

Spring 1998

[War and the New Global Order: Has Anything Really Changed?](#)
David J. Bercuson

[Total Rhetoric, Limited War: Germany's U-Boat Campaign 1917-1918](#)
Holger H. Herwig

[Evaluation of GPS-Aided Artillery Positioning and Orientation Methods](#)
G. Lachapelle, M.E. Cannon and J. Bird

[Some Canadian Experience Suggesting Evolutionary Models of Innovations Involving Industry, Government, and Universities](#)
Cooper H. Langford, Martha W. Langford and R. Douglas Burch

[Military Law, the Canadian Militia, and the North-West Rebellion of 1885](#)
Chris Madsen

[Spring 1998 Main Page](#)

[Fall 1999 Main Page](#)

Total Rhetoric, Limited War: Germany's U-Boat Campaign 1917-1918

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Our armies might advance a mile a day and slay the Hun in thousands, but the real crux lies in whether we blockade the enemy to his knees, or whether he does the same to us.

Admiral David Beatty

January 27, 1917

Imagine this country's sufferings after four years of blockade. The stock of pigs slashed 77 percent; that of cattle 32 percent. The weekly per capita consumption of meat reduced from 1,050 grams to 135; the amount of available milk by half. Women's mortality up 51 percent; that of children under five 50 percent. Tubercular-related deaths up 72 percent; the birthrate down by half. Rickets, influenza, dysentery, scurvy, ulceration of the eyes, and hunger edema a common occurrence. Malnutrition, smuggling, black marketing, and hoarding widespread. And 730,000 deaths attributed by the country's Health Office to the wartime blockade. This country is not "perfidious Albion," but rather Imperial Germany. The suffering caused was not by unrestricted submarine warfare, but rather by a surface blockade that, in the eyes of Jay Winter, did not fall short of being a war crime. Thus, we may well ask how "total" was Germany's unrestricted submarine warfare?

The Definition

The concept of "total war" is a vexing one and continues to defy precise definition. Does it infer the "total" application of all available armed force? Does it require "total" political aims, that is the "total" annihilation of the adversary? Does it translate into what John Keiger describes as the pursuit of "total" victory? Reference guides offer little assistance. The Official Dictionary of Military Terms published by the American Joint Chiefs of Staff in Washington, D.C., under "total war" reads: "Not to be used." A private civilian reference guide, Edward Luttwak and Stuart Koehl, The Dictionary of Modern War, under "total war" warns the reader: "The term is propagandistic and literary. . . ."

For the purpose of assessing the "process of totalizing" war with specific reference to Germany's unrestricted submarine campaign of 1917, I will therefore use the generic definition offered by Carl von Clausewitz in Book Eight, Chapter Two, of On War. There, he depicted "absolute war" as a "general point of reference," as a "state of absolute perfection"; in other words, as a theoretical "standard" to "judge all wars by." A nation or ruler seeking to approach this ideal-type method, Clausewitz stated, needed to wage war "without respite until the enemy succumbed," that is, with all available forces and resources until one side dictated political terms to the other. In real war, of course, the "absolute" ideal was tempered by "extraneous matters" such as friction, inertia, inconsistency, imprecision, and the "timidity of man."

Few military leaders read Clausewitz; even fewer understood him. For example, Admiral Alfred von Tirpitz, the architect of Germany's High Sea Fleet, in 1888-9 translated "absolute war" simply into "victory in the first great naval battle" of a war. In other words, victory in battle for Tirpitz was synonymous with "absolute" or "total" war. And General Erich Ludendorff, who in 1935 wrote a bestseller entitled Total War, allowed that the very concept simply tended to confuse (verwirrend

wirken). Still, Ludendorff later in the book championed unrestricted submarine warfare in 1917-8 as a genuine form of "total war."

The Vision

The first torpedo in the great debate over unrestricted submarine warfare was launched by Tirpitz on December 22, 1914. During an interview published by the Berlin representative of United Press, the grand admiral threatened "total" submarine warfare against the entente powers. Queried by Karl von Wiegand whether Germany truly intended to blockade Britain with its U-boats, Tirpitz testily replied: "If pressed to the utmost, why not? - England wants to starve us into submission; we can play the same game, blockade England and destroy each and every ship that tries to run the blockade." Tirpitz even toyed with the idea of "setting London in flames in a hundred places" with an aerial assault, but conceded that "a U-boat blockade would be more effective."

A fellow naval officer, Captain Magnus von Levetzow, the High Sea Fleet's future chief of operations, shortly after the start of the war gained insight into submarine warfare through a strange source: Sir Arthur Conan Doyle. In 1913 the creator of Sherlock Holmes had published a short story, "Danger! A Story of England's Peril," wherein he suggested that Britain, even after capturing the "enemy" fleet, was defeated by eight (!) small hostile submarines that starved her out within six weeks by attacking her merchant shipping. Levetzow passed the piece on to Fleet Commander Admiral Reinhard Scheer as well as to Kaiser Wilhelm II, and thereby claimed the title of "midwife" to unrestricted submarine warfare.

In an even more bizarre way, Rear-Admiral Karl Hollweg came to the conclusion that the Lord God wanted Germany to turn to unrestricted submarine warfare. Sitting in a Memorial Day (Totensonntag) service at Berlin in 1916, Hollweg experienced a quasi-theological "vision" when reciting the words "Power and Glory" of the Lord's Prayer. "The word 'Power' punched deeply into my memory. Yes, give us the power for the will to victory, Thou Governor of Battles!"

