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Naval Strategy in a War Between England and Germany

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NAVAL STRATEGY IN A WAR BETWEEN ENGLAND AND GERMANY.

By PROFESSOR WILLIAM HOVGAARD, Late Commander Royal Danish Navy.

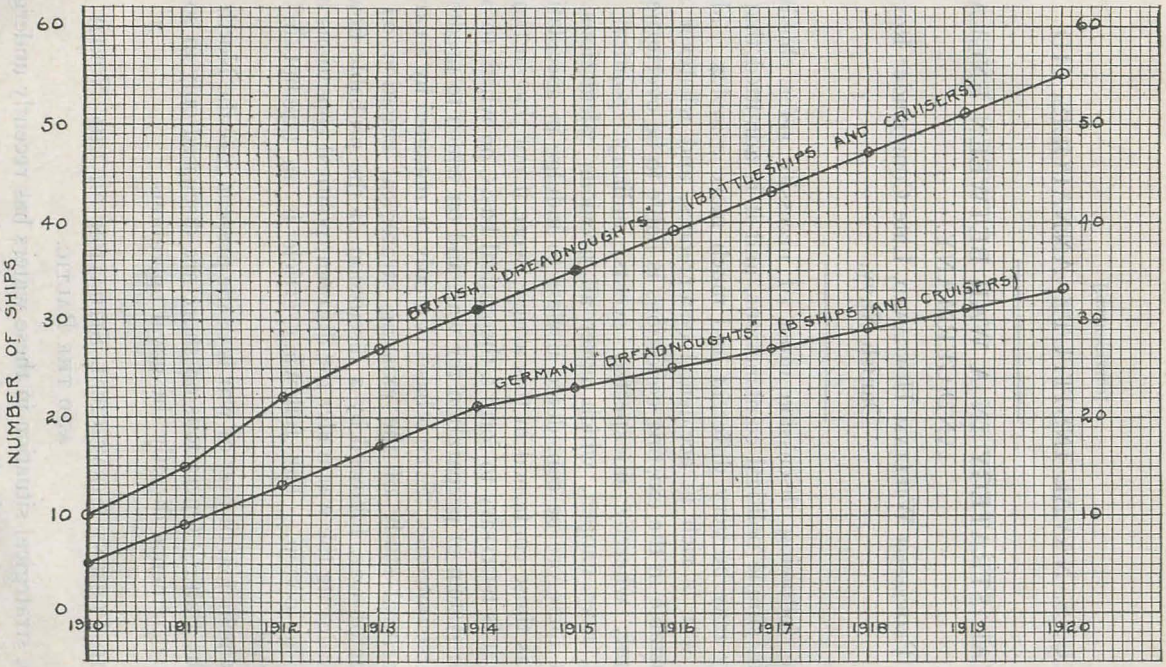
The following discussion must of necessity refer chiefly to certain simple political combinations, and it is admitted that the reality may be very different and much more complex. Moreover, war is rich in accidental occurrences, and whatever may be unstable in the existing conditions is liable to be overturned in wartime, whereby unexpected events, military, political and social, may happen, which upset all previous calculations. It might therefore be considered useless to indulge in speculations, such as those contained in this article, were it not that in time of peace it is necessary to form a theoretical basis, on which to build up the system of preparation for war, and on which to predict its probable outcome. Such a basis can only be obtained by a careful and critical study of the existing strategical situation on the theater of war, followed by a discussion of the probable flow of events during the war under the different political conditions most likely to obtain. The following article is an attempt in this direction.

The principal theater of war is in the present case the North Sea and the Baltic. Operations on shore are discussed only in so far as they influence directly the naval operations.

I. THE PRESENT STRATEGICAL SITUATION ON THE NORTH SEA AND THE BALTIC.

The strategical situation in these waters has recently undergone great changes, partly due to the rapid development in naval power of England and Germany, partly due to changes in the disposition of the naval forces and their bases, and finally due to the

PLATE I.—A COMPARISON BY NUMBER OF BRITISH AND GERMAN DREADNOUGHTS.

