring the effects of the policy in Germany, he misses the opportunity to assess its impact. My views have recently found confirmation in a lengthy critique, which points out many more inconsistencies, implausible claims, and unfounded assertions in Lambert's work: Coogan, John W.: *The Short-War Illusion Resurrected. The Myth of Economic Warfare as the British Schlieffen Plan*, in: *Journal of Strategic Studies* 38/7 (2015), pp. 1045-1064.
9. † Strachan, Hew: *The First World War. To Arms*, volume 1, Oxford 2001, pp. 393-400.
10. † Halpern, Paul G.: *The War at Sea*, in: Strachan, Hew (ed.): *The Oxford Illustrated History of the First World War*, Oxford 1998, p. 106.
11. † Strachan, *To Arms* 2001, pp. 402, 442, 255.
12. † Churchill to Col. Seely, 20 September 1914, in: Gilbert, Martin S.: *Winston S. Churchill. Companion. Documents July 1914-April 1915*, volume 3, part 1, London 1972, p. 125.
13. † Lambert, *Planning Armageddon* 2012, p. 212.
14. † Kennedy, Paul: *Imperial Cable Communications and Strategy, 1870-1914*, in: *English Historical Review* 86 (1971), pp. 728-752, here p. 752.

15. ↑ Bell, Archibald Colquhoun: A History of the Blockade of Germany and of the Countries Associated with her in the Great War. Austria-Hungary, Bulgaria, and Turkey, 1914-1918, London 1961. Bell describes in some detail the legal and diplomatic complexities of the first order-in-council of 20 August 1914, the pressure of public opinion and of the French government for a more stringent policy to stop the enemy's supplies, and conflicts with the US over its exports of copper and cotton, pp. 40-50.
16. ↑ Ibid., pp. 16, 59, and appendix II p. 722; Lambert, Planning Armageddon 2012, p. 226.
17. ↑ Bourne, Kenneth / Watt, Donald Cameron / Stevenson, David (eds.): British Documents on Foreign Affairs. Reports and Papers from the Foreign Office Confidential Print. From the First to the Second World War. The First World War, 1914-1918. Blockade and Economic Warfare, I. August 1914-July 1915, part 2, series H, volume 5, Frederick 1989, doc. 16, List of articles to be treated as absolute contraband under the Royal Proclamations of October 18 and December 1914, pp. 12-13.
18. ↑ Lambert, Planning Armageddon 2012, pp. 366-369.
19. ↑ For figures see Kramer, Blockade 2014, p. 467; Bourne et al., Blockade and Economic Warfare, I. August 1914-July 1915 1989, doc. 123, Memorandum to Swedish Minister, 10 May 1915, pp. 152-155. On Sweden see Lambert, Planning Armageddon 2012, pp. 392-408.
20. ↑ Bourne, Kenneth / Watt, Donald Cameron / Stevenson, David (eds.): British Documents on Foreign Affairs. Reports and Papers from the Foreign Office Confidential Print. From the First to the Second World War. The First World War, 1914-1918. Blockade and Economic Warfare, II. July 1915-January 1916, part 2, series H, volume 6, docs. 120 and 121 (enclosure) Sir C. Spring-Rice to Sir Edward Grey, 1 October 1915, pp. 154-161.
21. ↑ Lambert, Planning Armageddon 2012, pp. 431-432. To this day the precise extent of neutral re-exports to Germany is controversial: Kennedy, Greg: Strategy and Power. The Royal Navy, the Foreign Office and the Blockade, 1914-1917, in: Defence Studies 8/2 (2008), pp. 190-206, suggests that the Admiralty exaggerated the figures and failed to understand the nature of agreements between Britain and neutral shipping lines, merchants, and states.
22. ↑ Bell, A History of the Blockade 1961, p. 45.
23. ↑ Lambert, Planning Armageddon 2012, pp. 428-429; Offer, The First World War 1991, p. 306 (on Lloyd George).
24. ↑ Frey, Marc: Trade, Ships, and the Neutrality of the Netherlands in the First World War, in: The International History Review 19/3 (1997), pp. 541-562, here p. 547; Lambert, Planning Armageddon 2012, p. 475.