After the war, Allied leaders in their memoirs suggested that the Germans had come within a hairsbreadth of winning the war by way of the U-boats. The American Rear-Admiral William S. Sims recalled the gloom and despair that met him when he arrived at the Admiralty in April 1917. The Germans, he was told, "were winning" the war. "They will win," Admiral Sir John Jellicoe cautioned Sims, "unless we can stop these losses [603,000 tons in March] - and stop them soon." When Sims queried Jellicoe as to possible solutions to the problem, the first sea lord replied dourly: "Absolutely none that we can see now." Indeed, Jellicoe was most pessimistic throughout the spring of 1917 about the war against the submarines. On April 27, he cried out in exasperation at the War Cabinet's failure to grasp the seriousness of the submarine threat. "Disaster is certain to follow, and our present policy is heading straight for disaster and it is useless and dangerous in the highest degree to ignore the fact." His eventual successor, Admiral Sir David Beatty, was fully convinced that the war had come down to one of shipping attrition--on and below the seas.

Nor were the sailors alone in their gloom. Prime Minister David Lloyd George after the war recalled: "The submarine campaign . . . very nearly achieved the destruction of Britain's sea power." And the eminently quotable Winston Churchill confirmed every U-boater's view of the war. "It was in scale and in stake the greatest conflict ever decided at sea." Terming unrestricted submarine warfare as nothing less than "among the most heart-shaking episodes of history," Churchill assured the Germans that victory had been within their grasp in the spring of 1917. "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." In short, there was near unanimity in the chambers at Whitehall and the Admiralty that Germany had crossed the threshold into "total war."

The Promise

There can be no question that the promise of unrestricted submarine warfare was "total" victory by "total" war. Success by slide-rule calculations was guaranteed. While there exist countless memoranda, both official and private, on the issue of unrestricted submarine warfare, for our purposes it suffices to analyze the best known and most critical memorandum on the subject by Admiral Henning von Holtzendorff on December 22, 1916. Therein, the chief of the admiralty staff promised that "England will be forced to sue for peace within five months as the result of launching an unrestricted U-boat war." In fact, estimates of Britain's demise due to the U-boats hovered between two months (Tirpitz) and eight months (Holtzendorff). Assuming that Britain had available about 10 million tons of merchant shipping, Holtzendorff argued that the U-boats could readily sink 600,000 tons per month for four months and 500,000 tons per month thereafter as the volume of traffic on the high seas lessened; that 40 percent, or 1.2 million tons, of neutral shipping would be frightened off the seas; and that most of the 1.4 million tons of German bottoms interned in neutral ports could be "made unseaworthy" by their crews. The resulting 39 percent decline in tonnage available to succor Britain would constitute a "final and irreplaceable loss." London would be "in the grip of that fear which guarantees the success of the unrestricted U-boat war." Holtzendorff confidently accepted "the cost of a break with the United States" as neither American troops nor American money could arrive in Europe in time to blunt the U-boat offensive. The admiral's opinion was seconded by the Army Supreme Command (Field Marshal Paul von Hindenburg, General Ludendorff), the Navy Office (Admiral Eduard von Capelle), and the High Sea Fleet (Captain von Levetzow).

For, Holtzendorff offered a "new" concept of warfare. The very weapon, the U-boat, was new; just a decade had passed since U-1 had gone down the slip in 1906. New also was the form of blockade--siege warfare at sea, wherein submarines replaced battering rams, catapults, towers, Greek fire, and sappers--whereby ships and cargoes were to be destroyed rather than seized. New were the statistical compilations, by both naval and civilian experts, that translated tonnage sunk by submarine warfare into political victory. New was the very concept that an industrialized state could be brought to its knees by this kind of economic blockade. And new was that civilian populations in general and women and children in particular were targeted for starvation. Caloric intake became a measure of survival or defeat. The U-war reduced German strategy to one of ordnance (torpedoes) on target.

But how had the admiral arrived at his blueprint for "total" war? What mathematical calculations lay at its root? And how accurate were they?

Another new element: Holtzendorff had gathered in the Admiralty Staff's Department BI a small army of experts--the equivalent of a modern-day think tank--to make his case. They included Dr. Richard Fuss of the Discontogesellschaft-Magdeburg; the Heidelberg professor of economics, Hermann Levy; the editor of the Berliner Tageblatt, Otto J_ülinger; the grain merchants Hermann Weil and Henry P. Newman; and Professor Bruno Harms of Kiel University. Fuss, Newman, Weil, and Levy were the principal authors of Holtzendorff's memorandum of December 22, 1916. In addition, Holtzendorff had recruited experts from the worlds of finance (Merk, Fink & Co. at Munich, Diskontogesellschaft and Dresdner Bank at Berlin, Norddeutsche Bank at Hamburg, and Zuckschwerdt & Beuchel at Magdeburg), industry (Phoenix Mines and Foundries at H_ünde, Good Hope Foundry at Oberhausen, and Hoesch Iron & Steel at Dortmund), and agriculture (Chamber of Agriculture in Anhalt, Chamber of Estates in W_ürttemberg, and a country squire from Dirschau). In short, the admiral made his case with the support of a seemingly irrefutable cross-section of Germany's leading financial, commercial, agrarian, and industrial leaders. For the first time in modern German history, a national grand strategy was devised by committee.