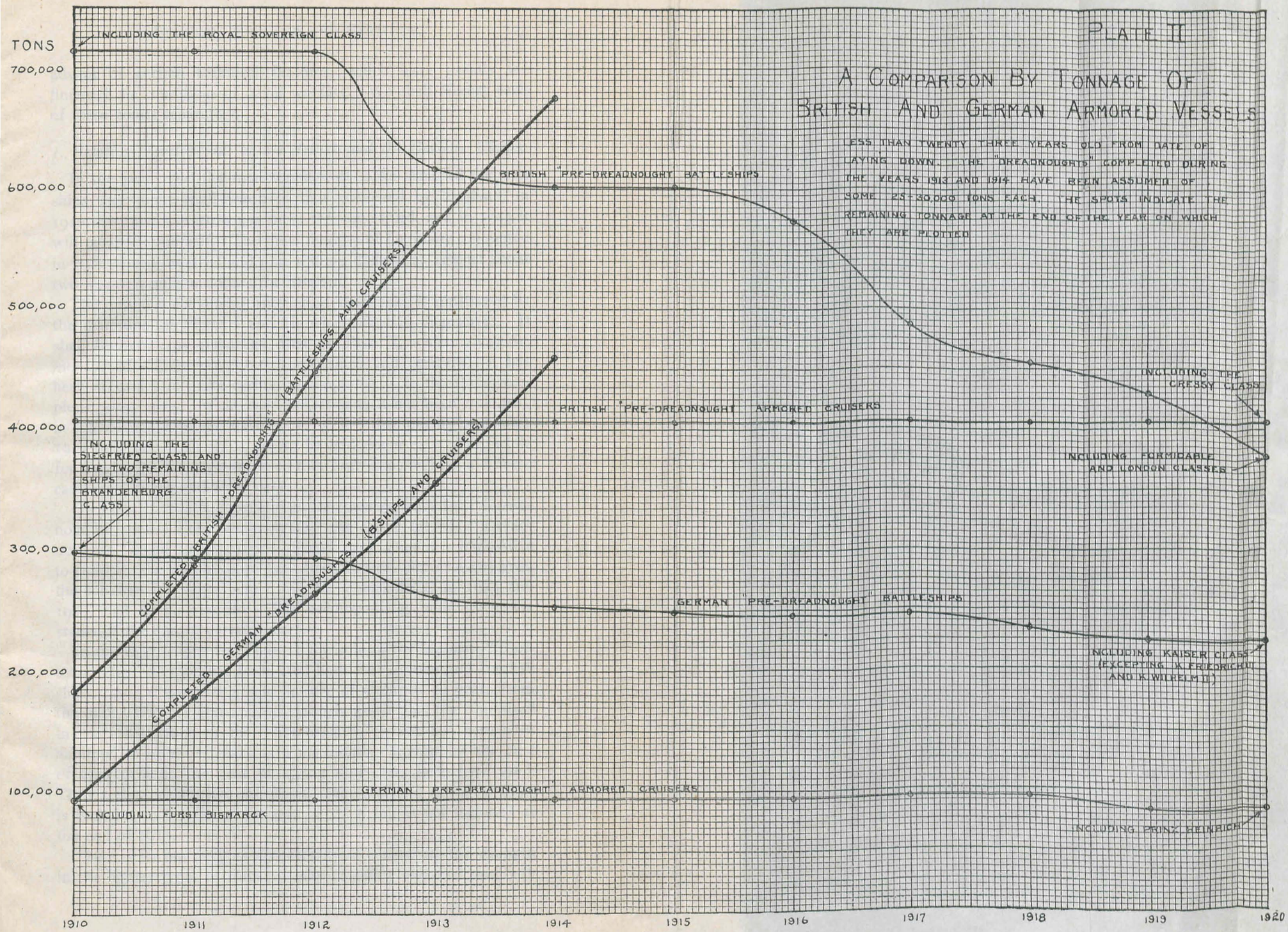


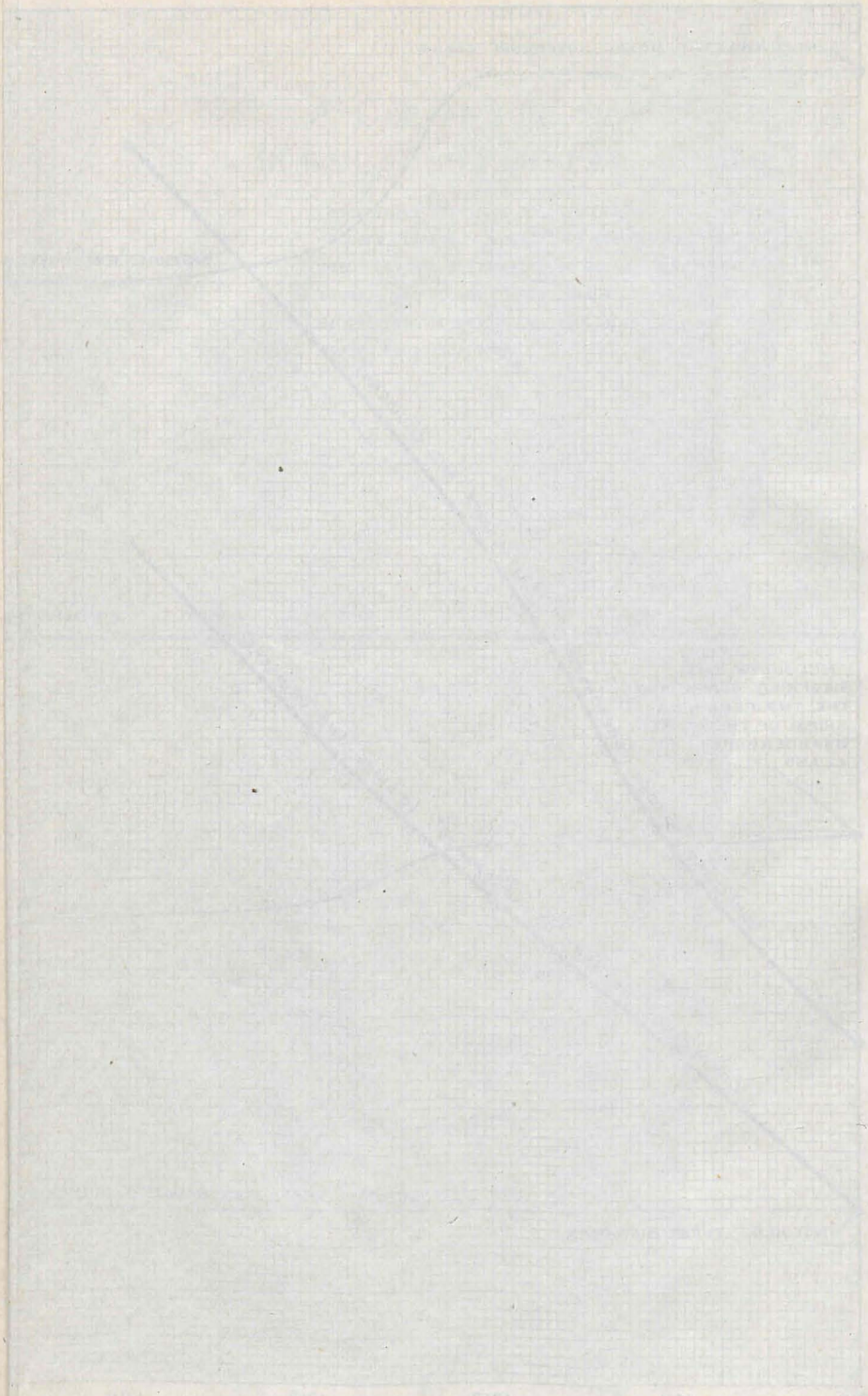
It is assumed that during and after the year 1912, Germany will lay down only two Dreadnoughts a year, while England will lay down four. The rapid rise in number of British Dreadnoughts in 1912 is due to the two armored cruisers for Australia and New Zealand. The spots indicate the number of completed ships at the end of the year on which they are plotted.

PLATE II

A Comparison By Tonnage Of British And German Armored Vessels

Less than twenty three years old from date of laying down. The "Dreadnoughts" completed during the years 1913 and 1914 have been assumed of some 25+30,000 tons each. The spots indicate the remaining tonnage at the end of the year on which they are plotted.





advent of certain technical features, which have greatly influenced the conditions of naval warfare. We shall discuss each of these points separately.

1. *Relative Development of the British and the German Navies.*

In the year 1900 the total tonnage of large armored German ships was about one-seventh of that possessed by England, in 1910 this ratio had grown to more than one-third, and in 1914 it will be about one-half. The naval budget of Germany amounted in 1910 to one hundred and nine million dollars, as against about two hundred million dollars for England.

The development during the period 1910-1920 is illustrated by the diagrams on Plates I and II, which explain themselves. It shall be here only remarked, that on Plate I, which gives the *number* of "Dreadnoughts" (battleships and cruisers), it has been necessary to make certain assumptions as to the ships completed after 1914. In the case of Germany it has been reckoned, in accordance with the existing program, that during and after 1912 only two such ships are to be laid down each year, while for England it has been assumed that four ships will be laid down each year during and after 1912.

On Plate II, which gives curves for *tonnage,* both for "Dreadnoughts' and "Pre-Dreadnoughts," the curve for the "Dreadnoughts" could not be carried beyond 1914, since it is impossible to estimate the size of ships laid down several years hence; even the tonnage for ships, which are to be completed in 1913 and 1914, had to be guessed. The accompanying table gives the status at the end of certain years.

