great increase of efficiency displayed by the hollow cap as compared to the solid pattern.

A typical hollow cap is shown in Fig. 2, on opposite page, which embodies the essential features of massing the metal round the point of the head and keeping it thin in front of the point. It will be noticed that the hollow front joins the main portion of the cap by a shallow inverted cone, the deformation of which offers just sufficient resistance to arrest the forward motion of the main body of the cap while pressing it into intimate contact with the shell head.

In the foregoing mathematical investigation the further progress of the shell has not been traced, but might be subjected to a similar analysis, the question however being complicated by the difficulty of estimating how much of the earlier radial acceleration is absorbed by the resistance to stretching of the cap metal.

The chief function of the cap, however, is to enable the head of the shell to withstand the first shock of impact without rupture and on its success in this ordeal will depend the effect produced on the plate. In the one case there will be perforation by a solid body, well designed for the purpose, and in the other case the damage caused by the energy of the fragments.

FOREIGN POWERS.

Secrecy abroad.

Year by year it becomes more and more difficult to write anything really instructive concerning progress in matters of ordnance and armour in foreign countries. The secrecy that is thrown over the characteristics of ships is spread more heavily over their special equipments, and especially over everything that concerns the means of their offensive and defensive power. Where facts are not made known, rumour sometimes takes their place, and it is consequently necessary to receive some reports with great caution. The views of authorities upon points that arise are suggestive and instructive, and the best course to pursue in this foreign section is to deal, as far as is possible, with events of current interest as they are discussed. It is possible to say something about changes and progress in the United States Navy, and even to record some results attained with trial armour-plates, which are not accessible in the records of any other foreign nation. The introduction of a quadruple turret in the new French ships, and the great inquiry into the subject of the unstable naval powders, are the only subjects which can be dealt with in relation to the French Navy. German progress in armour production and the mounting of new ordnance cannot be recorded,

and spread as much destruction as possible, but he did not anticipate great effects against armour. This opinion was based upon American experiments, intended to represent the effect of the Isham shell. These trials have been described in the *Naval Annual*.

Projectiles. Some remarks followed upon the advantages which have resulted from the introduction of the pointed shell, whereby air resistance is greatly reduced. In the Krupp tables of 1908 the 50-calibre 11-in. shell, with an initial velocity of 975 mètres, was given a residual velocity of 701 mètres at 5000 mètres range, being a loss of 274 mètres; but a modern shell, at the same range, would have a residual velocity of 796 mètres, which is the velocity of the older type at 3100 mètres. The pointed projectile permits either a large increase of energy without great increase of erosive effect upon the gun, or the same energy with lesser initial velocity and reduced erosion.

Armour. With regard to armour, "Nauticus" had some remarks on the larger plates now produced, and the system of applying them to the ship's side with their greater length vertical, whereby only one range of armouring might be required. He drew attention to the efforts made in this country to effect a copper weld between armour-plates with the object of increasing resistance. In his view vanadium steel is too expensive to be brought into ordinary use, but he referred to the hopes entertained of obtaining good results by applying a thin coating of armour of special steel covering the main armour but with an inter-space, as a decapping device. Such plates he referred to as being 25 mm., or about 1 in. thick. The idea is to bring about the detonation of the shell, and to diminish its power against the thicker armour.

Anti-air-craft guns. Referring to a special department of ordnance work—that of anti-balloon guns—"Nauticus" said that they would soon be mounted in all warships. There will not be a duplication of guns, because the special guns will also be available for the other uses of guns of their calibre. These matters are referred to below under the head of "Germany."

A statement was appended to the armour and ordnance section of "Nauticus," in the previous volume, intended to show the relative total number of guns mounted in German and British ships launched within a period of ten years. In the decennial period up to 1912 the German guns of heavy calibre were stated to be in the proportion of 1 to 2·2 British guns, 1 to 2 of medium calibre guns, and 1 to 1·7 of guns of lesser calibre. If the same period be reckoned back from 1913, taking account of ships expected to be launched, the proportions are given by Gen. Rohne in the *Artilleristische Monatshefte*, as

follows: heavy guns 1 to 2·4, medium 1 to 2·4, small guns 1 to 1·6. We have not examined the facts upon which these proportions are based, but the practical abandonment of medium armaments after the building of the Dreadnought seems to suggest some doubt as to their precise significance.

UNITED STATES.

As is the case in other countries, the ordnance authorities of the United States are reticent in regard to recent advances, and Rear-Admiral Twining, Chief of the Bureau of Ordnance, in his Report, says that though many improvements have been made, the information is regarded as confidential. A great deal of work had been thrown upon the department by the organisation of the new Reserve Fleets, and much experimental work had been in progress, which gave confidence that many details of ordnance material had been improved.

New guns.

The guns required for the New York, Texas, Oklahoma, Nevada, and the destroyers have been produced and are being completed by the Washington Navy Yard, the Watervliet Arsenal, the Bethlehem Steel Co., and the Midvale Steel Co. Modifications have been made in a number of 12-in., 8-in., 6-in., and 5-in. guns. Some fifty 8-in. and other larger guns, and more than 100 guns of calibre less than 8 in. have been relined and are to replace worn guns afloat. Conical lining has been definitely adopted, and in future this method will be used whenever practicable in the United States Navy.

An eccentric type of breech plug has been adopted for cartridge-case guns other than those having a sliding-wedge type of breech mechanism, and new mechanisms of the type are being fitted to all 3-in. 50-calibre Mark III. guns which are being issued to the Fleet.

The triple-turret mounting, tested at the Naval Proving Ground, subject to minor modifications, proved satisfactory, and that system has been definitely adopted. The manufacture of the four mountings for the Oklahoma and Nevada is making good progress. This type of mounting will also be adopted for the four turrets of the battleship Pennsylvania. The 14-in. Mark I. mounts for the New York and Texas are nearing completion, and the entire turret design for these vessels is reported to be a decided improvement on previous designs. The 14-in. Mark I. mounting will be installed in the two-gun turrets of the Oklahoma and Nevada.

Vessels of the New Jersey and Connecticut classes are all being equipped with 8-in. tube shell-hoists, and where the need was

apparent certain vessels of the above classes have been fitted with 12-in. tube shell-hoists.

The Report states that improvements have been made in turret telescopes, and that the Fleet has been supplied with telescopes embodying such improvements.

The ammunition handling arrangements of vessels of the Fleet have been greatly improved.

Nitro-cellulose powders.

Powder for the Navy is being manufactured upon the former specification, but improvements have been introduced in the methods to ensure uniformity and the incorporation of the right quantity of diphenylamine without variation. Experiments have been made in drying powders at high temperatures, but no results are known. Considerable alarm was created in certain naval circles by the Liberté catastrophe, owing to the fact that the United States and France both use a similar powder. It was suggested that disasters were to be anticipated in the United States Navy similar to those experienced in the French Navy. The two powders are of the same general type, both being nitro-cellulose powders, but they differ materially in the kind of solvent used, and French official reports showed that their methods of manufacture, blending and re-working are so unlike those employed by the Du Pont de Nemours Co. and the Government Works at Indian Head as to cause the two powders to be radically different. Recent reports from France are to the effect that all powder now in service will be withdrawn and replaced by powder of the American type. The specifications under which smokeless powder is manufactured for the United States Army and Navy are very stringent in requiring absolute purity of all material used, exceeding care in every portion of its manufacture, and step-by-step inspection of the powder from the raw-material stage to the finished product. The regulations regarding stowage, care and inspection of smokeless powder, both on shore and aboard ship, are comprehensive, and are strictly observed. Since the adoption of the present type of smokeless powder by the Navy Department not one accident has occurred due to decomposition or spontaneous ignition of the powder—a record which is probably not paralleled in any other service. No smokeless powder in which diphenylamine has been incorporated has as yet shown any signs of loss of stability, the oldest lot of powder containing this stabiliser being now four years old.

The experiments with ozokorite as an agent for reducing the erosion of guns were brought to a conclusion last year, it having been determined that, while powder charges with which ozokorite was mingled produced less erosion than charges containing the same

weight of powder, but containing no ozokorite, the disadvantages attending the use of ozokorite more than offset its advantages.

No change of any importance has been made in the design of armour-piercing projectiles, but higher qualities are required, and the manufacture is improved. The officers of the Ordnance Bureau believe that the tests are as severe as can be met by the manufacturers. Some of the old shells are being modernised and fitted with new fuses and long-point caps.

Experimental work.

In compliance with the wishes of the Committee on Naval Affairs of the House of Representatives, the Bureau of Ordnance has prepared to carry out exhaustive experiments with armour-piercing projectiles and with relatively thin-walled projectiles carrying a large charge of high explosive. Special target structures have been built on "Experimental Target A" (late the Katahdin), but no results have been reported.

Coincidently with the preparations for the actual firing experiments at a target, experimental work is being conducted with several types of explosives to determine their sensitiveness, keeping qualities, and effectiveness of explosion.

The subject of the flight of projectiles and their action in the air has been investigated and a large amount of data gathered and compiled, all of which tend to confirm the statements made in the last Annual Report regarding the direction of the axis of a projectile in flight.

On the subject of armour it is stated that the specifications for the plates for the Oklahoma and Nevada were slightly more severe than formerly, but it is not anticipated that any difficulties will occur. No radical changes in composition or methods of manufacture have been made, and while cemented and non-cemented armour is being supplied, it appears that it cannot be stated that one type is superior to the other. Steady and slow improvement is anticipated. Special-treatment steel for turret tops has shown steady improvement, both in composition and methods of manufacture.

Torpedoes

In so far as the design of material is concerned, the torpedo situation is reported by the Chief of the Ordnance Bureau to have greatly improved. The two new types of long-range, high-speed torpedoes have been built, and passed satisfactorily the test. Although it is not the department's policy to publish details in regard to these weapons, the Report states that a comparison of the characteristics of these torpedoes with those of the best torpedoes in service abroad indicates that the United States is at least abreast of all foreign countries in this respect. The Service is, however, still lacking in numbers, and the number of erratic runs and losses continues to be

greater than can be contemplated with satisfaction. There has been a very marked amendment in this respect in the submarine and destroyer flotillas, and Admiral Twining hopes that the same may be noted in the battleship fleet. There was considerable improvement during the year in the rapidity of manufacture and supply of torpedoes by contractors, and it is anticipated that during this year a considerable number of torpedoes will be added to the available supply.

Bethlehem Steel Co.

Armour and ordnance from the United States are now finding their way into the European market. Thus the Bethlehem Steel Company received orders for the complete armour and armament for the Greek battleship Salamis, now building at the Stettin Yard of the Vulcan Company, as well as for guns and ammunition for the Greek Navy, and armour for the new Italian battleships. There has also been a large order for 9·2-in. guns mounted in Bethlehem barbettes, with large quantities of armour-piercing ammunition, destined for the coast defence of Chile. Other foreign work has included large repeat orders from the Argentine Navy for guns and ammunition. The entrance of the American firm into competition with European ordnance firms is significant.

The Bethlehem 4-in. 50-calibre q.f. gun is fitted with an extremely large diameter pedestal, in order to distribute the firing stresses over as large an area of the deck as possible. This feature, together with the long recoil, enables the powerful gun to be used in destroyers which were thought quite recently to be capable of carrying only 4-in. low-velocity guns. This mounting is provided with the Bethlehem two-hand gear for both the elevating and the training mechanism, and with the control in a two-speed gear-box, so that the ratio can be changed by means of a foot pedal, even in the middle of a roll.

The American type of naval mounting for the 50-calibre 12-in. gun has special features. The gun is carried in a hydraulic cradle, and four powerful spring boxes are used, with a recoil cylinder in the centre-line below the gun. Above the right trunnion of the gun, which trunnion is of the frictionless knife-edge variety, is a prismatic sight of the horizontal periscope type, the sight setter's position being behind that of the gunlayer. The breech mechanism can be entirely man-handled, and although the Bethlehem Company supply guns fitted with hydraulic or electric breech mechanisms, the operation of the hand mechanism is simple and rapid, and in some quarters it is preferred to types operated by power.

It appears that the Bethlehem Steel Company's average output of armour has recently been well over 1000 tons per month.

Information regarding the plates generally cannot be given, but details are available concerning three special plates. One was a Bethlehem acceptance test plate, tested in July, 1912. The thickness varied from 9 in. to 8 in., and the dimensions were 105 in. by 138 in. The projectiles were 8-in. capped A.P., weighing 260 lb. No cracks developed in the plate, and in each case the shell was wrecked. The results of the firings at this plate are given below :—

Round.	Results.		De Marre.		Penetration.	Dish.	Effect on Plate.	
	Striking Velocity.	Energy.	Velocity.	Coeff.			Diam. Spall.	Diam. Impact.
		ft. tons.			in.		in. in.	in. in.
1	1626	4771·3	*1348·6	*1·205	1	0	29 × 32	8 × 8
2	1546	4313·1	*1292·5	*1·196	1⅜	0	11 × 38	7 × 8
3	1525	4196·1	*1263·5	*1·206	1½	0	5 × 11½	4½ × 6

Another trial was of a 12-in. plate, and three rounds were fired to determine the acceptance of the group of armour represented. In none of them did the actual penetration exceed 2½ in. The plate was curved on a 168-in. radius, and had a 6-in. oak backing. The projectiles were 12-in. capped A.P., weighing 870 lb. A fourth round was fired for information only. It will be noted from the table given below that, with a striking velocity of 40 f.s. higher than that prescribed by the governing specifications, the projectile effected an actual penetration of only 2 in.

Round.	Results.		De Marre.		Penetration.	Dish.	Effect on Plate.	
	Striking Velocity.	Energy.	Velocity.	Coeff.			Diam. Spall.	Diam. Impact.
		ft. tons.			in.	in.	in. in.	in. in.
1	1451	12713·3	*1272·4	*1·140	1¼	¼	14 × 14	9 × 10
2	1501	13604·6	,,	*1·169	¾	0	None	7 × 8
3	1513	13823	,,	*1·189	2⅛	¼	13 × 26	10 × 12
4	1476	13155·2	,,	*1·160	2	0	None	8 × 9

Another acceptance test plate was tested in January, 1913. The plate was of 6½ in. thickness, and had a 6-in. oak backing. The projectiles were 6-in. capped a.p., weighing 105 lb., and the thickness at the point of impact was 6$\frac{9}{16}$ in. No cracks developed, and in each case the projectile was wrecked. The actual penetration did

* It should be noted that in the above tables the velocities and co-efficients marked * can only be compared with other capped projectiles.

not in any case exceed 1½ in. The results of the test are given below:—

Round.	Results.		De Marre.		Penetration.	Dish.	Effect on Plate.	
	Striking Velocity.	Energy.	Velocity.	Coeff.			Diam. Shell.	Diam. Impact.
		ft. tons.			in.	in.	in. in.	in. in.
1	1812	2392·8	*1426·7	*1·27	Est. 1½	⅛	15 × 18	5½ × 6
2	1715	2143·5	*1417·2	*1·21	⅞	0	5 × 8	4 × 4½
3	1747	2224·2	*1426·7	*1·22	1¼	⅛	18 × 24	5 × 5½

FRANCE.

Two matters only concerning the French Navy can be dealt with here—the introduction of the four-gun turret in the new ships, and the question of the naval powders, which has so greatly agitated Service opinion and caused great general alarm.

The battleships of the 1912 and 1913 programmes—Bretagne and Normandie classes—are armed with the new 45-calibre 13·4-in. gun, which weighs 66 tons, and fires a 1190-lb. projectile with muzzle-energy of 65,340 foot-tons, calculated to be capable of penetrating 11·8 in. of Krupp steel at a range of 9000 mètres (9842 yards). In the Bretagne class, ten of these guns are mounted in five double-turrets on the keel line, but in the later class twelve guns are to be mounted in three quadruple turrets. It was a bold step to place four big guns in a single turret, but the French have not seldom displayed both originality and enterprise in matters of naval construction. The Italian, Austro-Hungarian, Russian and United States navies had adopted a triple mounting, and it seemed possible that a further step in the same direction was possible. The question of weight was predominant in the minds of the designers and constructors. With a lesser number of guns a double turret might suffice, but if twelve big guns were to be mounted in one ship, the displacement would considerably increase unless weights could be reduced. The Naval Staff and the Technical Committee of the Ministry of Marine were agreed upon the advantage of the plan proposed. A quadruple turret weighs more than a double turret, but the twelve guns, with mountings and turrets, weigh approximately the same as the ten-gun armament of the Bretagne. This is not the only advantage, for there is a large deck space and each turret has a very large arc of fire, while the arrangement of magazines

* It should be noted that in the above table the velocities and co-efficients marked * can only be compared with other capped projectiles.

is simplified. Such considerations weighed with the authorities, and early last year the Superior Council of the Navy, when the subject of the type of future battleships came up for discussion, approved of the principle. It has been rumoured, however, that when the final decision was arrived at, the quadruple turret was adopted by a rather small majority in the Council.

Quadruple turrets.

Naval opinion was doubtless divided upon the subject, and not a few officers disliked the idea of putting too many eggs in one basket. There was also the consideration that the quadruple mounting might become impracticable with a still bigger gun, and some officers doubted the wisdom or necessity of mounting twelve big guns in one ship. Another point was that the firing of the whole four guns simultaneously might have a serious effect upon the structural stability of the ship, and there seems to be an opinion that the experiment might be dangerous, and that simultaneous firing should not be resorted to. This consideration brings out another point—that the weight of broadside alone is not the real criterion of the fighting value of a ship, but rather the weight of discharge within a given time. No details have become public with regard to the type of mounting for these guns, nor of the arrangements of ammunition hoists, or the power to be employed. The secondary armament of the ships will be twenty-four 5·5-in. guns in casemates, and there has been some dissatisfaction that a rather larger calibre gun could not be adopted. The secondary guns will be provided with fire-direction and order transmission appliances like the big guns, and some critics think the complication may be too great. The 5·5-in. guns are really an anti-destroyer armament, but the provision of the appliances referred to seems to suggest that there is an idea they may also be used in fleet actions.

Propellants.

A question which, perhaps more than all others, has pre-occupied the gunnery department of the French Navy has been the safety of the powders employed. An account was given in the *Naval Annual* last year of the procedure adopted by the authorities after the Liberté catastrophe, the inquiry of Rear-Admiral Gaschard's committee, the action that followed, the further inquiry of a joint Naval and Military committee, the decision of Admiral Bellue to send some suspected ammunition ashore, and the subsequent disembarkation of ammunition more than four years old. It was shown that the B powder was not chemically homogeneous, that it had been subject to a destructive process of treatment or *remalaxage*, as well in many cases of several dryings at high temperature. The authorities were compelled to change front in this matter. In December, 1911, the Minister, on the authority of the Superior Council of the Navy,

said, apart from the older powder, that the ammunition would not be disembarked, because "France was not to be disarmed before the foreigner." The removal of the material of earlier manufacture, began on September 12, 1911, and continued until March 19, 1912. By that date some of the more recent lots of powder had fallen under suspicion, and the process of sending them ashore begun. Meantime, the double catastrophe of exploding charges on board the Jules Michelet occurred on June 26th, and before the close of September, all the powder treated by the amylic alcohol (AM) process was disembarked. The order for this measure of precaution was issued on July 31st, after much consideration and inquiry, and henceforth only powder prepared with diphenylamine (known as D powder) is to be employed. The French powder, like that employed in the United States, has a nitro-cellulose base, but the processes of manufacture had been irregular, the solvent used was different, and there was not the necessary stringent selection and examination of the material, while the incorporation of old powder with that of more recent date had opened a serious source of danger.

D powder.

Accidents in the Jules Michelet.

The accidents on board the Jules Michelet occurred at the Salins d'Hyères while gunnery practice was in progress. At 3.35 P.M. on June 26th, a cartridge exploded during the charging of a 6·4-in. gun in one of the port turrets, which gun had fired 113 rounds in the morning and forty-eight rounds after the resumption of firing. A jet of flame issued from the breech, the cartridge exploded, and ten men were injured, some of them seriously. There was no panic, and firing was continued, with the laudable object of maintaining confidence and discipline. But, at 6 o'clock in the evening, a disaster of precisely similar character occurred during the loading of another gun of the same calibre, which gun had fired 107 rounds in the morning and 113 in the afternoon. A Lieutenant and ten men were injured in the second explosion. As a result of these two accidents several lives were lost. In each case the air blast had been applied for eight seconds before introducing the projectile, and for six seconds afterwards. The firing had been conducted slowly, and all the regulations had been observed. The powder used was described as "BM 2-AM 8-4-10-SM-02-12," being a numbered lot of amylic alcohol B powder of 1910 supplied by the Saint Médard factory. An inquiry into the circumstances was conducted by a committee composed of General Gaudin, Captain Schwerer, Colonel Koehler, and M. Marquerol, chief expert on Government powders. The theory that the great heat of the guns might have caused the disasters was discussed. The explanation most probable was that incandescent fragments had ignited heavy residual gas remaining in

the gun, which in turn had caused the explosion of the cartridge. A sort of reproduction of the accident was devised by Lieut. Ravel and another officer, who placed a cartridge in a copper tube of the size of the gun, and residual gas bursting into flame caused the explosion of a cartridge. The conclusion was that the air blast was insufficient to drive out the heavy gas. The section of the blast was too small, so that it swept through, carrying away some gas, but leaving enough to cause danger, and it has since been decided to employ a more effective hydro-pneumatic blast.

Effect on gun practice.

The effect of the disaster was serious. It put an end for some time to the gunnery of the Fleet and the prize-firing. Officers were in the greatest uncertainty, and order after order came from the Minister of Marine instructing that one lot of powder or another should be discharged from the ships. Orders were transmitted by wireless telegraphy, and certain vessels at sea returned at full speed to Toulon to carry out the orders. It was said that the Third Squadron had disembarked all its powder at Sant Nicholas in August, when instructions came to carry out some blank firing, whereupon powder was sent to the squadron in lighters at Quiberon, and from these just enough was taken to permit the firing to take place Then the powder was sent ashore at Brest, but on the order to proceed to the Mediterranean it was re-embarked, and finally disembarked at Toulon. Happily confidence seems now to have been restored, and the powders of 1912 are made from new gun-cotton with diphenylamine as the solvent agent. In the course of the discussion of the Budget in February, M. Painlevé, who had dealt with the subject in his report on the Navy, was not, however, content. He said that the heat treatment was a great danger, and advocated trials of a nitro-glycerine powder. The proper chemical treatment of gun-cotton intended for nitration had never been studied, and each change had been a tentative imitation of what was being done abroad. General Gaudin, chief of the French explosives department, which still bears the old name of "Poudres et Salpêtres," affirmed, on the other hand, that the powder delivered in 1912 possessed excellent qualities, that it was very superior to the older powder, and, compared with powders recently brought for the Navy and which certain American factories had offered, that it possessed an incontestible superiority. The gunnery work of the Fleet has been resumed. The cessation of the most important work in the training of the officers and men had disheartened many, and a feeling of discouragement was widespread but now a corresponding feeling of exhilaration has followed the resumption of the gunnery training in the ships.

GERMANY.

New guns. Two new guns of large calibre have appeared in the Krupp lists this year, and details will be found in the tables at the end of this Part. They are a 38·1 cm. (15 in.) and a 40·66 cm. (16 in.), and each of them is shown in a light and a heavy model, the former presumably for ship use and the latter for fortress emplacements. It is possible, or probable, that not all these guns have been made, for a 50-calibre 16-in. gun is not yet within the range of practical ship design. The 38·1-cm. (15-in.) gun takes the place of a 38-cm. (14·96-in.), which was in last year's tables, and the ballistic details are not therefore quite the same. Particulars of these guns, converted to English measures, are given below, the reference being in each case to the lighter pattern gun :—

—	38·1 cm. = 15 in.			40·46 cm. = 16 in.		
Length, calibres . .	40	45	50	40	45	50
,, bore . . ft.	50	56·2	62·5	53·3	60·1	66·8
,, total . . ,,	53·2	59·5	65·7	56·7	63·3	70·1
Weight . . . tons	65·9	74·9	84·4	80·1	90·9	102·4
,, shell . . lb.	1,677·6	1,677·6	1,677·6	2,028·2	2,028·2	2,028·2
,, charge . . ,,	454·0	531·2	615·0	555·5	643·7	1,097·3
Initial velocity . ft. sec.	2,625	2,789	2,953	2,625	2,789	2,953
Muzzle energy . ft. tons	80,048	90,380	101,328	96,904	109,400	122,693
Perforation (steel) at muzzle . . . ins.	42·5	46·3	55·2	45·4	49·6	53·5

Anti-air-craft guns. Krupp anti-air-craft guns have already been illustrated and described in the *Naval Annual*. The mounting of such guns in warships is evidently being considered in Germany, and the question is likely to become of great importance in the near future. The Krupp company now shows two models of the gun for ship use, both on pedestal mounts, one a 12-pdr., and the other a 4·7-in. Though primarily intended for the attack of air-craft, these guns can be used for the same purpose as other guns of the same calibres. The object, therefore, is to substitute such guns for other ordinary guns, and consequently not to add a special type of gun, which is certainly undesirable in view of the limited space available in warships. Great care has been devoted to providing suitable sights for the guns, and it is claimed that the prismatic type employed, giving a large field of vision, are excellent in simplicity and effective use. The smoke-projectile, or tracer, for observing the flight of the shell, is now well-known, and these Krupp guns are provided with effective shells fitted with delicate fuses, which will, it is stated, cause detonation upon striking the thin material of a balloon. For

land use the Krupp Company have a 12-pdr. field gun, with an elevation of 65 deg., which can be used against air-craft. A 2·8-in. gun, with 11 lb. shot, is adapted for mounting in a power-car or wagon. The 4·1-in. gun, with 30·8 lb. shot, is for fixed positions, and such weapons are no doubt essential for coast defences and emplacements in the vicinity of dockyards and arsenals. Both the special anti-balloon guns have an elevation of 75 deg.

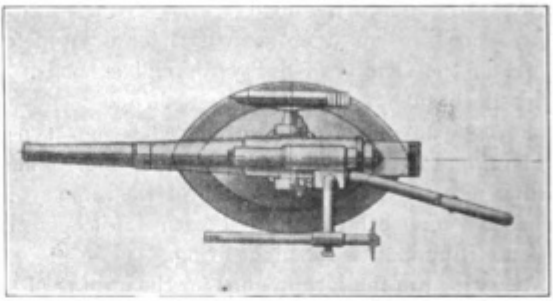
The same company have also introduced a new type of man-handled 4·1-in. and 2·9-in. gun for ship mounting. These do not seem to differ greatly from other guns of the same type, but are finely constructed and balanced, fitted with telescopic sights, and have glow-lamp illumination for night firing.

Guns for submarines.

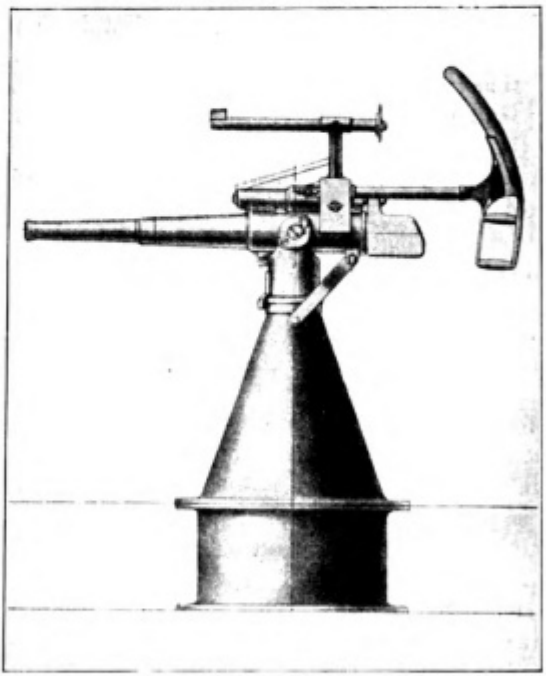
More interesting are the Krupp guns for the arming of submarine boats. Of these there are two types, one with a fixed pedestal mounting, to be bolted on the hull of the submarine, and the other of a disappearing type, rising from a well in the submarine for action, and then being stowed away again. The object is to provide an armament which shall be capable of coming into action within a very short time, and which, under way, shall offer the smallest resistance possible to the water. Both of these types are shown in the illustrations on pages 384 and 385. The disadvantage of the disappearing type is the time required to bring the gun into action—which, however, according to the accounts, seems to be very short—the complication of the mountings, and the stowage space required in the submarine. In the other type there are undoubtedly difficulties arising from the probable action of sea-water upon the guns, and a certain reduction of speed which must result from the added obstruction to passage through the water. It is doubtless these considerations which have caused the Krupp designers to make the fixed gun of small calibre. It is a 3·7-cm. (1·45 in.) piece mounted on a pedestal of lenticular section, and the whole weighs 5·23 cwt. The gun rests in a cradle, and there is hydraulic buffer control of the recoil. It is provided with shoulder-piece, telescopic sights, and hand elevating and depressing wheel. Two men are required at the gun, and a third for cartridge supply. There is a magazine on the right side for five changes. When the submarine is about to descend, the delicate appliances, sights, and shoulder-piece are removed and stowed below, the muzzle of the gun is closed with a tompion, and the breech has placed over it a water-tight covering.