The statistics that buttressed the official Admiral Staff memoranda were culled

from a plethora of sources. These included not only the London Times, the Glasgow Herald, the Manchester Guardian, the Economist, the Spectator, and the parliamentary Hansard, but also specialty papers such as the Corn, Seed & Oil Reporter, the Corn Trade News, the Liverpool Journal of Commerce, and Lloyd's Register. And the grain experts on the German Frankfurter Zeitung and Berliner Tageblatt.

The various memoranda all agreed, to varying degrees of certainty, on a number of basic, irrefutable points. First was that the war had to be brought to an end "by the autumn of 1917" as otherwise it would "result in the exhaustion of all the belligerents," which Holtendorff saw as being "fatal for us." Hence, the prediction of victory through the U-boats by August 1, 1917 coincided perfectly with accepted political-strategical views.

Second, Holtendorff and his paladins agreed that a modern economy was "a masterpiece of precision machinery; if it is once thrown into disorder, malfunctions, friction, and breakage will set in motion without end." "Disorder" caused by raw materials and food shortages would bring the British economy to a grinding halt within five months of unrestricted submarine warfare.

Third, the German experts agreed that Britain could never adopt rationing (as was already the case in Germany). London lacked the requisite local authorities to enforce controls; "the authority" to implement and to carry out central directives "is lacking"; and the British people "have not the discipline essential to meet such a crisis." In other words, the British national character militated against the German examples of "war socialism" and "war economy." Strikes by the notoriously "refractory" British workers would cripple the national war effort and rising unemployment would lead to a vast migration of skilled laborers.

Fourth, Professor Levy, basing his research on the reports of the Royal Commission on the Supply of Food of 1903-05, convinced the Admiralty Staff that wheat was "beyond all comparison the most important cereal." Holtendorff and Levy calculated precisely that Britain, which consumed 141,500 tons per week, at present levels of supply and reserve would fall 114,300 tons short of demand each week. Put differently, present provisions and reserves allowed only 12.5 weeks, or barely three months, supply. Wheat imports from Canada and the United States were already down to only two-thirds of normal levels and would soon fall to half due to a bad harvest in 1916 owing to wheat rust. Importing wheat from Australia, India, and Argentina would double the amount of shipping required due to the longer sea routes. All this would translate into food riots and labor unrest. "The psychological effect upon Englishmen" of drastically reduced foodstuffs, Holtendorff crowed, "is of no less importance than the direct result upon imports."

Fifth, Holtendorff and Department B1 followed the alarming wheat statistics up by arguing that the financial burden imposed by increased imports would bring the British economy to ruin. Most immediately, Britain's balance of payments would plummet to record lows. "English finances rise and fall with English exports." But even more important was that domestic food prices would soar. Already, Manitoba Nr. 1 Wheat had gone up 258 percent since the start of the war; bread, butter, milk had more than doubled in price since 1914; barley and oats were up 250 percent; flaxseed and cotton seed cakes stood at twice their peacetime levels; cold storage meat from Argentina and Australia had doubled, sugar tripled, and herring increased 600 percent in cost.

Sixth, the Germans were mesmerized with British coal production in general and reliance on Scandinavian pit-prop timber (Grubenholz) in particular. Coal, in Holtendorff's phrase, was "the daily bread of commercial life." The price of coal had already risen 70 percent during the war. France, whose best fields lay under German occupation, relied heavily on Britain for its supply of coal. Great Britain, for its part, drew half of its wood from Scandinavia. But these imports were already down 20 percent and sinking rapidly; the price of Scandinavian Grubenholz had doubled since 1914. "England's forests," Holtendorff opined, "are poor." In other

words, without a steady supply of Scandinavian wood, Britain's coal industry threatened to collapse.

Seventh, and perhaps most critically, the members of the German "think tank" put British and world shipping tonnage under a microscope. According to Lloyd's Register, Britain had started the war with 21.3 million tons of merchant shipping; by late 1916 that figure was down to 20 million tons due to losses and redirection of bottoms to "other tasks." Specifically, Holtzendorff projected that at least 8.6 million tons of shipping had been requisitioned for "military purposes," that 500,000 tons plied the coastal trade, that 1 million tons were under repair, and that 2 million tons were being used by Britain's allies. This left on paper just 8 million tons. But closer examination of cargo bottoms docked in Britain from July to September 1916 showed that the real total was just 6.75 million tons. Even when one added to that figure the 900,000 tons of enemy shipping trading with Britain and the 3 million tons of neutral shipping, London could command at best 10.75 million gross tons of merchant bottoms.

This was the prey of the U-boats. For every ship destroyed, insurance premiums would rise and a public "grip of fear" would guarantee the success of the U-boat war. Holtzendorff dismissed convoy out of hand. Heavy weather, inexperienced merchant captains, the need to travel at the rate of the slowest vessel, and anticipated congestion in ports would militate against its adoption. Above all, convoys "would be a most welcome sight"--a target-rich environment--for the U-boats.

Eighth, Holtzendorff tied unrestricted submarine warfare to Germany's survival as a great and a world power. Since the High Sea Fleet had remained idle for most of the war, the navy's very survival depended on energetic action at sea, and this could only mean the U-boats. The kaiser had given naval building direction in 1897; the Reich's "economic and political future" still depended on sea power in 1916. There was but one alternative: destruction of Britain's naval supremacy or Germany's demise. "The unrestricted submarine war is the proper and only means" to secure "our national existence." Holtzendorff closed the memorandum by "guaranteeing" that "the U-boat war will lead to victory" by bringing "England to her knees." Almost at the same time, he submitted a sweeping shopping list of global war aims to kaiser and government.