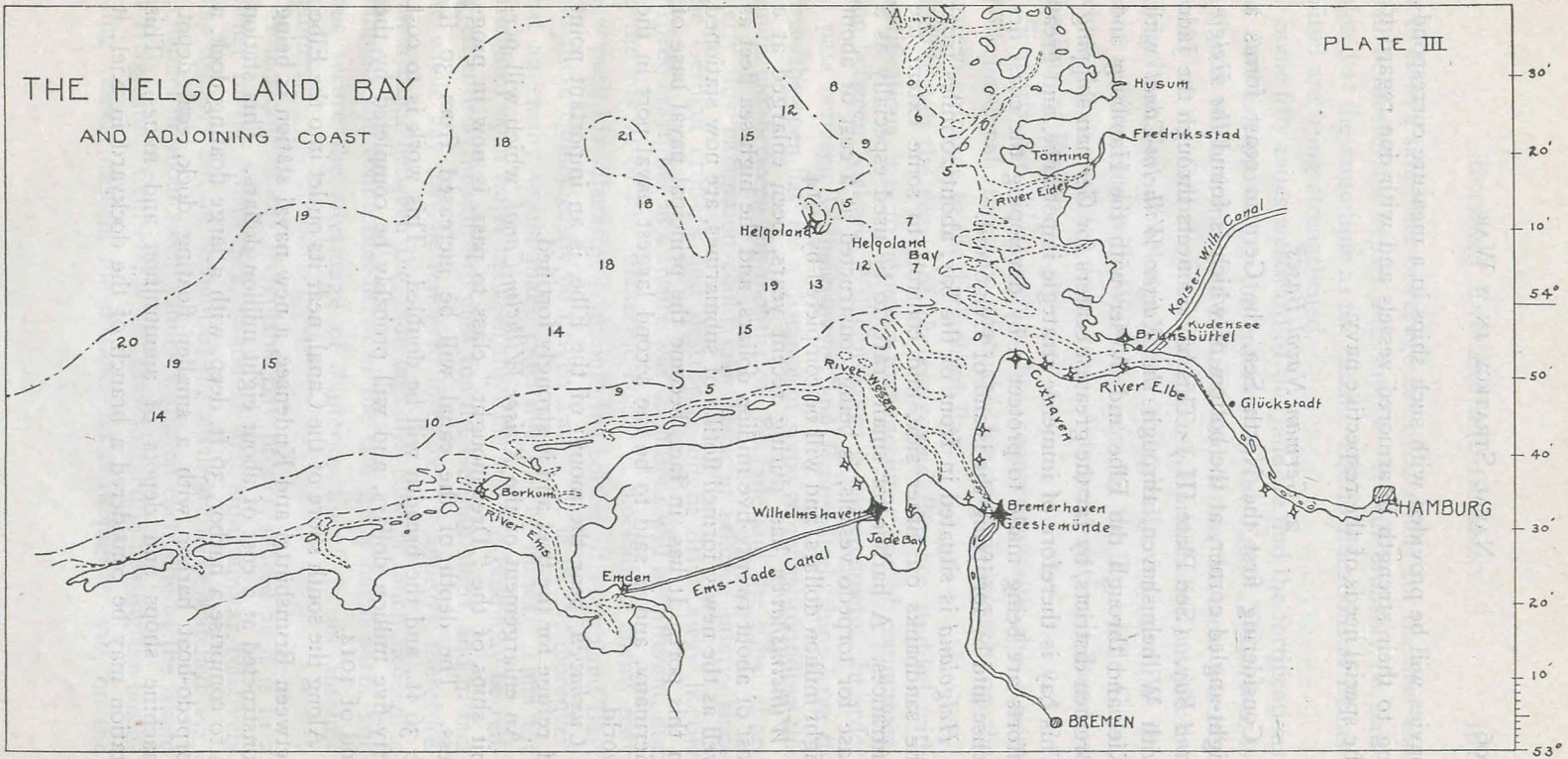
In the calculations for Plate II the rule of the German "Flottennovelle" of 1908 has been used both for German and English ships. According to this rule the life of a ship is 20 years from the date when the first appropriation is given plus the time used in the construction of the "Ersatzschiff," which has here been assumed to be three years as a maximum. Instead of the date of appropriation the year of laying down has been here used. Thus a ship which, like the *Royal Oak,* was laid down in 1890, is included in the list at the end of 1912, but is not included at the end of 1913.

There is for our purpose no necessity of comparing the strength in the lighter types of ships; it may be safely assumed that both

COMPARATIVE TABLE

FOR ENGLISH AND GERMAN ARMORED SHIPS NOT LESS THAN TWENTY THREE YEARS OLD FROM DATE OF LAYING DOWN

	ENGLAND								GERMANY							
END OF	COMPLETED "DREADNOUGHTS" (BATTLESHIPS AND CRUISERS)		"PRE-DREAD-NOUGHT" BATTLESHIPS		"PRE-DREAD-NOUGHT" ARM. CRUISERS		TOTAL		COMPLETED "DREADNOUGHTS" (BATTLESHIPS AND CRUISERS)		"PRE-DREAD NOUGHT" BATTLESHIPS		"PRE-DREAD NOUGHT" ARM. CRUISERS		TOTAL	
YEAR	NO.	TONS	NO.	TONS	NO.	TONS	NO.	TONS	NO.	TONS	NO.	TONS	NO.	TONS	NO.	TONS
1910	10	183,000.	49	714,000.	34	407,000.	93	1,304,000	5	93,000.	30	298,000	9	95,000.	44	486,000.
1912	22	445,000.	49	714,000.	34	407,000	105	1,566,000	13	264,000.	29	294,000.	9	95,000	51	653,000.
1914	31	675,000.	41	602,000.	34	407,000	106	1,684,000	21	460,000.	22	253,000	9	95,000	52	808,000.
1920	55	———	25	377,000.	34	407,000	114	———	33	———	18	224,000	8	84,000	59	———


THE HELGOLAND BAY
AND ADJOINING COAST
PLATE III
Husum
Fredriksstad
Tönning
River Eider
Helgoland
Helgoland Bay
Kaiser Wilh. Canal
Kudensee
Brunsbüttel
River Elbe
Glückstadt
HAMBURG
River Weser
Cuxhaven
Bremerhaven
Geestemünde
Wilhelmshaven
Jade Bay
Borkum
River Ems
Emden
Ems-Jade Canal
BREMEN
30'
20'
10'
54°
50'
40'
30'
20'
10'
53°

navies will be provided with such ships in a measure corresponding to their strength in armored vessels and with due regard to the special needs of the respective navy.

2. *German Naval Bases.*

Considering first the North Sea, the German coast forms a right-angled corner, at the bottom of which is found *the Helgoland Bay.* (See Plate III.) This bay connects through the Jade with Wilhelmshaven, through *the Kaiser Wilhelm-Canal* with Kiel and through the Elbe and Weser with the Hamburg and Bremen districts, by far the greatest centers for German shipping. This bay is therefore of immense strategic importance, and great efforts are being made to protect it by developing the coast defense and by fortifying the island of Helgoland.

Helgoland is situated in front of the bay, about 20 miles from the sandbanks on either side, and controls to some extent the entrances. A harbor for small craft, to be used especially as a base for torpedo vessels, is being constructed at a cost of about eight million dollars, and will be completed by 1914.

Wilhelmshaven has, during recent years, been enlarged at a cost of about twenty-five million dollars, and the high-sea fleet as well as the newly formed flotilla of submarines, are now stationed in this port. It has, in fact, become the principal naval base of Germany, and is said to be the second largest naval port in the world.

Cuxhaven, near the mouth of the Elbe, is an important point of refuge for the fleet and is strongly fortified.

An enlargement of the *Kaiser Wilhelm-Canal,* which will permit ships of the "Dreadnought" class to pass, is now in progress. The depth of the canal will be increased from 30 ft. to 36 ft., and the breadth will be doubled. This work is to cost fifty-five million dollars, and will probably be completed by the end of 1914.

Along the south shore of the Canal, near its outlet into the Elbe, between Brunsbüttel and Kudensee, a new naval station is being constructed at a cost of about eight million dollars. This station is to comprise a harbor, 36 ft. deep, with a large floating dock, a torpedo-boat harbor with a smaller floating dock, coal depot, machine shops and depots of ammunition and mines. This station may be considered a branch of the dockyard in Kiel; it

is to form a safe place of refuge and of assembly for the fleet and will be useful for repair and supply. It will probably be completed at the same time as the canal. The fortifications at Brunsbüttel are being strengthened.

Some fifty miles westward of the Jade we find the fortifications of *Borkum,* protecting the entrance to the Ems. This river is adjacent to the frontier of Holland, and is thus the most westerly outlet on the German coast. Although Borkum lies outside the Helgoland Bay, it belongs to it strategically, inasmuch as the Ems is connected with Wilhelmshaven by the Ems-Jade Canal, which is navigable for destroyers. A torpedo station is found on the Ems at Emden.

Similarly the *Eider,* which has connection with the Kaiser Wilhelm-Canal, forms a débouché for torpedo vessels on the eastern entrance to the Helgoland Bay.

Although the coasts of *the Helgoland Bay* are studded with fortifications, it is to be noted that the inner line of communication between Kiel and Wilhelmshaven is not complete. In order to pass between Wilhelmshaven and Brunsbüttel, ships have to cross the open bay for a distance of some 20 miles, rounding the sandbanks between the mouths of the Jade and the Elbe. Formerly this navigation could take place in relative safety, since the German cruisers and destroyers might drive away hostile torpedo craft, but in a future war conditions will be different, due to the advent of the submarine boat. A blockading enemy may now push his submarine boats into the bottom of Helgoland Bay, and these cannot easily be driven away. It is likely, moreover, that an enemy would make extensive use of mines. Thus the stretch of open water between the Elbe and the Jade may be rendered entirely insecure to pass for the German ships, and in fact the whole bay may be rendered insecure. It appears, therefore, that a canal between the Jade and the Elbe is much needed to complete the connection between the two great naval ports, and thus secure the advantage of "interior lines" in an absolute manner.