25. ↑ Bourne, Kenneth / Watt, Donald Cameron / Stevenson, David (eds.): British Documents on Foreign Affairs. Reports and Papers from the Foreign Office Confidential Print. From the First to the Second World War. The First World War, 1914-1918. Blockade and Economic Warfare, IV. November 1916-November 1918, part 2, series H, volume 8, doc. 50-51, Townley to Balfour, report by Francis Oppenheimer (British commercial attaché at The Hague) 14 February 1917, pp. 98-100.
26. ↑ Frey, Trade 1997, pp. 552-554, 561.
27. ↑ British Blockade. HC Deb 01 March 1917 volume 90 cc2118-9, issued by Hansard 1803-2005, online: <https://api.parliament.uk/historic-hansard/commons/1917/mar/01/british-blockade> (retrieved: 12 December 2018).
28. ↑ Stevenson, David: Introduction, in: Bourne et al., Blockade and Economic Warfare, I. August 1914-July 1915 1989, p. xvii.

29. ↑ Grainger, John D. (ed.): *The Maritime Blockade of Germany in the Great War. The Northern Patrol, 1914-1918*, Aldershot 2003, p. 1.
30. ↑ *Ibid.*, pp. 1-3.
31. ↑ The National Archives, UK, CAB 24/8/35, memorandum Ministry of Blockade, n.D., March 1917, presumably by Lord Cecil, Minister for the Blockade.
32. ↑ McKercher, B. J. C.: *Economic Warfare*, in: Strachan, Hew (ed.): *Oxford Illustrated History of the First World War*, Oxford 1998, pp. 119-133, here p. 124. On the fraught, sometimes hostile, relations between the British Foreign Office and the Admiralty, see Kennedy, *Strategy and Power* 2008, pp. 190-206.
33. ↑ Grainger, *Maritime Blockade* 2003, pp. 4-10.
34. ↑ Kennedy, *Intelligence and Blockade* 2007.
35. ↑ Huegel, Arnulf: *Kriegsernährungswirtschaft Deutschlands während des Ersten und Zweiten Weltkrieges im Vergleich*, Konstanz 2003, p. 13.
36. ↑ Eltzbacher, Paul (ed.): *Die deutsche Volksernährung und der englische Aushungerungsplan. Eine Denkschrift*, Braunschweig 1914, pp. 62-64, 195.
37. ↑ Vincent, *The Politics of Hunger* 1985, p. 20; Davis, Belinda J.: *Home Fires Burning. Food, Politics, and Everyday Life in World War I* Berlin, Chapel Hill 2000, p. 22. An inter-war German publication claimed by contrast that pre-war Germany had to import only 5 to 6 percent of its grain and meat, but this was almost certainly a wilful underestimate intended to back the argument that the imperial government was incompetent in planning for war: Jost, Walter / Felger, Friedrich: *Was wir vom Weltkrieg nicht wissen*, Leipzig 1936, p. 388.
38. ↑ Bell, *A History of the Blockade* 1961, pp. 672-574; Davis, *Home Fires* 2000, p. 22; Vincent, *The Politics of Hunger* 1985, p. 145; Osborne, Eric W.: *Britain's Economic Blockade of Germany 1914-1919*, London 2004, p. 182.
39. ↑ Offer, *The First World War* 1991, pp. 46-53.
40. ↑ Broadberry, Stephen / Harrison, Mark: *The Economics of World War I. An Overview*, in: Broadberry, Stephen / Harrison, Mark (eds.): *The Economics of World War I*, Cambridge 2005, pp. 3-40, here p. 19. Their comment is clearly intended to apply to Germany, in addition to those other countries that suffered severe problems with food supply.
41. ↑ Roerkohl, *Hungerblockade* 1991, p. 31. These figures are for Westphalia, but there is no reason to assume it was very different elsewhere.
42. ↑ Offer, *The First World War* 1991, p. 62.
43. ↑ Osborne, *Britain's Economic Blockade* 2004, p. 182. According to a German source from the 1920s, German imports of fats (which means butter, vegetable oils and fats, and margarine), may have been even lower – 3,767 tons in 1917. Skalweit, August: *Die deutsche Kriegsernährungswirtschaft*, Berlin 1927, quoted in Ritschl, Albrecht: *The Pity of Peace. Germany's Economy at War, 1914-1918 and Beyond*, in: Broadberry / Harrison, *The Economics of World War I* 2005, pp. 41-76, here p. 58, table 2. Roerkohl cites slightly lower figures: the Reich authorities set a norm of 90 grams of fat in both 1917 and 1918, but the municipalities in Westphalia could only provide between 58 and 64 grams, Roerkohl, *Hungerblockade* 1991, pp. 126-127. The argument remains unaffected.