With regard to force size, it should be pointed out that secrecy, confusion, and speculation enveloped the issue in an impenetrable fog of uncertainty. As early as March 1916, Chancellor Theobald von Bethmann Hollweg had been forced to call a press conference in a vain attempt to quell "fantastic" public rumors that Germany was about to launch unrestricted submarine warfare with "200, 140, 100, 80" boats. The leader of the pivotal Center Party, Matthias Erzberger, recalled open speculation in Berlin about "300 or more U-boats." And Grand Admiral von Tirpitz, who before 1914 had declined to put funds into U-boat construction for fear of thereby watering down capital-ship construction and creating a "museum of experiments," did nothing to lay to rest such irresponsible speculation. That same March 1916, Tirpitz sent a deputy, Lieutenant-Commander Heinrich Lücklein, to inform the Federal Chamber that Germany had "54 U-boats in commission" and "204 ready for service." In short, all indicators pointed toward "total" force being on hand for "total" effort already in the spring of 1916.

The formal decision to launch the U-boat offensive was taken by kaiser, chancellor, generals, and admirals at Pless on January 9, 1917. It is interesting to note that whereas numerous authors in this volume stress the "acceleration of time"--that is, that so little time and so little information were available to make decisions of immense importance in what in fact was a rather "short war" by previous standards (Hundred Years' War, Thirty Years' War, Seven Years' War)--such was not the case with unrestricted submarine warfare. The issue had been debated both inside and outside official chambers since early 1915; Holtzendorff had taken sixteen months to craft his great memorandum of December 22, 1916. Officers, statesmen, politicians, and journalists alike had taken sides with a passion

unmatched by any other issue during the war. Rationality had clashed endlessly with irrationality--and led to no concrete conclusion. And the Admiralty Staff's countless memoranda, some leaked to enflame the public debate, offered voluminous statistical material to buttress arguments both for and against the U-war.

In the end, the decision of January 9 came as a result of a complexity of factors and only after bitter internal political wrangling. Many of the U-boat campaign's supporters argued that the new technology (submersibles) deserved a chance to prove itself. Others called for submarine warfare purely from an emotional conviction that only the U-boats could win the war. Many feared that without the U-boats, Germany could not survive another winter of war. A few touted it as the only realistic road to peace (through victory). Yet others trumpeted the slim, cigar-shaped steel cylinders as mysterious, stealth-like Wunderwaffen, as Vergeltungswaffen that would finally bring the war "home" to "perfidious Albion." Some undoubtedly saw the U-war as the last chance to realize the Reich's ambitious war aims. Countless others simply yearned for a delivery system that would "repay" London for its "starvation" blockade of Germany--and the accompanying high rates of disease and mortality. This "moral element," as Dennis Showalter argues in his contribution to this volume, perhaps constituted the "final element" on the road to "total war." A very few among the ruling elite as an afterthought suggested that "honor" had dictated the recourse to unrestricted submarine warfare.

The fact remains that, in the final analysis, the battle over unrestricted submarine warfare was fought on the ground chosen by the navy: the plethora of expert Denkschriften that guaranteed victory by slide-rule calculations of British bottoms, coal, and food supplies. Put differently, Holtzendorff and his experts set the tone of the debate, laid down its ground rules, defined its parameters, and closed off all other options. Even the most bitter opponents of the U-campaign accepted the admiral's battleground. Thus, Max Weber already in March 1916 tried to lobby both Reichstag deputies and the Foreign Office against adopting unrestricted submarine warfare by refuting Holtzendorff's naval-technical arguments on its behalf. Secretary of the Treasury Karl Helfferich on August 31, October 6, and December 18, 1916, subjected Holtzendorff's memoranda to critical statistical analysis; and even his half-hearted final attempt to defuse Admiralty Staff thinking on the eve of the Pless decision was solidly based on Holtzendorff's calculations. Chancellor von Bethmann Hollweg at Pless endorsed the underwater offensive primarily on the basis of Holtzendorff's statistical prognostications of victory "before England's fall harvest." And as late as July 10, 1917, at the height of the submarine war, the kaiser's personal friend, Albert Ballin, head of the Hamburg-Amerika Line, argued the merits of the campaign with General Ludendorff strictly on the basis of Holtzendorff's statistical tabulations.

The Reality

How close did Imperial Germany's unrestricted submarine campaign come to Clausewitz's ideal of a theoretical "standard" to "judge all wars by"? Quantitatively, the Admiralty Staff's predictions proved extremely accurate. The U-boats for the first four months of the campaign destroyed on average 629,862 tons of shipping, and for the next two on average 506,069 tons. Both figures were on target with Holtzendorff's predictions of December 22, 1916. The American war effort, again as the admiral correctly predicted, was slow to develop: a mere 225,000 "doughboys" had landed in France by the end of 1917. But Britain had not been "brought to its knees" by August 1, 1917.

What had gone wrong? In order to assess unrestricted submarine warfare as part of the "process of totalization" that is the theme of this volume, it is necessary not to "deconstruct" Holtzendorff's calculations, but rather on the basis of hard evidence to compare and to contrast the admiral's theoretical calculations against actual battlefield effectiveness. Therein, they fall short of the mark.