The disappearing gun is a 12-pdr, and with its equipments weighs 15·75 cwt. When the gun is stowed below the only projection from the hull of the submarine is the small base for the pivot mounting, which has sloping sides, intended to reduce to a

minimum the resistance to water-passage. There is a cover-plate for the opening, through which the gun is raised, and the upper

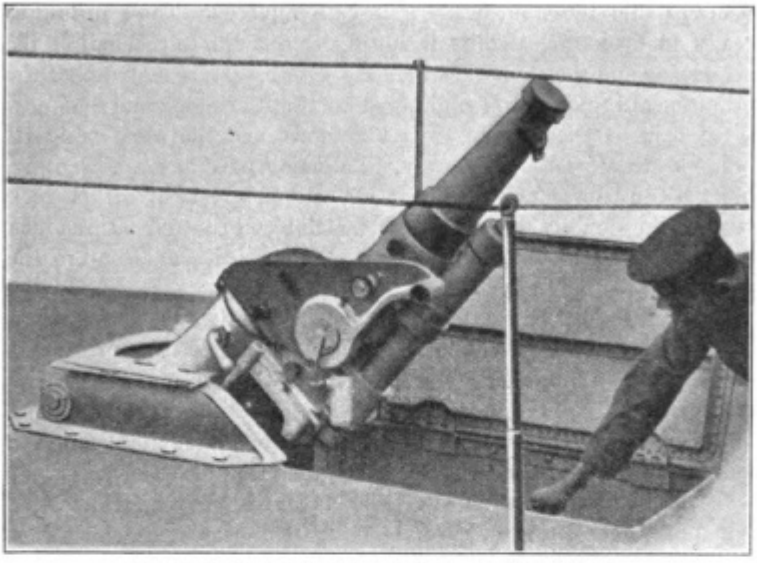


KRUPP GUN FOR SUBMARINES.
Plan of the Fixed Mounting.



KRUPP GUN FOR SUBMARINES.
Permanent Mount.

part of the projecting base is removed. The gun-mounting is pivoted below, and is brought up by electric power, one man attending the operation of bringing it into position, after which the cover-plate



KRUPP DISAPPEARING 12-PDR. GUN FOR SUBMARINES.
Bringing the Gun into Position.

KRUPP DISAPPEARING 12-PDR. GUN FOR SUBMARINES.
In Action against Air-craft.

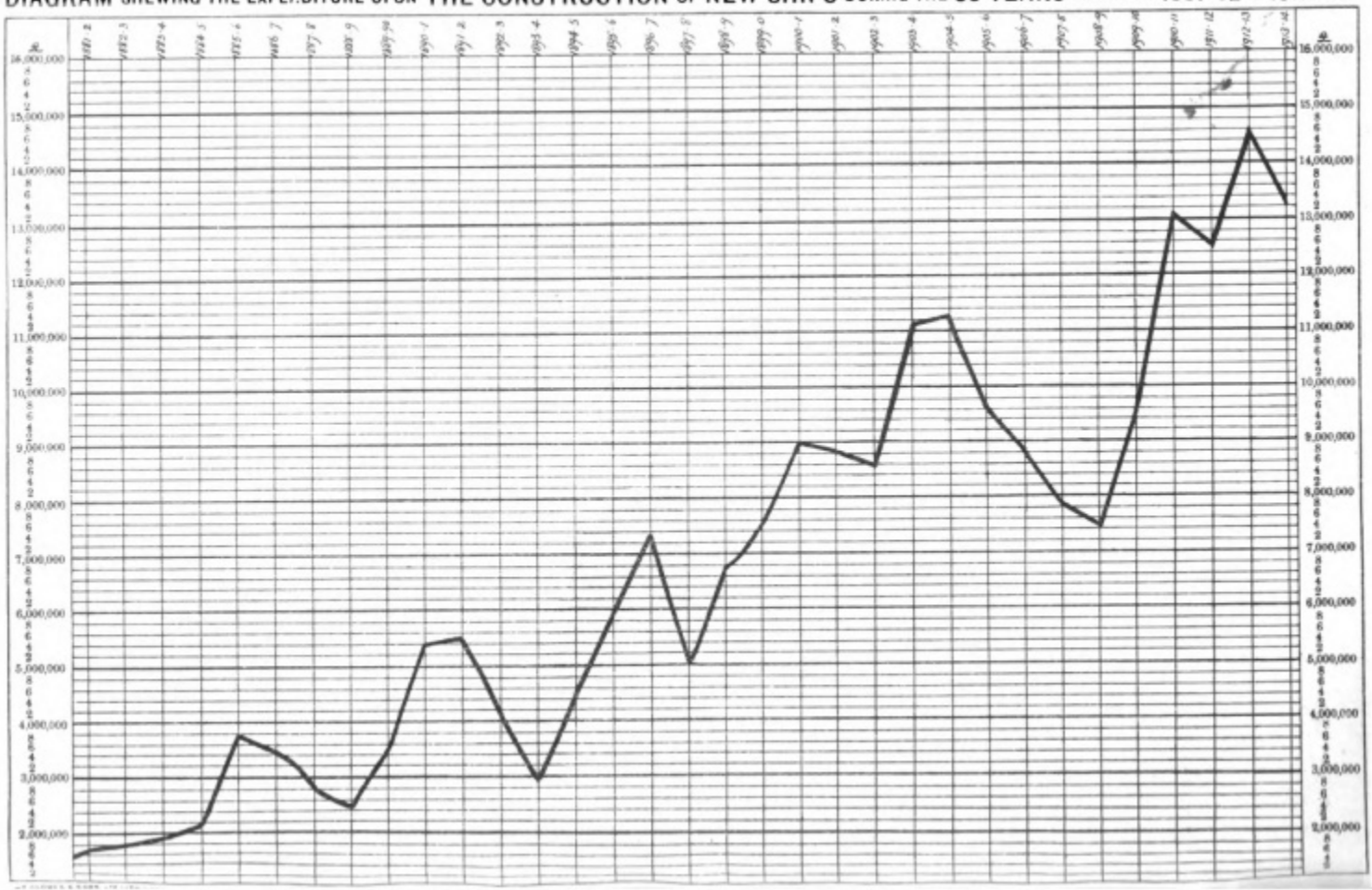
BRITISH RIFLED ORDNANCE.

Ordnance. Nature. Calibre or Pr.	Ordnance. Nature. Weight.	Ordnance. Nature. Mark and Service.	Ordnance. Total length in inches.	Ordnance. Length of Bore, including Chamber.	Ordnance. Chamber. Diameter.	Ordnance. Chamber. Length to base of projectile.	Ordnance. Rifling. Twist one turn in: Least at breech.	Ordnance. Rifling. Twist one turn in: Greatest at muzzle.	Ordnance. Rifling. System.*	Charge (full). Weight.	Charge (cordite). Weight.	Charge (cordite). Size.	Projectile. Diameter.	Projectile. Weight.	Projectile. Bursting Charge of Common Shell.	Projectile. Value of $\frac{d^2}{w}$.	Projectile. Value of $\frac{w}{d^3}$.	Ballistics (with full charges). Muzzle velocity.	Ballistics. Total muzzle energy.	Ballistics. Muzzle energy per ton of gun.	Perforation of wrought iron. At muzzle.	Perforation of wrought iron. At 1000 yards range.	Perforation of wrought iron. At 2000 yards range.	Perforation of wrought iron. At 3000 yards range.
				cals.	ins.	ins.	cals.	cals.		lbs.	lbs. ozs.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft. tons.	ins.	ins.	ins.	ins.
QUICK-FIRING GUNS (using metal cases)																								
6·0 in	7 tons	I. & III. II. (Wire)	249·25	40	..	..	60	30	P.	..	13 4	30	6·0	100·0	..	0·360	0·463	2200	3356	479	15·9	12·7	10·2	8·2
6·0 in Q.F.C.	5 „	I. to VI.	169·1 166·6	26·2 26·6	.. ..	.. ..	.. ..	..										1913	2537	362	13·0	10·3	8·2	6·4
4·7 in.	41 cwt. 42 „	I. II. III. & IV. Wire	194·1	40	..	..	100 0	34·4 30	E.O.C.	..	5 7	20	4·72	45·0	..	0·495	0·428	2188	1494	711	12·4	9·2	6·6	5·0
4 in.	26 cwt.	I. II. III. Wire converted guns	165·25 120	40 28	..	..	..	30	M.Pl.	..	3 9	15	..	25·0	..	0·640	0·390	2300 2177	917 821	705 569	10·5 9·5	6·9 6·5	4·9 4·6	3·3 3·0
12-pr.	12 cwt.	I.	123·6	40	..	..	120 0	28 30	E.O.C. M.Pl.	..	1 15	10	3·0	12·5	..	0·072	0·463	2210	423	677	8·1	5·3	3·5	2·4
12-pr.	8 cwt.	I.	87·6	28	..	..	60 0	28 30	E.O.C. M.Pl.	..	13¾	10	3·0	12·5	..	0·072	0·463	1607	223·8	544	4·9	3·2	2·4	..
Hotchkiss . 6-pr...	8 cwt.	I. & II.	97·63	40·0	..	..	180	29·9	M.Pl.	..	b7¾	5	2·24	6·0	..	0·836	0·534	1818	137·5	344·8	4·8	2·8	..	..
Nordenfelt . 6-pr...	6 cwt.	I. II. & III.	104·4	42·3	..	..																		
Hotchkiss . 3-pr ..	5 cwt.	I. & II.	80·63	40	..	..	25	25	M.Pl.	..	b6⅜	5	1·85	3·3	..	1·037	0·521	1873	80·3	321·2	4·1	2·1	..	..
Nordenfelt . 3-pr...	4 cwt.	I. L.	91·5	45·4									..	..	..	..	..	1920	84·3	337·2	4·3	2·2	..	..
MACHINE GUNS.										grains.				grs.										
Maxim, 1 bar 0·45 in.	63 lbs.	I.	45·0	..	..	..	10	27	Enfi'ld	31 Cordite	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as M.H. Rifle.			
Maxim, ·303			42·38				10	25·6	Metf'd				0·303	215	..	..	..	..	..	..	Same as Lee-Metford.			

Calibre . . . . cm. / Length of Bore . . cals.	7·5 = 2·9 in.			8·8 = 3·4 in.			10·5 = 4·1 in.			12 = 4·7 in.			15 = 5·9 in.			17 = 6·7 in.			19 = 7·4 in.		
	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50
Length of Bore . mm.	3000	3375	3750	3520	3960	4400	4200	4725	5250	4800	5400	6000	5965	6710	7455	6905	7765	8630	7600	8550	9500
Total Length . . „	3195	3570	3945	3750	4190	4630	4475	5000	5525	5110	5710	6310	6355	7100	7845	7355	8215	9080	8095	9045	9995
Weight of Gun . . kg.	677	764	850	1094	1234	1373	1555	1755	1950	2325	2620	2910	4460	5020	5590	6930	7800	8680	9230	10400	11550
Weight of Projectile „	5·8	5·8	5·8	9·5	9·5	9·5	16	16	16	24	24	24	46	46	46	70	70	70	95	95	95
Weight of Charge . „	1·65	1·86	2·09	2·66	3·0	3·37	5·05	5·80	6·60	7·5	8·65	9·85	14·4	16·6	18·9	22·4	25·7	29·3	29·8	34·3	39·1
Muzzle Velocity . m.	840	890	940	840	890	940	840	890	940	840	890	940	840	890	940	840	890	940	840	890	940
Muzzle Energy mètre-tons	208·6	234·2	261·2	341·7	383·5	427·8	575	646	721	863	969	1081	1654	1857	2072	2517	2826	3152	3417	3835	4278
Muzzle Penetration (Steel) mm.	203	220	238	243	264	285	292	317	344	338	367	397	426	463	500	492	535	578	553	600	649

Calibre . . . . cm. / Length of Bore . . cals.	21 = 8·2 in.			24 = 9·4 in.						28 = 11 in.						30·5 = 12 in.					
	40	45	50	40		45		50		40		45		50		40		45		50	
Length of Bore . . mm.	8370	9420	10465	9600		10800		12000		11200		12600		14000		12200		13725		15250	
Total Length . . „	8915	9965	11010	10225		11425		12625		11930		13330		14730		12995		14520		16045	
Weight of Gun . . kg.	12330	13900	15450	18600	16750	21000	19000	23300	21450	29550	26600	33300	30200	37000	34050	38200	34400	43000	39000	47800	44000
Weight of Projectile. „	125	125	125	190	190	190	190	190	190	300	300	300	300	300	300	390	390	390	390	390	390
Weight of Charge . „	39·9	45·8	52·3	60·1	51·8	69·1	60·1	78·8	69·8	95	82	110	95	125	111	123	106	142	123	162	143
Muzzle Velocity . m.	840	890	940	840	800	890	850	940	900	840	800	890	850	940	900	840	800	890	850	940	900
Muzzle Energy mètre-tons	4495	5047	5629	6833	6198	7671	6997	8557	7844	10790	9790	12110	11050	13510	12390	14030	12720	15750	14360	17560	16100
Muzzle Penetration (Steel) mm.	606	658	711	703	658	766	717	828	778	828	772	900	842	973	914	912	850	990	927	1071	1006

Calibre . . . . . / Length of Bore	35·56 = 14 in.						38·1 = 15 in.						40·64 = 16 in.					
	40		45		50		40		45		50		40		45		50	
Length of Bore . . mm.	14225		16000		17780		15240		17145		19050		16255		18290		20320	
Total Length . . „	15150		16925		18705		16230		18135		20040		17315		19345		21375	
Weight of Gun . . kg.	60500	54500	68100	61900	75800	69700	74400	67000	83800	76100	93200	85800	90300	81400	101700	92400	113100	104100
Weight of Projectile „	620	620	620	620	620	620	760	760	760	760	760	760	920	920	920	920	920	920
Weight of Charge . „	196	169	225	196	256	227	241	207	277	241	315	279	292	252	336	292	383	339
Muzzle Velocity . m.	840	800	890	850	940	900	840	800	890	850	940	900	840	800	890	850	940	900
Muzzle Energy mètre-tons	22300	20220	25030	22830	27920	25600	27330	24790	30680	27990	34230	31380	33090	30010	37140	33880	41430	37980
Muzzle Penetration (Steel) mm.	1077	1005	1170	1095	1265	1189	1157	1079	1257	1177	1359	1277	1238	1154	1344	1259	1453	1366



Date and Pattern of Gun.	Model 1902.	Model 1893–96.				Model 1893.					Model 1887.				1884.					1881.						
Desig. by Calibre, in cms.	30·5	30·5	27·44	24·0	19·4	34·0	30·5	27·44	24·0	19·4	34	30·5	27	19	34	27	24	16	14	34 long.	34 short.	27	24	16 heavy.	16 light.	14
Calibre, in inches . .	12·01	12·01	10·8	9·45	7·64	13·39	12·0	10·8	9·45	7·64	13·39	12·0	10·80	7·64	13·39	10·80	9·45	6·49	5·45	13·39	13·39	10·8	9·45	6·49	6·49	5·46
Total length, in feet .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	28·47	24·89	17·04	..	33·69	25·32	27·12	23·70	15·14	15·14	14·3
Length of Bore, in ins. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	380·6	280·2	306·9	269·3	180·9	180·9	162·6
Length of Bore, in cals.	45	40	40	45	45	35	40	40	40	40	42	45	45	45	30	30	30	30	30	28·5	21·0	28·5	28·5	28	28	28
Number of Grooves .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	50	50	42
Depth of Grooves, inches	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·067	0·067	0·059	0·055	0·039	0·039	0·035
Rifling Twist . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7°	7°	7°	7°	7°	7°	7°
Total weight, in tons .	..	44·4	34·5	23·6	12·5	52·9	45·9	34·9	22·4	10·6	60·0	49·2	37·1	10·6	50·8	27·7	17·9	5·4	3·15	52·2	47·2	27·4	17·7	4·9	3·9	3·2
Weight of Firing Charge — Armour-piercing Projectile, lbs. . . .	..	246	188·5	145½	74	243·0	198·4	114·6	110·2	44·1	220·5	198·4	114·6	44·1	388·0	200·6	..	42·5	..	388·0	337·3	203·9	149·9	42·5	32·6	..
Weight of Firing Charge — Com. Shell lb.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	200·6	..	42·5	27·1	337·3	368·2	203·9	149·9	42·5	32·6	27·1
Weight — Armour-piercing Projectile lb.	750	750	562	375	190	925·9	643·8	476·2	317·5	165·3	925·9	643·8	476·2	165·3	925·9	476·2	317·5	99·2	..	925·9	925·9	476·2	317·5	99·2	99·2	..
Weight — Com. Shell „	..	750	562	375	190	925·9	643·8	476·2	317·5	165·3	925·9	643·8	476·2	165·3	771·6	396·8	264·6	99·2	66·1	771·6	771·6	396·8	264·6	99·2	99·2	66·1
Muzzle Velocity, in f.-s., A.P. Projectile . .	2870	2650	2650	2870	2870	2400	2625	2625	2625	2625	2560	2625	2625	2625	1969	1969	1969	1969	1969	1969	1804	1969	1969	1969	1821	1936
Muzzle Energy — Total, in f.-t. .	42890	36782	27186	21445	10890	36850	30750	22750	15170	7898	42040	30750	22750	7898	24900	12800	8539	2668	1777	24900	20880	12800	8539	2668	2080	..
Muzzle Energy — Per in. circ., f.-t.	..	..	..	..	..	..	815·8	670·7	511·1	329·1	..	815·8	670·7	329·1	591·9	377·5	287·7	130·8	103·9	591·9	496·6	377·5	287·7	130·9	121·3	..
Perforation at Muzzle† wrought iron, inches.	46·0	42·7	38·8	37·0	29·0	36·8	37·3	33·7	29·4	23·4	40·8	37·3	33·7	23·4	27·6	22·0	19·2	13·0	10·7	27·6	24·2	22·0	19·2	13·0	11·6	..
Perforation Krupp Steel 3,000 yds.	15½	13½	11½	10½	6¾	11½	11	9	7½	5½	13	11	9	5½	7½	6	5¼	3	..	7½	7	6	5¼	3	..	..

BRITISH RIFLED ORDNANCE.—*continued.*

Other guns are mounted, but details are withheld from publication.

Ordnance.										Charge (cordite).		Projectile.						Ballistics (with full charges).						
	Nature.				Chamber.		Rifling.												Perforation of wrought iron.					
Calibre or Pr.	Weight.	Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Diameter (at largest).	Length to base of projectile.	Twist one turn in. Least at breech.	Twist one turn in. Greatest at muzzle.	System.†	Weight.	Size.	Diameter.	Weight.	Bursting Charge of Common Shell.	Value of $\frac{d^2}{w}$.	Value of $\frac{w}{d^2}$.	Muzzle velocity.	Total muzzle energy.	At muzzle.	At 1000 yards range.	At 2000 yards range.	At 3000 yards.	Perforation Krupp steel, 3/60 yards. Uncapped Shot.
B.L. GUNS.				cals.	ins.	ins.	cals.	cals.		lbs. oz.		ins.	lbs	lbs. oz.			f. s.	ft. tons.	ins.	ins.	ins.	ins.	ins.
16·25-in.	110½ tons.	III.	524·0	30·0	21·125	84·5		30	Modified Pl. Section, the last in the new guns.	960‡ S.B.C.	..	16·25	1800	‡‡193 **179¾	0·147	0·420	2087	54,390	38·0	34·6	31·7	29·4	13
13·5-in.	69 & 67 tons.	I. II. III. & IV.	433·0	30·0	18·0	66·5		30		187 8	..	13·5	1250	**85	0·146	0·508	2016	35,230	33·0	30·2	27·6	25·2	11
12-in.	46 tons.	VIII. Wire	445·5	35·43	16·0	70·0		30		167 8	50	12·0	850	80–1 $\frac{3}{16}$	0·169	0·492	2367	33,020	37·0	32·7	29·4	26·6	11½
12-in.	50 tons.	IX. Wire	496·5	40·0	17·5	87·2		..		201 8 9 8	50 32½	12·0	850	„	..	..	2481 §2580	36,290 39,280	39·7 42·0	35·4 38·0	31·6 34·6	28·7 32·0	12½ 14
12-in.	38 tons.	X. Wire	558·0	45·0	..	..		..		325 0 M.D.	..	12·0	850	..	..	..	2900	47,697	51·0	46·2	42·0	38·4	17
10-in.	31 tons.	Triumph & Swiftsure	483·0	45·0	14·0	64·5		..		..	..	10·0	500	..	..	..	§2800	§27,200	39·5	34·6	30·2	27·0	11¾
10-in.	29 tons.	II. III. III.A & IV.	342·4	32·0	14·0	54·0		30		76 0	30	10·0	500	37¾	0·200	0·500	2040	14,430	24·8	21·8	19·3	17·0	7½
9·2-in.	21 & 22 tons.	I. & II.	255·8	25·56	11·0	44·0		35		42 0	30	9·2	380	18 ‡‡33	0·223	0·488	1781	8,356	18·3	15·9	14·4	12·4	5½
9·2-in.	24 & 22 tons.	III. V. VI. VI.A&C & VII.	310·0	31·5	12·0	43·0		30		53 8	30	9·2	380	**30 $\frac{6}{16}$	0·223	0·488	2065	10,910	22·9	19·8	17·2	15·5	6¾
9·2-in.	25 tons.	Wire VIII.	384·0	40·08	10·5	53·15		..		63 0	40	9·2	380	..	0·223	0·488	2347	14,520	27·6	23·9	20·7	18·0	7¾

BRITISH RIFLED ORDNANCE.

Ordnance. Nature. Calibre or Pr.	Weight.	Mark and Service.	Total length in inches.	Length of Bore, including Chamber.	Chamber. Diameter.	Chamber. Length to base of projectile.	Rifling. Twist one turn in Least at breech.	Rifling. Twist one turn in Greatest at muzzle.	Rifling. System.*	Charge (full). Weight.	Charge (cordite). Weight.	Charge (cordite). Size.	Projectile. Diameter.	Projectile. Weight.	Projectile. Bursting Charge of Common Shell.	Projectile. Value of $\frac{d^3}{w}$.	Projectile. Value of $\frac{w}{d^3}$.	Ballistics (with full charges). Muzzle velocity.	Total muzzle energy.	Muzzle energy per ton of gun.	Perforation of wrought iron. At muzzle.	At 1000 yards range.	At 2000 yards range.	At 3000 yards range.
				cals.	ins.	ins.	cals.	cals.		lbs.	lbs. ozs.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft. tons.	ins.	ins.	ins.	ins.
QUICK-FIRING GUNS (using metal cases)																								
6·0 in	7 tons	I. & III. II. (Wire)	249·25	40	..	..	60	30	P.	..	13 4	30	6·0	100·0	..	0·360	0·463	2200	3356	479	15·9	12·7	10·2	8·2
6·0 in Q.F.C.	5 ,,	I. to VI.	169·1 166·6	26·2 26·6	.. ..	.. ..	.. ..	.. ..										1913	2537	362	13·0	10·3	8·2	6·4
4·7 in.	41 cwt. 42 ,,	I. II. III. & IV. Wire	194·1	40	..	..	100 0	34·4 30	E.O.C.	..	5 7	20	4·72	45·0	..	0·495	0·428	2188	1494	711	12·4	9·2	6·6	5·0
4 in.	26 cwt.	I. II. III. Wire converted guns	165·25 120	40 28	..	..	..	30	M.Pl.	..	3 9	15	..	25·0	..	0·640	0·390	2300 2177	917 821	705 569	10·5 9·5	6·9 6·5	4·9 4·6	3·3 3·0
12-pr.	12 cwt.	I.	123·6	40	..	..	120 0	28 30	E.O.C. M.Pl.	..	1 15	10	3·0	12·5	..	0·072	0·463	2210	423	677	8·1	5·3	3·5	2·4
12-pr.	8 cwt.	I.	87·6	28	..	..	60 0	28 30	E.O.C. M.Pl.	..	13¾	10	3·0	12·5	..	0·072	0·463	1607	223·8	544	4·9	3·2	2·4	..
Hotchkiss . 6-pr...	8 cwt.	I. & II.	97·63	40·0	..	..	180	29·9	M.Pl.	..	b7¾	5	2·24	6·0	..	0·836	0·534	1818	137·5	344·8	4·8	2·8	..	..
Nordenfelt . 6-pr...	6 cwt.	I. II. & III.	104·4	42·3	..	..																		
Hotchkiss . 3-pr ..	5 cwt.	I. & II.	80·63	40	..	..	25	25	M.Pl.	..	b6⅜	5	1·85	3·3	..	1·037	0·521	1873	80·3	321·2	4·1	2·1	..	..
Nordenfelt . 3-pr...	4 cwt.	I. L.	91·5	45·4									..	..	..	..	..	1920	84·3	337·2	4·3	2·2	..	..
MACHINE GUNS.										grains.				grs.										
Maxim, 1 bar 0·45 in.	63 lbs.	I.	45·0	..	..	..	10	27	Enfi'ld	31 Cordite	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as M.H. Rifle.			
Maxim, ·303			42·38				10	25·6	Metf'd				0·303	215	..	..	..	..	..	..	Same as Lee-Metford.			

BRITISH RIFLED ORDNANCE.—*continued.*

Other guns are mounted, but details are withheld from publication.

Ordnance.										Charge (cordite).		Projectile.						Ballistics (with full charges).						
	Nature.				Chamber.		Rifling.												Perforation of wrought iron.					
Calibre or Pr.	Weight.	Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Diameter (at largest).	Length to base of projectile.	Twist one turn in. Least at breech.	Twist one turn in. Greatest at muzzle.	System.†	Weight.	Size.	Diameter.	Weight.	Bursting Charge of Common Shell.	Value of $\frac{d^2}{w}$.	Value of $\frac{w}{d^2}$.	Muzzle velocity.	Total muzzle energy.	At muzzle.	At 1000 yards range.	At 2000 yards range.	At 3000 yards.	Perforation Krupp steel, 3/60 yards. Uncapped Shot.
B.L. GUNS.				cals.	ins.	ins.	cals.	cals.		lbs. oz.		ins.	lbs	lbs. oz.			f. s.	ft. tons.	ins.	ins.	ins.	ins.	ins.
16·25-in.	110½ tons.	III.	524·0	30·0	21·125	84·5		30	Modified Pl. Section, the last in the new guns.	960‡ S.B.C.	..	16·25	1800	‡‡193 **179¾	0·147	0·420	2087	54,390	38·0	34·6	31·7	29·4	13
13·5-in.	69 & 67 tons.	I. II. III. & IV.	433·0	30·0	18·0	66·5		30		187 8	..	13·5	1250	**85	0·146	0·508	2016	35,230	33·0	30·2	27·6	25·2	11
12-in.	46 tons.	VIII. Wire	445·5	35·43	16·0	70·0		30		167 8	50	12·0	850	80–1 $\frac{3}{16}$	0·169	0·492	2367	33,020	37·0	32·7	29·4	26·6	11½
12-in.	50 tons.	IX. Wire	496·5	40·0	17·5	87·2		..		201 8 9 8	50 32½	12·0	850	„	..	..	2481 §2580	36,290 39,280	39·7 42·0	35·4 38·0	31·6 34·6	28·7 32·0	12½ 14
12-in.	38 tons.	X. Wire	558·0	45·0	..	..		..		325 0 M.D.	..	12·0	850	..	..	..	2900	47,697	51·0	46·2	42·0	38·4	17
10-in.	31 tons.	Triumph & Swiftsure	483·0	45·0	14·0	64·5		..		..	..	10·0	500	..	..	..	§2800	§27,200	39·5	34·6	30·2	27·0	11¾
10-in.	29 tons.	II. III. III.A & IV.	342·4	32·0	14·0	54·0		30		76 0	30	10·0	500	37¾	0·200	0·500	2040	14,430	24·8	21·8	19·3	17·0	7½
9·2-in.	21 & 22 tons.	I. & II.	255·8	25·56	11·0	44·0		35		42 0	30	9·2	380	18 ‡‡33	0·223	0·488	1781	8,356	18·3	15·9	14·4	12·4	5½
9·2-in.	24 & 22 tons.	III. V. VI. VI.A&C & VII.	310·0	31·5	12·0	43·0		30		53 8	30	9·2	380	**30 $\frac{6}{16}$	0·223	0·488	2065	10,910	22·9	19·8	17·2	15·5	6¾
9·2-in.	25 tons.	Wire VIII.	384·0	40·08	10·5	53·15		..		63 0	40	9·2	380	..	0·223	0·488	2347	14,520	27·6	23·9	20·7	18·0	7¾

is closed, and the front of the gun-base replaced. The gun is thus ready to open fire, and its mounting is secured to the hull of the submarine and the supports which are within. It is stated that the operation of bringing up the gun and affixing the sights and shoulder-piece can be executed in twenty seconds, and the same period is required to stow the gun away. Ballistic particulars are wanting, but the gun is evidently short for its calibre. It is of nickel steel, with sliding breech, telescopic sights, and recoil control. Three men are required at the gun, but if necessary the third can attend to the ammunition supply.