A blockade of the Helgoland Bay proper, placed as it is in a corner of the North Sea, would at first sight appear relatively easy to carry out on account of the small arc to be watched, viz., a channel of about twenty miles width on each side of the island of Helgoland. Cruisers, which may succeed in passing the blockading vessels unseen, for instance on dark nights, will, on the

next morning, if going north, find themselves in the middle of the North Sea, and going west, they cannot have reached farther than the eastern entrance to the channel. In either case they are liable to be discovered and intercepted by the enemy before they reach the ocean, and before they can do any serious injury to English commerce. Sorties by the German battle fleet will probably be observed and reported before the fleet has proceeded far into the North Sea. It is, however, to be noted, that German torpedo-boats and submarines have an excellent advanced base in the new harbor of Helgoland. Moreover, the right wing of the blockading force will be exposed to attack in the flank and rear by such craft debouching from the Ems, wherefore the mouth of this river must be closely watched by a blockading enemy. Similarly the left wing will be threatened with attack of torpedo vessels from the Eider. Mines will be planted outside the bay.

There is to be taken into account, moreover, the general inclemency of the climate, the prevailing strong westerly winds often accompanied by rain or snow, and the frequent fogs; further the dangerous nature of the coasts.

The blockading service is therefore likely to be connected with great losses and to be exceedingly wearing both to the personnel and the matériel. The need of an advanced base will be strongly felt.

Turning now to the Baltic, we find in the western part the great naval port *Kiel,* in the eastern part the navy yard at Danzig.

From Kiel the North Sea, and hence the ocean, can be reached, not only by way of the canal, but also by way of the Danish waters. The navigation goes through the three international channels, which connect the Baltic with the Kattegat, viz., the Sound, the Great Belt and the Little Belt, and thence through Kattegat and Skagerak to the North Sea. See Plate IV.

Of these channels only the Great Belt can be passed by large ships, in the modern sense of this term, and is in fact to be considered the military highway between the Baltic and the Kattegat. The Great Belt is, however, difficult to navigate for large ships, and like the two other channels it may be easily mined or controlled by submarine boats and torpedo-boats.

Also the Kattegat presents considerable difficulties to the navigation of large ships, which, under many circumstances, have to move with great caution, and hence become liable to submarine attack of various kinds in the presence of an enemy.

These difficulties of the Danish waters, inherent in the hydrographical conditions, are, however, of great advantage to Germany on account of the nearness of these waters to Kiel. In fact, as long as no other power has obtained a foothold in the Danish waters, and as long as Denmark remains neutral, they can easily be controlled by the German Navy.

The Skagerak is 60 miles wide at its narrowest part and is difficult to blockade or even to watch effectively. It is deep and free from shoals, it cannot be mined, and a high speed can be maintained in navigating it, whereby the dangers of submarine boats may be eliminated.

Once the Skagerak is passed, the distance to the ocean is relatively short and the navigation simple. Hence it may be said that the Skagerak, considered as a gateway to the ocean, is much more direct and less dangerous to pass than the Helgoland Bay. Likewise, and for the same reasons, Skagerak is better adapted than the Helgoland Bay for making sorties or raids into the North Sea, whether with large or small forces.

3. *English Naval Bases on the North Sea.* (See Plate IV.)

The development of the Helgoland Bay as the principal center for the German Navy has had its counterpart in a concentration by England of her naval strength in the Home Fleet, and in an effort to station this fleet more and more on the North Sea.

A naval port has been built at Dover at a cost of about eighteen million dollars, and a new base is being formed at Rosyth on the Forth. While Dover, which is practically without dockyard facilities, is to be considered chiefly a port of assembly and refuge, it appears to be the intention in course of time to make Rosyth a base of the same rank as Portsmouth. The station as now planned is, however, according to press reports, on a more modest scale, and comprises only one large dock, which is to be ready for use in 1914, while the entire station is said not to be completed before 1918. Recently it has been decided to build two more docks at Rosyth.

The principal base on the East Coast is still Chatham—Sheerness with its extensive dockyard facilities. At Harwich is found a base for torpedo craft.

At all the important harbors on the East Coast fortifications are found, which in combination with submarine boats will pro-

PLATE IV


Shetland Is
Orkney Is
Firth of Moray
Inverness
Aberdeen
Dundee
Firth of Forth
Tyne
Newcastle
Tee
Hull
Humber
Harwich
LONDON
Sheerness
Chatham
Dover
ENGLAND
NORTH SEA
Rhine
HOLLAND
Borkum
Emden
Ems
Ems-Jade Canal
Wilhelmshaven
Cuxhaven
Brunsbüttel
K.W. Canal
Bremerhaven
HAMBURG
BREMEN
Elbe
Weser
GERMANY
Helgoland
Kiel
Eckernförde
Flensburg
Aarhus
Aalborg
Esbjerg
Jutland
DENMARK
KATTEGAT
Great Belt
Little Belt
Fyen
Zealand
COPENHAGEN
The Sound
Falster
Smaaland
BALTIC
SKAGERAK
Skagen
Frederikshavn
Lindesnæs
Kristiansand
NORWAY
SWEDEN

vide ample security against attack as long as the English fleet is in being. Moreover, these harbors will probably be used as temporary stations for cruisers and destroyers, and will thus never lack protection. The immediate protection of the coast need therefore not influence the choice of location of naval bases.

Rosyth is particularly well located as a base for the English main force in a war with Germany, since the Forth is about the same distance, 375 miles, from Helgoland and from the Skagerak, and the navigation from the Forth to these two places is perfectly clear and simple. Chatham and Dover are indeed somewhat nearer to Helgoland, but are considerably farther away from the Skagerak, and the navigation from these ports is anything but simple for large ships, especially in foggy weather. While, therefore, torpedo-boats, submarines and all the vessels directly employed in the blockade of Helgoland Bay would naturally have their base in Dover, Sheerness, Harwich and other ports on the East Coast, the gros of the fleet might, with advantage, be concentrated on the Forth and only seek Chatham or the Channel ports when necessary for repair. Stationed on the Forth, the fleet would be less exposed to attack by German submarines and torpedo-boats than would be the case in the Southern ports, which are nearer Borkum, and which are situated in waters more favorable to the navigation of such craft. The fact that large ships, stationed on Rosyth, are able to go at high speed as soon as they are outside the port, would reduce very much the danger from attack by submarines.

Whether the Forth with Rosyth, possibly in conjunction with other Scotch fjords, will be able, in a near future, to give safe anchorage and harbor space to the entire English main fleet with complete protection against submarine attack, seems, however, doubtful. Perhaps it will be necessary for the fleet to concentrate in the less advantageous positions on the Nore and in the Channel.

A base at *Scapa Flow* in the Orkneys has been proposed; it would flank the northern outlets of the North Sea, but would be of importance only if a close blockade of the German coasts could not be carried out.

A *canal between the Forth and the Clyde,* navigable for large ships, would, under the same circumstances, be of great strategic value, and has been the subject of much discussion. In would put Rosyth in direct and safe communication with the great shipbuilding district of the Clyde; it would afford a covered line of

connection between the Channel ports and the Forth, and would in general procure the advantage of "interior lines" between the East and West Coast.

4. *Technical Progress.*

The *increase in size and draft* of ships of all types, which has taken place in recent years, has greatly restricted the field of action of modern fleets, especially in such waters as the approaches to the Baltic and the southern part of the North Sea. It has made navigation in such waters more difficult and therewith enhanced the danger of all forms of submarine attack, and in particular of submarine boats.