First, Holtzendorff and his experts failed to appreciate that a modern industrial state can tap into almost inexhaustible lines of credits; can build up an almost limitless debt, as long as it (and its creditors) believe in its future. In the British case, by 1917 this meant almost exclusively "inexhaustible" American credits.

Second, a modern state's "machinery" is not as precise or as finely tuned as German Admiralty Staff planners had assumed. Rather, it is, in the words of Avner Offer, "a self-repairing mechanism, not a machine." The British economy had a great deal of elasticity in 1917 and 1918, and it was able to adjust to changes in imports and production.

Third, the British national character likewise proved far more resilient than the German experts had predicted. Price mechanisms enabled Britain's economy to substitute commodities: London introduced mild forms of rationing, and by adding other types of flour to wheat created a so-called "war bread" that in 1917-8 saved about thirteen weeks' consumption of wheat flour. In a strange turn of events, the British outdid the Germans when it came to "war socialism" and "war economy." In short order (as Moncur Olsen first argued, and as several others papers in this volume show), the government created a Ministry of Shipping and a Food Production Department, and appointed a "food controller" who by the end of the war oversaw 90 percent of the nation's imports and bought and sold 85 percent of the food consumed in the country. In an almost obscene fashion, the submarine campaign translated into a healthier nation--even given the absence of 13,000 doctors called to the colors. The female death rate in 1917 due to cardiovascular diseases, diarrheal diseases, and complications of pregnancy was well below that for 1912, 1913, and 1914. The mortality rate due to scarlet fever and rheumatic fever likewise fell in 1916--as did that among women during childbirth and among their offspring. By 1918, per capita caloric intake among civilians was probably higher than it had been in 1914.

Fourth, and most critically of all, Holtzendorff and his experts showed a glaring inability to synthesize accurately the bulk of statistical materials on British wheat, grain, and agricultural conditions. For Britain, they assumed that there was no alternative to wheat, thus overlooking other cereal grains almost entirely. Additionally, they failed to recognize that the British planted only 43 acres of wheat per 1,000 population (compared to 308 acres in Germany and 468 acres in France). Overall, the British had been so secure in the belief that the Royal Navy could at all times guarantee food imports that there were fewer acres devoted to cultivated crops in 1915 than there had been before 1913.

Obviously, cultivation could be increased greatly. Most dramatically, the Food Production Department under a Cultivation of Lands Order in 1917 gave county officials the power to force farmers to put about 1 million acres of grasslands under the plow; a similar increase was implemented in 1918; and another was planned for 1919. While this reduced meat stocks by as much as 24 percent, it enhanced net food output by 2.3 million tons. Urban "garden allotments" increased that figure by another 1 million tons. In 1918, which brought the most inclement harvest season in years, wheat production was up over peacetime levels by 1 million tons, oats by 1.4 million, and potatoes by 2.6 million. Recent investigations suggest that Britain turned almost 4 million acres of common and grasslands into grain and vegetable fields over the last two years of the war.

Another cardinal miscalculation by Admiralty Staff planners was in the area of United States grain production. By assuming 1916 wheat output of 640 million bushels to be the norm, they failed to appreciate that 1916 was an off-year due to crop failure already occasioned in part by wheat rust. Normal annual production in 1913, 1914, and 1915 had been 900 million bushels. Thus, while the 1917 wheat crop remained almost the same as that of 1916, the 1918 output again rose to normal levels (921 million bushels). The rye harvest steadily increased from 47.4 million bushels in 1916 to 62.9 million in 1917, and to 91 million in 1918. American wheat and rye exports in 1917-8 stood at almost 1 million tons over prewar levels. Moreover, the "total war" advocates in Berlin conveniently overlooked that the

carryover from the 1915 wheat crop on July 1, 1916 stood at 179 million bushels, and that as late as July 1, 1917, it still measured 55.9 million.

Fifth, the unrestricted U-boat war did not destroy the domestic food situation in Britain. Nor did it cause vast and violent labor unrest. To be sure, prices did rise, but so did wages. While luxury goods such as alcoholic beverages, beer, coffee, sugar, cheese, and butter became more scarce and dear, basic staples were not adversely affected because of generous subsidies. The weekly food consumption of beef, bread, flour, and milk by British working-class families in 1917-18, for example, remained at the same level as it had been before 1914; that of bacon, potatoes, and margarine actually increased.

Nor did the predicted surplus of unemployed and unemployable laborers forced to emigrate develop. Quite the contrary. With millions of young men in the army--including one-third of British farmers--the United Kingdom actually experienced an acute labor shortage. The Food Production Department was hard-pressed to make up for the shortage by recruiting 350,000 boys, women, physically handicapped men, and prisoners of war for agriculture alone. Hundreds of thousands of others were drawn to high-paying jobs in the industrial and communications sectors. In short, modern wartime economies over time have no problem absorbing available labor.

Sixth, Holtzendorff's and Ludendorff's curious calculations about Scandinavian pit-prop timber for British mines failed to hold. Once again, statistics proved whatever case their authors wished them to make. First and foremost, given that coal mining was a crucial war industry, Britain assigned top priority to pit-props, thus guaranteeing their availability. Domestic housing construction was delayed for the duration of the war, and the wood thus saved was diverted to mines. Even had there been a shortage, Britain could conceivably have turned to the forest reserves of France, which it could have shuttled across the Channel with impunity. The hard reality of politics also softened the submarines' bite. Shortly after the commencement of unrestricted U-boat warfare, Germany had to conclude agreements with the major European neutrals--Denmark, the Netherlands, and the Scandinavian countries--that allowed them to maintain their trade (including wood and food) with Britain.