Armour. Very little can be said about armour-production in Germany, all details being confidential, but there are indications that progress is being made in improving the quality of the output. The views of "Nauticus" are given in the introduction to this foreign section. Statements have been made that a new type of armour is coming to the front, but they must be received with great caution. The fact seems to be that an engineer named Schaumann has experimented with thin plates, consisting of several laminations cemented, which have shown great power of resistance to rifle fire. According to the accounts published, bullets which went clean through a nickel-steel plate merely rebounded from the Schaumann plate or broke up. This invention seems therefore to have some relation to the bullet-proof shields which have been introduced from time to time as possessing extraordinary resisting power. The claim made for the invention is that it produces plates considerably lighter and much more cheaply than is possible by other processes. It remains to be seen whether the process can be applied to the manufacture of armour-plates tested under the severe conditions of the trial ground.

ITALY.

The building of battleships in which three guns were mounted in a single turret, though the plan was not confined to Italy, and is being numerically exceeded in France, imposed a great difficulty upon Italian naval constructors. The provision of the armaments did not exceed the resources of the splendidly equipped Vickers-Terni ordnance works at Spezia, nor, indeed, of the Terni steel works to produce the gun-forgings. Both these establishments were described in the *Naval Annual* last year. The real trouble arose in the matter of the armour, though the Acciaierie di Terni are credited with a capacity for an output of 12,000 tons of Krupp steel plates per annum. It would appear, however, that the great demand for the armour-plates and complicated gun-turrets of the four Dreadnoughts

came at a time when these resources had not been fully developed, and the contract of the Terni works was to produce 500 tons per month, or one-half of the estimated total capacity of the establishments. Tenders for a large quantity of armour—4200 tons—to supplement this supply were opened, and contracts were secured by the Carnegie and Bethlehem steel companies of America.

Delay, however, occurred in Italy, and though the Dante Alighieri has been completed and has passed through her trials, the three other ships have been retarded by the late delivery of armour. The causes of this delay have been explained by Signor Raffaele Bettini, director of the Terni steel works, and as they illustrate the difficulties which are apt to arise in such matters, they may be described here with advantage. A new plate-rolling mill was being installed, but MM. Schneider, of Le Creusot, who were supplying the plant, or part of it, were six months late in their delivery, being the last two months of 1910 and the first four months of 1911. The consequences, however, would not have been serious, owing to the large resources of the works, if it had not been that the armour for the Dante Alighieri was still in hand, and very evidently occupying a considerable part of those resources. Orders had been given at such times that the work fell upon the last six months of 1910 and the first six months of 1911, and the difficulty was increased by one of the best presses at the works breaking down, and by the extraordinary difficulties attending the making of the new turrets, conning-tower, and other parts. The result was that the steel works were engaged upon the work for the Dante Alighieri when they should have been employed upon plates and turrets for her three successors. The chief trouble was with the turrets, which presented unusual complications, and exacted an enormous amount of work. The authorities had not given the orders in due time, and the director of the works says that no foreign establishment could have executed the work better in such conditions. It seems to be a fact that the system of ordering the armour and ordnance requirements of ships in Italy is very defective, and that in the case of the first Dreadnought the most difficult and complicated parts of the armour were ordered last.

Armour-plates.

The result was that the work upon the armour of the other ships could not be carried on with the desired intensity. It further appears that delay has occurred in delivering the American armour-plates also, and in March, 1913, some of this armour was still wanting for the Leonardo da Vinci and Giulio Cesare. The American companies are to provide the side armour for the Andrea Doria, and the Terni steel works have that for the Duilio in hand. It is

admitted, in the circumstances in which the orders are given, that the Terni works could not have engaged to deliver the whole of the armour for both ships within the period allowed by the authorities, which terminates during the first six months of the present year. The directors of the Italian company anticipate that the works will complete the Duilio's armour supply in due time. All the ten gun turrets for both ships will be supplied by Terni, and it would not be surprising if some retardation occurred in completing them, but the director says the establishment is as well equipped as any like establishment abroad.

Gun-mounting trials of Dante Alighieri.

After showing the difficulties under which the Italian establishments labour—difficulties evidently of a transitory nature—it is pleasant to turn to the results of their endeavours, as shown in the successful trials of the Dante Alighieri at Spezia in December. With the satisfactory steam trials we have here nothing to do. The guns in each turret were fired simultaneously, with greater elevation than would ordinarily be the case, and the heaviest projectile that is employed, and the results were completely successful. The solidity and stability of the ship were demonstrated, and the turrets worked with complete ease and satisfaction, and the advisability of employing the triple turret in future ships was fully assured. The design and construction had been long considered, and those responsible are to be congratulated on what they have achieved. It was recorded that the firing of a single lateral gun in the turret caused even less side movement than has been the case with coupled guns in Italian ships.

The great demands for the Italian Navy have brought new activities into play. Signori Gio. Ansaldo & Co., of Genoa, have laid down a great plant for ordnance and armour production. The ordnance works are entirely newly erected, and are provided with modern and powerful tools and appliances for the construction of guns from the largest to the smallest calibre, and work is in hand for the secondary armaments of the battleships Duilio and Doria. At Cornigliano, close to the steel foundry, important steel works have been erected within these last two years for the making of armour of all kinds and of gun elements. The works are fitted with the most modern plant and appliances, including four hydraulic presses from 8000 to 15,000 tons.

The Iéna and Liberté disasters aroused the deepest interest and concern in the Italian Navy. The Italians have themselves had serious disasters from the spontaneous explosion of their ballistite powder, which, however, has a nitro-glycerine base. There have been explosions on board the Marco Polo and Sicilia, and on shore at

Fontana Liri, Castagna, Avigliana, Ferrara and Taranto. The whole subject of smokeless powders and nitro-cellulose has been treated very exhaustively by Captain Bravetta, a well-known authority, in the *Rivista di Artiglieria e Genio*, who expresses himself unable to understand why the French retained so long the B. powder, after so many great and minor explosions and disasters in the fleet and the naval establishments during the last eighteen years—Amiral Duperré, Vauban, Descartes, Forbin, Charlemagne, Iéna, Liberté, Patrie, Suffren, Diderot, Justice, and, more recently, Jules Michelet. Captain Bravetta says an adequate solution of the powder question has not been reached, and that it demands the exhaustive care of chemists, gunners, and manufacturers. Recognising the danger attending nitro-explosives, he does not necessarily advocate their abandonment. The immediate question is to remove any possibility of a repetition of such disasters as those of the Iéna and Liberté, and the question of the future is to arrive at a compound chemically more stable. For the first object there must be scrupulous care in manufacture, rigorous examination of materials, and questions of cost must not enter into the matter at all. Powders must be kept in a constant and relatively low temperature. There must be constant watchfulness, and any lots suspected must be removed immediately. Other powder and fulminates must not be kept in magazines with smokeless powder. Captain Bravetta does not approve of powder in tubular grains. As to the powder of the future, he refers to the American Robin Hood powder, which is composed mainly of picrates of ammonia and potassium and nitrate of barium, with some vegetable and other ingredients, and is prepared with a very special treatment, which need not be described here. The Italian officer does not believe that smokeless powder, with a nitro-cellulose base, is the *ne plus ultra* of science.

Italian powders.

AUSTRIA-HUNGARY.

The powder question has also engrossed much professional thought in Austria-Hungary, where what is known as "ammonpulver" has been adopted, composed of 80 to 90 parts of nitrate of ammonium, with wood carbon, the latter prepared in various ways according to the intended use of the compound, as a propellant or an explosive. This material produces little smoke, and this is rapidly dissipated.

Little can be said about the ordnance and armour supplies of the Austro-Hungarian Navy. The same problems which have confronted Italian engineers and constructors have been met, and with more or less success have been solved. The Viribus Unitis was built rapidly

—within a period of about two and a half years—so that no delay was caused by non-delivery of guns, turrets, or other armour. Various statements were made about the ship which were transparently absurd. It was said that the turrets were heavier than was expected owing to the constructors having forgotten to include the gun-mountings in the calculation of weight, and that the "guns were to be lightened." Probably it was true that the ship exceeded the intended displacement, which would not be surprising, considering experience elsewhere. Other and later statements have been made concerning the effects of firing the guns simultaneously, but at the time of writing there has been no official confirmation of the statements as to defects revealed.

It is much to the credit of the Skodawerke at Pilsen and the Witkowitz steel works in Moravia that the guns and armour, including the complicated turrets, mountings, and mechanism, were produced in due time. These establishments are now on a great scale, and have been successively enlarged. The armour-plate works at Witkowitz, which had steam-driven plant, did not suffice for the new requirements, which were foreseen, and in October, 1909, work was begun upon a new steel and armour-plate rolling plant, with electric power, and the first plate was rolled in August, 1910. Since that time the whole of the works have been completed, the electric power being installed on the Ilgner system, and the works include a large gas-generating plant. Ingots up to 100 tons are dealt with, and the efficiency of the system and large capacity of the works are shown by the timely manner in which the armour requirements of the new ships have been completed.

9·2-in ††	28 tons.	Wire X.	442·35	46·6	13·0	71·215	Various in the P. Elswick, Hook, or	..		103	0	44	9·2	380	..	0·223	0·488	2640 ◊2800	18,400 20,685	33·3 36·0	28·9 31·2	25·0 27·4	22·0 24·0	9½ 10½
7·5-in.	16 tons.	Triumph & Swiftsure	386·7	50·0	..	46		..		..		..	..	200	..	0·281	0·474	§2800	10,883	29·0	24·9	21·4	17·8	7¾
7·5-in.	14 tons.	..	337·5	45	11·1	55		30		47 0 30 2 8 2½			7·5	200	18½	0·281	0·474	2600	9,340	26·0	22·3	18·8	15·7	6¾
6-in.	5 tons.	III.	170·7	25·53	8·0	26·75		35					6·0											
6-in.	5 tons.	IV. VI.	173·5	26·0	8·0	26·75		35 30		14	12	20	6 0	100	7¼ **9 1/16	0·360	0·463	1960	2,665	13·4	10·7	8·9	7·0	3
6-in.	7·4 tons.	VII. VIII.	269·5	45	8·5	32·7		30		20	0	20	6·0	100	9	0·360	0·463	2493 ◊2750	4,308 5,250	19·6 22·3	15·3 18·0	11·9 14·6	9·8 11·6	4¼ 5
4-in.	23 cwt. 26 cwt.	II.II$_A$.III.III$_A$. IV.V.& VI.	120·0	27·0	5·3	18·5	120	30		3	1	5	4·0	25	1 1/16 3 3/16	0·640	0·391	1900	625	7·7	5·4	4·0	3·0	..

* The Roman numeral is the number of the pattern given. Further differences in pattern are indicated by letters a, b, and c. Some details of the 12-in. Mark X. uncertain.
† P. means Polygroove; Pl., Plain; ‡ Cordite has not been introduced for this gun; ◊ Estimated with M.D. cordite;
** Cast steel; †† A 50-calibre 9·2-in. gun is under construction; ‡‡ Forged steel.

AUSTRIAN NAVAL ORDNANCE.

Designation by Calibre, in centimètres, length in calibres, and type of gun	30·5 L. 45 Skoda.	24 L. 45 Skoda.	24 L. 40 Skoda.	24 L. 40 K. 97	24 L. 40 K. 94	19 L. 42 Skoda.	15 L. 40 Skoda.	15 L. 40 Krupp	15 L. 35	12 L. 40 Skoda.	12 L. 35
Calibre, in inches	12·01	9·45	9·45	9·45	9·45	7·5	5·91	5·9	5·87	4·72	4·72
Length: Total, in feet	45·0	35·5	31·5	31·5	31·5	26·3	19·5	19·5	17·13	15·74	13·8
Length: Rifled Portion, in ins.	417·9	325·8	290·3	290·3	286·2	239·7	182·6	182·5	153·6	147·6	126·3
Length: Powder Chamber in ins.	78·3	65·2	55·5	55·5	63·7	51·8	35·4	35·4	35·4	28·6	28·6
Length: Of bore in calibres	45	45	40	40	40	42	40	40	35	40	35
No. of Grooves	92	72	72	72	72	56	44	44	44	36	36
Twist in calibres	40–25	40–25	45–25	45–25	∝–25	45–25	∝–25	∝–25	45–25	45–25	45–25
Weight: Gun, tons	51·9	26·23	27·30	29·8	27·5	11·9	4·22	4·36	3·68	2·04	1·94
Weight: Breech Block, in lb.	3450·2	1873·9	1336·0	..	1450	..	330	339·5	346	172	211·6
Weight: Steel Shell „	992	473·0	504·8	473	473	213	102·1	102·1	102·1	52·4	52·4
Weight: Common Shell „	992	473·0	504·8	473	473	213	112·5	..	102·1	52·4	52·4
Weight: Shrapnel Shell „	..	..	..	..	..	213	..	..	102·1	52·4	52·4
Weight of Bursting Charge: Steel Shell	7·3	2·03	8·3	8·3	8·3	6·38	3·31	3·31	1·98	1·1	1·1
Weight of Bursting Charge: Common Shell „	53·6	23·4	29·5	29·5	47·3	10·6	4·84	4·84	5·73	2·86	2·86
Weight of Bursting Charge: Shrapnel Shell „	..	..	..	..	..	1·98	1·00	1·00	1·00	0·53	0·53
Weight of Firing Charge: Steel Projectile, in lb.	304	156·2	99·2	99·1	91·5	59·6	18·29	18·29	17·82	9·7	9·7
Weight of Firing Charge: Common Shell, in lb.	304	..	99·2		91·5			18·29	17·82	9·7	9·7
Weight of Firing Charge: Shrapnel, in lb.	..	..	..	..	..	23·1	11·85	11·85	11·85	4·41	4·62
Muzzle Velocity, in feet	2625	2625	2313	2313	2264	2625	2264	2264	2133	2264	2133
Muzzle Energy: Total, foot-tons	..	..	..	..	..	..	..	..	..	..	..
Muzzle Energy: Per inch circumference, foot-tons	..	..	..	..	..	..	..	..	..	..	..
Thickness of Iron, perforated inches at Muzzle, by Tresidder's formula	..	..	..	..	..	..	..	..	..	..	..
Perforation of Krupp Steel, 3000 yds., inches	..	..	..	..	..	..	..	..	..	..	..

There are other types of Krupp guns, also Skoda 7-cm., Skoda and Hotchkiss 47-mm., and Hotchkiss 37-mm.

Corrected to March, 1913.

DANISH NAVAL ORDNANCE.

Designation by Calibre, in centimètres, length in calibres, and type of gun	26 L. 35 Krupp	24 L. 40 1893 Krupp.	24 L. 40 1896 Canet.	24 L. 43 1901 Bofors.	24 L. 43 1906 Bofors.	21 L. 35 Krupp.	15 L. 35 1888 Krupp.	15 L. 43 1896 Bofors.	15 L. 43 1901 Bofors.	15 L. 50 Bofors.	12 L. 40 Krupp.	8·7 L. 40 Krupp.	7·5 L. 55 Danish semi-aut	5·7 L. 44 Hotch-kiss.	4·7 L. 44. Hotch-kiss.	4·7 L. 50 Danish semi-aut.
Calibre, in inches	10·24	9·45	9·45	9·45	9·45	8·24	5·87	5·87	5·87	5·87	4·72	3·43	2·95	2·24	1·85	1·85
Total length, in feet	29·86	31·50	31·50	33·86	33·86	24·05	17·12	21·17	21·17	24·46	15·75	11·41	13·53	8·13	6·72	7·71
Length of Bore, including Powder Chamber — in inches	327·6	349·7	358·5	397·0	397·0	264·5	189·0	244·0	247·4	286·4	176·4	126·8	152·6	89·8	74·1	87·6
Length of Bore, including Powder Chamber — in calibres	32·0	37·0	37·9	42·0	42·0	32·1	32·2	41·6	42·1	48·8	37·3	37·0	51·7	40·0	40·0	47·3
Number of Grooves	60	72	60	60	60	48	36	44	44	44	36	32	28	24	20	20
Twist of Rifling, in calibres	70–25	00–25	72–33	72–33	33	50·25	70–25	70–30	70–30	30	42–25	45–20	30	180–30	25	40–25
Total weight, including Breech-gear, tons	27·3	25·4	22·9	24·3	24·5	13·3	4·7	5·5	5·5	7·5	2·26	1·13	0·87	0·36	0·23	0·32
Weight of — Breech Block, lb.	2006	1691	871	851	802	904	390	295	252	313	205	136	83	60	40	40
Weight of — Armour-piercing Projectile, lb.	452	353	353	353	353	238	112	112	112	112	..	..	..	..	..	..
Weight of — „ Shell „	..	353	353	353	353	..	..	112	112	112	44	20	15	6	3·3	3·3
Weight of — Common Shell, lb.	452	353	353	353	353	238	112	112	112	112	44	20	15	6	3·3	3·3
Weight of Bursting Charge — Armour-piercing Shell, lb.	..	5·3	5·3	5·3	5·3	..	..	1·7	1·7	1·7	1·7	0·7	0·7	0·25	0·11	0·11
Weight of Bursting Charge — Common Shell, lb.	29·8	24·9	24·9	21·4	21·4	16·5	7·2	7·2	7·2	7·2	2·8	1·3	0·7	0·19	0·14	0·14
Weight of Firing Charge, lb.	191·8	91·5	77·2	83·8	97·0	105·8	41·9	22·0	22·5	34·2	11·3	4·7	4·0	1·3	1·1	1·4
Muzzle Velocity, feet	2018	2362	2362	2477	2641	2018	1851	2297	2297	2690	2362	2362	2625	2297	2346	2723
Muzzle Energy — Total foot-tons	12750	13640	13640	15000	17060	6712	2678	4100	4100	5642	1702	767	737	218	126	170
Muzzle Energy — Per inch circumference, foot-tons	396·4	459·5	459·5	505·4	574·7	259·3	145·2	222·4	222·4	306·1	114·8	71·2	79·5	31·0	21·7	29·3
Perforation at Muzzle, wrought iron, Tresidder's formula, inches	22·8	26·6	26·6	28·6	31·5	18·5	13·2	18·3	18·3	23·2	13·3	10·5	11·7	6·8	5·8	7·2
Perforation Krupp Steel, 3000 yards, inches	6·2	9·1	9·1	9·8	10·7	4·2	3·3	6·2	6·2	7·9	..	..	..	..	..	..

There are also some older 1·46-inch 1-pr. Hotchkiss guns.

Corrected to February, 1913.

DUTCH NAVAL ORDNANCE.

	Krupp Q.F.								
Designation by Calibre, in centimètres	28 Q.F.	24 Q.F.	24 Q.F.	15 Q.F.	15 Q.F.	15 Q.F.	12 Q.F.	10·5 Q.F.	7·5 Q.F.
Calibre, in inches	11·0	9·4	9·4	5·9	5·9	5·9	4·72	4·1	3·0
Total Length, in feet	40·0	31·5	31·5	19·55	19·55	19·55	15·75	18·5	13·5
Length of Rifled Portion of Bore, in inches	..	..	..	..	..	..	..	..	..
Length of Powder Chamber „	..	..	..	..	..	..	..	..	..
Length of Bore, in Calibres	40	37	37	37	37	37	37	50	55
Number of Grooves	..	..	..	..	..	..	..	..	..
Depth of Grooves, inches	..	..	..	..	..	..	..	..	..
Twist of Rifling, in Calibres	..	..	..	..	..	..	..	..	..
Total Weight, in tons	31·0	24·5	24·5	4·83	4·88	5·11	2·40	1·24	1·00
Firing Charge — Armour-piercing Projectile, in lb.	..	..	..	..	..	..	..	..	..
Firing Charge — Common Shell „									
Weight — Armour-piercing Projectile „	595·24	374·80	374·80	100	90·38	90·38	52·35	39·68	12·90
Weight — Common Shell „									
Weight — Case Shot „									
Bursting Charge — Armour-piercing Projectile „	..	..	..	..	..	..	..	..	..
Bursting Charge — Common Shell „									
Muzzle Velocity, feet	2920	2690·5	2789	2221	2444	2789	2221	2900	2945
Muzzle Energy — Total, in foot-tons	15,191	18,809	20,210	3469	3744	4874	1807	..	..
Muzzle Energy — Per inch Circumference, foot-tons	..	..	..	..	.	..	..	..	..
Perforation at Muzzle, in inches (Krupp Steel)	24·25	18·1	19·1	6·5	9·8	11·5	4·7	..	..
Perforation Krupp Steel, 3000 yards	18·50	14	14·2	3·9	5·7	7·1	..	..	..
Model	1909	1900	1905	1899	1900	1905	1899	1912	1910

Corrected to February, 1913. There is a new model of the 28 cm. with muzzle energy of 35,000 ft. tons.

FRENCH NAVAL ORDNANCE—*continued.*

Date and Pattern of Gun.			16·47.*	Q.F. Guns.							
				Mod. 93·6. 16·47	16§	16‡	14§	14‡	Mod. 92. 10	Mod. 91. 10	Mod. 81. 10‡
Desig. by Calibre, in cms.			16·47		16·47		13·86			10·00	
Calibre, in inches			6·46		6·46		5·44			3·94	
Total length, in feet			26·9								
Length of Bore, in inches			..								
Length of Bore, in calibres			47·5	45	45	30	45	30	55	45	26
Number of Grooves			..								
Depth of Grooves, inches			..								
Rifling Twist			..								
Total weight, in tons			8·5	8·1	6·89	4·92	4·13	3·84	2·19	1·62	1·18
Weight of Firing Charge	Armour-piercing Projectile	lb.	..	44	30·2	19·0	16·1	12·8	8·16	8·16	5·07
	Common Shell	„	..								
Weight	Armour-piercing Projectile	lb.	115	115	99·21		66·14			30·87	
	Common Shell	„	..	115	99·21		66·14			30·87	
Muzzle Velocity, in ft.-secs.			3110	2870	§2625	2100	2625	2100	2500	2428	1840
Muzzle Energy	Total, in foot-tons		7185	6568	4730	3061	3160	2022	1340	1266	725
	Per in. circ. foot-tons		..	..	233·5	150·9	184·9	118·7	..	..	..
Perforation at Muzzle, wrought iron, inches			26·3	24·5†	20·0†	14·4†	17·7†	12·7†	13·0†	12·5†	8·2†
Perforation Krupp steel, 3,000 yards			5⅜	5¼	4	..	..	..	..	..	..

* Experimental gun not in service. † By Treaidder's formula. ‡ Models 1881 and 1884 converted guns.
§ There are three models of the years 1887, 1891 and 1893, of slightly different weights from the above.

		Armstrong Breech Loading.					Q.F.	Armstrong B.L.	Armstrong Quick-Firing.			
Designation by Calibre, in centimètres		43·1†	43·1† Early Pattern. 1882.	34·3	30·5	25·4	20·3	15·2	15·2	15·2	12·0	7·6
Calibre, in inches		17	17	13·5	12	10	8	6	6	6	4·7	3·0
Length	Total, in feet	40·75	39	36·09	41·5	34·8	31	16·9	20·9	20·9	16·2	10·26
	Rifled Bore, in inches	346·8	315·7	409·4	479·9	400	360	194	239·6	239·6	189	119·6
	Powder Chamber, in inches	84·5	98	67·2	92·1	55·1	47·4	37·7	37·7	37·7	15·9	15·8
	Bore, in Calibres	27	26	30	40	40	45	32	40	40	40	40
No. of Grooves		82	82	56	48	42	32	28	28	28	22	16
Twist of Rifling, in Calibres		50	50	35	30	30	30	30	30	30	34·4	30
Total Weight, in tons		104·3	101·5	67·9	51·77	30	19·09	5·4	5·7	6·5	2·05	0·6
Firing Charge	Armour-piercing projectile lb.	900·0	725	630·5	235·6	231	58·9	46	46	17·6*	5·7	2·2
	Common Shell „	600	480	313	117·7	116·5	29·32	33·7	15·3	6·5	1·85	1·1
Weight	Armour-piercing projectile „	2000	2000	1250	850	448	250	98	100	100	45·0	12
	Common Shell „	2000	2000	1250	880·6	456·3	256·2	102·3	102·3	102·3	44·9	13·9
	Shrapnel „	2017	2017	1250	..	405·6	..	104·7	104·7	104·7	44·9	..
	Case Shot „	2007	2007	1217	887·6	449·7	256·2	99·6	99·6	99·6	44·9	13·9
Bursting Charge	Armour-piercing projectile „	32	32	17·4	10·7	7·1	2·23	2·0	5·1	4·4	..	..
	Common Shell „	60	60	31	56	19·8	7·5	5·0	5·0	5·0	·88	·66
	Shrapnel „	5	5	4·25	..	1·5	..	·66	·66	·66	·24	..
Muzzle Velocity, in ft.-secs.		1992	1935	2016	2500	2460	2600	1952	2149	2297	2180	2625
Muzzle Energy	Total, foot-tons	55,030	51,930	35,230	36,925	18,798	11,730	2577	3169	3622	1490	573
	Per inch circumference, foot-tons	1035	976·3	830·8	..	..	..	..	..	..	..	..
Perforation at Muzzle, inches of iron by Tresidder's formula		36·7	35·0	33·0	40·0	31·0	28·3	13·2	15·4	17·0	12·4	10·2
Perforation Krupp Steel, 3000 yds., inches		12½	12	11	13	9	7	..	..	3½	..	..

* Ballistite. † There are four types of these old guns, viz., Lauria. Lepanto, Italia, Morosini.

Note.—There is also a 6-inch quick-firing gun, 40 cals. M.V., 2600 f.s.

The weight of Ballistite charges is not known, but it is understood that they give the same ballistics as the powder charges shown.

Corrected to March, 1913.

NAVAL ORDNANCE OF NORWAY.

	Modern Guns.							
Designation by Calibre, in cms.	21	21 Q.F.	15	15 Q.F.	12 Q.F.	76 mm.	76 mm.	7 cm.
Calibre, inches	8·24	8·24	5 87	5·87	4·7	3·0	3·0	2·8
Total Length, feet	24·0	31·2	19·6	23·3	17·7	10·3	13·3	9·2
Length — Rifled Portion of Bore, inches	212·3	309·7	178·0	234·1	179·2	102·4	127·7	81·8
Length — Chamber, inches	49·0	48·6	39·0	32·9	26·0	15·4	20·4	19·1
Length — Bore in calibres	35·0	43·8	37·2	45 8	44·0	40	50	36·6
Number of Grooves	64	32	44	28	26	16	28	28
Twist of Rifling	46-23	∝-30	45-25	∝-30	∝-30	∝-30	30	20
Total Weight, tons	14·2	18·9	5·6	7·1	2·7	0·6	1·0	0·63
Weight of — Armour-piercing Shell, in lb.	309	309	112·4	99·3	45	12·5	12·5	10·5
Weight of — Common Shell, in lb.	..	..	..	..	..	..	..	..
Weight of * Firing Charge — Armour-piercing Shell, in lb.	45·6	54	20·4	20·9	9·4	2·2	3·75	2·2
Weight of * Firing Charge — Common Shell, in lb.	..	..	..	..	..	..	..	..
Muzzle Velocity, feet	1903	2300	2050	2625	2570	2200	2840	2230
Muzzle Energy, Total foot-tons	7760	11450	3328	4870	2060	430	695	367
Perforation through Iron by Tresidder's formula	19·3	25·6	15·4	21	15·3	8·0	11·6	7·8
Perforation, Krupp Steel, 3000 yards	4¾	6½	3½	4	..	..	..	..