It is not accidental that the growth in the size of large vessels has been accompanied by a very forced development of the submarine boat. The two movements are indeed correlative, since the increase in size of capital ships has, at least partly, for its object to render them more resistive to submarine attack, while the very increase in size and cost of individual ships has greatly stimulated the development of submarine boats.

The submarine boat is now recognized as a necessary link of the naval force, useful for defensive and under certain circumstances also for offensive purposes. Recent large types of submarine boats are capable of navigating everywhere in the North Sea under all conditions of weather. Thus the German boats U_3 and U_4 have, in November, 1909, made the voyage from Cuxhaven round Skagen to Kiel, 540 miles, in 40 hours, *i. e.*, at an average speed of 12½ knots. The boats had no escort.

Technically then, *i. e.*, as far as seaworthiness and endurance are concerned, there is no difficulty in sending submarine boats from one side of the North Sea to the other, and while they may not be suited for cruising about or for attacking ships independently in the open sea, it does appear possible to station them for some time off the port of an enemy. In the daytime they will remain submerged, keeping lookout intermittently through periscope, and being ready to seize any chance of attack; during night time they will keep connection with the atmosphere and if necessary replenish their store of electricity.

The submarine boats may thus take up advanced positions at the entrance to the enemy's ports and may at times even attempt attacks in these ports or roadsteads themselves.

The success of such offensive use of the submarine boats must, however, largely depend on the strategical situation. Thus the submarine boats of a blockading fleet have the advantage that they run no danger till they approach the port of the enemy. When on their blockading station, they may, whenever found necessary, fall back on the advanced torpedo vessels and scouts, from which they may obtain fresh crews and supplies, or, if the weather is too rough, they may be towed into shelter.

It is clear that such service will be very exhausting for the personnel, but, even if not kept up continuously, such submarine blockade will have good chances of inflicting actual damage on the enemy, and cannot fail to produce a great moral effect. The weaker power, if blockaded, may indeed likewise send submarine boats to the enemy's ports, but the risk of discovery before they reach such ports will be much greater, and relief and assistance cannot so easily be obtained. Hence the endurance of the boats will be very limited, and the service will be intermittent and extremely hazardous.

On the other hand, submarine boats will be of great value to the blockaded part in the defence of home coasts and ports. The blockading vessels will be exposed to unexpected attacks by such craft, and may be forced to keep at a greater distance from the blockaded port than formerly.

Already in the Russo-Japanese War, where submarine boats were not used, the gros of the blockading fleet was ordinarily stationed in a well-protected advanced base, where it was safe from the attack of torpedo-boats. It did not, as in old days, cruise about in front of the enemy's port, but came out, in fact, only when called upon to meet the enemy's battleships, or to protect landing expeditions. The immediate blockade or watch was carried out by means of torpedo vessels and a few cruisers.

After the advent of the submarine boat this mode of warfare, the so-called "base strategy," which has been much facilitated by the development of the wireless telegraphy, will, no doubt, be followed even more rigorously. The harbor where the main fleet is stationed must, in future, be guarded and protected by special means against all forms of submarine attack; the fleet will not go out unless its action is urgently needed, and great precautions will be taken when going in and out of port. The blockading capital ships will hardly ever go as near the enemy's naval ports as did the Japanese battleships, with such fatal results, when they were used

for a close blockade of Port Arthur in order to protect the landing of the II Army.

II. STRATEGICAL CONDITIONS DURING THE WAR.

1. *England and Germany at War, Neither Being Supported by Other Powers.*

We shall commence by considering *the time up to the end of 1914*. After that year the Kaiser Wilhelm-Canal, as well as the new naval station at Brunsbüttel, will probably be completed. The harbor of Helgoland and the dock at Rosyth will be ready. Moreover, we know fairly definitely what the additions to the two navies of capital ships will be up to that time, while later development is impossible to predict. The great importance of the completion of the canal makes indeed the year 1914 or 1915 a turning point in the strategical relations of the two countries.

We have seen that the naval superiority of England as compared with Germany may at the present time be taken as three to one, steadily decreasing till at the end of 1914, when it is as about two to one, the superiority in "Dreadnoughts" being then as three to two. In view of this enormous difference in quantitative strength, we conclude that the war would essentially take the form of a blockade or masking of the German ports by the English. The object of the blockade would be:

1. To watch and report upon the movements of the German fleet, and to bring it to action.
2. To prevent the escape of commerce destroyers.
3. To prevent all trade on the German ports.

It would not be the immediate object of the blockade to prevent sorties of the German fleet, but only to secure and transmit such information about its movements as will enable the English main fleet to intercept it and to meet it with a superior force.

Let us consider first conditions in the *North Sea*. The English will undoubtedly keep their main fleet assembled at one base, whether in the northern or the southern part of the North Sea, if necessary, distributed in several ports or roadsteads so close together that an actual concentration can always be effected before meeting the enemy.

The first immediate duty of the English fleet will, according to the foregoing, be a close watch, and a blockade of the Helgoland Bay and of the Skagerak. This we imagine to be carried

out in the following way: Submarine boats are sent into the Helgoland Bay and stationed at the estuaries of the rivers. Attempts will be made to obstruct the channels by mines, and to block the harbor of Helgoland.

Destroyers keep going outside the bay and off Borkum, ready to report any movements of German warships, and ready to intercept merchant vessels, which might attempt to break the blockade. The line to be watched, extending from Amrum to Borkum, is of about 90 miles length, but destroyers would probably take up more advanced positions. Similarly, destroyers, with base on the Scotch or northern English coast, will watch the Skagerak.

Behind these lookout vessels are found scouts and other light cruisers distributed so as to form support for the destroyers and connecting links with the battle fleet. Armored cruisers are distributed in accordance with their speed and fighting power, partly as direct support for the lighter ships, partly as reserves in the rear.

The detailed distribution of the blockading vessels, as well as their tactical formation, shall not be discussed here, these features being considered outside the scope of this essay, but it may be taken for granted that the whole North Sea would be kept under surveillance.

The battle fleet remains at its base, as effectively protected against submarine attack as possible, but ready to go out on short notice, whenever German sorties in force are reported.

It is not likely that the efficient and enthusiastic German Navy would remain passive when subject to such a blockade.

From *the Helgoland Bay* cruisers and torpedo-boats would try to escape and would attack the blockading vessels and perhaps the shipping in the North Sea.

Cruisers attempting to reach the ocean would, as explained above, in most cases be intercepted.

Submarine boats might break through the blockading lines at any time, but would in the open sea have poor chances of success against the English ships, which would always be moving at a safe speed. Expeditions to the English coast must be carried out chiefly in surface condition, across a sea closely watched by the enemy, and would, as explained above, be very liable to failure. Probably the most advanced blockading vessels and boats would suffer most from the attack of submarines.

As to the main fleet, it seems unlikely that the Germans should risk a decisive action in view of the overwhelming superiority of the English. Most likely the Germans would try to wear out the enemy by frequent sorties, undertaken with the object of surprising and overwhelming detached vessels or smaller squadrons. The time and radius of operation of the German ships must, however, always be limited as long as they want to avoid the English battle fleet. Attacks on English ports or landing expeditions on the English coast appear to be entirely out of the question under these circumstances.

Since the nearest point of the English coast is more than 200 miles from the blockading line the need of *an advanced base,* for repair and for replenishing bunkers and stores, would undoubtedly be strongly felt by the English. Especially the destroyers and the submarine boats would need an advanced point of refuge.

The best point for this purpose would be the island of Helgoland, but this island could hardly be reduced and captured without undue sacrifices. The German North Sea islands, even if they offer any suitable harbor, would be very difficult to hold, and points on the mainland are for the same reason entirely out of the question.

Outside the German coast we find to the north an excellent point of refuge in the Danish port of Esbjerg, close to the German frontier, but here again the English would soon be driven out by the Germans if the Danes prove incapable of preventing a landing. Similarly, points in Holland, even on the Frisian Islands, would probably be difficult to keep. In either case there would be an infringement of the neutrality of one of these countries with the attendant political complications, being a positive violation of the agreements of the North Sea Conference in Berlin, 1908.