Seventh, the Germans erred terribly in their rather simplistic calculations of gross tonnage available to Britain. They failed entirely to take into account world tonnage, which was about twice as large. Nor did they anticipate that London could requisition neutral and interned German ships, conscript their crews, and set and enforce uniform insurance rates. Although convoy first of twelve to twenty ships and later of thirty to forty vessels protected by an escort screen did not really get fully underway until the summer of 1917, once ritualized it actually brought about more efficient use of port and railway facilities due to its predictable rhythms of arrivals and departures. Special Transport Workers' Battalions eliminated anticipated congestion in British ports. And "Atlantic concentration" eliminated the need to institute the more lengthy sea routes to Australia, India, and South America.

Above all, the nature of merchant cargoes, and not simply the total tonnage, was critical. Thus Admiral von Holtzendorff and his civilian experts failed to understand that Britain's daily needs of 15,000 tons of grain could be delivered by a mere four ships. Or that the government would simply give grain cargoes higher priority, thus assuring the national cereals supply.

In fact, as the U-boat historian Bodo Herzog has shown, at no time in the war did London reduce even the oats for its race horses! No one in Berlin had dreamed that Britain, basically by adjusting production and consumption at home, would eventually free up 6.7 million tons of shipping--sufficient to transport 1.3 American soldiers to France.

Eighth, the politics of unrestricted submarine warfare backfired. As is well known,

Britain did not beg for peace on August 1, 1917. Nor was General Ludendorff "spared a second battle of the Somme" by the U-boat war. British coal mines did not close due to lack of pit-props. Allied and neutral ships continued to ply the Atlantic: only 393 of the 95,000 ships convoyed across the Atlantic were lost; and not a single troop transport was torpedoed en route to France. No major food riots erupted in Britain. No vast migration of skilled labor developed. No public panic ensued.

Ironically, the Russian Empire collapsed just two months after the Germans launched their unrestricted submarine campaign on February 1, 1917. Then, as expected, on April 6 the United States entered the war, thereby turning the tide against Germany. By the summer of 1918, half a million American soldiers manned the front lines. They arrived in France at the rate of 10,000 per day. A cargo or transport ship left the eastern seaboard of the United States for France every five hours. Almost one-half of the 962,000 "doughboys" escorted to France by the U.S. Navy sailed on board eighteen large German ships that had been interned in American ports and later seized by the American government.

Finally, Germany never managed to mount the "total" effort required to conduct "total" war. Whereas an internal study by Lieutenant Ulrich-Eberhard Blum of the Submarine Inspectorate at Kiel in May-June 1914 had estimated that at least 222 U-boats would be required for an underwater offensive against shipping in the waters surrounding the British Isles, Germany never even remotely approached this figure. For much of 1915, when the clamor for unrestricted submarine warfare first reached fever pitch, Germany had available in both the Atlantic and the Mediterranean theaters on average 48 boats; and the following year, when public speculation went as high as 300 U-boats, the average monthly total was 58 craft. Most of the Reich's treasure, labor, and raw materials instead went into army production under the auspices of the "Hindenburg Program" and the Auxiliary Service Law of late 1916. Even on February 1, 1917, the date on which Holtzendorff's unrestricted submarine warfare commenced, total forces available stood at only 111 boats, of which 82 were stationed in the North Sea and the English Channel. If one keeps in mind that at any given time one-third of all U-boats were undergoing repair and refit, and another one-third were going to or returning from the war zones, this meant for 1917 that on average a mere 32 boats were on patrol in the North Sea, the English Channel, the Irish Sea, and the Atlantic Ocean to bring Britain "to its knees." Moreover, only 20 of these 32 boats were stationed in the critical waters off Britain's west coast. In short, there existed no synergy between "total war" rhetoric and actual force structure.

Nor did the U-boat force appreciate significantly over time. Despite the heated public as well as internal debate over unrestricted submarine warfare, the Navy Office tendered U-boat orders without sense or purpose. A mere 29 craft were ordered in 1914; 72 in 1915; 86 in 1916; and 67 in 1917. Not a single U-boat building contract was placed in the critical eight months between September 1915 and May 1916. None of the boats ordered in and after May 1916 were completed in time to see service.

Still, German yards proved unable to meet even these modest, sporadic orders. The truth is that wartime U-boat production consistently failed to meet contractual delivery schedules: only 12 units were completed on time; 50 were six months behind schedule; and 114 were nine months behind. A central U-Boat Office to regulate the purchase, construction, and delivery of submarines was not established until December 5, 1917--four months after Holtzendorff's promise of victory over Britain! The so-called "Scheer program" of the autumn of 1918, which planned to place orders for 450 U-boats, was largely a national placebo, a propaganda effort to show the nation that the navy was back in business. It speaks volumes for the "blue-water" mentality of the Imperial Navy's leadership that at the very height of the unrestricted submarine campaign, in the spring of 1917, Admiral von Capelle of the Navy Office spent a great deal of time pondering the construction of "a special cemetery for our existing submarines" after the war. What in October he termed "unlimited construction orders" for U-boats threatened

The Verdict

Was Germany's unrestricted submarine warfare an example of "total war"? I have suggested that while the rhetoric was "total," the reality was limited. Admiral von Holtzendorff, Department B1, and their civilian experts sought "total" victory over Britain by attacking not British armies in the field, but rather British women and children and workers at home. In the process of indiscriminately targeting all shipping--merchant as well as war, neutral as well as belligerent--for sinking without warning, they flagrantly ignored (indeed, violated) established international law. Put differently, civilian populations were viewed by Berlin as targets on an equal footing with combatants in the field. There can be no question that, as Wolfgang J. Mommsen has argued elsewhere in this volume, the U-war "brought a qualitative shift in strategic thought" insofar as it targeted enemy morale and will power.