* Smokeless powder.

Corrected to February, 1913.

RUSSIAN NAVAL ORDNANCE.

	Heavy Guns.			Q.F. Guns.		
Calibre, in inches	12	10	8	6	4·7	12-pdr.
Weight, in tons	43	22	12	5½	3	0·9
Length, in calibres	40	45	45	45	45	50
Weight of Projectile, in lbs.	730	450	192	91	46	12
Muzzle Velocity, foot-seconds	2600	2275	2950	2600	2700	2700
Perforation, in inches, of Wrought Iron — At Muzzle	38	35	27	22½	15½	10·2
Perforation, in inches, of Wrought Iron — At 2000 yards	30	27	20	13	9	4·8
Perforation of Krupp Steel at 3000 yards	16	12	8½	3¾	3	..

There exists a new pattern 12-in. gun of 50 calibres with 714 lb. projectile, 3000 ft. muzzle velocity, and penetration of Krupp steel at 3000 yds. of 20 in., also 10-in. gun of 50 calibres, 8-in. gun of 50 calibres, and 4·7-in. gun of 50 calibres (Vickers), details of which are not published.

Corrected to February, 1913.

SPANISH NAVAL ORDNANCE.

——	Hontoria.—Pattern 83.—Breech Loading.						Canet.		Skoda.			Krupp.	Vickers.		Maxim Nordenfelt.	Nordenfelt.		Sarmiento (*)	Hotchkiss.			Maxim Nordenfelt.
Designation by Calibre, in m/m	320	280	240	200	140	120	150	140	150	70	47	105	101·6	75	75	57	42	42	57	37	37	37
Length — Total length, in m/m	11780	10310	10200	7360	5303	4420	7500	6300	5960	2743	2048	3680	5240	1222·9	3500	2651	1935	1946	2480	842	1134	1105
Length — Powder Chamber, in m/m	2113·5	1845	1698·3	1695	1030	886	1124	1078·5	915	..	397·05	750	635·23	111	632·20	345·78	353	525·6	256	129	627	394·6
Length — Bore, in m/m	11180	9787	8387	7095	4879	4173	7250	4893·2	5540	2550	1881	3375	5100	934·74	3200	2413	1750	1806	2280	713	740	980·9
No. of Grooves	80	70	60	50	34	30	48	36	44	24	20	32	32	32	30	24	18	20	24	12	12	12
Depth of Grooves, in m/m	1·5	1·5	1·25	1·25	1·00	1·00	1·00	1·00	1·5	0·75	1·20	1·25	1·00	0·75	0·58	0·305	0·305	0·3	0·3	0·37	0·4	0·4
Twist of Rifling, in m/m and degrees	9600	8400	7200	6000	4200	3600	6°	4902·5	..	..	..	..	3048	1919·02	2250	1710	6°	1260	6°	1·107	1·131	1·110
Weight of the empty projectile — Armour-piercing proj., in kgs.	472·20	315·0	198·0	114·6	39190	24100	39500	39190	44350	3878	1440	..	13920	5670	6410	2605	1093	1093	2546	0·488	0·488	0·409
Weight of the empty projectile — Common Shell, in kgs.	398·60	265·60	167·00	98·00	34946	21400	38·00	34946	40445	3770	1440	17400	12620	5600	6390	2633	1108	1108	2574	0·407	0·407	0·409
Weight of the empty projectile — Ring Segment, in kgs.	402·30	268·00	168·50	99·00	33835	21600	..	33835	44990	3760	..	..	..	..	..	..	..	..	..	..	..	..
Weight of the empty projectile — Semi-piercing, in kgs.	399·86	363·109	167·00	98207	34260	20043	..	34260	..	..	..	..	12920	..	..	..	..	..	..	..	..	..
Weight of the empty projectile — Case Shot, in kgs.	..	..	..	..	..	..	..	..	..	..	..	..	..	6000	..	2224	1264	1264	2240	0·616	0·616	..
Weight of the explosive charge — For the Armour-piercing, in kgs.	7500	5000	3000	1900	0·512	0·340	0·500	0·512	0·860	0·122	0·060	..	0·500	0·230	0·227	0·078	0·038	0·038	0·115	0·015	0·015	0·013
Weight of the explosive charge — „ Common Shell, in kgs.	21000	14000	9000	5000	1695	0·950	1430	1695	4225	0·230	0·060	0·350	1350	0·260	0·250	0·065	0·038	0·038	0·085	0·022	0·022	0·013
Weight of the explosive charge — „ Ring Segment, in kgs.	17500	12000	7500	4000	1216	0·800	..	1216	0·445	0·240	..	..	..	..	..	..	..	..	..	..	..	..
Weight of the explosive charge — „ Semi-piercing, in kgs.	..	..	..	..	..	..	..	..	..	..	..	..	1061	..	..	..	..	..	..	..	..	..
Muzzle Velocity, in metres	620	620	647·1	620	580	612	800	736	690	710	710	600	884	300	641	570	603	590	670	404	404	549
Muzzle Energy, in metre-tons	9408	6275·9	4400	2290	679·8	469	1309	1094·7	1098	102·9	38·5	326	574·9	27	139·1	45	21·6	20·2	42·5	4	4	6·4

Corrected to April, 1913.

The 12-in. 50-calibre Armstrong gun in the new ships fires a projectile of 249 lb., with muzzle velocity of 29,530 ft., and muzzle energy of 51,600 foot-tons.

NAVAL ORDNANCE OF SWEDEN.

—	Bofors.	Armstrong.		Canet and Bofors.	Armstrong.	Whitworth.	Bofors.		Bofors.			Bofors.	Bofors.	Stockholms Vapenfabrik and Finspong.		Bofors.	Finspong.	Stockholms Vapenfabrik.		Finspong.	Stockholms Vapenfabrik.	
N. = belongs to the Navy. C.A. = belongs to the Coast Artillery.	28 cm.k. m/12 N.	25 cm.k. m/85 C.A.	25 cm.k. m/89 C.A.	25 cm.k. m/94 N.	24 cm.k. m/90 C.A.	24 cm.k. m/92 C.A.	24 cm.k. m/96 C.A.	24 cm.k. m/04 C.A.	21 cm.k. m/98 N.	15 cm.k. m/98 N.C.A.	15 cm.k. m/03 and m/12 N.C.A.	12 cm.k. m/94 and m/97 N.C.A.	12 cm.k. m/03 and m/11 C.A.	7·5 cm.k. m/05 and m/12 N.	5·7 cm.k. m/89 B and m/99 N.C.A.	5·7 cm.k. m/92 N.C.A.	5·7 cm.k. m/95 ⊙ B1/95B C.A.	5·7 cm.k. m/95 C. C.A.	5·7 cm.k. m/95 D. N.	4·7 cm.k. m/92 C.A.	4·7 cm.k. m/95 N.	3·7 cm.k. m/98 B N.C.A.
Designation by Calibre, in cms.	28·3	25·4	25·4	25·4	24	24	24	24	21	15·24	15·24	12	12	7·5	5·7	5·7	5·7	5·7	5·7	4·7	4·7	3·7
Total Length . . . . . mm.	12735	8636	8636	10670	8237	8544	10320	12000	9335	6768	7620	5400	6000	3970	3108	2760	1478	1504	1100	1200	2572	1450
Length . Rifled Portion of Bore . mm.	10515	6637	6550	8498	6353	6618	8541	10009·3	7801·1	5693	6265·9	4665	5013	3129	2517·5	2328	1049·5	1049·5	1447·5	817·3	2034·5	1126
Length . Chamber	1660	1397	1397	1609	1209	1373·1	1299·6	1508·4	1123	787·7	1049·9	474	742	560·5	265	229	205	205	200	175	2572	133·4
Length . Bore, in calibres . . .	44	32	32	40·5	32·4	33·5	41	48	42·5	42·5	48	43	48	49	49	41·5	22	23	30	22	49	34
Number of Grooves	80	42	42	44	42	40	40	40	60	44	44	36	36	28	24	24	24	24	24	24	20	16
Twist of Rifling	28	40	40	30	30	30	30	30	30	30	30	30	30	30	30	30	25	25	27	25	30	30
Total Weight . . . . . tons	43·5	30·25	31·03	29·2	23·84	28·1	25	30·44	17·00	5·98	7·75	2·8	3·7	0·950	0·380	0·334	{0·216 / 0·206}	0·212	0·189	0·116	0·243	0·0773
Weight . Armour-piercing Shell, in kg.	305	204	204	204	181	215	215	215	125	45·4	45·4	21	21	—	—	—	—	—	—	—	—	—
Weight . Common Shell . . kg.	—	182	182	182	181	215	215	—	—	—	—	21	21	6·5	2·722	2·722	2·722	2·722	2·722	1·5	1·5	0·8
Weight of Firing Charge . Armour-piercing Shell, in kg.	100	41	41	45·2	34	45·5	43	53	30	10·3	15	4·3	7·0	—	—	—	—	—	—	—	—	—
Weight of Firing Charge . Common Shell . . kg.	—	31·5	31·5	—	—	—	—	—	—	—	—	4·3	7·0	1·3	0·435	0·34	0·24	0·24	0·365	0·143	0·3	0·08
Muzzle Velocity . . . . . m.	870	640	640	720	625	640	685	785	750	750	850	740	860	780	704	640	485	485	600	468	740	550
Muzzle Energy, total m. ton. . . .	—	4258	4258	5386	3609	4209	5138	6575	3581	1301	1671	586	791	201	68·7	56·8	32·64	32·64	49·9	16·73	41·80	12·3
Perforation (K.C. armour, 3000 m.), in cms.	—	14·6	14·6	20·6	13·4	19·0	21·8	35·9	22·9	10·4	15·7	—	10·5	—	—	—	—	—	—	—	—	—

Corrected to February, 1913. For the 11-in. and 12-in. guns, and details of some of the others, see the Bofors Company's table, *post*.

GUN.	MARK.	Length in Calibres.	Total Length.	Capacity of Chamber in Cubic Inches.	Travel of Projectile in Inches.	Weight of Gun.	Weight of Projectile.	Weight of Charge.	Muzzle Velocity.	Muzzle Energy.	Penetration at Muzzle, Krupp Armour, using Capped Projectile.	At 3000 Yards.		At 6000 Yards.		At 9000 Yards.	
												Remaining Velocity.	Penetration.	Remaining Velocity.	Penetration.	Remaining Velocity.	Penetration.
			inch.			tons.	lb.	lb.	ft.-seconds.	ft.-tons.	inch.	ft.-seconds.	inch.	ft.-seconds.	inch.	ft.-seconds.	inch.
3-in. R.F.G.	II., III.	50	154	219	128·3	0·9	13	3·85	2700	658	3·3	1230	1·2	848	0·8	..	..
3-in. S.A.	V., VI.	50	159	219	128·3	1·0	13	3·85	2700	658	3·3	1230	1·2	848	0·8	..	..
4-in. R.F.G.	III., IV., V., VI.	40	164	331	134·5	1·5	33	4·85	2000	915	3·4	1156	1·7	897	1·2	..	..
4-in. R.F.G.	VII.	50	205	652	168·3	2·6	33	9·0	2500	1,430	4·6	1432	2·2	979	1·4	853	1·2
4-in. R.F.G.	VIII.	50	205	652	168·3	2·9	33	12·3	2800	1,794	5·3	1627	2·6	1033	1·5	878	1·2
5-in. R.F.G.	II., III., IV.	40	206	656	165·8	3·1	50	10·0	2300	1,852	5·3	1286	2·6	934	1·7	829	1·4
5-in. B.L.R.	V., VI.	50	256	1,200	215·6	4·6	60	19·2	2700	3,032	6·2	1692	3·5	1102	2·0	928	1·6
5-in. B.L.R.	VI.	50	256	1,200	215·6	4·6	50[1]	20·5	3000[1]	3,122	6·4	1732	3·2	1057	1·7	877	1·4
5-in. R.F.G.	VII.	51	261	1,135	215·6	5·0	50	23·8	3150	3,439	6·8	1835	3·4	1091	1·8	895	1·4
6-in. R.F.G.	II., III.	30	196	1,287	150·0	4·8	105	18·8	1950	2,768	5·3	1305	3·2	1009	2·3	909	2·0
6-in. R.F.G.	IV., VII.	40	256	1,320	205·8	6·0	105	18·8	2150	3,365	6·0	1440	3·6	1058	2·4	934	2·1
6-in. R.F.G.	IX.	45	270	1,320	221·7	7·0	105	18·8	2250	3,685	6·3	1511	3·8	1086	2·5	948	2·1
6-in. B.L.R.	VI	50	300	2,101	247·5	8·3	105	30·0	2600	4,920	8·6	1770	4·7	1207	2·9	996	2·2
6-in. B.L.R.	VIII.	50	300	2,101	247·5	8·6	105	37·0	2800	5,707	11·3	1923	5·2	1297	3·2	1026	2·3
7-in. B.L.R.	II.	45	323	3,643	259·8	12·7	165	58·0	2700	8,338	9·6	1948	6·4	1382	4·2	1083	3·0
8-in. B.L.R.	III., IV.	35	305	3,170	245·8	13·1	260	43·8	2100	7,948	8·6	1576	6·0	1206	4·2	1040	3·6
8-in. B.L.R.	V. and VI.	45	369	5,243	299·1	18·7	260	98·5	2750	13,360	12·0	2106	8·6	1589	6·1	1227	4·4
10-in. B.L.R.	I., II.	30	329	6,779	251·1	25·1	510	90·0	2000	14,141	10·7	1590	8·0	1274	6·1	1103	5·0
10-in. B.L.R.	III.	40	413	10,222	327·0	34·6	510	207·5	2700	25,772	19·4	2184	11·9	1747	9·0	1406	6·9
12-in. B.L.R.	I., II.	35	441	11,991	345·2	45·3	870	160·0	2100	26,596	14·2	1733	11·2	1433	8·8	1219	7·2
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	237·5	2400	34,738	19·8	1994	13·3	1649	10·5	1376	8·3
12-in. B.L.R.	III., IV.	40	493	17,096	392·2	52·1	870	305·0[2]	2600[2]	40,768	18·5	2171	14·8	1801	11·7	1500	9·3
12-in. B.L.R.	V.	45	553	16,974	452·0	52·9	870	305·0	2700	43,964	19·4	2259	15·5	1877	12·3	1561	9·8
12-in. B.L.R.	VI.	45	553	14,970	452·0	53·6	870	340·0[3]	2850[3]	48,984	20·8	2393	16·6	1991	13·3	1653	10·6
12-in. B.L.R.	VII.	50	607	14,296	506·3	56·1	870	340·0[3]	2950[3]	52,483	25·7	2483	17·5	2071	13·9	1719	11·0
13-in. B.L.R.	I., II.	35	479	15,068	374·9	61·4	1130	180·0	2000	31,383	15·0	1679	12·0	1414	9·7	1221	8·1
14-in. B.L.R.	I.	45	642	..	..	63·6	1400	365·0	2600	65,606	28·3*	..	23·4*	..	..	..	..

* Harveyized armour.

Corrected to March, 1913.

ELSWICK B.L. AND Q.F. GUNS AND HOWITZERS.

This Table is supplied by the Manufacturers.

GUNS.

		Semi-Automatic			Semi-Automatic		Naval Landing.			Semi-Automatic	Jointed Gun.															
Diameter of Bore .....ins.	1·85	1·85	1·85	2·24	2·24	2·953	3	3	3	3	3	4	4	4·7	4·7	4·7	6	6	6	7·5	7·5	8	8	9·2	9·2	10	10	10
do. do. .....mm.	47	47	47	57	57	75	76	76	76	76	76	102	102	120	120	120	152	152	152	190	190	203	203	234	234	254	254	254
Length of Bore .....cals.	40	46	50	40	50	14·13	18·8	40	50	50	19·2	40	50	40	45	50	40	45	50	45	50	45	50	45	50	40	45	50
	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons
Weight of Gun	4·51	5·0	7·5	7·5	10·5	1·875	4	12	17 75	23	4·5	26	42	42	53	66	6·6	8·4	8·75	13·8	15 75	18·0	20·4	26·75	28 82	31	36·25	38·25
do. do. .....kilos.	230	254	381	381	533	95	203	609	901	1168	229	1321	2134	2134	2692	3353	6706	8535	8890	14021	16003	18289	20727	27179	29289	31497	36832	38864
do. Projectile .....lbs.	3·3	3·3	3·3	6	6	11·75	12·5	12·5	12·5	14·33	14·33	31	31	45	45	45	100	100	100	200	200	250	250	380	380	450	500	500
do. do. .....kilos.	1·5	1·5	1·5	2·722	2·722	5·33	5·67	5·67	5·67	6·5	6·5	14·06	14 06	20 41	20 41	20·41	45·36	45·36	45 36	90·72	90·72	113·4	113·4	172·37	172·37	204·12	226·8	226·8
	oz.	oz.	lb. oz.	oz.	lb. oz.	oz.	oz.	lb. oz.	lb. oz.	lb.	ozs.	lb.	lb.	lb.	lb. oz.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
do. Charge, M.D. Cordite	8·25	10·0	1 0	10	1 2 5	7·75	15	2 0	3 0	5·75	15	5·5	10·5	6·125	9 11	14	24	31	33·0	74	76	80	90	122	136	86·5	167	200
do. do. do. kil s.	0·234	0·283	0·453	0·283	0·525	0·22	0·369	0·907	1·36	2·604	0·425	2 495	4·76	2·78	4·395	6 35	10·886	14·061	15·0	33·566	34·473	36 29	40·82	55 34	61·7	39·24	75·75	90·72
Muzzle Velocity .....f.s.	2132	2300	2680	1968	2400	1100	1585	2210	2600	3050	1485	2300	3000	2200	2600	3000	2500	2800	3000	2900	3000	2845	3000	2750	3000	2400	2800	3000
do. do. .....m.s.	650	701	817	600	731	335	483	674	792	930	452	701	914	670	792	914	762	853	914	884	914	867	914	838	914	731	853	914
Muzzle Energy .....f.t.	104	121	164	161	240	98	213	423	586	922	218	1137	1934	1510	2109	2808	4334	5436	6240	11663	12481	14031	15600	19926	23714	17973	27181	31203
do. do. .....m.t.	32·2	37·5	50·8	49·8	74·3	30·3	66	131	181·5	285·5	67·5	352·1	599	467·6	653	869·6	1342·2	1683·4	1932	3611·9	3865·2	4345·2	4831·2	6171	7340	5566	8418	9663
Penetration at Muzzle ...ins. (Tressider Wrought Iron Pl.)	5·15	5·8	7·3	5.4	7·3	..	..	8·0	10·3	13 7	..	11·6	17·4	12 1	15·6	19·3	19·4	22·9	25·5	30·6	32·3	32·2	34·9	35·2	40·1	29·9	39·7	44·1
do. do. ...mm.	130·8	147·3	185·4	137·2	185·4	..	..	203·2	261·6	348·0	..	294·6	442·0	307·3	396·2	490·2	492·8	581·6	647·7	777·2	820·4	817·9	886·4	894·1	1018·5	759·4	1008·4	1120·1
Rounds per Minute	25	25	25	25	25	20	20	20	20	30	15	12	12	12	12	12	9	9	9	6	6	5	5	4	4	3	3	3

Diameter of Bore .....ins.	12	12	12	12	13·5	14	16
do. do. .....mm.	305	305	305	305	343	355·6	406·4
Length of Bore .....cals.	40	40	45	50	45	45	40
	tons	tons	tons	tons	tons	tons	tons
Weight of Gun	48·5	51	59·3	66·7	76	85	105
do. do. .....kilos	19278	51818	60252	67770	77216	86360	106680
do. Projectile .....lbs	850	850	850	850	1250	1400	2200
do. do. .....kilos.	385·55	385·55	385·55	385 55	567	635	998
	lb.	lb.	lb.	lb.	lb.	lb.	lb.
do. Charge, M.D. Cordite	155	260	260	285	296	324	390
do. do. do. kilos.	70·31	117 93	117·93	129·3	134·26	147	177
Muzzle Velocity .....f.s.	2400	2650	2800	3000	2700	2700	2310
do. do. .....m.s.	731	808	853	914	823	823	713
Muzzle Energy .....f.t.	33949	41386	46208	53046	63187	70770	83530
do. do. .....m.t.	10513	12816	14310	16428	19568	21916	25868
Penetration at Muzzle ...ins. (Tressider Wrought Iron Pl.)	37·5	43·6	47·3	52·5	51·3	53·2	50·4
do. do. ...mm.	952·5	1107·4	1201·4	1333·5	1303·0	1351·3	1280
Rounds per Minute	2	2	2	2	2	2	2

HOWITZERS AND FIELD GUNS.

		Mountain Gun.	Field.	Horse and Field.	Field.	Howitzers.			Field Position.	Howitzers.						
Diameter of Bore ...	ins.	2·953	3	3	3·3	4	4·3	4·7	5	5	6	8	9·2	11	11·24	12
,, ,, ...	mm.	75	76	76	84	102	109·2	120	127	127	152	203	234	279·4	285·5	305
Length of Bore ...	calibres	15·2	28	24	28	8·75	12·5	12	32	8·4	12·2	12	13·7	12	15	17
		lb.	cwt.	cwt.	cwt.	lb.	cwt.	cwt.	tons	cwt.	ton	tons	tons	tons	tons	tons
Weight of Gun		260	7·25	6	9	220	7	8	2	9	1	2·6	4·3	5·5	7·85	12·55
,, ,, ...	kilos.	118	368	305	457	100	356	406	2032	457	1016	2642	4369	5588	7976	12751
,, Projectile	lbs.	12·5	14·3	12·5	18·5	20	40	35	60	50	100	240	290	500	661·38	981 771
,, ,,	kilos.	5·67	6·49	5·67	8·39	9·07	18·14	15·87	27·22	22·68	45·36	108·9	131·5	227	300	445 350
		oz.	oz.	lb. oz.	lb. oz.	oz.	oz.	lb. oz.	lb. oz.	oz.	lb.	lb.	lb.	lb.	lb.	lb. lb.
,, Charge M.D. Cordite		10	20¼	1 4	1 6	8¼	16¼	1 4¼	9 8	12	3	7·5	14	20	32	53 56·25
,, ,, ,, kilos.		0·283	0·582	0·567	0·624	0·241	0·461	0·582	4·31	0·34	1·361	3·4	6·35	9·07	14·51	24 25·51
Muzzle Velocity	f.s.	1250	1755	1700	1635	950	980	1150	2150	782	1000	1000	1250	1220	1230	1350 1585
,, ,, ...	m.s.	381	535	518	498	290	298	350	655	238	305	305	381	372	375	411·5 483

Corrected to March, 1913.

	37 m m	37 m m	3-pdr.	6-pdr.	3-in. Semi-Auto.	4-in. Semi-Auto.	4-in. Semi-Auto.	4·7-in. Semi-Auto.	4·7-in. Semi-Auto.	Naval Howitzer.	6-in. Semi-Auto.	6-in. Semi-Auto.	7·5-in. Semi-Auto.	7·5-in. Semi-Auto.	8-in. Semi-Auto.	9·2-in. Semi-Auto.	9·2-in. Semi-Auto.	10-in. Semi-Auto.	10-in. Semi-Auto.	12-in. Semi-Auto.	12-in. Semi-Auto.	13·5-in. Semi-Auto.	14-in. Semi-Auto.	15-in. Semi-Auto.
	30 cal.	12·5 cal.	50 cal.	50 cal.	50 cal.	40 cal.	50 cal.	45 cal.	50 cal.	18 cal.	45 cal.	50 cal.	45 cal.	50 cal.	50 cal.	45 cal.	50 cal.	45 cal.	50 cal.	45 cal.	50 cal.	45 cal.	45 cal.	45 cal.
Diameter of Bore .ins.	1·457	1·457	1·85	2·244	3	4	4	4·724	4·724	4·724	6	6	7·5	7·5	8	9·2	9·2	10	10	12	12	13·5	14	15
Length of Bore . .ins.	43·5	62	92·5	112·2	150	160	201·15	212·6	228·45	85	269·5	300	337·5	375	368·75	429·3	460	450	486	540	600	607·5	630	675
Length of Gun . .ins.	73·75	94	98·9	118·6	156·995	166·6	208·45	220	236·2	89·9	279·2	310·07	349·2	386·7	400	442·35	473	464·6	500	557·55	617·7	625·9	648·4	695·3
Weight of Projectile lbs.	1	1·25	3·3	6	12·5	31	31	45	45·14	45	100	100	200	200	216·7	380	380	478·4	496·6	850	850	1250	1400	1488·12	1720	1950
Weight of Gun . . .	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	tons.	tons.	c. q. l.	tons.	tons.	tons.	tons.	tons.	tons.	tons.	tons	tons	tons	tons	tons	tons	tons	tons	tons
Muzzle Velocity . .f.s.	3·75	5 42	5.53	9·29	19	25	41	3·18	3·2	11 1 14	7·42	7·8	14·02	16·0	14·6	26·85	27·81	34·85	28 7	57·7	65·85	76·125	80·25	80·25	96	96
Muzzle Energy . .f.t.	1800	2300	2800	2600	2700	2300	3030	2800	3050	1200	2900	3100	2875	3003	3090	2800	2950	2850	2863	2850	3010	2760	2615	2525	2655	2500
Penetration of Wrought Iron Plate at Muzzle. Gavre formula . .ins.	22·5	45·85	179·4	281	632	1137	1975	2445	2910	450	5830	6665	11465	12505	14350	20660	22930	26945	28225	47875	53400	63190	66385	65790	84070	84510
Penetration of Hard Steel Plate at 3000 yards. Gavre formula . .ins.	1·9	3·3	6·7	7·5	9·65	10·8	16	15·9	17·8	—	22·6	24·8	28·75	30·75	31·5	35·3	38·0	38·9	40·2	48·3	52·1	52·8	52·0	51·5	57·2	57·5
	—	—	—	—	—	—	—	—	5·0	—	7·8	8·8	10·6	11·4	12·6	14·1	15·2	15·8	16·4	21·0	22·2	22·8	22·9	22·6	25·1	25·5
Rounds per minute . .	300	300	30	28	25	20	15	12	12	10	10	10	8	8	6	4	4	3	3	2	2	1·5	1·35	1·35	1·2	1·2
Weight of Mounting complete with Shield . .	c. q. l. 4 1 10	c. q. l. 4 3 20	c. q. l. 11 2 0	c. q. l. 18 1 0	t. c. q. l. 1 1 1 0	t. c. q. l. 1 9 2 0	t. c. q. l. 2 6 3 0	t. c. q. l. 3 3 13 3 0	t. c. q. l. 6 5 3 0	t. c. q. l. 4 8 1 11	t. c. q. l. 9 1 1 0	t. c. q. l. 12 0 2 0	t. c. q. l.	t. c. q. l.	t. c. q. l.	t. c. q. l.	t. c. q. l.								
Thickness of Shield . .	·1875	·16	·25	·25	·25	·028	none	2 & ·313 ins.	4·33 ins.	2 ins.	3 ins.	3 & 1·5 ins.	Depending on type of Mounting.											
Weight of Shield . .	c. q. l. 0 3 11	c. q. l. 0 1 22	c. q. l. 1 0 0	c. q. l. 1 2 8	c. q. l. 2 1 0	c. q. l. 1 1 0	none	c. q. l. t. 17 0 0 1 1 0	c. q. l. t. 2 8 2 0	c. q. l. t. 1 9 1 14	t. c. q. l. 3 1 1 0	t. c. q. l. 5 5 0 0													
Angle of Elevation . .	16°	15°	20°	20°	20°	20°	15°	20°	16°	70°	15°	15°												
Angle of Depression . .	25°	20°	20°	10°	10°	10°	10°	7°	7°	5°	7°	7°												

HOWITZERS AND FIELD GUNS.