44. ↑ Huegel, *Kriegsernährungswirtschaft* 2003, p. 329.
45. ↑ Eltzbacher, *Die deutsche Volksernährung* 1914, p. 62.
46. ↑ Riebel, Kurt: *Die Versorgung Deutschlands mit tierischen und pflanzlichen Oelen und Fetten. Ein Vergleich mit der Vorkriegszeit*, Thesis, Heidelberg University 1926, p. 7.

47. † Heather Jones (University College London) is currently working on the cultural history of blockade.
48. † Cf. *ibid.*, p. 62, and preface, p. v.
49. † Kaiserliches Statistisches Amt (ed.): *Statistisches Jahrbuch für das Deutsche Reich*, Berlin 1914, p. 183, also for the following table. Henceforth referred to as SJDR.
50. † SJDR 1914, p. 43.
51. † Offer, *First World War* 1991, p. 63.
52. † SJDR 1914, p. 199.
53. † Roerkohl, *Hungerblockade* 1991, p. 317.
54. † Musehold, Dr. Paul: Ernährung. 1, Die Ernährung des Feldheeres, in: Schjerning, Otto von (ed.): *Handbuch der Ärztlichen Erfahrungen im Weltkriege 1914/1918. Hygiene*, volume 7, Leipzig 1922, pp. 91-109, here p. 100.
55. † Chickering, Roger: *Imperial Germany and the Great War, 1914-1918*, Cambridge 2004, p. 42.
56. † Wehler, Hans-Ulrich: *Deutsche Gesellschaftsgeschichte. Von der Deutschen Doppelrevolution bis zum Beginn des Ersten Weltkrieges 1849-1914*, volume 3, Munich 1995, p. 698.
57. † Treitel, Corinna: Max Rubner and the Biopolitics of Rational Nutrition, in: *Central European History* 41 (2008), pp. 1-25, here p. 9.
58. † *Ibid.* pp. 19-20.
59. † Alfred Stellwaag, *Die deutsche Eisenwirtschaft während des Krieges*, ed. by Marcel Boldorf and Rainer Haus, Berlin: De Gruyter Oldenbourg, 2016, p. 287. This book was originally scheduled for publication in 1922.
60. † Osborne, *Britain's Economic Blockade*, p. 183. He estimates German iron production in 1918 to be 9,208 tons (sic).
61. † Alfred Stellwaag, *Die deutsche Eisenwirtschaft während des Krieges*, ed. by Marcel Boldorf and Rainer Haus, Berlin: De Gruyter Oldenbourg, 2016, p. 15; iron ore from Lorraine: p. 38; ore from Sweden: p. 226.
62. † Stellwaag, *Die deutsche Eisenwirtschaft*, pp. 52-55.
63. † Stellwaag, *Die deutsche Eisenwirtschaft*, pp. 79-80.
64. † Stellwaag, *Die deutsche Eisenwirtschaft*, pp. 140-141; for 1918 pp. 223-239, 259.
65. † Karlsch, Rainer / Stokes, Raymond G.: *Faktor Öl. Die Mineralölwirtschaft in Deutschland 1859-1974*, Munich 2003, p. 93.
66. † Offer, *First World War* 1991, p. 61.
67. † List of articles to be treated as absolute contraband under the Royal Proclamations of October 18 and December 1914, 23 December 1914, in: Bourne et al., *Blockade and Economic Warfare*, I. August 1914-July 1915 1989, doc. 16, pp. 12-13.
68. † Ritschl, *The Pity of Peace* 2005, table 2.7, p. 50, and Hardach, Gerd: *Der Erste Weltkrieg 1914-1918*, Munich 1973, table 6, p. 42.
69. † SJDR 1914 p. 258; cf. Gerd Hardach, 'Die finanzielle Mobilmachung in Deutschland 1914–1918', in *Jahrbuch für Wirtschaftsgeschichte* 56/2 (2015), pp. 359-387, here 379–381.