The cold-blooded calculus behind Holtzendorff's "total" war concept was equally frightening. Merchant and neutral ships, women and children were seen and tabulated as "wastage" in much the same sense as front-line troops. Septic columns of merchant bottoms destroyed paralleled those of soldiers killed. Measures of caloric intake by Britain's women and children matched those of soldiers injured and rehabilitated, of shells produced and fired. It was all a matter of accounting, of war by slide-rule. No romanticism. No adventure. No individualism. In the process, grand strategy was reduced to ordnance on target--in this case, torpedoes against steel hulls. This "process of totalization" would reappear in the crisp charts of Allied Bomber Command in World War Two and in the computer printouts of Secretary of Defense Robert McNamara during the bombing of Vietnam and Cambodia during the Vietnam War. It worked in none of the cases cited. War remained more complex than mere bombs-to-kill ratios.

Germany's unrestricted submarine campaign was limited in large measure only by inadequate force size. Twenty or thirty 500 to 700 ton U-boats on station in the vast expanses of water around the British Isles simply were insufficient to do the job. As one of Holtzendorff's principal intuitive experts, Dr. Fuss, later conceded: "The U-war was never unrestricted." This lay less in intent and desire than in lack of adequate forces. In the end, only death was "total": the U-Boat service lost 5,249 sailors (one-half of its total force) in 199 U-boats at sea. It remained for another world war and another admiral to surpass those grim statistics.

NOTES

1 C. Paul Vincent, The Politics of Hunger: The Allied Blockade of Germany, 1915-1919 (Athens and London, 1985), 127-46; and Richard Bessel, Germany After the First World War (Oxford, 1993), 39.

2 The Joint Chiefs of Staff, The Official Dictionary of Military Terms (Washington, 1988), 370. Under "general war," the Dictionary states that it is an "armed conflict between major powers in which the total resources of the belligerents are employed, and the national survival of a major belligerent is in jeopardy." *ibid.*, 157.

3 Edward Luttwak and Stuart Koehl, The Dictionary of Total War (New York, 1991), 625. The authors define "total war" as a "theoretical concept, implying the use of all available resources and weapons in war, and the elimination of all distinctions between military and civilian targets."

4 Carl von Clausewitz, On War, eds. Michael Howard and Peter Paret (Princeton, 1984), 579-81.

5 Volker R. Berghahn, Der Tirpitz-Plan. Genesis und Verfall einer innenpolitischen Krisenstrategie unter Wilhelm II. (Dnsseldorf, 1971), 66.

6 Erich Ludendorff, Der totale Krieg (Munich, 1935), 3.

7 *ibid.*, 83-5.

8 Cited in Alfred von Tirpitz, Politische Dokumente: Deutsche Ohnmachtspolitik im Weltkrieg (Hamburg and Berlin, 1926), 623, 626. The interview had taken place on November 21. For the broad picture of submarine development, see Holger H. Herwig, "Innovation ignored: The submarine problem--Germany, Britain, and the United States, 1919-1939," in Military Innovation in the Interwar Period, eds. Williamson Murray and Allan R. Millett (New York, 1996), 227-264.

9 Arthur Conan Doyle, "Danger! A Story of England's Peril," The Strand Magazine 14 (1913): 3.

10 Bundesarchiv-Militärarchiv (BA-MA), Nachlass Hollweg, RM 3/11679, Hamburger Fremdenblatt, November 14, 1926. See also Michael L. Hadley, Count Not the Dead: The Popular Image of the German Submarine (Montreal & Kingston, 1995), 36.

11 William Sowden Sims, The Victory At Sea (New York, 1920), 7, 9.

12 Jellicoe to the First Lord, Sir Edward Carson, April 27, 1917, cited in A. Temple Patterson, ed., The Jellicoe Papers. Selections from the private and official correspondence of Admiral of the Fleet Earl Jellicoe, 2 vols. (London and Colchester, 1966-8), 2: 161. See also John R. Jellicoe, The Submarine Peril: The Admiralty Policy in 1917 (London, 1934).

13 David Lloyd George, War Memoirs, 6 vols. (London, 1938), 1: 667.

14 Winston S. Churchill, The World Crisis (London, 1932), 722, 728-30. For German references to Jellicoe, Sims, Lloyd George, and Churchill, see Hermann Bauer, Als Führer der U-Boote im Weltkrieg (Leipzig, 1940), 443-8, 463-8.

15 Cited in Stenographische Berichte über die öffentlichen Verhandlungen des 15. Untersuchungsausschusses der Verfassunggebenden Nationalversammlung nebst Beilagen (Berlin, 1920), 2: 227. A rough translation is by the Carnegie Endowment for International Peace, Official German Documents Relating to the World War, 2 vols. (New York, 1923), 2: 1214-77. All citations are from the German edition, hereafter abbreviated as Stenographische Berichte. The original is in BA-MA, RM47, vol. 772.