	3-in. Mountain Gun.	3-in. Landing Gun.	3-in. Field.		Howitzers.					
			Light.	Heavy.	4·33-in.	4·7-in.	6-in.	8-in.	9·2-in.	11-in.
Diameter of Bore . .ins.	3	3	3	2·95	4·33	4·724	6	8	9·2	11
Length of Bore . .ins.	42·94	66	64·96	99·46	58·45	66·15	94·5	128·8	128·8	154
Length of Gun . .ins.	47·23	70·34	69·3	103·8	63·55	71·05	102·8	138·2	141·2	168·25
Weight of Projectile lbs.	12·5	12·5	12·5	14·33	35·25	45	90·3	216·7	290	758
Weight of Gun . cwts.	2·45	3·9	4·5	7·5	7·25	9·75	18·75	46·75	tons ·3	tons 5·85
Muzzle Velocity . . f.s.	1150	1640	1600	1660	1100	1000	1285	1100	1300	1000
Muzzle Energy . . f.t.	115	233	220	274	296	312	1035	1820	3400	5260
Weight of Mounting complete with Shield . .	c. q. l. 7 1 0	c. q. l. 9 2 0	t. c. q. l. 0 11 3 0	t. c. q. l. 0 14 0 0	t. c. q. l. 0 17 0 0	t. c. q. l. 0 17 2 0	t. c. q. l. 2 14 3 0	t. c. q. l. 3 11 0 0	t. c. q. l. 5 9 0 0	t. c. q. l.
Thickness of Shield . .	·125	·192	·125	·144	None	·157	·236	·236	None	
Weight of Shield . . .	c. q. l. 0 2 17	c. q. l. 1 1 15	c. q. l. 0 3 10	c. q. l. 1 0 15	None	c. q. l. 1 2 8	c. q. l. 3 3 0	c. q. l. 3 0 0	c. q. l. None	
Angle of Elevation . .	25°	23°	16°	16°	50°	43°	50°	40°	55°	
Angle of Depression . .	15°	10°	6°	10°	5°	5°	None	None	3°	

Corrected to March, 1913.

COVENTRY ORDNANCE WORKS' GUNS.

This Table is supplied by the Manufacturers.

—		3-pdr., 50 cal.	6-pdr., 50 cal.	Mountain 3·3-in. 20-pdr., Howitzer.	Field. 12½-pdr., 23 cal.	Field. 15-pdr., 33·44 cal.	Field. 4·65-in. Howitzer.	Field. 6-in. Howitzer.	3-in., 40 cal.	3-in., 50 cal.	4-in., 40 cal.	4-in., 50 cal.	4·7-in., 50 cal.	6-in., 50 cal.	7·5-in., 50 cal.	9·2-in., 50 cal.	11·02-in., 50 cal.	12-in., 50 cal.	13·5-in., 45 cal.	14-in., 45 cal.
Diameter of Bore	in.	1·85	2·244	3·3	3·0	3·0	4·65	6·0	3·0	3·0	4·0	4·0	4·7	6·0	7·5	9·2	11·2	12·0	13·5	14·0
	m.m.	47	57	83·8	76·2	76·2	117·5	152·4	76·2	76·2	101·6	101·6	120·0	152·4	190·5	233·7	280	304·8	342·9	355·6
Length of Gun	in.	99·0	119·0	45·25	75·0	100·34	72·0	101·5	123·6	154·5	166·4	208	242·5	310	387·5	475	568	617·7	630	648·7
Weight of Charge	lb.	1·1	1·75	0·5	1·0	1·626	1·1	5·0	2·0	5·25	5·25	11·25	16·0	31·0	71·0	95	270	285	290	305
Weight of Projectile	lb.	3·3	6·0	20·0	12·5	15·0	37·5	100	12·5	12·5	31	31	45	100	200	380	760	850	1250	1600
Weight of Gun		c. 6	c. 10	c. q. 2 2	c. 6	c. q. 8 2	c. q. 8 2	t. c. q. 1 2 2	c. q. 12 1	c. q. l. 18 2 21	t. c. q. l. 1 5 3 15	t. c. 2 2	t. c. q. 3 14 2	t. c. 8 15	t. c. 15 10	t. 28	t. 42	t. 67	t. c. 76 10	t. 81
Muzzle Velocity	f.-sec.	2800	2800	860	1600	1850	1000	1120	2300	3000	2300	3000	3000	2950	2950	2950	2950	2950	2600	2450
Muzzle Energy	f.-tons	179·4	326	102	222	356	260	870	458·5	780	1137	1934	2810	6034	12068	22930	45861	51290	58590	66580
Penetration of Wrought-Iron Plate at Muzzle	in.	..	..	..	..	..	..	..	7·7	11·25	10·8	16·0	17·4	23·1	29·8	37·9	51·2	50·65	49·1	51·7
Penetration of Hard Steel Plate at 5000 yards	in.	..	..	..	..	..	..	..	..	..	..	..	2·6	5·5	8·5	12·3	18·0	18·3	18·3	20·7

Corrected to March, 1913.

BEARDMORE GUNS.

This Table is supplied by the Manufacturers.

Gun Calibre.	Length of Bore.	Weight of Gun.	Weight of Shot.	Muzzle Velocity.	Remaining Velocity at a Range of			
					3000 yards.	5000 yards.	6000 yards.	10,000 yards.
inches.	calibres.	tons.	lbs.	ft. secs.	ft. secs.	ft. secs.	ft. secs.	ft. secs.
4·0	50	2·1	31	3000	2045	..	1322	..
6·0	50	8·2	100	3000	2313	..	1725	..
9·2	50	28·5	425	2810	..	2198	..	1670
12·0	50	66·0	950	2820	..	2346	..	1917
13·5	46	77·0	1375	2600	..	2201	..	1838
15·0	42	90·0	1850	2500	..	2140	..	1812

Corrected to March 1913.

SCHNEIDER GUNS.

The information in this Table is given by the Manufacturers.

Calibre, in millimètres.	400		370		340		305		240		150		120		100		75		47	37
Calibre, in inches	15·7	15·7	14·5	14·5	13·4	13·4	12·0	12·0	9·4	9·4	5·9	5·9	4·7	4·7	3·9	3·9	2·9	2·9	1·8	1·4
Length, in calibres	40	45	40	45	40	45	45	50	45	50	45	50	45	50	45	50	50	60	60	60
Weight, in tons	99·4	102·5	78·9	83·6	63·7	66·3	52·9	57·3	25·8	27·9	6·3	6·8	3·2	3·5	1·9	2·0	·85	1·2	·30	·17
Weight of A.P. Projectile, lb.	2183	2183	1719	1719	1332	1332	826	826	407	407	99	99	48	48	28·6	28·6	14·3	14·3	3·3	1·76
Weight of Charge, in lb.	540	540	496	496	447	447	353	375	165	176	39·6	40·7	17·8	18·4	13·2	13·8	5·5	6·2	1·3	..
Muzzle Velocity, ft.-secs.	2428	2493	2493	2575	2559	2675	2952	3116	2952	3116	2952	3116	2952	3116	2952	3116	2871	3035	3116	3116
Muzzle Energy, ft.-tons	89444	94287	74268	79272	60706	65388	50007	55717	24667	27487	6001	6686	2932	3268	1734	1931	820	917	223	119
Perforation of Steel at muzzle (ins.)	...	..	..	..	..	..	38·3	41·6	30·1	32·3	18·2	20·1	13·9	15·0	11·6	12·5	9·3	10·0	5·9	5·0
Perforation of Steel at 3000 yards (ins.)	..	..	..	..	..	..	29·3	31·9	21·2	23·1	10·2	11·8	6·4	6·9	4·6	4·9	..	..	..	..
Perforation of Steel at 6000 metres (6561 yards), ins.	17·9	18·7	16 6	17·5	15·2	16·1	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Corrected to March, 1913.

BETHLEHEM STEEL CO.

ORDNANCE.

Table supplied by the Manufacturers, February, 1913.

Calibre.	Length of bore in Calibres.	Calibre.	Weight of Gun.	Weight of Projectile.	At Muzzle.		Penetration of Wrought Iron. (Gavre Formulæ.)	At 3000 yards Range.			At 8000 yards Range.			Limiting ranges beyond which capped armour piercing projectiles will not penetrate Krupp hard-faced armour of 12 inches and 7 inches thickness.		Calibre.
					Velocity.	Energy.		Dangerous Space for Target 25 feet high.	Energy.	Penetration of Krupp hard-faced armour by capped armour piercing projectiles, with normal impact.	Dangerous Space for Target 25 feet high.	Energy.	Penetration of Krupp hard-faced armour by capped armour piercing projectiles, with normal impact.	12-in. plate.	7-in. plate.	
inches.	calibres.	cms.	lbs.	lbs.	ft. per sec.	foot-tons.	inches.	yards.	foot-tons.	inches.	yards.	foot-tons.	inches.	yards	yards.	inches.
1·457	50	3·7	120	1	2150	32	..	..	..	..	..	..	..	..	..	1·457
1·851	50	4·7	550	3	2400	120	..	..	..	..	..	..	..	..	..	1·851
2·244	50	5·7	960	6	2400	240	..	..	..	..	..	..	..	..	..	2·244
3	50	7·62	1900	13	2800	707	..	..	..	..	..	..	..	..	..	3
4	50	10·16	2·6 tons.	33	2800	1,793	11·0	320	890	..	..	..	..	..	..	4
4	50	10·16	2·6	14 kilos.	3000	1,924	11·5	362	980	..	..	..	..	..	..	4
5	45	12·7	3·4	50 lbs.	2600	2,343	11·3	253	1,996	..	..	..	..	..	..	5
5	50	12·7	4·75	50	3000	3,120	13·8	371	1,514	..	..	..	..	..	..	5
6	45	15·24	7·2	105	2600	4,920	16·9	313	2,970	7·0	60	1,307	4·2	..	2,870	6
6	50	15·24	8·4	105	2800	5,707	18·8	374	3,478	7·7	71	1,543	4·6	..	3,890	6
7	45	17·78	12·7	165	2700	8,338	22·0	358	5,426	9·2	74	2,660	5·9	..	6,063	7
7	50	17·78	14·5	165	2900	9,619	24·4	422	6,263	10·1	87	1,948	4·8	..	7,063	7
8	45	20·32	18·6	260	2800	14,460	29·2	410	9,869	12·3	92	5,457	8·5	3,240	10,420	8
8	50	20·32	22·3	260	2900	15,160	30·7	441	10,616	12·9	100	5,885	8·9	3,950	11,235	8
9·2	50	23·37	30·4	380	2900	22,200	35·8	302	15,760	14·9	107	9,350	10·8	7,237	15,311	9·2
10	45	25·4	35·4	515	2800	27,990	40·5	429	21,080	17·2	106	13,160	12·8	9,075	Max. range	10
10	50	25·4	43·9	515	2900	30,020	42·6	453	22,671	18·0	114	14,394	13·6	10,000	Max. range	10
12	45	30·48	53·8	870	2800	47,380	51·8	439	36,794	21·7	114	24,608	16·9	14,560	Max. range	12
12	50	30·48	66·0	870	2900	50,720	54·4	476	39,990	23·0	123	26,495	17·7	15,596	Max. range	12
14	35	35·56	57·4	1660	2150	53,190	50·4	244	44,660	22·3	70	33,650	18·7	Max. range	Max. range	14
14	45	35·56	70·3	1400	2600	65,700	56·4	362	50,420	24·0	105	39,840	20·7	Max. range	Max. range	14
18	30	45·72	60·0	2075	2150	66,490	49·4	235	52,750	21·1	63	36,365	16·7	15,100	Max. range	18

Guns of 3-inch calibre or under are chambered for fixed ammunition with the powder and projectiles in brass cartridge cases. Guns from 3-inch calibre upwards, and including the 6-inch L-45 gun, can be chambered to use either fixed ammunition, or chambered to use loose ammunition with the powder in cartridge bags and the projectile separate from the powder. Guns above 6-inches calibre and including the 6-inch L-45 gun are chambered for loose ammunition. The breech mechanisms of all guns up to 8 inches are operated by the single motion of a hand-lever. Those of the larger guns are operated by the revolution (8 to 5 turns) of a crank.

The 8-inch, 10-inch, and 12-inch L-50-guns, and the 14-inch L-45 gun are for use in turrets, and are of great weight at the breech in order to balance the long muzzles, so that a comparatively small barbette may be used.

BOFORS GUNS.

Table supplied by the Manufacturers.

Calibre . . . . . cm. / Calibre . . . . . in.	30·5 / 12			28 / 11·02			25·4 / 10			24 / 9·45			21 / 8·27		
Length of Gun . . . . cal.	50	45	40	50	45	40	50	45	40	50	45	40	50	45	40
Length of Gun . . . . in.	600·4	540·3	480·3	551·2	496·1	441	500	450	400	472·4	425·2	378	413·4	372	330·7
Weight of Gun . . . . tons	50	44	40	39	35	30	29	26	23	24	22	19	16	14·4	12·8
Weight of Projectile . . . lb.	981 / 772	981 / 772	981 / 772	761 / 595	761 / 595	761 / 595	564 / 445	564 / 445	564 / 445	474 / 375	474 / 375	474 / 375	309 / 249	309 / 249	309 / 249
Weight of Charge . . . lb.	266	239	213	205	184	164	153	138	123	129	116	103	84	75·8	67·5
Muzzle Velocity . . . ft.-secs.	2776 / 3140	2625 / 2969	2477 / 2802	2776 / 3140	2625 / 2969	2477 / 2802	2789 / 3140	2638 / 2969	2490 / 2802	2789 / 3140	2638 / 2969	2490 / 2802	2828 / 3150	2677 / 2979	2526 / 2812
Muzzle Energy . . . ft.-tons	52583	47019	41877	40767	36452	32468	30536	27320	24349	25647	22944	20448	17174	15391	13705
Penetration of soft steel plate at muzzle de Marres formula } in.	39·8	36·8	33·9	36·4	33·6	30·9	32·9	30·3	27·9	30·8	28·5	26·2	26·7	24·7	22·7
Number of rounds per minute .	2	2	2	2	2	2	3	3	3	4	4	4	4	4	4

Calibre . . . . . cm. / Calibre . . . . . in.	19·4 / 7·64			15·24 / 6			12 / 4·72			10·5 / 4·13			8·7 / 3·43			7·5 / 2·95		
Length of Gun . . . . cal.	50	45	40	50	45	40	50	45	40	50	45	40	50	45	40	50	45	40
Length of Gun . . . . in.	381·9	343·7	305·5	300	270	240	236·2	212·6	189	227·4	206·7	186	188·4	171·3	154·1	162·4	147·6	132·9
Weight of Gun . . . . tons	12·8	11·6	10·3	5·8	5·3	4·7	2·96	2·56	2·37	2·2	2	1·8	1·88	1·14	1·05	0·72	0·665	0·59
Weight of Projectile . . . lb.	251 / 198	251 / 198	251 / 198	112·4 / 90·4	112·4 / 90·4	112·4 / 90·4	59·5 / 46·3	59·5 / 46·3	59·5 / 46·3	39·7 / 30·9	39·7 / 30·9	39·7 / 30·9	22·7 / 17·6	22·7 / 17·6	22·7 / 17·6	14·5 / 11·5	14·5 / 11·5	14·5 / 11·5
Weight of Charge . . . lb.	68·1	61·3	54·7	33·1	29·8	26·5	16·2	14·5	12·9	10·8	9·7	8·7	6·14	5·53	4·92	3·92	3·53	3·13
Muzzle Velocity . . . ft.-secs.	2786 / 3140	2635 / 2969	2487 / 2802	2897 / 3235	2749 / 3051	2582 / 2884	2789 / 3143	2638 / 2973	2474 / 2805	2871 / 3251	2733 / 3097	2585 / 2933	2864 / 3248	2726 / 3084	2582 / 2936	2848 / 3215	2717 / 3074	2572 / 2907
Muzzle Energy . . . ft.-tons	13566	12136	10815	6565	5913	5215	3220	2881	2567	2267	2057	1841	1292	1169	1049	817	742·7	668·5
Penetration of soft steel plate at muzzle de Marres formula } in.	24·6	22·7	20·9	19	17·6	16·1	14·7	13·6	12·5	13·2	12·3	11·4	10·8	10·1	9·4	9·2	8·5	7·9
Number of rounds per minute .	5	5	5	9	9	9	11	11	11	15	15	15	17	17	17	20	20	20

Corrected to March, 1913.

Table Relating to Conversion of Measures.

Length.

Metric to English. | English to Metric.

I. Mètres.	II. Yards.	III. Feet.	IV. Inches.	V. Yards.	VI. Mètres.	VII. Feet.	VIII. Mètres.	IX. Inches.	X. Centimètres.
1	1·0936	3·2809	39·37	1	0·91438	1	0·30479	1	2·5400
2	2·1873	6·5618	78·74	2	1·82877	2	0·60959	2	5·0799
3	3·2809	9·8427	118·11	3	2·74315	3	0·91438	3	7·6199
4	4·3745	13·1236	157·48	4	3·65753	4	1·21918	4	10·1598
5	5·4682	16·4045	196·85	5	4·57192	5	1·52397	5	12·6998
6	6·5618	19·6854	236·22	6	5·48630	6	1·82877	6	15·2397
7	7·6554	22·9663	275·60	7	6·40068	7	2·13356	7	17·7797
8	8·7491	26·2472	314·97	8	7·31507	8	2·43836	8	20·3196
9	9·8427	29·5281	354·34	9	8·22945	9	2·74315	9	22·8596

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of yards in 2354 mètres (see cols. I. & II.).	of feet in 12·4 mètres (see cols. I. & III.).	of inches in 30·5 centimètres (see cols. I. & IV.). Note, 1 m.=100 cm.	of mètres in 1026 yards (see cols. V. & VI.).	of mètres in 1742 feet (see cols. VII. & VIII.).	of centimètres in 17·72 ins. (see cols. IX. & X.)
mètres. yards.	mètres. feet.	cms. inches.	yards. mètres.	feet. mètres.	inches. cms.
2000=2187·3	10 =32·809	30·0=11·811	1000=914·38	1000=304·79	10·0 =25·400
300= 328·09	2 = 6·562	·5= ·197	20= 18·29	700=213·36	7·0 =17·780
50= 54·68	0·4= 1·312		6= 5·49	40= 12·19	0·7 = 1·778
4= 4·37				2= 0·61	·02= ·051
∴ 2354=2574·44	∴ 12·4=40·683	∴ 30·5=12·008	∴ 1026=938·16	∴ 1742=530·95	∴ 17·72=45·009

Note.—A ready way of approximately converting all French measures into English inches is to multiply by 4 and apply the decimal point by common sense—Thus for a 15-cm. gun; 15 × 4 = 60. Now this Calibre cannot be 60 inches, nor can it be 0·6 inch; therefore it must be 6 inches. (The exact value is 5·906 in.)

Weight.

Metric to English. | English to Metric.

I. Kilogrammes.	II. Tons.	III. Pounds Avoirdupois.	IV. Grains Troy.	V. Tons.	VI. Milliers.	VII. Pounds Avoirdupois.	VIII. Kilogrammes.	IX. Grains. Troy.	X. Gramme
1	·000984	2·2046	15432·3	1	1·016	1	0·4536	1	·0648
2	·001968	4·4092	30864·7	2	2·032	2	0·9072	2	·1296
3	·002953	6·6139	46297·0	3	3·048	3	1·3608	3	·1944
4	·003937	8·8185	61729·4	4	4·064	4	1·8144	4	·2592
5	·004921	11·0231	77161·7	5	5·080	5	2·2680	5	·3240
6	·005905	13·2277	92594·1	6	6·096	6	2·7216	6	·3888
7	·006889	15·4323	108026·4	7	7·112	7	3·1751	7	·4536
8	·007874	17·6370	123458·8	8	8·128	8	3·6287	8	·5184
9	·008858	19·8416	138891·1	9	9·144	9	4·0823	9	·5832

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of tons in 35 milliers (see cols. I. & II. Note, 1000 kg. =1 millier).	of pounds in 56·3 kilogrammes. (see cols. I. & III.).	of grains in 120 grammes (see cols. I. & IV. Note, 1000 grms. = 1 kg.)	of milliers in 38 tons (see cols. V. & VI.).	of kilogrammes in 68 pounds (see cols. VII. & VIII.).	of grammes in 85 grains (see cols. IX. & X.).
milliers. tons.	kgrms. lbs.	grammes. grains.	tons. milliers.	lbs. kgs.	grains. grammes.
30 = 29·53	50 =110·231	100=1543·23	30 = 30·48	60 = 27·216	80 = 5·184
5 = 4·92	6 = 13·228	20= 308·65	8 = 8·13	8 = 3·629	5 = 0·324
	0·3= ·661				
∴ 35 = 34·45	∴ 56·3=124·120	∴ 120=1851·88	∴ 38 = 38·61	∴ 68 = 30·845	∴ 85 = 5·508

Note.—7000 grains troy = 1 pound avoirdupois.

PRESSURE.

Metric to English.			English to Metric.				Atmospheric to English.		English to Atmospheric.	
I. Kilogrammes per square centimètre.	II. Pounds per square inch.	III. Tons per square inch.	IV. Pounds per square inch.	V. Kilogrammes per square centimètre.	VI. Tons per square inch.	VII. Kilogrammes per square centimètre.	VIII. Atmospheres.	IX. Tons per square inch.	X. Tons per square inch.	XI. Atmospheres.
1	14·223	·00635	1	·07031	1	157·49	1	·00656	1	152·38
2	28·446	·01279	2	·14062	2	314·99	2	·01313	2	304·76
3	42·668	·01905	3	·21003	3	472·48	3	·01969	3	457·14
4	56·891	·02540	4	·28124	4	629·97	4	·02625	4	609·52
5	71·114	·03175	5	·35155	5	787·47	5	·03281	5	761·91
6	85·337	·03810	6	·42186	6	944·96	6	·03938	6	914·29
7	99·560	·04445	7	·49217	7	1102·45	7	·04594	7	1066·67
8	113·783	·05080	8	·56248	8	1259·95	8	·05250	8	1219·05
9	128·005	·05715	9	·63279	9	1417·44	9	·05906	9	1371·43

Note.—One atmosphere is taken to be 14·7 lbs. per square inch.

Explanation.—To convert any number from one measure to the other, take the value of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of pounds per square inch in 32·1 kilogrammes per square centimètre (see cols. I. & II.).		of tons per square inch in 3210 kilogrammes per square centimètre (see cols. I. & III.).		of kilogrammes per square centimètre in 15 lbs. per square inch (see cols. IV. & V.).		of kilogrammes per square centimètre in 18·3 tons per square inch (see cols. VI. & VII.).		of tons per square inch in 3254 atmospheres. (see cols. VIII. & IX.).		of atmosphere in 14·6 tons per square inch (see cols. X. & XI.).	
kgs. per sq. cm.	lbs. per sq. in.	kgs. per sq. cm.	tons per sq. in.	lbs. per sq. in.	kgs. per sq. cm.	tons per sq. in.	kgs. per sq. cm.	atmospheres.	tons per sq. inch.	tons per sq. in.	atmospheres.
30 =	426·68	3000 =	19·05	10 =	·7031	10 =	1574·9	3000 =	19·69	10 =	1523·8
2 =	28·45	200 =	1·27	5 =	·3516	8 =	1259·95	200 =	1·31	4 =	609·5
0·1 =	1·42	10 =	·06			0·3 =	47·25	50 =	·33	0·6 =	91·4
∴ 32·1 =	456·55	∴ 3210 =	20·38	∴ 15 =	1·0547	∴ 18·3 =	2882·10	∴ 3254 =	21·36	∴ 14·6 =	2224·7

ENERGY.

Metric to English.		English to Metric.	
I. Mètre-tons.	II. Foot-tons.	III. Foot-tons.	IV. Mètre-tons.
1	3·2291	1	0·3097
2	6·4581	2	0·6194
3	9·6872	3	0·9291
4	12·9162	4	1·2388
5	16·1453	5	1·5484
6	19·3743	6	1·8581
7	22·6034	7	2·1678
8	25·8324	8	2·4775
9	29·0615	9	2·7872

1 mètre-ton is termed a "dinamode" in Italy.

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus find the number

of foot-tons in 4367 mètre-tons (see cols. I. & II.).		of mètre-tons in 3592 foot-tons (see cols. III. & IV.).	
mètre-tons.	foot-tons.	foot-tons.	mètre-tons.
4000 =	12916·2	3000 =	929·1
300 =	968·72	500 =	154·84
60 =	193·74	90 =	27·87
7 =	22·60	2 =	·62
∴ 4367 =	14101·26	∴ 3592 =	1112·43

PERFORATION THROUGH IRON AND STEEL WITH THE FACE NOT HARDENED.

To obtain perforation through steel equivalent to a given perforation through iron, and *vice versa*.

1 inch steel = 1¼ inches iron;

that is, 4 inches steel = 5 inches iron.

Thus, given 9·4 inches perforation through iron,

$$9{\cdot}4 \times \frac{4}{5} = 7{\cdot}52 \text{ inches steel;}$$

or, given 5·2 inches steel,

$$5{\cdot}2 \times \frac{5}{4} = 6{\cdot}5 \text{ inches iron.}$$

PART IV.

STATISTICS, OFFICIAL STATEMENTS AND PAPERS.

STATEMENT showing the NET EXPENDITURE from NAVY VOTES and LOANS on account of NAVAL SERVICES for the Years 1901–2 to 1911–12, together with the ESTIMATES for 1912–13 and 1913–14.

Year	Total Expenditure from Navy Votes (Net). (1) £	Annuity in Repayment of Loans under the Naval Works Acts. (2) £	Total Expenditure exclusive of Annuity [Column (2) deducted from Column (1).] (3) £	Expenditure from Loans under Naval Works Acts. (4) £	Total of Columns (3) and (4). (5) £	Expenditure on New Construction (Vote 8). (6) £
1901–2	30,981,315	122,255	30,859,060	2,745,176	33,604,236	8,865,080
1902–3	31,003,977	297,895	30,706,082	3,198,017	33,904,099	8,534,917
1903–4	35,709,477	502,010	35,207,467	3,261,083	38,468,550	11,115,733
1904–5	36,859,681	634,238	36,225,443	3,402,575	39,628,018	11,263,019
1905–6	33,151,841	1,015,812	32,136,029	3,313,604	35,449,633	9,688,044
1906–7	31,472,087	1,094,309	30,377,778	2,431,201	32,808,979	8,861,897
1907–8	31,251,156	1,214,403	30,036,753	1,083,663	31,120,416	7,832,589
1908–9	32,181,309	1,264,033	30,917,276	948,262	31,865,538	7,406,930
1909–10	35,734,015	1,325,809	34,408,206	—	34,408,206	9,597,551
1910–11	40,419,336	1,322,752	39,096,584	—	39,096,584	13,077,689
1911–12	42,414,257	1,322,752	41,091,505	—	41,091,505	12,526,171
1912–13 (estimated) . . .	45,075,400	1,322,752	43,752,648	—	43,752,648	14,595,527
1913–14 (estimated) . . .	46,309,300	1,311,558	44,997,742	—	44,997,742	13,276,400

First Lord's Statement explanatory of Navy Estimates, 1913-14.

THE Estimates for 1913–14 amount to £46,309,300, as compared with £45,075,400 for the current year (including the Supplementary Estimate).

The principal increases occur under the heads of Pay of *Personnel* (Vote I.), Victualling and Clothing (Vote II.), and Naval Armaments (Vote IX.).

The increase in the Vote for *Personnel* is due mainly to the requirements of new ships now being placed in commission and under construction.

It is proposed to reach a total of 146,000 officers and men by March 31, 1914. This requires an addition to Vote A of 8500 and an increase in average bearing throughout the year of 5000. The maximum figure is given for Vote A instead of, as heretofore, the average figure, which was somewhat misleading.

The increase of £712,200 in Vote I. is due chiefly to the pay required for the additional *personnel*, and to meet the charge for increases of pay to officers and men recently approved.

The increase under Vote II. is to provide for Victuals and Clothing for additional numbers of the Fleet and for the maintenance of Reserves and Stores.

The increase in the armaments vote is mainly due to the requirements of new construction.

The increases under Votes XII., and the non-effective Votes are mainly automatic, the addition to the non-effective charge being £91,900.

The extraordinary pressure of work in the shipyards and the scarcity of labour are leading to short earnings by contractors on the continuation programmes; and I do not estimate that more than £11,224,000 will be spent on this branch of new construction (Vote VIII.) within the year as compared with £12,067,727 estimated for 1912–13. Every effort will be made to secure punctual deliveries, and should conditions change and progress improve, a further Estimate will be presented later in the year.

A sum of £2,052,400 is required for beginning work on ships of the new programme, which is composed as follows:—

5 battleships,
8 light cruisers,
16 destroyers,
together with a number of submarines and subsidiary craft.