70. † This elementary point seems to have escaped those who have hitherto written on the blockade certainly and the war economy; cf. Ritschl, *The Pity of Peace* 2005, p. 52.

71. † Bourne et al., *Blockade and Economic Warfare*, II. July 1915-January 1916 1989, doc 217, Memorandum Foreign Office 28 December 1915, pp. 367-378.
72. † Strachan, *To Arms* 2001, pp. 1026-1027.
73. † *Ibid.*, pp. 1018-1020.
74. † Goebel, Otto: *Deutsche Rohstoffwirtschaft im Weltkrieg*, Stuttgart 1930, p. 16.
75. † Ritschl, *The Pity of Peace* 2005, p. 47 and table 2.5, p. 49.
76. † Scherner, Jonas: *Lernen und Lernversagen. Die Metallmobilisierung im Deutsche Reich, 1939 bis 1945*, in: *Vierteljahrshefte für Zeitgeschichte* 66/2 (2018), pp. 233-266, here p. 266.
77. † Jèze, Gaston: *The War Finance of France. The War Expenditure of France*, New Haven 1927, pp. 73-74.
78. † De Schaepdrijver, Sophie: *La Belgique et la Première Guerre mondiale*, Brussels 2004, pp. 216-17; Stellwaag, *Die deutsche Eisenwirtschaft*, pp. 95-97, 198-222.
79. † Epkenhans, Michael: *Die kaiserliche Marine im Ersten Weltkrieg*, in: Michalka, Wolfgang (ed.): *Der Erste Weltkrieg. Wirkung, Wahrnehmung, Analyse*, Munich 1994, pp. 319-340, here pp. 322-323.
80. † Strachan, *To Arms* 2001, pp. 466-480.
81. † Memorandum by the Chief of Admiralty Staff, Admiral Hugo von Pohl, 7 January 1915, in: Otto, Helmut / Schmiedel, Karl (eds.): *Der erste Weltkrieg. Dokumente*, Berlin 1983, doc. 35, pp. 117-121.
82. † Order by Admiral Gustav Bachmann on behalf of Admiralty staff, 18 February 1915, in: Otto et al, *Der erste Weltkrieg* 1983, doc. 36, pp. 122-123.
83. † Covering letter by Chief of Admiralty Staff Admiral von Holtendorff on the memorandum "On the necessity of unrestricted U-boat warfare" to the chief of general staff of the army, Field-Marshal von Hindenburg, 22 December 1916, see *Ibid.*, doc. 85, pp. 213-215.
84. † Minutes of meeting between Chancellor von Bethmann Hollweg, Chief of Army General Staff Field Marshal von Hindenburg, and First Quartermaster-General General Ludendorff, on the opening of unrestricted U-boat warfare, 9 January 1917, see *Ibid.*, doc. 88, pp. 222-224. Herwig, Holger: *Total Rhetoric, Limited War. Germany's U-Boat Campaign, 1917-1918*, in: Chickering, Roger / Förster, Stig (eds.): *Great War, Total War. Combat and Mobilization on the Western Front, 1914-1918*, Cambridge 2000, pp. 189-206, here pp. 192-196.
85. † *Ibid.*, pp. 192-200.
86. † Both cited in *Ibid.*, p. 192.
87. † Davis, Lance E. / Engerman, Stanley L.: *Naval Blockades in Peace and War. An Economic History since 1750*, Cambridge 2006, p. 187.
88. † Herwig, *Total Rhetoric* 2000, pp. 200-202. See above all Winter, Jay: *The Great War and the British People*, Basingstoke 2003, pp. 103-153.
89. † General Groener, letter 3 November 1917, in Otto et al., *Der erste Weltkrieg* 1983, doc. 108, pp. 270-271.
90. † The common, but by no means universal, assumption of civilian morale causing Germany's collapse is in Osborne, *Britain's Economic Blockade* 2004, p. 182. The assumption is based on the questionable statements made by Ludendorff and Hindenburg which formed part of their accusation that the German army had been "stabbed in the back".

91. ↑ Speech Dr. Philipp, 11 October 1927, in: Schücking, Walter et al. (eds.): Das Werk des Untersuchungsausschusses der Verfassunggebenden Deutschen Nationalversammlung und des Deutschen Reichstags 1919-1930. Verhandlungen, Gutachten, Urkunden. Die Ursachen des deutschen Zusammenbruchs im Jahre 1918. Der Innere Zusammenbruch, series 4, section 2, volume 5, Berlin 1928, p. 138.