It is therefore likely that England will accept the drawbacks accompanying the great distance between the blockading lines and their bases. These drawbacks are in fact not so great now as only a few years ago on account of the general increase in size of all classes of vessels, including destroyers and submarine boats, and on account of the advent of wireless telegraphy, but, with an enemy so energetic and well equipped as in the present case, it seems likely that the blockading service will be very strenuous and connected with considerable losses.

Let us next consider conditions in *the Baltic and in the Danish*

waters. If the English limit themselves to a blockade of the Skagerak, *i. e.,* if they do not penetrate into the Kattegat, they must be prepared to see German ships and torpedo-boats break through quite frequently. Cruisers, armored and unarmored, would have good chances of reaching the ocean and might thus threaten the English trade routes, although it must be admitted that in these days of wireless telegraphy such ships, having no base outside Germany on which to fall back, would be in a very perilous position. The English vessels and torpedo-boats, patrolling the North Sea, would be liable to continuous attacks, and since they would probably be somewhat scattered, while the German ships might perform concentrated offensive thrusts, the result of such engagements might often be fatal to the English.

Again, in this case, it would be highly desirable for the English to possess an advanced base. A port in Norway, near Lindesnæs, such as Kristiansand, would for this purpose be ideal, but could not be obtained without breaking the guaranteed neutrality of this country. The seizure of a port in Norway by the English would, moreover, probably be followed by the seizure of ports in Jutland, such as Skagen and Frederikshavn, by the Germans.

If we suppose the German "Dreadnoughts' to be stationed in Wilhelmshaven, a concentration of the German fleet in the Baltic could not be effected, and only the earlier battleships could make sorties through the Skagerak.

On the whole, then, we may expect the English to remain in control of the North Sea, but the frequent raids of German cruisers into the ocean, and the constant disturbances by sorties of German armored and unarmored ships into the North Sea would soon become intolerable to the English, and make it desirable for them to carry out a more effective blockade than is possible in the Skagerak. This could only be done by pushing the blockading lines farther forward, into the Kattegat or even through the Belt and the Sound into the Baltic. The Germans would, however, here, as pointed out above, be in a more advantageous position than the English, because they would be so much nearer to their base. Notably the German submarines would act under much more favorable conditions than the English, and also mines could be used with great effect. Hence the English could send armored ships into these waters only at the greatest risk, while detached cruisers and torpedo vessels would run great danger of being cut off or overwhelmed.

The only way in which England could overcome this difficulty and place herself on an equal footing with Germany in the Baltic, would be by establishing *an advanced naval base in the Danish waters.*

The best location of such a base would be on the eastern shores of the Great Belt, which channel, as stated above, is the highway between the Kattegat and the Baltic, and which, moreover, debouches on Kiel Bay. Another more retired base is found in the Danish capital, Copenhagen, on the Sound, which place, being fortified and provided with a good harbor and dockyard facilities, would form an excellent port of repair and supply for the fleet. Copenhagen would at the same time form a good base for a blockade of the eastern part of the German coast on the Baltic.

The possession of the former base implies indeed with necessity the possession of the latter, since no position on the shores of Zealand could be securely held against the will of the Danish government without control of the whole island and in particular of Copenhagen.

From these two bases the English might thus blockade Kielerhaven and the entire German sea-coast on the Baltic, and they could not be driven away from Zealand as long as they were in control of the surrounding waters.

In pushing through the Kattegat and the Great Belt the English would probably meet with a determined resistance from the German fleet, which could consist, however, of only Pre-Dreadnoughts, since the Canal cannot be passed by Dreadnoughts. To meet such a force the English might detach a superior squadron of similar ships, without unduly weakening their main fleet in the North Sea.

Even after the German battleships and cruisers were driven back on Kiel, there would still remain a danger of losses from the attack of submarine boats and mines. To this must be added the resistance which the English fleet would meet from Denmark, the moment it tries to seize upon a base in strictly Danish waters. In order to gauge this resistance, we must consider the probable political attitude of Denmark and the condition of its national defence.

It is the declared policy of Denmark to remain neutral under all conditions, and there is every reason to believe that Denmark would oppose with armed force, to the utmost of its ability, any infringement of its neutrality, whoever might be the aggressor.

The problem of the defence is in Denmark one of peculiar difficulty, because the territory is by the Great Belt divided into two parts, each of which has to be defended separately, if the navy is not in control of this channel.

The defence of the western portion, Jutland and Fyen, is necessarily weak, since the army must be mainly concentrated on Zealand as the most important part of the country, and since there are no fortified positions in the western part of the kingdom on which the army can fall back. In fact, if the aggressor is Germany, the resistance which can be offered will be relatively insignificant. If England is the aggressor, the case is somewhat better for the Danish forces, since the English Army must then effect a landing, which is always a somewhat delicate operation. Should such a landing be attempted, and should the Danish forces prove incapable of preventing it, it is likely that the Germans would step in. In view of the overwhelming superiority of the German Army it is indeed very unlikely that the English should attempt a landing in Jutland, as long as the German forces are not engaged elsewhere.

The eastern portion of the kingdom, Zealand, with adjacent islands, comprising the capital, is placed under entirely different strategic conditions, since it is capable of a naval defence. As the Danish waters are particularly well adapted to the use of mines and torpedo vessels of all kinds, this defence may be made very effective. The first and most important line of defence is therefore formed by the navy.

The Danish Navy consists at present of four small armorclads, a number of torpedo-boats, mostly of older date and one small submarine, suitable only for harbor defence. The mine defence is fairly well developed.

The armorclads, although incapable of fighting first-class battleships and of resisting submarine attack, will be useful against hostile cruisers and torpedo vessels and as support for own torpedo-boats and submarines.

According to the bill of national defence of 1909 there are to be 24 torpedo-boats and submarines, and several such boats, among which two submarines, are now under construction.

The only base of the navy is Copenhagen, which place, according to the new bill of defence, will soon be fairly well protected on the sea front. Thus the main force of the fleet will be free to take up an advanced position on the Great Belt for defending the

neutrality of this channel, and for maintaining the connection between Fyen and Zealand.

The position most suitable for this purpose is a bay between the islands Zealand and Laaland, called *the Smaaland Sea,* which is now being provided with fortifications at various points. The Smaaland Sea is undoubtedly the best position for controlling the Belt, and it is of particular importance that the Danish naval force should entrench itself here, because it is at the same time the position most likely to be coveted as an advanced base by a power, which, like England, might desire to blockade Kielerhaven.

The second line of defence is the coast of Zealand, where the navy and the field army may cooperate in opposing landing expeditions of an enemy. Since the Danish ships and torpedo-boats are easily overwhelmed by a great naval power, submarine boats would here be of particular value, but, as appears from the foregoing statements, Denmark is at present very poor in this class of vessel. The mine defence is alone likely to cause any serious difficulty to the enemy.

The total strength of the Danish Army is about 80,000 men when fully mobilized, with a field artillery of 96 guns of modern type, but a part of this force may be stationed in Jutland and Fyen, while another part will be tied to the defence of Copenhagen.

The third line of defence consists in the fortifications round Copenhagen. Copenhagen cannot be considered a fortress as far as the defence towards the land front is concerned; in fact the place has here more the character of an intrenched camp or fortified position on which the field army can fall back.

The resistance which can be offered by the second and third lines of defence is, from the point of view of a great power, only small, and can be estimated with tolerable certainty beforehand, but the resistance which may be offered by the first line, the navy, if properly developed, is of an entirely different order.

We need consider only the fate of the battleships *Petropawlowsk, Hatsuse* and *Yashima* to realize the risks incurred by vessels operating in hostile waters suitable for mine laying, as are the Danish waters in an eminent degree. The advent of the submarine boat has greatly added to these risks.