The total cost of the new programme is £15,958,525, as compared with £13,014,000 in 1912–13.

I attach the usual statement of work done by the Department during the past year, together with a reprint of certain Admiralty memoranda, which were published in September last.

WINSTON S.-CHURCHILL.

ADMIRALTY,
8th March, 1918.

STATEMENT OF WORK.

SHIPBUILDING.

Between April 1, 1912, and March 31, 1913, the following ships will have been completed and become available for service:—

Battleships: King George V., Centurion, Thunderer, Conqueror.
Battle-cruisers: Lion, Princess Royal, New Zealand.
Light cruisers: Chatham, Dublin, Southampton, Amphion, Melbourne (for the Commonwealth of Australia).
Destroyers: Attack, Badger, Lizard, Hydra, Goshawk, Phœnix, Firedrake, Lurcher, Oak, Beaver, Acasta, Christopher, Shark, Achates, Cockatrice.
5 Submarines: D 6, E 1, E 4.
Miscellaneous: Maidstone, Adamant, Alecto.

On April 1, 1913, there will be under construction:—

11 Battleships (including Malaya).
3 Battle-cruisers (including one for the Commonwealth of Australia).
13 Light cruisers (including one for the Commonwealth of Australia).
35 Torpedo-boat Destroyers.
21 Submarines (including two for the Commonwealth of Australia).
A number of vessels for carrying oil fuel, and for various Fleet services.

New Construction.

The Conqueror and Thunderer have been completed and commissioned.

The King George V. has been completed and commissioned, and the Centurion, which has been delayed owing to a collision during the early stages of her steam trials, will be completed in April.

The Ajax and Audacious have both been launched.

The Iron Duke and Marlborough, of the 1911–12 programme, have been launched, and progress made with the Delhi and Benbow, the two other battleships of this programme.

The four battleships of the 1912–13 programme, Queen Elizabeth, Warspite, Barham and Valiant, have been laid down, the two former at Portsmouth and Devonport, and the two latter at the yards of

Messrs. John Brown and Company and the Fairfield Company, at Glasgow, respectively.

Of the battle-cruisers, the Princess Royal and the New Zealand (built for the New Zealand Government) have been completed and commissioned, and the Queen Mary will shortly proceed on trial, and prepare for completion and commission.

Progress has been made with the battle-cruiser Tiger, of the 1911–12 programme, at the works of Messrs. John Brown and Company.

Of the five vessels of the Chatham class under construction, the Chatham, Dublin, and Southampton have been completed and commissioned; H.M.A.S. Melbourne has been completed and commissioned for the service of the Australian Commonwealth. The remaining vessel, H.M.A.S. Sydney, is expected to have completed her steam trials and be commissioned early in the new financial year. A cruiser of this type, H.M.A.S. Brisbane, is being built in Australia by the Commonwealth Government. Detailed drawings have been supplied by the Admiralty for the use of the Commonwealth authorities, and tenders for machinery are being invited in this country.

The three light cruisers, 1911–12, are under construction, the Birmingham at the works of Messrs. Armstrong, Whitworth and Company, Limited; the Lowestoft at H.M. Dockyard, Chatham; the Nottingham at H.M. Dockyard, Pembroke. Substantial progress has been made on all these ships; the Lowestoft will be launched on April 23 next.

The orders for the eight light cruisers of the 1912–13 programme have been placed as follows:—one at H.M. Dockyard, Chatham; one at H.M. Dockyard, Devonport; three with Messrs. Beardmore and Company; two with Vickers, Limited; one with the Fairfield Shipbuilding Company. All these ships are to be completed in the summer of 1914.

The light cruiser Amphion is being completed at H.M. Dockyard, Pembroke, and will probably be commissioned by the end of the present financial year. The light cruiser Fearless, also under construction at Pembroke, was launched in June last, and should be completed early in the new financial year.

All the destroyers of the 1910–11 programme have been delivered and are in commission. Two of the destroyers of the 1911–12 programme have been delivered, and three more are expected to be delivered before the close of the present financial year.

The twenty vessels of the programme for 1912–13 have been ordered, and good progress has been made in their construction.

Good progress has been made with the construction of submarines. The depôt ship for submarines, the Maidstone, and her tenders, the Adamant and Alecto, have been completed.

The surveying ship Endeavour has been completed and delivered.

It has been decided not to proceed with the two shallow-draught steamers, Kingfisher and Rail, for service in China, until the new financial year.

The Woolwich, depôt ship for torpedo-boat destroyers, is nearing completion.

The two floating docks for Portsmouth and the Medway have been completed and delivered; a small floating dock for destroyers has been completed and placed at Harwich; and one for submarines, to be stationed ultimately at Dover, has been completed and is at present at Sheerness.

A small floating dock for destroyers has been ordered for Portland for completion next year.

The S.S. Knight Companion, Tabaristan, and Heliopolis (to be renamed Mediator) have been provisionally purchased, subject to satisfactory trials and survey, and will be converted into a fleet repair ship, a depôt ship for torpedo-boat destroyers, and a hospital ship respectively.

ADMINISTRATION.

The development of the War Staff, under the direction of Rear-Admiral E. C. T. Troubridge, C.B., C.M.G., M.V.O., since succeeded by Vice-Admiral Sir Henry Jackson, K.C.B., K.C.V.O., F.R.S., has been continuous throughout the year. The Board of Admiralty are satisfied with the progress made both in regard to the organisation at the Admiralty and the training of officers at the War College.

Sir Philip Watts, K.C.B., has retired under the age rule from the post of Director of Naval Construction, but has been retained for a time in the position of Adviser on Naval Construction to the Board. Mr. E. H. Tennyson D'Eyncourt has been appointed Director of Naval Construction.

Colonel Sir Edward Raban, K.C.B., R.E., has retired from the post of Director of Works, and has been succeeded by Mr. T. Sims, C.B., M.I.C.E.

Sir W. E. Smith, C.B., has retired from the position of Superintendent of Construction Accounts and Contract Work, and has been succeeded by Mr. W. H. Whiting.

Rear-Admiral Frederick C. T. Tudor has been appointed Director of Naval Ordnance in succession to Rear-Admiral Archibald G. H. W.

Moore, C.V.O., C.B., who has been appointed Third Sea Lord of the Admiralty.

Rear-Admiral Arthur W. Waymouth has been appointed to the new office of Director of Naval Equipment, with the duty of dealing with naval professional questions relating to the equipment and fittings of ships.

Captain Murray F. Sueter, R.N., has been appointed Director of the Air Department, which has been established to deal with matters relating to the Naval Air Service. This service has been placed under the superintendence of the Second Sea Lord.

In consequence of the changes in the organisation of the Controller's Department which have already been announced, the Third Sea Lord has been relieved of the departmental functions which he has hitherto discharged in the capacity of Controller, and the Heads of Branches in the former Controller's Department have been given the status of Heads of Departments.

Effect has been given to the recommendations of the Committees on the Royal Corps of Naval Constructors and on the Writing Staff of the Home Dockyards.

The Reports of the Committees on the Admiralty Works Department, and on the Education and Training of Cadets, Midshipmen, and Junior Officers of H.M. Fleet, are at present engaging the attention of the Board.

The Financial Regulations with regard to official business have been revised, and the Finance Committee has been reorganised in accordance with the Memorandum published in September last.

The Royal Commission on Liquid Fuel is still pursuing its labours.

Naval Policy in the Overseas Dominions.

The principal vessels now building for the Australian Fleet unit are nearing completion. H.M.A.S. Melbourne is in commission and is on her way to Australia, and H.M.A. ships Australia and Sydney will be commissioned early this summer. Arrangements have been made for the naval establishments at Sydney to be transferred to the Commonwealth on July 1, 1913. Rear-Admiral George E. Patey, M.V.O., has been appointed in command of the Australian Fleet under the Commonwealth Government, and will sail from England in H.M.A.S. Australia, which will be his flagship.

Temporary arrangements have been made for the period of transition prior to the arrival of the fleet unit in Australia. Certain ships of the existing Australian Squadron have been withdrawn in

advance, and H.M.S. Encounter has been lent to the Commonwealth, with a nucleus crew, as a training ship for the recruits who are being raised in Australia for the Fleet unit, proportionate deductions being made from the Australian naval subsidy. Legislation has been passed by the Commonwealth covering this and any similar arrangement which may be necessary.

To assist in the development of the Royal Australian Navy, a number of active service petty officers and men have been lent as part of the complement of H.M.A. ships Australia, Melbourne, Encounter, and Tingira, and for the Royal Naval College, Geelong. A considerable number of naval pensioners and Royal Fleet Reserve men have also been enrolled for temporary service in the Royal Australian Navy.

H.M.S. Pioneer has been presented to the Commonwealth as a free gift for use as a gunnery training ship.

In response to a suggestion from the Admiralty, the Government of New Zealand have agreed to the battle-cruiser New Zealand (presented by the Dominion to the Royal Navy) being stationed wherever His Majesty's Government consider her services of most value. The Admiralty, availing themselves of the generous permission granted, propose to employ her in the First Battle-cruiser Squadron on her return from New Zealand, whither she is now proceeding on a special visit.

The principal development of Imperial naval policy during the year has been in Canada. Mr. Borden and other members of the Canadian Cabinet visited London to confer with the Admiralty. On their invitation the Admiralty prepared a statement of the present and immediate prospective requirements of the naval defence of the Empire for the consideration of the Canadian Government. Mr. Borden has since announced in the Canadian House of Commons the decision of his Government to propose the grant to the Crown of £7,000,000 for the immediate construction of three of the most modern type of armoured ships. It is intended to place these ships at the disposal of the Imperial Government for the common defence of the Empire, to be controlled and maintained as part of the Royal Navy. Mr. Borden added: "If at any time in the future it be the will of the Canadian people to establish a Canadian unit of the British Navy, these vessels can be called by the Canadian Government to form part of the Navy, in which case, of course, they will be maintained by Canada and not by Great Britain." This measure is still under discussion in the Canadian Parliament.

By the South Africa Defence Act of 1912 provision was made by the Government of the Union of South Africa for the establishment,

at the expense of the Union, of a South African Division of the Royal Naval Volunteer Reserve, which will be available for general service in the Royal Navy in the event of emergency. The Act provides that the government, organisation, administration, training, and conditions of service of the division shall be governed by regulations made under the authority of the Admiralty and accepted by the Governor-General. Draft regulations have been prepared by the Commander-in-Chief in concert with the Union authorities, and are now under consideration. It is expected that the division will be constituted on July 1 next.

The Federated Malay States have offered a first-class armoured ship to the Imperial Government, and the offer has been gratefully accepted. The contract for this ship, which has been named Malaya, and will be of the same design as the Queen Elizabeth, has been placed with Messrs. Armstrong, Whitworth and Company, Limited.

Organisation of the Fleet.

The Home, Atlantic, and Mediterranean Fleets have been reorganised. The battleships in full commission (at present twenty-nine in number, to be raised later to thirty-three) have been organised in four battle squadrons of the First Fleet, with a Fleet flagship. Corresponding to these are the First Battle-Cruiser Squadron and the Second, Third, and Fourth (Armoured) Cruiser Squadrons; the last, having only recently been constituted out of the Training Squadron, is for the time being manned on a Second Fleet basis. In addition to the First Fleet the Home Fleets comprise a Second Fleet, with a Fifth and Sixth Squadron (the latter still in process of formation), and a Third Fleet, with a Seventh and Eighth Battle Squadron and six more cruiser squadrons. The Second Fleet is manned with active (full nucleus) crews, and the Third Fleet with Reserve (reduced nucleus) crews. For the present, however, the Sixth Cruiser Squadron will be manned on a Third Fleet basis.

The Mediterranean Fleet will in future comprise a battle-cruiser squadron (styled the Second) of four ships of the Indomitable class, and an armoured cruiser squadron (the First), also composed of four powerful ships.

To the First Fleet are attached four fully-manned destroyer flotillas, and a fifth will be formed as new destroyers are delivered. Four other destroyer flotillas, manned with active crews, have been organised as a separate command under an "Admiral of Patrols," and are known as "Patrol Flotillas." In the same organisation are comprised the bulk of submarine flotillas. The growing importance

of this arm has been recognised by the advancement of the Officer in Charge of the Submarine Service to Commodore.

The preliminary sea training of boys for the Fleet will in future be carried out in cruisers of the Edgar class based on Queenstown, in charge of a Captain. These vessels have special complements in peace, but will belong to cruiser squadrons of the Third Fleet on mobilisation.

The organisation of the remaining squadrons and detached ships has not been varied in any important respect.

Fleet Exercises.

The final section of the combined exercises off the coast of Spain, referred to in my previous statement, continued until the last week of March, when the Mediterranean Fleet, the Training Squadron, and the vessels of the Second Fleet engaged therein were dispersed.

The main manœuvres were held in July in Home waters. All the squadrons and flotillas of the First and Second Fleets, including mine-layers and mine-sweepers, all the patrol flotillas, and the Training Squadron, together with certain Third Fleet ships and Mediterranean cruisers, took part in the manœuvres.

On the termination of the manœuvres tactical exercises were carried out for three days. In October tactical exercises were again carried out by the First Fleet.

In the autumn the patrol flotillas were exercised off the east coast of Great Britain, and the destroyer flotillas of the First Fleet off the north coast.

General Service of the Fleet.

The movements of the Mediterranean Fleet have been affected by the disturbed political conditions of the Eastern Mediterranean during the past year. For a portion of the time several vessels were stationed in Cretan waters; owing to disturbances in Samos a ship was also sent to that island. The advance of the allied Balkan armies on Salonica and Constantinople led to the dispatch of ships of various Powers, and for a time an international naval force was landed at the latter place. Various ports on the Anatolian and Syrian coasts have been visited by men-of-war, in case disturbances should arise which might endanger European lives and property. In no case, however, during the year has the actual employment of armed force been required.

Since November last, during a period of great tension in the Near East, the Third Battle Squadron has been in the Mediterranean, in

accordance with a long-standing arrangement. For a time this squadron was in the Ægean.

In the East Indies the operations for the suppression of the arms traffic have continued throughout the year. A considerable number of captures have been made, and the deterrent effect of the blockade has undoubtedly been great.

In China, the situation having become more composed since last year, the special dispositions which were adopted during the progress of the Revolution have been terminated and all landing parties withdrawn.

Ceremonies and Visits.

His Majesty the King visited the First and Second Fleets at Weymouth in May, and during several days witnessed various exercises of the Fleets.

The Houses of Parliament were present in July, on board a vessel chartered for the occasion, at an inspection by the Board of Admiralty of the assembled Fleet at Portsmouth prior to the manœuvres. After visiting some of the newer types of ships at anchor, they saw the Fleet weigh and disperse from Spithead to its manœuvre stations.

The Mediterranean Cruiser Squadron was present off Nice and Cannes on the occasion of the unveiling of memorials to Queen Victoria and King Edward in April. At the review at Nice a British naval brigade of seamen and marines with guns marched past with the French troops. The utmost cordiality was displayed by the French authorities, and courtesies and entertainments were exchanged with the French Fleet.

In August H.M.S. Gloucester was present at Antwerp during the visit to that city of Their Majesties the King and Queen of the Belgians. Officers and men took part in various festivities, and the ship was honoured by a visit from the King of the Belgians.

In the autumn the First Cruiser Squadron visited Norway and Denmark, and the Second Cruiser Squadron Sweden and Russia. The squadrons were everywhere most hospitably received.

In the course of a summer cruise the Commander-in-Chief (China), in his flagship, accompanied by another armoured cruiser, paid short visits to Tsingtau and Vladivostok in July and September respectively. Early in this year he paid a short visit to Saigon. At all three ports he received a warm welcome from the authorities.

H.M.S. Natal conveyed the remains of the late American Ambassador, Mr. Whitelaw Reid, from Portsmouth to New York, and her officers represented the Royal Navy at the funeral.

H.M.S. New Zealand, the gift of the Dominion Government to

the Royal Navy, is now proceeding *viâ* the Cape to New Zealand, where every opportunity will be given, during a stay of about three months, for as many as possible of the citizens to inspect their ship. She will subsequently return *viâ* British Columbia, South America, and the West Indies to England, and will then join the First Battle-Cruiser Squadron.

Before her departure from Portsmouth, the ship was inspected by the King on February 5th. His Majesty was attended by the Board of Admiralty, the Secretary of State for the Colonies, the Minister of Defence for New Zealand, the High Commissioner for New Zealand, and the late Prime Minister of the Dominion. A reception of representative citizens of New Zealand resident in the Mother Country was also held on board before the ship sailed.

Naval Bases and Works.

Progress on the important naval works under construction at Rosyth has been interfered with by strikes and labour difficulties, but every effort is being made by the contractors to recover the lost ground. The construction of a third dock has been ordered. Permanent moorings have been laid for destroyers using the anchorage to the west of the Forth Bridge.

In the Humber an oil fuel depôt is under construction for the Admiralty, with a view to the river being used as a base for torpedo craft. Contracts have also been let for the erection of oil fuel storage in the Medway, at Invergordon, and at Portsmouth.

The inner harbour and depôt for destroyers and submarines at Dover is making good progress. The main Admiralty Harbour has been principally used by torpedo craft during the past year.

It is intended to station four battleships and three cruisers of the Third Fleet at Pembroke. These vessels will be maintained there on the ordinary Third Fleet basis.

As already stated, Queenstown will in future be used as a base for boys' training cruisers, eight vessels being detailed for this service.

By the stationing of these fifteen vessels at Pembroke and Queenstown, it is anticipated that the difficulty which has been felt for some time past in finding berthing room at the three principal naval ports will be reduced.

Repairs of the Fleet.

After investigation by a special committee, orders have been issued to the Fleet and dockyards which will have the effect of reducing the length of time spent by ships undergoing annual refit, and, in consequence, of strengthening the squadrons at sea. By the

more systematic examination of defects as they arise, the excessive accumulation of defects for the dockyards to deal with will, it is hoped, be avoided; and by various steps, including the limitation of alterations to such as are strictly essential, the standard time for an annual refit will be reduced to four weeks.

PERSONNEL.

The Committee appointed to inquire into the education and training of cadets and midshipmen, presided over by Admiral Sir Reginald Custance, has presented its report, which is now under the consideration of the Board. It has been found possible, however, to make certain changes recommended without waiting for a decision on the more important questions involved. The examinations in seamanship and in navigation and pilotage are now passed at sea after two years and four months' service as midshipmen, instead of on shore after three years as hitherto, and, on passing, midshipmen are rated Acting Sub-Lieutenant. The remaining examinations, in gunnery, torpedo, and engineering, are held eight months afterwards, but the examination in voluntary subjects has been abolished. By this means the strain of the examinations will be considerably lessened, and better results will undoubtedly be obtained. The annual examination of midshipmen afloat has been abolished.

In order to meet the growing requirements of the Fleet, it has been decided to enter a limited number of Lieutenants and Sub-Lieutenants on a Supplementary List of the Royal Navy. Candidates for appointment will be selected from officers of the Royal Naval Reserve who have undergone, or are undergoing, twelve months' training in the Royal Navy. In exceptional cases these officers will be eligible for promotion to the rank of Commander.

It is further proposed to meet the increased demand for officers by means of the special entry of a limited number of cadets of about the age of eighteen who have completed their general education in the public schools or elsewhere. A number of such cadets, not exceeding thirty, will be admitted by competitive examination of selected candidates during this and each of the succeeding three years. They will be sent to a naval establishment for a course of professional training before being distributed as midshipmen in the Fleet. Their service as midshipmen will be somewhat shortened in comparison with that of other midshipmen, in view of their greater maturity. The same subsequent career will be open to them as to officers who have entered through Osborne. They will be employed as general service officers, and it will be open to them to volunteer for service in any one of the special branches.

It is necessary to emphasise the fact that the scheme of special admissions is in the nature of an emergency measure, designed to prevent an anticipated shortage, and that the intention of the Board is to retain the Osborne-Dartmouth training for the main body of Naval officers.

With a view to encourage the study of Foreign Languages and Naval History, it is intended to institute a system of prizes, medals, and certificates in these subjects, to be competed for by Junior Lieutenants.

The development of the War Staff has proceeded on the lines laid down in the Memorandum published last year; 39 Naval and 7 Marine Officers have been appointed to form the nucleus of the War Staff. The first War Staff Course, to which 12 Naval and 3 Marine Officers were appointed, commenced in April last and has just terminated. A second class, consisting of 12 Naval and 3 Marine Officers, began the course at the end of last month.

A series of lectures on International Law and Prize Manual, Merchant Shipping and Court-martial procedure, supplemented by instruction in the principles of Strategy and Tactics, has been started at the Branch War College at Devonport, and the reports on the first two courses are satisfactory. Owing to the expansion of the work at the Branch War College at Chatham, a Captain has been appointed to take charge of it.

The relative rank of officers of the Royal Marines when embarked has been revised. Lieutenants, Royal Marines, of two years' seniority, when afloat, now rank with Lieutenants, Royal Navy, and Majors, Royal Marines, rank with Commanders, Royal Navy. The limits in the age for the direct entry of Royal Marine Officers have been altered from 17 to 18 to 17 to 18½, and higher mathematics has been made an optional instead of a compulsory subject.

As already announced, a new scale of pay for Lieutenants has been introduced, and the rates of half-pay for Captains and the sea-going command money of Commanders have been increased.

The further officers required have been lent to the Australian Government for service in ships of the Royal Australian Navy and for duty on shore.

The Naval Medical School at the Royal Naval College has been established. Two courses for newly entered surgeons were held at the school last year, and the first post-graduate course commenced in September. A further post-graduate course began last month. Satisfactory arrangements have been made with the Dreadnought Seamen's Hospital Society and the London School of Tropical

Medicine for the educational and scientific work of the medical officers of the Naval Medical School.

A new scheme was introduced last autumn to enable warrant officers, petty officers, and seamen to reach the rank of commissioned officer at an early age. The candidates selected undergo courses of instruction at Portsmouth, and on passing are given the rank of Acting Mate. They then proceed to the Royal Naval College at Greenwich for four months' instruction in navigation, followed by two months' instruction in pilotage at the Navigation School at Portsmouth. On passing the examination at the termination of this course, they are confirmed as Mates and are embarked in sea-going ships for two years, at the end of which time they are eligible for promotion to the rank of lieutenant. Their duties as lieutenants will be the same as those of other lieutenants, and they will be considered for promotion to commander with other lieutenants on their merits. Twenty candidates were selected for the first course in October last, and a further selection is now being made.

As announced last year, all deserving warrant officers of the Royal Navy are now promoted to commissioned warrant rank after fifteen years' service, the change being introduced from April 1st last.

During the financial year 1911–12, 11,576 naval ratings and 1556 marines were recruited from the shore through the various recruiting agencies. This was the largest total entry since 1901–2, exceeding the numbers recruited in 1910–11 by 270. Recruiting generally was satisfactory in this period except for armourers, carpenter's crew, and painters.

Additional temporary accommodation has been provided for the harbour training of boys by the transfer of youths formerly trained in H.M.S. Ganges II., at Harwich, to Devonport Barracks, and by the addition of H.M.S. Powerful to the Impregnable Establishment at Devonport. Under these arrangements about 1050 additional boys can be accommodated for harbour training.

The Inspecting Captain of Boys' Training Ships has now been relieved of the command of H.M.S. Impregnable, and has been appointed for the duty of inspecting and supervising generally the training of boys.

A general increase in the pay of the men of the Royal Navy and Royal Marines was made on December 1st last. The details have already been given in the paper presented to Parliament, the estimated cost of the increase to officers and men being £386,473 per annum.

Included in this provision was the extension of the grant of a

free kit to certain classes of ratings who previously had only received a gratuity towards the expense of their Service clothing.

With a view to the prevention and early detection of cases of tuberculosis in H.M. Navy, directions have been issued to the Fleet for certain hygienic precautions to be observed on board ship. A Committee has also been appointed to consider the best methods of ventilating modern ships of war.

A scheme has been instituted for enlisting the assistance of private residents at ports visited by H.M. ships to give night accommodation to men on week-end leave. The scheme has already been partially tried and has proved of great help to the men.

As already announced, the system of summary punishments in the Navy has been closely investigated during the past year by a Committee appointed under the presidency of Rear-Admiral F. E. E. Brock, C.B. Experience has shown that many of the punishments were out of date and ill-adapted to the needs of the modern Navy.

Full effect has been given to the recommendations of the Committee by the abolition of some punishments and the drastic revision of others, and it is confidently expected that the changes made will prove beneficial to the men, while at the same time maintaining the high standard of discipline that has always been associated with the Royal Navy.

Steps have also been taken to ensure that Chief Petty Officers and Petty Officers of the Royal Navy, and non-commissioned officers of the Royal Marines, shall be given the option of trial by court-martial before being disrated summarily.

Royal Marines.

The numbers borne on March 31, 1913, will be about 16,300. There will be also about 1400 band ranks afloat and under training. Of these numbers, 4483 have re-engaged to complete time for pension, as compared with 4318 last year.

The training of non-commissioned officers and men in the higher gunnery ratings continues to give satisfactory results. The instructional turret at Eastney is now practically complete, and will afford facilities for preliminary training of gunlayers before proceeding to H.M.S. Excellent.

After the close of the Naval Manœuvres, a battalion of Royal Marines attended the Army Brigade training on Salisbury Plain.

Thirteen officers have been admitted to the corps during the past

year by direct entry, and are now probationary second lieutenants at the Royal Naval College, Greenwich. Further entries will be made by competitive examination in June next to fill existing vacancies.

Approval has been given for two commissions to be granted each year to candidates selected from Warrant Officers, Non-Commissioned Officers, Lance-Corporals, and Acting Bombardiers. Selected candidates will go through courses in the gunnery and torpedo schools, at the Royal Naval College, Greenwich, and at headquarters, and on completion of these courses they will be embarked in a sea-going ship. After serving six months afloat they will be eligible for promotion to Lieutenants, Royal Marines.

The "afloat" allowance recently approved is much appreciated, and it is hoped that it will have the effect of inducing more men to re-engage after their first period.

Coastguard.

The authorised establishment of Coastguard officers and men is 3130.

The numbers borne on January 1, 1913, were :—

District Captains, District Paymasters and Staff.	35
Divisional Officers	76
Chief Officers and Men	2,962
	3,037

Royal Fleet Reserve.

The new class of the Royal Fleet Reserve, called the "Immediate" Class, has been established, composed of seamen, stokers, and marines under thirty-two years of age who have left the Service before completing time for naval pension. These men are enrolled for a period of five years, and are required to perform twenty-eight days' training on board H.M. ships annually, and to undertake to come into actual service if summoned by the Admiralty on a national emergency. They draw a retainer of 1s. a day so long as they fulfil the conditions of service in the "Immediate" Class, and on completing their service in that class are allowed to re-enrol in Class B. Since the institution of the class last May, 2180 men were enrolled up to December 31st last, the majority of these being transfers from Class B. It is expected that these numbers will be increased during the present year.

The total numbers of the Royal Fleet Reserve have increased

from 24,082 to 25,788, the distribution of these numbers on December 31, 1912, being as follows:—

——	Class A.	Class B.	Intermediate Class.	Total.
Seamen and Naval Police . .	3,714	8,091	902	12,707
Stokers	2,097	5,055	947	8,099
Marines	1,730	2,921	331	4,982
	7,541	16,067	2,180	25,788

Royal Naval Reserve.

The strength of the Royal Naval Reserve (Home) on January 1, 1913, was—

Officers of the Military Branch . . .	1,219
Commissioned Engineer officers . . .	171
Assistant Paymasters	99
Warrant Engineers	158
Engine Room Artificers	571
Seaman ratings	10,572
Stoker ratings	5,401

Five hundred and sixty-nine of the above Military Branch Officers have undergone twelve months' training in the Fleet, and are in receipt of training fees. In addition to these forty-one are now undergoing this training.

The following numbers have performed courses of instruction and training during the twelve months ended December 31, 1912:—

——	Short Courses.			Annual or Biennial Training.		
	Gunnery and Torpedo.	Signal.	Strategy.	Three Months.	28 Days.	8 or 4 days.
Officers of the Military Branch	129	16	8	—	319	—
Assistant Paymasters . .	—	—	—	—	73	—
Warrant Engineers . .	—	—	—	5	—	—
Engine-room Artificers . .	—	—	—	48	—	—
Seamen ratings . . .	—	—	—	780	3,485	—
Stoker ratings . . .	—	—	—	222	2,224	—
Trawler Section . . .	—	—	—	—	—	241

The training of officers of the Military Branch is carried out, as far as practicable, in ships of the Second Fleet. Many officers who have done twelve months' training in big ships have also been appointed for periodical training in torpedo-boat destroyers, manned with nucleus crews.