92. ↑ Commander of Army Group Crown Prince Rupprecht, Field-Marshal Crown Prince Rupprecht von Bayern, to Chancellor Prince Max von Baden, 18 October 1918, in: Otto et al., Der erste Weltkrieg 1983, doc. 135, pp. 327-9.
93. ↑ The contemporary German condemnation of Allied economic warfare as illegal is in Schücking, Walter et al. (eds.): Das Werk des Untersuchungsausschusses der Verfassunggebenden Deutschen Nationalversammlung und des Deutschen Reichstags 1919-1930. Verhandlungen, Gutachten, Urkunden. Völkerrecht im Weltkrieg, series 3, volume 4, Berlin 1927, pp. 361-474; condemnation of Allied blockade policy: *ibid.*, pp. 121-131, 147-163. In Hull, Isabel V.: A Scrap of Paper. Making and Breaking International Law during the Great War, Ithaca / London 2014, Hull makes the case that the blockade was legal; she exonerates British policy of the charge that it intended to starve the German population or threatened the neutral states with starvation. John W. Coogan questions her assumptions of British legality in a review: Coogan, John W.: Isabel V. Hull. A Scrap of Paper. Breaking and Making International Law during the Great War, issued by H-Diplo ISSF, online: <http://h-diplo.org/essays/PDF/E121.pdf> (retrieved: 30 October 2018).
94. ↑ Figes, Orlando: A People's Tragedy. A History of the Russian Revolution, New York 1996, p. 300.
95. ↑ Gatrell, Peter: Poor Russia, Poor Show. Mobilising a Backward Economy for War, 1914-1917, in: Broadberry / Harrison, (eds.): The Economics of World War I 2005, pp. 235-275, here pp. 256-259.
96. ↑ Howard, N. P.: The Social and Political Consequences of the Allied Food Blockade of Germany, 1918-19, in: German History 11/2 (1993), pp. 161-188, here p. 175.
97. ↑ United States Army in the World War 1917-1919. Reports of the Commander-in-Chief, Staff Sections and Services, volume 13, Washington, D.C. 1991, reports of Third Army and subordinate units, 1 to 8 December 1918, pp. 384-388 See Reports of the Commander-in-Chief, Staff Sections and Services, issued by U.S. Army Center of Military History, online: https://history.army.mil/html/books/023/23-19/CMH_Pub_23-19.pdf (retrieved: 9 November 2018).
98. ↑ Howard, Social and Political Consequences 1993, pp. 181-182.
99. ↑ *Ibid.*
100. ↑ Reich Minister for Nutrition and Agriculture to the Parliamentary Investigation Commission, 4th Sub-Commission, 9 March 1926, cited in session of 18 March 1926, Schücking, Walter et al. (eds.): Das Werk des Untersuchungsausschusses der Verfassunggebenden Deutschen Nationalversammlung und des Deutschen Reichstags 1919-1930. Verhandlungen, Gutachten, Urkunden. Die Ursachen des deutschen Zusammenbruchs im Jahre 1918. Der innere Zusammenbruch, series 2, section 2, volume 4, pp. 292-294.
101. ↑ Priemel, Kim Christian: Lernversagen. Der Erste Weltkrieg und die nationalsozialistische Wirtschaftspolitik, in: Krumeich, Gerd / Hoffstadt, Anke / Weinrich, Arndt (eds.): Nationalsozialismus und Erster Weltkrieg, Essen 2010, pp. 300-322, here pp. 303-305. On the strenuous, ultimately successful, but economically irrational and wasteful, effort to secure the supply of non-ferrous metals in the Second World War on the basis of the "lessons" of the First, see Scherner, Lernen und Lernversagen 2018.

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Citation

Kramer, Alan: Naval Blockade (of Germany) , in: 1914-1918-online. International Encyclopedia of the First World War, ed. by Ute Daniel, Peter Gatrell, Oliver Janz, Heather Jones, Jennifer Keene, Alan Kramer, and Bill Nasson, issued by Freie Universität Berlin, Berlin 2020-01-22. DOI: [10.15463/ie1418.11451](https://doi.org/10.15463/ie1418.11451).

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