16 In reality, half of the American soldiers transported to France by the U.S. Navy sailed on converted German liners. George W. Baer, One Hundred Years of Sea Power: The U.S. Navy, 1890-1990 (Stanford, 1994), 79.

17 Stenographische Berichte, 260-2.

18 *ibid.*, 206, 229, 269. Italics in the original.

19 Bernd Stegemann, Die Deutsche Marinepolitik 1916-1918 (Berlin, 1970), 51-8.

20 Stenographische Berichte, 231.

21 *ibid.*, 226.

22 *ibid.*, 233.

23 *ibid.*, 227, 249.

24 *ibid.*, 236-41.

25 *ibid.*, 265.

26 *ibid.*, 265.

27 *ibid.*, 240-3.

28 *ibid.*, 250-1. At Pless on January 9, 1917, Ludendorff also stressed the centrality of pit-props. *ibid.*, 322.

29 *ibid.*, 226.

30 *ibid.*, 266.

31 *ibid.*, 263-4.

32 "The navy is still popular with the people. . . . But something must be done immediately to preserve this predilection. One hears next to nothing, for example, about the U-boats."

33 BA-MA, Nachlass Levetzow, N 239, Box 3, vol. 4. Admiralty Staff memo to Holtzendorff, June 26, 1916. Stenographische Berichte, 273-5.

34 Memoranda of November 26 and December 24, 1916, BA-MA, Nachlass Vanselow, F 7612, "Kriegsziele der Marine." See also Holger H. Herwig, "Admirals *versus* Generals: The War Aims of the Imperial German Navy 1914-1918," Central European History 5 (1972): 203-38.

35 Stenographische Berichte, 164. Press conference of March 13, 1916.

36 Matthias Erzberger, Erlebnisse im Weltkrieg (Stuttgart and Berlin, 1920), 227.

37 Walter G. Litz, ed., The Kaiser and His Court: The Diaries, Note Books and Letters of Admiral Georg Alexander von Müller, Chief of the Naval Cabinet, 1914-1918 (New York, 1959), 144. Entry of March 4, 1916.

38 See "Der verschörfte U-Bootkrieg," in Max Weber, Gesammelte Politische Schriften, ed. Johannes Winkelmann (Tübingen, 1958), 143-51.

39 See Stenographische Berichte, 170-8, 186-92, 199-209.

40 *ibid.*, 321. The chancellor saw the U-boats as Germany's "last card," but deemed their chances of success as being "downright favorable."

41 Hartmut Pogge von Strandmann, ed., Walther Rathenau: Industrialist, Banker, Intellectual, and Politician. Notes and Diaries 1907-1922 (Oxford, 1985), 227-8.

42 Bodo Herzog, 60 Jahre Deutsche UBoote 1906-1966 (Munich, 1968), 111.

43 Avner Offer, "Economic interpretation of war: the German submarine campaign, 1915-18," Australian Economic History Review 24 (1989): 32.

44 Mancur Olson, Jr., The Economics of the Wartime Shortage: A History of British Food Supplies in the Napoleonic War and in World Wars I and II (Durham, 1963), 86, 95.

45 J. M. Winter, The Great War and the British People (Basingstoke, 1985), 120, 135, 138, 141, 143-4, 229.

46 Olson, Economics of the Wartime Shortage, 75, 77, 86, 98-109.

47 William Clinton Mullendore, History of the United States Food Administration 1917-1919 (Stanford, 1941), 10, 48, 121.

48 Winter, The Great War and the British People, 219, 224.

49 Olson, Economics of the Wartime Shortage, 99.

50 *ibid.*, 87, 93. See Jellicoe, Submarine Peril, 206-7, for convoys.

51 Herzog, 60 Jahre Deutsche UBoote, 109. See also John G. Williamson, Karl Helfferich 1872-1924: Economist, Financier, Politician (Princeton, 1971), 157, 159, 165-6; Klaus Epstein, Matthias Erzberger and the Dilemma of German Democracy (Princeton, 1959), 154-6; Weber, Gesammelte Politische Schriften, 143 ff.; and Leonidas E. Hill, ed., Die Weizsacker-Papiere 1900-1932 (Berlin, 1982), 225 ff., for critical German views on the U-war. I am deeply indebted to Prof. Hill for unselfishly sharing some of his researches into U-boat warfare.

52 Olson, Economics of the Wartime Shortage, 110-1.

53 Stenographische Berichte, 322. Pless conference protocol, January 9, 1917.

54 Baer, One Hundred Years of Sea Power, 76.

55 *ibid.*, 79; Paul G. Halpern, A Naval History of World War I (Annapolis, 1994), 435.

56 Arno Spindler, ed., Der Handelskrieg mit U-Booten, 5 vols. (Berlin, 1932-66), 1:1-10, 153-6.

57 *ibid.*, 3: 212, 368.

58 Peter Graf Kielmansegg, Deutschland und der Erste Weltkrieg (Frankfurt, 1968), 393.

59 *ibid.*, 387.

60 Herzog, 60 Jahre Deutsche UBoote, 109.

61 BA-MA, Nachlass Keyserlingk, N 161, vol. 19, 138. See Holger H. Herwig, The German

Naval Officer Corps: A Social and Political History 1890-1918 (Oxford, 1973), 237-9.

62 *ibid.*, 193.

63 Richard Fuss, Der U-Boot-Krieg des Jahres 1915. Ein Kapitel auswärtiger Politik im Weltkrieg (Stuttgart, 1936), 94.

64 Hadley, Count Not the Dead, 174