Courses of Strategy, International Law, etc., have recently been approved for Royal Naval Reserve Officers of the Military Branch.

The entry and training of Accountant Officers is now arranged on the same lines as that of other branches of the Royal Naval Reserve. The reports received on the training of these officers have been generally satisfactory; it has been decided to increase the establishment from 100 to 120.

As regards engine-room artificers, a good class of candidates, all holding Board of Trade certificates, is generally forthcoming. The training of these ratings is carried out in ships of the First and Second Fleets.

Proposals for the trial of the new scheme of signal instruction to officers and men of the Mercantile Marine were approved early in last year, and instructional courses were begun last April at London and Glasgow. Up to the end of last November 217 officers and 58 men had received instruction.

Royal Naval Volunteer Reserve.

The strength of the force is now six divisions, comprising forty-four companies, the actual numbers being:—

Royal Naval Volunteers.	Establishment.	Strength, Jan. 1, 1913.
Officers	194	170
Honorary Officers	—	25
Petty Officers and Men	4,318	3,944
Permanent Staff—		
Officers	7	7
Petty Officers and Men	78	78

It is now under consideration to form another division on the Forth, and a beginning will be made with three companies of 100 men each, which will be temporarily attached to the Clyde Division.

The strength of the various divisions is as follows:—

Division.	Establishment.	Strength, Jan. 1, 1913.
Bristol	412	392
Clyde	1,126	1,033
London	1,024	918
Mersey	718	654
Sussex	616	504
Tyneside	616	618

During the current financial year the following numbers have embarked for training afloat for fourteen or twenty-eight days in fully-manned ships of the Home Fleet:—

Officers	72
Petty Officers and men	1,240

Forty-one Volunteers qualified for Trade Certificates in engine-room and other skilled naval ratings.

Officers and men have also undergone courses at the various schools in gunnery, torpedo, signalling, and telegraphy during the year, and the following have passed and obtained certificates:—

——	Gunnery.	Torpedo.	Signalling and Telegraphy.	Electrician.	Total.
Officers	24	8	—	—	32
Petty Officers and Men .	54	10	1	1	66

Sixteen medical officers have undergone a fourteen days' course at Haslar Hospital.

The reports of officers and men embarked and under instruction in the schools continue to be most satisfactory.

Signalling instruction has shown a marked improvement in the last two years, due, in a large measure, to the appointment of active service signal-instructors.

Approval has been given for officers of the Military Branch of and above the rank of Sub-Lieutenant to attend the courses of Strategy and International Law which have recently been instituted.

The regulations relative to the new system of R.N.V.R. medical officers have been in force during last year, and fourteen surgeons on the unattached list have been entered.

The annual inspections of all divisions have been carried out, and there has been a steady improvement in the general efficiency, smartness, and physique of the Royal Naval Volunteer Reserve.

ORDNANCE.

Good progress is being made in the manufacture of ordnance and ammunition, and the reserves of ammunition are fully maintained in spite of the large additions to the Fleet.

The manufacture of improved designs of gun-mountings for new ships building is proceeding satisfactorily. The hydraulic gun-machinery and transferable gun-mountings of the ships which have joined the Fleet during the year have proved successful.

The supply of torpedoes to the Fleet is fully maintained, and improvements in this important weapon, in the direction of increased speed, range, and accuracy, are receiving careful attention. The new torpedo range at Loch Long was opened in August last and is in full working order.

The officers and men of the Fleet continue to show the utmost keenness to achieve the best possible results in the various gunnery practices, and the results, taken as a whole, may be considered very satisfactory. Additional practices have necessitated a small increase in the annual allowance of ammunition, and this addition, it is confidently expected, will result in a definite gain in gunnery efficiency.

Recent developments in all branches of naval ordnance, particularly in the system of fire-control, are being closely studied, and good progress is being made in wireless telegraphy. Additional shore wireless-stations have been erected during the year, and others are nearing completion.

The new Admiralty test-house at Sheffield is working well.

Air Services.

Substantial progress has been made during the year with the newly-formed Air Service. The Central Flying School of the Royal Flying Corps has been established on Salisbury Plain, under the administration of the War Office, and a captain of the Royal Navy has been appointed as the first commandant of the school. Four naval and marine officers have also been appointed on the staff, of whom two have been graded as squadron commanders.

The development of the naval wing is progressing rapidly, and an Air Department has been created at the Admiralty to deal with all questions affecting the air services. Good progress has been made with the aeroplane section at Eastchurch, and close attention is being given to the establishment of air-stations along the coast. The progress with the hydro-aeroplane has been satisfactory. The work of training has been and is proceeding steadily, both at the Central Flying School and Eastchurch.

The needs of the airship section of the naval wing are also being closely studied, and a naval airship station is being established in the Medway. By arrangement with the War Office, officers and men have been trained at Farnborough with the military airship and kite squadrons. Two airships of the Astra Torres and Parseval types have been purchased for instructional and experimental purposes.

Greenwich Hospital.

A beginning has been made with the scheme of reconstruction of the several large blocks of property in East Greenwich which have recently become available on the expiration of the ground leases, and the work of demolition and of re-building the first block is making good progress.

The revenue from both the Greenwich estate and the estates in the north continues to be satisfactory. All important premises are let and there are no farms vacant.

The standard of efficiency of the Royal Hospital School is being well maintained, the grants earned and paid to the funds of Greenwich Hospital by the Board of Education being the highest rates that could have been obtained.

W. S. C.

ADMIRALTY MEMORANDA PUBLISHED IN SEPTEMBER, 1912.

I. Distribution of Admiralty business.

II. Memorandum by the First Lord on the Redistribution of Admiralty Business.

III. Memorandum by the First Lord on Revised Financial Procedure at the Admiralty.

IV. Circular Letter to the Fleet promulgating certain changes in the Regulations affecting disciplinary matters.

I.—DISTRIBUTION OF ADMIRALTY BUSINESS.

The First Lord has approved of the following distribution of Admiralty business, which will come into force forthwith:—

THE BOARD OF ADMIRALTY.

First Lord . . .	General direction of all business.
First Sea Lord . .	Organisation for war and distribution of the Fleet.
Second Sea Lord . .	*Personnel.*
Third Sea Lord . .	*Matériel.*
Fourth Sea Lord . .	Stores and transport.
Civil Lord . . .	Works, buildings, and Greenwich Hospital.
Additional Civil Lord .	Contracts and Dockyard business.
Parliamentary Secretary .	Finance.
Permanent Secretary .	Admiralty business.

DISTRIBUTION OF BUSINESS.

First Lord.

1. General direction and supervision of all business relating to the Navy; political and Board questions.

2. Promotions and removals from the Service of Naval and Marine Officers; honours and rewards.

3. Royal yachts and Admiralty yacht, including appointment of all officers.

4. Appointments of Admirals and Officers in Command, including Engineer Rear-Admirals, Surgeons-General and Deputy Surgeons-General, and Staff appointments of Royal Marines.

5. Chaplain of the Fleet, appointment of, and entry of Naval Chaplains and Instructors.

6. Civil appointments and promotions (higher posts).

7. Naval cadetships and nominations to assistant clerkships, R.N.

First Sea Lord.

1. Preparation for war: All large questions of naval policy and maritime warfare—to advise.

2. Fighting and sea-going efficiency of the Fleet, its organisation and mobilisation, including complements of ships as affecting total numbers; system of gunnery and torpedo exercises of the Fleet, and tactical employment of air-craft, and all military questions connected with the foregoing; Distribution and Movements of all Ships in Commission and in Reserve.

3. Superintendence of the War Staff and the Hydrographic Department.

Second Sea Lord.

1. Manning* and training of the Fleet; details of complements of ships and establishments; barracks, training, and educational establishments, with their complements; also all mobilisation regulations for the *personnel*.

2. Service and appointments of officers of all branches (except as reserved to First Lord).

3. Royal Marines.

4. Coast-guard and Reserve forces.

5. Hospitals.

6. Discipline (*see* Note).

7. Signals.

NOTE.—The following papers are invariably to be marked also to the First Sea Lord:—

(1) Questions of importance relating to discipline.

(2) Questions affecting total Fleet numbers.

Third Sea Lord.

1. Design of *matériel* for the Fleet, including ships and their machinery, armour, naval ordnance and gun mountings, aeroplanes and airships, and docking facilities, also alterations and additions to ships which affect design or fighting efficiency; preparation of estimates of cost of all new construction falling due in any year under current and prospective programmes; superintendence of the departments of the Director of Naval Construction, Engineer-in-Chief, Director of Naval Ordnance, Director of Naval Equipment, Director of Air Department, and Superintendent of Compasses.

* Manning means recruiting the numbers authorised by Parliament.

2. Design questions affecting vessels proposed to be purchased for the Fleet or to be employed in auxiliary services.

3. Inventions relating to ships, machinery, etc.

4. Salvage of vessels, so far as technical and professional considerations are involved.

Fourth Sea Lord.

1. Transport service, including hired auxiliary vessels other than armed merchant cruisers; passages.

2. Superintendence of naval store, fleet coaling, and victualling services; ordnance and medical stores, etc., and all questions relating thereto

3. Full and half pay; allowances and compensations, including table money; prize questions, piloting and surveying pay, and freight of treasure and all extra payments; debts of officers and men; naval and marine pensions and widows' pensions; character, conduct, and badge questions; naval savings banks.

4. Medals; uniform regulations.

5. Naval detention quarters and Bodmin naval prison; deserters —Rewards for apprehension; removals of "R."

6. General salvage money questions, and money demands for salvage of naval stores.

7. Collisions.

Civil Lord.

1. Works and buildings, including purchases of land; Coast-guard buildings, sites and leases.

2. Staff of civil establishments (except as reserved to First Lord) including classification, appointment, promotion, pay, allowances, and pension; Dockyard police.

3. Greenwich Hospital business, including appointments (except of naval chaplains to livings, superintendent of the Royal Hospital School, curator of the Painted Hall, and appointments to Greenwich Hospital pensions).

4. Charitable fund, compassionate allowances, subscriptions, etc., and allowances to ministers of religion, and grants in aid of churches and schools.

5. Marine and Dockyard schools.

6. Special questions affecting retirement and pay of naval and Marine officers and men, when discretionary power is specifically provided for by order in council.

NOTE.—Works questions of an important character, or if likely to affect questions dealt with by the Financial Secretary, will be marked to him also.

Additional Civil Lord.

1. Contracts for *matériel* for the Fleet (including ships and their machinery, armour, naval ordnance and gun mountings, aeroplanes and airships), works, yard machinery, and stores of all descriptions; contract arrangements in connection with the disposal, salvage, or loan of vessels or stores; superintendence of the Contract and Purchase Department.

NOTE.—Tenders for ships' hulls and propelling machinery, armour, and important gun and air-craft orders, will also be marked to the Third Sea Lord.

2. General organisation of Dockyards, including provision of labour and plant, and all business questions in connection with the building and repair of ships and their machinery, whether in the Dockyards or in private yards.

Parliamentary and Financial Secretary.

1. Finance, estimates and expenditure generally, and all proposals for new and unusual expenditure.

2. Accounts—Cash, store, and dockyard expense.

3. Purchase and sale of ships, and of stores generally.

4. Payment of hire of ships as armed merchant cruisers, troop-ships, colliers, freightships, etc.

5. Questions involving reference to the Treasury financially, except the less important works questions dealt with finally by the Civil Lord.

6. Exchequer and Audit Department—Questions connected with.

7. General labour questions, including annual petitions.

Permanent Secretary.

1. General office organisation.

2. Discipline of the clerical staff of the various Admiralty departments.

3. Admiralty procedure.

4. Recommendations for appointments and promotions in the Admiralty Office.

5. Correspondence.

6. Communications with foreign Naval Attachés.

7. Communications with ministers of religion (other than Church of England).

NOTE.—Routine papers, as defined below, will be disposed of by the Permanent Secretary:—

(*a*) Such as require intermediate action or reference to render them sufficiently complete for decision by the Board.

(*b*) Such as do not involve some new principle, establish a precedent, or occasion expense not provided for under existing regulations.

(*c*) Such as do not involve any point of discipline, or affect the movements of or orders to a ship.

In the absence of the Permanent Secretary the Assistant Secretary will act in his place.

NOTES.—(1) It is to be understood that in any matter of great importance the First Sea Lord is always to be consulted by the other Sea Lords, the Civil Lord, the Additional Civil Lord, and the Parliamentary and Permanent Secretaries; but each member of the Board and the Parliamentary and Permanent Secretaries will communicate direct with the First Lord.

(2) The proceedings of Courts-martial will be marked to the Fourth and Second Sea Lords, but will specially pass under review of the Fourth Sea Lord, who will call the attention of the Second Sea Lord to any special point requiring consideration. The latter will consult the First Sea Lord in cases of importance.

II.—MEMORANDUM BY THE FIRST LORD ON THE REDISTRIBUTION OF ADMIRALTY BUSINESS.

The main object of the changes effected in the new Table of Admiralty Business is to divide and reorganise the work of the Controller's Department. Reference should be made to the Minute by the First Lord of January 1, 1912, which explained the reasons for the appointment of an Additional Civil Lord. The work of the Controller had hitherto comprised three principal spheres:—first, the designing of the Fleet; secondly, the administrative construction, equipment and repair of the Fleet; and thirdly, the great group of contract, business and financial questions arising from the second. All these functions are of high importance and all are intimately related, but their character is distinct. The qualifications which fit an officer for the discharge of the duties connected with any one of these groups are quite different from those required for the others, yet the direct responsibility for any one of them is sufficiently important and extensive to occupy one man's time.

2. The first essential has been to set the Third Sea Lord, the officer charged with the supervision of design, free from the complicated contract and financial questions which arise from the construction and repair of the Fleet, and from the business management of the Dockyards. The duties assigned to the Additional Civil Lord will effectually relieve him in that respect. But besides these, he has been burdened by an enormous day to day administration connected with the construction, equipment, repair and refit of ships. These duties cannot in principle be dissociated from him. The Third Sea Lord must exercise a general and covering superintendence over the whole region of *matériel*. But if he is to be free to devote his mind to the progress of naval science and the designing of new ships of all kinds, he must be relieved in practice of these multifarious administrative duties.

3. It may be taken for granted that the designs passed by the Board will, under the existing system of supervision, be correctly executed by the constructive departments or private firms. But the delays which have recently occurred over so large an area of naval shipbuilding show that the work must be continually watched by high naval authority, in respect not only of its design, but of its progress. In this field a large number of important questions of a practical nature are constantly arising, which, under the old system, fell upon the head of the Controller's Department to decide. Refits and repairs not affecting design again require no attention from the Third Sea Lord. But on the other hand the whole work of keeping the Fleet in good repair and getting the ships back to sea demands the constant supervision of a naval officer of considerable standing. Another long series of naval questions of a practical nature are continually arising from this great business and must be settled easily and quickly as they come. No civilian can deal with such matters satisfactorily, and the Third Sea Lord is already fully occupied; for the new guiding principle is to concentrate his attention upon the creative and original task of design, and to free him from administrative distractions.

4. It is therefore proposed to afford the Third Sea Lord, under his general authority, the assistance of a naval departmental officer of flag or senior captain's rank, who will be styled the Director of Naval Equipment, and whose duties will be in effect to supervise, from the naval point of view, the equipment of ships under construction and to deal with technical questions relating to the repair and refit of completed sea-going ships.

5. So far the changes have all been in the direction of lightening the work of the Third Sea Lord. But while he must be restricted

generally to the work of design, it is equally necessary that all the factors which contribute to design shall be within his control, so that he may deal with the whole problem in its integrity. Hitherto the Department of Naval Ordnance and Torpedoes has been assigned to the general supervision of the First Sea Lord. But a warship is primarily a gun platform, and scarcely anything connected with her design can be considered apart from the armament she carries or will have to resist. The association of the Department of Naval Ordnance with the Constructive Departments has, of course, in practice been very close. It must now become absolute; and the genesis of the ideas which govern design must be identical and simultaneous with that which governs the character of weapons and projectiles. The Department of Naval Ordnance and Torpedoes will, therefore, be placed under the Third Sea Lord so far as *matériel* is concerned. But the First Sea Lord will be responsible for the systems of gunnery and torpedo exercises prevailing in the Fleet, the tactical employment of air-craft, and all military questions connected with the foregoing.

6. The duties of the Additional Civil Lord are fully set out in the new table of business. In short they comprise contracts of all kinds for the *matériel* of the Fleet, including ships and their machinery, armour, naval ordnance and gun mountings, aeroplanes, airships, works, yard machinery and stores of all descriptions; also contract arrangements in connection with the disposal, salvage, or loan of vessels or stores. Secondly, the general organisation of dockyards, including the provision of labour and plant, and all business questions in connection with the building and repair of ships and their machinery, whether in the dockyards or in private yards. The Department of Contract and Purchase and the Department of the Director of Dockyards will be placed under the superintendence of the Additional Civil Lord.

General labour questions, including annual petitions, will, however, remain under the Financial Secretary. It is right that labour conditions should be periodically surveyed from a standpoint not exclusively concerned with the business administration of the dockyards; and the present holder of the office of Financial Secretary has besides special knowledge and aptitudes which fit him for this work.

7. The Department formerly presided over by the Controller will thus in future be placed under the superintendence of two members of the Board, viz., the Third Sea Lord and the Additional Civil Lord, and under the control of the former for the purposes already specified there will be a departmental officer, styled the Director of Naval Equipment. But their work, like all Admiralty work, overlaps and

is interdependent. All must work in harmonious combination with each other in close and constant personal intercourse. They will be served for different purposes by the same technical departments, according to the long established custom of the Admiralty. This system, although at first sight somewhat anomalous, is inevitable. It presents no difficulties in practice and is well understood by all concerned. The departments are in fact the foundation which unites the different spheres of the Third Sea Lord, the Director of Naval Equipment, and the Additional Civil Lord, and by their common science prevent the risks of technical discordance.

With these changes the title of Controller as an addition to that of Third Sea Lord will disappear.

8. These changes have been most carefully considered in regard to the persons who will occupy the various positions at the present time. The arrangements must now be proved and tested in actual working to see how far they give effect to the principles laid down in the First Lord's Minute of January 1st, and what further improvements in their application are possible.

III.—MEMORANDUM BY THE FIRST LORD ON REVISED FINANCIAL PROCEDURE AT THE ADMIRALTY.

Simultaneously with the new Table of Distribution of Business now authorised, it is desirable to revise in certain respects the regulations and procedure of Admiralty finance. Such revision was already under consideration when the change in the constitution of the Board took place in October, 1911. The subject of financial control within the Admiralty has been dealt with from time to time in a series of official memoranda, the last of which was issued in 1904. The large and progressive increases in the volume of work require additional measures to ensure that proposals for new expenditure and annually recurring charges are thoroughly considered in their financial aspect.

By the Table of Distribution of Business the Parliamentary and Financial Secretary is responsible under the First Lord for the finance of the Admiralty. At the request of the late First Lord, the Financial Secretary examined the existing procedure, and prepared a report showing how the official machinery might be improved so as to assist him in his work and at the same time provide an improved means of enquiry into departmental finance.

Having regard to the relations of the various departments to each other and to the Board, it is recognised that the most efficient method

Other Summary Punishments.

24. Chief Petty Officers who cannot be disrated may be awarded imprisonment or detention summarily for any of the offences specified in Article 756, Clause 4, of the King's Regulations.

25. No. 10 B punishment (stoppage of grog and standing on the upper deck) and No. 18 (standing on the upper deck) are abolished.

26. Deductions from pay under Article 1368 of the King's Regulations (loss of stores, etc.) are not to be considered as punishments, and No. 13 in the table of summary punishments is therefore cancelled.

27. No. 15 punishment (stoppage of grog) is to be applicable to Chief Petty Officers for offences comprised under the heading of drunkenness.

28. No. 16 punishment (carrying hammock or bag) is, in its present form, abolished, and a punishment is to be substituted for it consisting of extra work or drill for not more than two hours a day for a period not exceeding seven days. Such extra work or drill should not entail any deprivation of the recognised time allotted to the various meals. This punishment may be awarded for one day by the officer of the watch, the officer of the day, or the Senior Engineer (*see* paragraphs 31–34).

Award of Punishment by Officers in command below the rank of Commander.

29. Except in time of war or, in the case of ships abroad, when on detached duty for long periods, officers in command below the rank of Commander are not to inflict punishments which require warrants, except with the approval of an officer of or above the rank of Commander. Commanders-in-Chief and Senior Officers of Fleets or Squadrons are to issue such orders as may seem to them best calculated to ensure this being carried out in the ships and establishments under their command. The same rule is to apply when officers below the rank of Commander are temporarily in command of ships in the absence of the Captain.

30. As regards the method of dealing with offences committed by men in a tender in the absence of the Captain from the parent ship, it has been decided that, when necessary, the Captain of the parent ship may delegate his powers of punishment, subject to the above restrictions, to the Senior Officer of the tenders present, should the latter be senior to the officer temporarily in command of the parent ship. The Senior Officer of the tenders present should not, however,

assume the duties of Commanding Officer of the parent ship for other purposes.

Award of Punishment by the Officer of the Watch, Officer of the Day, and Senior Engineer.

31. In order to provide for the many trifling cases which now go through the formality of the Commander's report and become invested with an importance which they do not deserve, the Captain is authorised to delegate to the officer of the watch or officer of the day, if of the rank of Lieutenant in both cases, the power to award extra work or drill for a period not exceeding two hours. Such extra work or drill is not to entail any deprivation of the recognised time allotted for the various meals.

32. The same power may, with the Captain's approval, be exercised, as regards the stoker ratings for offences connected with the work of their department, by the Senior Engineer, or, in ships with only one officer of the Engineer branch, by the Engineer Officer, provided that such Engineer Officer or Senior Engineer is not below book the rank of Engineer Lieutenant.

33. These punishments are not to appear in the conduct book or daily record, but are to be entered in a special book, to be signed by the officer at the time, examined and initialled by the Executive Officer daily, and signed by the Captain weekly. This book is to be produced at all inspections.

34. When young or inexperienced officers are doing duty as officer of the watch in harbour, the Lieutenant told off as officer of the day is to investigate all complaints and reports, and he is to be invested with the power of awarding extra work instead of the officer of the watch. The latter, however, should also be present at the investigation in order to gain experience on disciplinary matters.

35. Similarly, at sea, when it is important that the attention of the officer of the watch should not be distracted from his duties on the bridge, the Captain may detail a Lieutenant as officer of the day for disciplinary purposes.

Appeals from the Lower Deck.

36. It appears to be a growing custom for Petty Officers and men who think they have a grievance in regard to the manner in which they have been treated for some offence against discipline to obtain the assistance of persons unconnected with the Service to write to

the Admiralty on their behalf. This practice is injurious to the welfare and discipline of the Service, and should be checked.

37. Should any Petty Officer or man consider that he has been treated unjustly in any way, he may, after the lapse of at least twenty-four hours, request to see his Captain, to whom he should state his grievance verbally, and should the Captain refuse or be unable to remedy it, he may respectfully request that his complaint in writing should be forwarded as provided in Article 8 of the King's Regulations. He is to be given twenty-four hours to reconsider his application, and is to be allowed the advice and assistance of an officer in stating his case, but the officer is to warn him that, should there be no reasonable grounds for his grievance, he is liable to be treated as having made a frivolous or vexatious complaint, which is an act to the prejudice of good order and naval discipline. Although the superior authority to whom the matter has been submitted may not see fit to alter the ruling of the Captain, the latter is not thereby justified in dealing with the appeal as a breach of discipline, and is only to do so when expressly authorised by such superior authority.

38. The procedure detailed in paragraph 37 will alone be recognised and should be made widely known on the lower deck. All ratings, especially new entries, are to be carefully instructed as to the proper course to be followed, and are to be warned that any departure from it will be a direct disobedience of orders involving the usual penalties. They should further be informed that no answer to any appeal can be expected unless the above procedure is followed.

Money Lending.

39. Money lending at interest is prohibited.

Gambling and Card-playing.

40. Card-playing is to be allowed in all ships and establishments under such restrictions as the Captain may consider necessary to prevent gambling.

Ship's Police.

41. The utmost care should be taken in selecting candidates for ship's police ratings.

42. The ship's police are to be used entirely as police, and care is to be taken that they are not given powers they were never intended to possess. In particular the Executive Officer is to avoid depending upon the ship's police in matters which he should direct personally.

43. The detailing of men for their various duties is in all cases to be carried out under the direct orders of the Executive Officer, and there should be no possibility of any alterations being made by the ship's police without his sanction. Ship's police should have nothing to do with the routine work of decks, nor are they to interfere with the men except to prevent crime or when dealing with offenders. The care and cleanliness of mess decks, etc., is to be entirely in the hands of the Petty Officers (under the responsible officers), who should not be interfered with by the ship's police unless some breach of the regulations occurs.

Night Leave for Young Men.

44. Young men and boys, except those whose ships are at ports where their own homes are situated, or unless in other special circumstances, are not to be allowed all-night leave until they become able seamen, stokers, first class, or equivalent ratings, or reach the age of twenty.

45. In barracks, etc., ships alongside dockyards, or in enclosed harbours where it is easy to bring men off at night, they should be granted the ordinary leave whenever it is given to men in their class for leave, but they are not to be allowed to sleep ashore. In other places where there may be a doubt about the advisability of sending for them at night, they are to return to their ships in time for supper, and, in these circumstances, in order to give them a reasonable amount of leave in comparison with the older members of the ship's company, they should, when possible, be allowed to land on two afternoons a week at 1.30 p.m.

Award of Ability.

46. The number of men in each ship or establishment awarded "exceptional" for ability in rating is in future not to exceed:—

(*a*) Four per cent. of the total numbers of ratings borne, in ships with over 400, or

(*b*) Five per cent in ships with 400 or less.

This number should be distributed among the various departments of the ship, or to one or more of them, at the discretion of the Commanding Officer, but no attempt should be made to bring the number of "exceptional" awards up to the maximum authorised.

47. Should there be in any ship or establishment a number of ratings considered worthy of the award of "exceptional" in excess of

the percentage authorised in paragraph 46, the Commanding Officer may apply to the Commander-in-Chief or Senior Officer of the station or squadron for permission to award the additional number.

48. When the Commanding Officer assesses men's abilities at the end of the year, he is to send to the Commodore of the depôt to which the men belong a list of those to whom "exceptional" is awarded, in order that their names may be noted for advancement. In cases where the percentage of "exceptional" awards authorised in paragraph 46 is exceeded, the list should be accompanied by the written approval of the Commander-in-Chief or Senior Officer.

STATEMENT showing the GROSS EXPENDITURE on NAVAL SERVICES for the years 1909–1910 to 1911–1912, together with the ESTIMATED GROSS EXPENDITURE for 1912–1913 and 1913–1914.

—	ACTUAL EXPENDITURE.			ESTIMATED EXPENDITURE.	
	1909–1910.	1910–1911.	1911–1912.	1912–1913.	1913–1914.
	£	£	£	£	£
Gross Expenditure (Navy Vote)	37,385,460	42,441,420	44,384,340	45,949,292 (*a*) 990,000	48,333,194
Abate: Annuity under the Naval Works Acts, 1895 to 1905	1,325,809	1,322,752	1,322,752	1,322,752	1,311,558
	36,059,651	41,118,668	43,061,588	44,626,540 (*a*) 990,000	47,021,636
Value of Stores drawn from stock, without replacement, in aid of cash expenditure ...	155,900	20,750	40,160	66,000	25,000
Expenditure on behalf of Naval Services from Votes of other Departments	383,741	380,413	378,270	382,184	392,423
TOTAL	36,599,292	41,519,831	43,480,018	45,074,724 (*a*) 990,000	47,439,059

(*a*) Supplementary Estimate, 17th July, 1912 (Parliamentary Paper No. 254).