All that is needed in order to make the naval defence of Zealand a serious obstacle even to a great power is a further development of the mine defence and the acquisition of a number of submarine boats.

We shall now return to the discussion of an English occupation of an advanced naval base on the Great Belt and of Copenhagen. We assume then, that as the first step in this operation the English have succeeded in driving back the Baltic division of the German fleet into Kielerhaven, and that they have seized upon the Smaaland Sea, overcoming the resistance which they would here meet from the Danish Navy. If this base is to be held in safety, we have seen that it will be necessary for the English to take possession of Zealand and of Copenhagen. The existence of the Danish field army will force the English to land a very considerable expeditionary force, which will require a large tonnage for its transportation.

As explained above, the resistance which the Danish Navy can offer at present to the landing of such an expedition will not be serious.

German submarines will perhaps constitute the gravest menace to an English landing expedition, but these boats, having no base in Danish waters, will not be in so favorable a position as would be Danish submarines stationed at the various Danish harbors and fjords.

Points on the coast of Zealand can be found where the landing of troops can take place under the guns of the ships in perfect safety against the attack of the Danish Army. A force, superior to any which the Danes can put in the field, can be landed, and the Danish Army can be driven back on Copenhagen. After further reinforcements and siege guns have arrived, the fall of this city will only be a question of time.

Although the operation must be admitted to present very serious risks and difficulties, it seems perfectly feasible under the present circumstances, and would perhaps be carried out by a coup-de-main at the beginning of the war.

If then the English succeed in establishing themselves on Zealand they will be absolute masters in the North Sea and the Baltic and will be able to carry on an effective blockade of the entire German coast.

The occupation of Zealand by England would probably be followed by an occupation by Germany of Jutland and Fyen as a countermove. The Germans would hereby obtain control of the western shores of the Great Belt and the Kattegat and might thus, under many circumstances, be able to disturb the English line of communication. It is not unlikely that in such case the English

would contest the German occupation of Fyen, which might thus become the scene of serious fighting.

An occupation of Zealand by Germany, anticipating the action of England, would hardly be attempted as long as the Germans have no assured control of the Danish waters, and if such control were established, the occupation would have no object.

We shall next consider the case where *the war takes place during or after* 1915, when the works on the Kaiser Wilhelm-Canal will have been completed. Let us suppose that the increase in capital ships of the two navies after 1914 is as indicated on Plate I. The situation during the years 1915-20, will then be gradually improving for Germany, for at the end of that period her strength in "Dreadnoughts" will be about as three to five, while the preponderance in "Pre-Dreadnoughts," which England possesses at present, will be reduced and will lose more and more in significance (see Table and Plate II).

Germany will now be able to concentrate her entire fleet in either the North Sea or the Baltic as desired, and it will not be safe or wise for England to attempt the seizure of a base in Danish waters, since this would necessitate the division of her fleet into halves, which could not on short notice mutually support each other. Such a move could indeed not be contemplated by England, unless the German main fleet had been first defeated. England must therefore, as far as the Baltic is concerned, limit herself to a blockade of the Skagerak, and will be in the position already described above, where her trade is liable to suffer serious disturbances, and where she will have to face frequent offensive blows from the German Navy. The Germans would in this case, as mentioned before, need a base in the northern part of Jutland, just as the English would need a base in Norway, but the resistance which these small countries are able to offer to such violation of their neutrality, would no doubt first be seriously considered.

In actions between the main fleets the English have a reasonable prospect of defeating the Germans, although hardly without suffering serious losses themselves. Where the difference in strength is not greater than here assumed towards the year 1920, it is not safe, however, to rely too much upon numerical comparisons, even if full allowance is given for the high standing of the British Navy. Unless the war is brought to an early end by pressure from other powers or by internal or colonial difficulties, it is

quite likely to be of long duration. In a protracted war the resources of the two countries for the construction of ships, guns, armor and other war material would play a most important part and would no doubt be strained to the utmost. The rate of construction of Dreadnoughts in peace time has been estimated to be eleven for England and eight for Germany per two years. The final issue might thus come to depend on which country would first become economically exhausted.

Even if the English fleet were defeated, there would, however, be no probability of a German invasion into England. Such an operation would require an assured control of the North Sea, which Germany could not expect to obtain, especially in these days of submarine boats. If a landing should be attempted and successfully accomplished, the line of communication would be liable to interruption, and it is believed, that in view of the strength of the English Army as well as the resolution and resourcefulness of the English nation, the life of such an expedition would be very short.

Before attempting to form any general conclusion, it is necessary to complete the mental sketch which has here been drawn by considering briefly *the trade and food supply* of the two countries during the war.

According to the so-called "Declaration of London," adopted by the International Naval Conference, held in London, 1908-09, *all goods, excepting absolute contraband of war, destined to one of the belligerents, are exempt from capture by an enemy if carried in neutral bottoms and documented for discharge in neutral ports.* This rule includes not only raw materials and manufactured articles which are susceptible of use for peace purposes only, but also so-called *conditional contraband of war, i. e.*, articles susceptible of use in war as well as for purposes of peace. Foodstuffs, fuel, etc., belong to this category. Such *conditional contraband carried by a neutral ship is, on the other hand, under many circumstances, liable to capture when documented for discharge in enemy port.*

It is easy to show that in a war between Germany and England these rules are as favorable to Germany as they are unfavorable to England, on account of the peculiar geographical conditions of these two countries.

Holland, Belgium and Denmark form the chief gateways through which, under this rule, raw materials and foodstuffs

carried in neutral or even English bottoms may flow into Germany, and through which German manufactured goods may be exported to all parts of the world. Holland, in particular, is favorably situated for such trade, having excellent connection by waterway right into the heart of Germany.

England, on the other hand, is not contiguous to any neutral country, and according to Article 34 of the Declaration neutral ships carrying conditional contraband of war to English ports will be liable to capture by German warships in the following cases:

1. If consigned directly to any department of the British Government.

2. If consigned to a trader, who is known to have delivered goods of the kind in question to the British Government.

3. If consigned to any British fortified place.

4. If consigned to any place which serves as a base of operation or supply for the British Army or Navy.

It is seen that this article is so vague as to permit of a very broad definition. Thus practically any port of importance in the United Kingdom, and indeed in the British Empire, may, according to (3) and (4), be interpreted to fall under this rule.

Moreover, according to Article 49, neutral vessels are, when thus captured, liable, in "exceptional" cases, to be destroyed, viz., when the warship cannot bring it into port without involving danger to itself. This contingency, which in the case of German warships is likely to be the rule rather than the exception, will, of course, greatly increase the insurance premium in such trade.

It follows, for instance, that a neutral ship carrying wheat, which is on the way to Germany via Rotterdam, cannot be captured by English warships, even if the wheat is destined to the German Army or Navy, while the same ship, carrying wheat to England, will, in most cases, be liable to capture or even destruction by German warships.

Thus Germany may obtain food supplies not only by land but also by sea with perfect security, while the supply of foodstuffs to England, which to this country is an absolute necessity, will be liable to serious interruption, if any German cruisers are abroad.

It is in this connection of great interest to note that at the London Conference the British government proposed certain re-

strictions in *the rights of belligerents to convert merchant vessels into warships on the high seas,* but the delegates of the other powers refused to attach any condition or limitation to this principle. Thus, at the outbreak of the war, Germany may convert a number of her merchant ships into auxiliary cruisers, if before the war she has provided them with arms and ammunition. Such conversion may, of course, also take place later during the war.

England has not, at the time these lines are written, ratified the rules of this Conference. Since the main object of the Conference was to frame rules for the guidance of a new international prize court, and since agreement was not obtained on all the questions raised by the British government, the basis for the establishment of such a court is not complete. Since, moreever, the rules agreed upon have met with bitter opposition from several sides in England, it does not seem certain that this ratification will take place.

We have seen that *if England succeeds in establishing herself on Zealand,* she is able to carry out a complete and effective blockade of all German ports, naval and commercial. Hence German shipping will be in that case completely paralyzed from the beginning of the war. All over the world German merchant vessels will be laid up, inactive as during a great strike. The German colonies may be occupied by England, and German shipping will be largely supplanted by English.

If England accedes to the rules of the London Conference, the industry and commerce of Germany will, however, largely go on as in time of peace, and the food supply will not be seriously disturbed. German merchant ships converted into auxiliary cruisers will at once from the beginning of the war prey upon English shipping, and German cruisers breaking the blockade may from time to time cause disturbances in English trade, but it seems likely that all such vessels, being without any base, would soon be hunted down or driven into port by the English cruisers. Thus on the whole the shipping and food supply, the trade and the industry of England would, under these circumstances, hardly suffer any serious disturbance. The interruption in mutual trade relations which the two warring countries would suffer would of course in any case cause great losses to both nations.

If, on the other hand, *the English have no advanced base in the Baltic,* as is likely to be the case if the war takes place after the work on the Kaiser Wilhelm-Canal is completed, we have seen

that German cruisers will probably break the blockade in Skagerak quite frequently. In such case English shipping, trade and food supply may be seriously disturbed. Prices on foodstuffs may rise sharply and panics may be caused. At the same time the German trade in the Baltic and in Danish waters may be carried on as in time of peace, and the great Danish export of foodstuffs, which ordinarily goes to England, will be diverted into Germany.

On the whole, if England adheres to the rules of the London Conference, the economic life of Germany will not be deeply affected in either case. If, on the other hand, England does not ratify these rules, she may, if she chooses, consider as absolute contraband all the articles specified by the Conference as conditional contraband, and by giving a broad definition to the list of articles so specified, she may most seriously hamper the food supply, as well as the trade and industry of Germany. In this case not only the shipping, but also the trade and industry of England will flourish at the expense of those of Germany.

2. England allied with France at War with Germany.

Referring to the foregoing discussion, the naval situation on the North Sea and the Baltic will in this case only be changed in as much as the inferiority of the German Navy will now be more marked. The probability of an occupation of Zealand will therefore be greater than if England stood alone against Germany.

By establishing themselves on Zealand the Allies would not only be able to blockade Kiel and the German coast on the Baltic, but would also pave the way for a diversion from the north, should such a move be found opportune. The mere possibility of such a diversion would tie a part of the German Army in the defence of Kielerhaven and would force Germany to undertake a strong occupation of Jutland and Fyen.

The main issue of the war would be determined on the continent, and would depend chiefly on the strength of the expeditionary force, which England could send to the support of France.

Should the Germans be victorious, they might take possession of the French Channel ports, but as long as the Allies were in control of the sea, Germany would be as incapable of invading England as was Napoleon in 1805.

3. *A Great European War.*

We shall only consider the case where the powers of the Triple Entente, England, France and Russia, are at war with the two powers of the Dreibund, Germany, Austria, while Italy may or may not be supposed to take part in the war.

While the French Navy may be partly or wholly engaged in the Mediterranean, the Russian Baltic fleet will be available. The balance of naval power in the North Sea and the Baltic will be strongly in favor of England and her Allies, and it is again extremely likely that these powers will attempt to seize Zealand so as to be able to control the Great Belt and to blockade Kiel effectively.

Again in this case the issue of the war would be determined on shore.

SUMMARY AND CONCLUSIONS.

It has been shown that in the event of the war taking place before 1915, Germany will be at a great disadvantage in a single-handed conflict with England. Her colonies will be occupied, her entire coast line will be blockaded, and her shipping paralyzed. If England does not tie herself by a ratification of the rules of the London Conference, the trade, the industry, and the food supply of Germany are liable to suffer most serious interruption, while the commerce and industry of England will prosper almost in the same measure as those of Germany decline. Thus England may exert a great economic pressure on Germany, and this latter country will be practically unable to retaliate. On the other hand, England is incapable of directly inflicting any vital injury upon Germany, for the perfect coast defence of this country and the great military power behind it render it safe against all shore attack. The English will probably attempt to establish a base on Zealand, in which case the Germans are likely to occupy Jutland and, perhaps, Fyen.

The outcome will depend on how long Germany will be able to sustain this throttling of her economic life.

In the event of England adhering to the rules of the London Conference, Germany will probably be capable of a more prolonged resistance. Political conditions and events, internal or external, may of course force the warring nations to an early peace, but otherwise Germany may gain time for a material increase in

naval strength by new construction, as well as for the completion of the Canal. The English will then be liable to be driven out of the Baltic and the Danish waters, Zealand will be captured by the Germans, and the war will enter into a different phase.

After the completion of the Kaiser Wilhelm-Canal, Germany will be in a much better strategical position. Provided the growth of the two navies is as assumed in the foregoing and as indicated in Plates I and II, the relative strength of Germany will be gradually improving till the time when her naval program is completed.

Towards the end of the period 1915-20 the disparity in strength will not in fact be so very great, and it seems quite possible that the war may be carried on with varying success. Moreover, many other factors, besides numerical strength and success in battle, may influence the final outcome of the war. Even if England is victorious and even if she has fully maintained her present naval superiority, it seems certain that her trade and food supply will suffer interruption and that she will experience heavy losses. It is likely that the war will be carried to the point of exhaustion of one of the parties, both countries putting forth their utmost efforts in military operations as well as in repair and renewal of their matériel.

An exclusively naval war must rely for its issue ultimately on economical exhaustion, and is likely, under the circumstances here discussed, to be either inconclusive or else very protracted. The warring nations can in fact only apply a part of their resources and forces in the conflict, since their armies cannot be brought into action, and the most powerful form of coercion, that of territorial occupation following the defeat of the hostile army, cannot be employed.

In the event of fighting between the two powers taking place on shore, whether on Zealand, Fyen or elsewhere, the war may, of course, acquire a much more intense character.

On the whole, a war between England and Germany alone, in the near future, whether before or after 1915, cannot be tempting to either party, but it must be admitted that events may happen, not to be foreseen and entirely outside the control of the two countries, which at any time may produce a conflict. Hence, it is necessary for the countries concerned, including adjacent small countries, to be fully prepared for war.

Holland and Denmark, which flank the German North Sea coast, will act as buffer States to the German Empire, as long as they are neutral. Holland will, in particular, cause the stress of the commercial blockade of the North Sea coast to be relieved, while Denmark will prevent a close blockade of the Baltic coast line. Thus, during a war with England, Germany is interested in respecting the neutrality of these countries, on condition, however, that their policy is strictly and impartially neutral, and that they are capable themselves of defending their neutrality.

If these conditions are not fulfilled, we have seen that these countries, and in particular Denmark, will constitute a danger to Germany, and their position will then be very critical.

It is therefore dangerous for these small countries to listen to the advice of the peace advocates, who recommend the easy and tempting course of disarmament. So long as the great powers have not disarmed, the small powers must be prepared to protect their neutrality and independence with armed force.

Denmark is indeed at present making great efforts for strengthening her national defence, but an addition of a considerable number of submarine boats should be made to the existing programme of the navy.

Unless Denmark is well prepared to defend her neutrality, in particular on the sea, she will run great risks of seeing her territory invaded by the belligerents in spite of the most earnest and impartial policy of neutrality on her part. Denmark will then become a second Manchuria, a battleground for foreign armies and navies, and even the integrity and independence of the country may be jeopardized.

Holland is militarily much stronger and, as appears from the foregoing, not in quite so dangerous a position as Denmark.

As to the probability of France or other powers taking part in the conflict, and as to the probable outcome of the war in such case, no opinion shall here be expressed. The strategic conditions in the North Sea and the Baltic would, however, probably be essentially of the same order as during a war between England and Germany alone.