Abstract of Navy

Votes.		Estimates, Gross Estimate.	Estimates, Appropriations in Aid.
	I.—Numbers.		
A.	Total Number of Officers, Seamen, Boys, Coast-guard, and Royal Marines	146,000	....
	II.—Effective Services.	£	£
1	Wages, &c., of Officers, Seamen and Boys, Coast-guard, and Royal Marines	8,537,200	138,000
2	Victualling and Clothing for the Navy . . .	3,729,028	799,028
3	Medical Establishments and Services . .	290,810	18,610
4	Martial Law	3,460	60
5	Educational Services	228,025	68,325
6	Scientific Services	97,270	31,070
7	Royal Naval Reserves	480,201	4,201
8	Shipbuilding, Repairs, Maintenance, &c.:		
	Section I.—*Personnel*	4,089,500	26,400
	Section II.—*Matériel*	6,462,000	610,400
	Section III.—Contract Work	12,333,790	107,490
9	Naval Armaments	4,521,600	125,600
10	Works, Buildings, and Repairs at Home and Abroad .	3,481,500	33,500
11	Miscellaneous Effective Services	600,045	9,345
12	Admiralty Office	459,062	9,062
	Total Effective Services . £	45,313,491	1,981,091
	III.—Non-Effective Services.		
13	Half-Pay and Retired Pay	1,022,094	16,294
14	Naval and Marine Pensions, Gratuities, and Compassionate Allowances	1,588,186	26,086
15	Civil Superannuation, Compensation Allowances, and Gratuities	409,423	423
	Total Non-Effective Services . £	3,019,703	42,803
	Grand Total . . £	48,333,194	2,023,894

Provision to the extent of £5,000 is included in the Estimates for 1913-1914 under Vote 8, for the Acts, 1895 to 1905.

In addition to the Cash expenditure, stocks of Stores purchased in previous years

Estimates for 1913-1914.

1913-1914.	Estimates, 1912-1913.			Difference on Net Estimates.		Votes.
Net Estimate.	Gross Estimate.	Appropriations in Aid.	Net Estimate.	Increase.	Decrease.	
Total Numbers. 146,000	136,000 (a) 1,500	...	Total Numbers. 136,000 1,500	Numbers. 8,500	Numbers. ...	A.
£	£	£	£	£	£	
8,399,200	7,801,500 (a) 60,000	174,500	7,627,000 60,000	712,200	...	1
2,930,000	3,359,437 (a) 54,000	731,337	2,628,100 54,000	247,900	...	2
272,200	289,965	20,065	269,900	2,300	...	3
3,400	3,600	100	3,500	...	100	4
159,700	218,885	66,385	152,500	7,200	...	5
66,200	103,789	31,789	72,000	...	5,800	6
476,000	436,432	9,732	426,700	49,300	...	7
						8
4,063,100	3,515,800 (a) 35,000	22,000	3,493,800 35,000	534,300	...	Sec. I.
5,851,600	5,457,100	380,300	5,076,800	774,800	...	Sec. II.
12,226,300	13,230,600 (a) 611,000	175,000	13,055,600 611,000	...	1,440,300	Sec. III.
4,396,000	4,064,700 (a) 200,000	145,700	3,919,000 200,000	277,000	...	9
3,448,000	3,547,000 (a) 30,000	32,000	3,515,000 30,000	...	97,000	10
590,700	545,386	13,386	532,000	58,700	...	11
450,000	437,350	8,850	428,500	21,500	...	12
43,332,400	43,011,544 (a) 990,000	1,811,144	41,200,400 990,000	2,685,200	1,543,200	
1,005,800	977,212	21,412	955,800	50,000	...	13
1,562,100	1,547,126	30,926	1,516,200	45,900	...	14
409,000	413,410	410	413,000	...	4,000	15
2,976,900	2,937,748	52,748	2,885,000	95,900	4,000	
46,309,300	45,949,292 (a) 990,000	1,863,892	44,085,400 990,000	2,781,100	1,547,200	
			Net Increase			£1,233,900

(a) Supplementary Estimate, 17th July, 1912 (Parliamentary Paper, No. 254).

continuation of services originally provided for out of funds raised under the authority of the Naval Works will be drawn upon without replacement to the extent of £25,000 (estimated).

STATEMENT of the Principal Points of DIFFERENCE between the ESTIMATES of 1912–1913 and those for 1913–1914.

INCREASES.		£
Wages, &c., of Officers, Seamen and Marines		675,900
Victualling and Clothing for the Navy		235,800
Educational Services		7,200
Royal Naval Reserves		44,000
Wages of Artificers and Police in Dockyards		529,382
Naval Stores, and Fuel, &c., for the Fleet		897,700
Auxiliary Machinery, &c., for His Majesty's Ships and Vessels (Contract)		78,146
Repairs and Alterations by Contract of Ships, &c.		10,000
Inspection of Contract Work		22,000
Naval Ordnance Establishments, and Naval Ordnance Stores		273,350
Miscellaneous Effective Services		54,100
Non-Effective Services		78,800
Miscellaneous Increases		34,478
Decrease in Amount of Contribution from the Australian Commonwealth towards Naval Expenditure		158,400
	£	3,099,256

DECREASES.	£	
Scientific Services	5,800	
Increase in Amount of Receipts arising from the Sale of Ships	143,300	
Propelling Machinery for His Majesty's Ships and Vessels (Contract)	572,946	
Hulls of Ships (Contract)	159,940	
Armour for His Majesty's Ships and Vessels (Contract)	544,291	
Gun Mountings and Air-Compressing Machinery (Contract)	279,379	
Machinery for His Majesty's Shore Establishments (Contract)	62,700	
Works, Buildings, and Repairs	97,000	
		1,865,356
Net Decrease	£	1,233,900

STATEMENT showing the Total Estimated EXPENDITURE for the NAVAL SERVICE, including Amounts provided in the NAVY ESTIMATES, as well as in the CIVIL SERVICE and other ESTIMATES, for the following Services :—

		1913–1914.	1912–1913.
		£	£
NAVY ESTIMATES:			
Estimated Expenditure (after deducting Appropriations in Aid) . .		46,309,300	44,085,400 (*b*) 990,000
CIVIL SERVICE ESTIMATES: (*a*)			
Estimated Expenditure under—			
Class I. Vote 10.—Public Buildings, Great Britain:	£		
Maintenance and Repairs, including New Works, Alterations, &c. .	10,650		
Rents, Insurance, Tithes, &c. . .	5,540		
Fuel, Light, Water, &c. . . .	6,500		
Furniture	4,500		
		27,190	22,540
Class I. Vote 11.—Surveys of the United Kingdom		4,550	4,500
„ I. „ 14.—Rates on Government Property		153,500	149,000
„ I. „ 15.—Public Works and Buildings, Ireland:			
Coast-guard, viz.:	£		
Purchase of Sites . . .	—		
New Works and Alterations, including Naval Reserve Stations . .	6,385		
Maintenance and Supplies . .	4,868		
Naval Reserve, viz.:			
Maintenance and Supplies . .	20		
		11,273	11,220
Class II. Vote 8.—Board of Trade:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force . . .		3,250	3,294
„ II. „ 9.—Mercantile Marine Services:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force . . .		2,500	2,500
„ II. „ 13.—Government Chemist:			
Analysis of Food, &c.		400	400
„ II. „ 15.—Exchequer and Audit Department (Cost of Audit):	£		
Navy Cash Accounts . . .	5,300		
Expense and Manufacturing Accounts	3,830		
Store Accounts	4,013		
		13,143	14,639
Class II. Vote 24.—Stationery and Printing		112,000	118,000
„ III. „ 1.—Law Charges, England		17,052	11,477
Maintenance of Naval Prisoners:			
„ III. „ 8.—Prisons, England and the Colonies . . .		1,260	630
„ III. „ 11.—Law Charges and Courts of Law, Scotland . .		100	..
„ III. „ 14.—Prisons, Scotland		200	300
„ III. „ 15.—Law Charges and Criminal Prosecutions, Ireland .		70	..
„ III. „ 21.—Prisons, Ireland		383	397
REVENUE DEPARTMENT ESTIMATES:			
Vote 1.—Customs and Excise.—Percentage for provision of funds for District Paymasters of the Coast-guard, &c.		252	297
Vote 1.—Customs and Excise.—Staff and Incidental Expenses in connection with the Royal Naval Reserve Force		3,300	3,300
Vote 3.—Post Office		42,000	39,690
Total . . .	£	46,701,723	44,467,584 (*b*) 990,000

(*a*) Provision is also made in the Estimate for Osborne (Class I., Vote 2) for expenditure in connection with the treatment of invalid Officers of the Navy in the Convalescent Home at Osborne, and in the Vote for Public Buildings, Great Britain (Class I., Vote 10) for Annuities in repayment of sums advanced for sites and buildings under various Acts.

(*b*) Supplementary Estimate, 17th July, 1912 (Parliamentary Paper, No. 254).

Note.—In addition to the Services shown above, an annuity of £16,243 18*s.* is payable to the Commissioners of Woods, &c., from the Consolidated Fund, under the Public Offices Sites Act of 1882 (45 & 46 Vict. c. 32).

STATEMENT showing the CONTRIBUTIONS from INDIA and the COLONIES towards NAVAL EXPENDITURE.

RECEIVED FROM.	NATURE OF SERVICE.	VOTE. 1	2	3	6	7	8 Section I.	8 Section II.	8 Section III.	9	11	12	13	14	15	TOTAL.
		£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
India	Maintenance of His Majesty's Ships in Indian Waters	28,000	9,100	500	..	..	12,500	10,200	13,000	11,600	2,500	..	4,300	8,300	..	100,000
India	Indian Troop Service (on account of work performed by the Admiralty)	..	..	..	..	..	..	..	..	..	..	3,050	..	..	350	3,400
India	Repayment on account of services rendered by His Majesty's Ships engaged in the suppression of the Arms Traffic in the Persian Gulf	25,000	7,000	200	..	..	..	15,550	4,500	4,000	700	..	2,200	4,850	..	64,000
Australian Commonwealth	Contributions on account of liability for Retired Pay of Officers and Pensions of Men lent from the Royal Navy	..	..	..	..	..	..	..	..	..	..	..	4,700	6,100	..	10,800
Dominion of Canada																

Australian Commonwealth	Survey of the N.-W. coast of Australia	3,900	1,300	..	550	..	200	1,550	..	..	..	..	..	..	..	..	..	..	..	..	..	7,500
	Maintenance of an Australasian Squadron and of a branch of the Royal Naval Reserve	36,200	10,800	350	..	1,000	..	18,100	56,000	3,250	4,100	..	5,000	6,800	..	..	..	..	..	..	..	41,600
Dominion of New Zealand	Maintenance of an Australasian Squadron and of the Imperial Navy generally, also of a branch of the Royal Naval Reserve	18,800	7,800	..	..	..	8,300	15,500	24,000	10,600	..	..	..	..	..	..	..	..	..	..	..	85,000
Union of South Africa	General maintenance of the Navy	..	..	..	..	3,000	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3,000
Newfoundland	Maintenance of a branch of the Royal Naval Reserve	£ 111,900	36,000	1,050	550	4,000	21,000	60,900	97,500	29,450	7,300	3,050	16,200	26,050	350	415,300						
	Total																					

VOTE (A).

NUMBERS of OFFICERS, SEAMEN and BOYS, COAST-GUARD, and ROYAL MARINES Borne on the Books of His Majesty's Ships, and at the ROYAL MARINE DIVISIONS.

One Hundred and Forty-six Thousand.
(146,000.*)

I.—SEA SERVICE.

Under which Vote Provided.	RANKS, &c.	NUMBERS, ALL RANKS. 1913–1914.		1912–1913.		Numbers of all Ranks borne on 1st January, 1913.
Vote 1	**FOR HIS MAJESTY'S FLEET:**					
	Flag Officers	29		28		
	Commissioned Officers	5,264		4,727		
	Subordinate Officers	657		740		
	Warrant Officers	1,905		2,070		
	Petty Officers and Seamen	102,718		98,036		
	Boys (Service)	4,479	115,052	2,926	108,527	109,026
	COAST-GUARD:					
	Commissioned Officers	102		99		
	Chief Officers and Second Mates.	198		205		
	Petty Officers and Seamen	2,830	3,130	2,796	3,100	3,053
	ROYAL MARINES (for Service Afloat and on Shore):					
	Commissioned Officers	422		420		
	Warrant Officers	80		67		
	Staff Sergeants and Sergeants	1,302		1,300		
	Band Ranks, Buglers and Musicians	1,762		1,708		
	Rank and File	14,401		13,546		
	Band Boys	268	(a) 18,235	272	17,313	17,522
	Total		136,417		128,940	129,601
	Net Increase		7,477			

* Maximum for the year. The estimated average is 142,560.
(a) Including 30 Officers, &c., Sub-Heads F and H.

VOTE (A)—*continued.*

II.—OTHER SERVICES.

Under which Vote Provided.	RANKS, &c.	NUMBERS, ALL RANKS. 1913–1914.		1912–1913.		Numbers of all Ranks borne on 1st January, 1913.
Vote 1	Naval Cadets	845		820		
	Pensioners in Home Ships, &c.	310		299		
	Boys under Training—					
	Seaman Class	5,972		4,981		
	Artificer Class	620	(b)	596		
			7,747		6,696	6,621
Vote 2	For Victualling and Clothing for the Navy	1		7		
Vote 3	For Medical Establishments and Services	724		769		
Vote 5	For Educational Services	565		552		
Vote 6	For Scientific Services	3		3		
Vote 7	For Royal Naval Reserves	67		63		
Vote 8	For Shipbuilding, Repairs, Maintenance, &c.:					
	Section I.	284		245		
	Section II.	6		15		
	Section III.	87		90		
Vote 9	For Naval Armaments	58		81		
Vote 12	For Admiralty Office	41		39		
			1,836		1,864	1,874
	Total		(c) 9,583		8,560	8,495
	Net Increase		1,023			
	Total, Sea Service	136,417		128,940		
	„ other Services	9,583		8,560		
			146,000		137,500	
	Net Increase		8,500			

(b) Including 16 Officers, Sub-Head H.

(c) Including Officers and Seamen	2,421	..	2,483
„ Retired Officers and Pensioners (Vote 1)	310	..	299
„ Boys (Training, Seaman Class)	5,972	..	4,281
„ Boys (Training, Artificer)	620	..	596
„ Boys (Training, Artisan)	145	..	64
„ Royal Marines	115	..	137
	9,583	..	7,860

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION III., CONTRACT WORK, of this VOTE will be accounted for.

	ESTIMATES.		Increase.	Decrease.
	1913-1914.	1912-1913.		
SECTION III.—CONTRACT WORK.	£	£	£	£
A.—Propelling, &c., Machinery for His Majesty's Ships, Vessels, &c. .	3,759,362	4,332,308	..	572,946
B.—Auxiliary Machinery, &c., for His Majesty's Ships, Vessels, &c. .	183,146	105,000	78,146	..
C.—Hulls of Ships, &c., Building by Contract	3,547,117	3,707,057	..	159,940
D.—Armour for His Majesty's Ships and Vessels	2,031,861	2,576,152	..	544,291
E.—Repairs and Alterations by Contract of Ships, &c., and their Machinery and Stores	110,000	100,000	10,000	..
F.—Inspection of Contract Work . .	146,000	124,000	22,000	..
G.—Gun Mountings and Air-Compressing Machinery	2,105,004	2,384,383	..	279,379
H.—Machinery, &c., for His Majesty's Shore Establishments at Home and Abroad	277,300	337,000	..	59,700
H.H.—Fixed Machinery, formerly provided for by Advances under the Naval Works Acts, 1895 to 1905 .	5,000	8,000	..	3,000
I.—Royal Reserve of Merchant Cruisers.	151,000	150,000	1,000	..
K.—Purchase of Ships, Vessels, &c. .	18,000	17,700	300	..
	£ 12,333,790	13,841,600	111,446	1,619,256
Deduct,—				
L.—Appropriations in Aid . . .	107,490	175,000	..	67,510
	£ 12,226,300	13,666,600	111,446	1,551,746
	Net Decrease . .		£1,440,300	

VOTE 9.

NAVAL ARMAMENTS.

I.—ESTIMATE of the SUM which will be required in the Year ending 31st March, 1914, to defray the Expense of NAVAL ARMAMENTS.

Four Million Three Hundred and Ninety-Six Thousand Pounds.
(£4,396,000.)

II.—SUB-HEADS under which this Vote will be accounted for.

	ESTIMATES.		Increase.	Decrease.
	1913–1914.	1912–1913.		
NAVAL ORDNANCE, &c., ESTABLISHMENTS AT HOME AND ABROAD	£	£	£	£
A.—Salaries and Allowances . .	60,020	57,836	2,184	..
B.—Wages of Artificers, &c. . .	352,480	351,700	780	..
C.—Wages of Crews of Naval Ordnance Vessels . . .	13,000	12,700	300	..
D.—Wages, &c., of Police Force .	37,430	33,200	4,230	..
E.—Medical Attendance, Rents, Water, Gas, &c., and Contingencies	17,020	16,394	626	..
NAVAL ORDNANCE STORES.				
F.—Guns	1,224,000	1,135,500	88,500	..
G.—Projectiles and Ammunition .	1,638,160	1,560,500	77,660	..
H.—Torpedoes and Gun-cotton .	324,900	351,500	..	26,600
I.—Small Arms, Torpedo Materials, Maintenance of Vessels, and Miscellaneous . . .	538,590	455,370	83,220	..
K.—Inspection, Proof, Experiments, &c.	286,000	265,000	21,000	..
L.—Freight and Incidental Charges	30,000	25,000	5,000	..
£	4,521,600	4,264,700	283,500	26,600
Deduct.— M.—Appropriations in Aid . .	125,600	145,700	..	20,100
£	4,396,000	4,119,000	283,500	6,500
		Net Increase . .	£277,000	

PROGRAMME of

PROGRAMME of the ESTIMATED EXPENDITURE in CASH, and in NET
MAINTENANCE, &c., in
(Exclusive of the FLEET

SUB-HEADS under which this ESTIMATED EXPENDITURE will be
provisions of Section 1 (2), ARMY

	ESTIMATED EXPENDITURE IN				
	Direct Expenditure.				
	Dockyard Work.		Contract Work, Sec. III.	Total Direct Expenditure. (a)	
	Personnel, Sec. I.	Matériel, Sec. II.			
NEW CONSTRUCTION:	£	£	£	£	
A.—DOCKYARD-BUILT SHIPS—					
Hulls, &c. (c)	924,355	561,175	(f) 1,511,912	2,997,942	1
Machinery	60,235	20,015	1,037,498	1,117,748	2
	985,090	**581,190**	**2,549,410**	**4,115,690**	3
B.—CONTRACT-BUILT SHIPS—					
Hulls, &c. (c)	184,210	163,470	(g) 5,719,424	6,067,104	4
Machinery	..	*Cr. 4,500*	2,683,630	2,679,130	5
	184,210	**158,970**	**8,403,054**	**8,746,234**	6
C.—OTHER VESSELS, &c. (d) . .	2,850	22,300	283,848	308,998	7
TOTAL NEW CONSTRUCTION	**1,172,150**	**762,460**	**11,236,312**	(e) **13,170,922**	8
D.—REPAIRS, ALTERATIONS, &c. .	1,789,331	819,000	479,484	3,117,815	9
E.—STORES, FOR MAINTENANCE, &c.	..	1,152,500	..	1,152,500	10
F.—ESTABLISHMENT, INCIDENTAL, AND MISCELLANEOUS CHARGES, UNAPPROPRIATED .	..	..	..	..	11
TOTAL . . £	**2,961,481**	**2,763,960**	**11,715,796**	**17,441,237**	12

(c) Including Hydraulic and Transferable Gun Mountings, &c.
(d) Including Harbour Craft, and [illegible]ding Torpedo Boats, &c., the value of which is included under other Sub-Heads.
(e) Exclusive of £40,000 pre[illegible] Vote 9 for New Vessels for Naval Ordnance Store Service and £422,300 for Coaling Craft, Vote 8, Sect
(f) Including £749,270 [illegible]
(g) Including £1,272,591 for Armour.

VALUES OF STORES issued for SHIPBUILDING, REPAIRS, ALTERATIONS, the Year 1913–1914.
COALING SERVICE.)
accounted for in the NAVY EXPENSE ACCOUNTS, under the AND NAVY AUDIT ACT, 1889.

	1913–1914.		EXPENDITURE AS ESTIMATED IN NAVY ESTIMATES, 1912–1913.			Difference between Direct Expenditure, 1912–1913 (B) and 1913–1914 (A).	
	Establishment, &c., Charges, apportioned.	Aggregate, 1913–1914.	Direct Expenditure. (B)	Establishment, &c., Charges, apportioned.	Aggregate, 1912–1913.	Increase.	Decrease.
	£	£	£	£	£	£	£
1	246,149	3,244,091	(h) 3,389,472	258,010	3,647,482	..	391,530
2	29,011	1,146,759	839,924	29,868	869,792	277,824	..
3	**275,160**	**4,390,850**	**4,229,396**	**287,878**	**4,517,274**	..	**113,706**
4	134,853	6,201,957	(i) 6,137,675	116,036	6,253,711	..	70,571
5	42,413	2,721,543	3,155,495	53,448	3,208,943	..	476,365
6	**177,266**	**8,923,500**	**9,293,170**	**169,484**	**9,462,654**	..	**546,936**
7	7,085	316,083	305,982	5,388	311,370	3,016	..
8	**459,511**	**13,630,433**	**13,838,548**	**462,750**	**14,291,298**	..	**657,626**
9	369,504	3,487,319	2,480,693	325,462	2,806,155	637,122	..
10	110,955	1,263,455	1,027,500	94,678	1,122,178	125,000	..
	939,970			882,890			
11	2,680,962	2,680,962	..	3,026,641	3,026,641	..	..
12	**3,620,932**	**21,062,169**	**17,336,741**	**3,909,531**	**21,246,272**	..	..
	NET INCREASE ON DIRECT EXPENDITURE . .						**£104,496**

(h) Including £1,077,733 for Armour.
(i) Including £1,488,116 for Armour.

RECAPITULATION OF ESTIMATED EXPENDITURE ON SHIPBUILDING.

SUB-HEADS OF EXPENDITURE.	Charged Direct as Incurred.	Establishment, etc., Charges Apportioned.	New Construction.	Repairs, Alterations, etc.			Stores for Maintenance, etc.	Establishment and Incidental Charges Unapportioned to Ships, etc.		Total Amount of Estimated Expenditure.
				Ships. Large Repairs and Alterations.	Ships. Other Repairs, etc.	Other Naval Services.				
DOCKYARD WORK:	£	£	£	£	£	£	£	£	£	£
Section I.—*Personnel*.	2,961,481	1,346,847	1,336,354	507,221	1,424,478	75,265	67,947	417,207	479,856	4,308,328
Section II.—*Matériel*.	2,763,960	1,648,011	881,652	282,345	651,328	61,239	1,195,508	576,789	974,795	4,411,971
CONTRACT WORK:										
Section III. . .	11,715,796	626,074	11,412,427	147,117	217,265	121,061	..	15,150	217,165	12,341,870
Total Estimated Expenditure for 1913–1914	17,441,237	3,620,932	13,630,433	936,683	2,293,071	257,565	1,263,455	1,009,146	1,671,816	21,062,169
Totals of Sub-Heads £	21,062,169		13,630,433	3,487,319			1,263,455	2,680,962		21,062,169

Austro-Hungarian Navy Estimates, 1913-14.

(Converted at £1 = 24 Kronen.)

Heads of Expenditure.	Estimates, 1913-14.	Estimates, 1912-13.
ORDINARY ESTIMATES.	£	£
Pay of Officers, etc.	278,100	260,290
Pay and Clothing—petty officers and seamen	320,445	245,484
Land Service	160,300	135,142
Sea Service	433,004	390,362
Shore Establishments	40,590	38,926
Maintenance of Fleet	771,542	519,125
New Construction, viz.:—		
(A) Hulls and Machinery: Battleship Zrinyi, 14,500 tons	—	200,000
(A) Hulls and Machinery: Cruiser Admiral Spaun, 3500 tons	—	70,833
(A) Hulls and Machinery: Mine-ship, 1000 tons, 2nd instalment	31,667	29,166
(A) Hulls and Machinery: Aeroplanes	—	4,166
(A) Hulls and Machinery: 2 Steam Colliers (carrying 7000 tons), 1st instalment	166,667	—
(A) Hulls and Machinery: 9 Torpedo-boats, 250 tons, 1st instalment	192,972	—
(B) Guns, torpedo-fittings, &c., for above vessels	39,167	529,166
Guns and Small Arms	240,167	160,875
Miscellaneous	247,370	226,634
	2,921,991	2,840,169
Less Special Receipts	20,833	18,750
Total of Ordinary Estimates	2,901,158	2,821,419
EXTRAORDINARY ESTIMATES.		
Pay and Clothing, &c.	8,333	4,166
Shore Establishments	1,250	250
Floating-Dock for torpedo-boats and destroyers	27,083	—
Large Alterations	30,417	57,500
Guns and Small Arms, Torpedo Fittings, &c.	30,000	29,636
Buildings	92,742	73,844
Miscellaneous	3,066	3,066
	3,094,049	2,989,871
Extraordinary credits for further Development of the Fleet, including guns, torpedoes, &c.	2,850,000	2,791,666
Ditto ditto for defensive works at Pola	41,666	41,666
Total	£5,985,715	£5,823,203

Subsequently to the sanctioning of the above an additional credit of 40,000,000 kronen (£1,670,000) was opened, providing for the building of two monitors, additional torpedo-boats, and a large floating-dock. The Estimates for 1914-15 presented to the Delegations in March, 1913, amount in round figures to £8,300,000 on all accounts, except for the mobilisation caused by the war in the Balkan peninsula, and include grants for three battleships to replace the Monarch class.

French Navy Estimates, 1913.

(Converted at £1 = 25 francs.)

Cap. in Estimates, 1913.	Heads of Expenditure.	Credits voted for 1913.	Credits voted for 1912.
	SECTION I.		
	General Expenses of Administration—Maintenance of the Navy.	£	£
1, 2, 3, 4	Admiralty Office	192,110	182,064
5, 6	Hydrographic Department . . .	29,435	29,288
7	Inspection of Administrative Services .	12,949	12,780
8, 9, 10, 11	Navy Pay, Officers and Men; Mess Allowance, Officers	2,791,333	2,657,712
12, 13	Justice and Police	105,285	101,725
14	Commissariat Staff	55,663	54,321
15, 16, 17	Storekeeper's Department — Wages and Materials	1,115,108	1,004,145
18, 19	Victualling Department — Wages and Materials	985,173	907,155
20, 21, 22	Medical and Hospitals	213,255	199,949
23	Constructors' Staff	215,925	210,253
24, 26	Shipbuilding—Maintenance and repair of Fleet; Wages	613,208	562,120
25, 27	Shipbuilding—Maintenance and repair of Fleet; Materials	816,680	783,387
28	Ordnance Staff	85,105	80,340
29, 31	Guns—Repairs and improvements, &c.; Wages	184,544	175,664
30, 32	Guns—Repairs and improvements, &c.; Materials	862,019	672,767
33, 34, 35	Hydraulic and other Works . . .	163,965	161,152
36	Administrative Staff	185,808	185,035
37	Travelling and lodging allowances . .	145,198	148,909
38	Charitable and subscriptions . . .	108,405	107,298
39	Pay of Reserve Officers	40,220	38,944
40	Secret Service	4,000	4,000
	SECTION II.		
41–45	Mercantile Marine and Fisheries . .	140,180	132,944
46	Pensions	704,121	662,132
	Carried forward . .	£9,769,689	£9,074,084

Programme of New Construction, to be continued or undertaken in 1913.—Building by Contract.

Class.	Names of Ships.	Where Building and to be Completed.	Date of Commencement.	Proposed Date of Completion.	Estimated Cost.	Probable Expenditure in 1913.
					£	£
Battleships	France	St. Nazaire—Brest	1911	1914	2,550,207	890,255
	Paris	La Seyne	1911	1914	2,554,207	890,255
	Lorraine	St. Nazaire	1912	—	2,642,439	899,587
	A 7 (Languedoc)	La Seyne	1913	—	2,642,439	344,980
	A 8 (Normandie)	St. Nazaire	1913	—	2,642,439	344,980
Torpedo-boat Destroyers	Capitaine Mehl	St. Nazaire—Lorient	1910	1912	124,713	23,056
	Dehorter	Cherbourg	1910	1912	125,147	21,586
	Francis Garnier	„	1910	1912	127,675	9,130
	Commandant Rivière	Lorient	1910	1912	120,248	7,816
	Commandant Bory	„	1910	1912	120,760	22,216
	Magon	„	1912	1913	124,103	45,618
	Mangini	Toulon	1911	1913	123,414	46,657
	1 t.b.d., 800 tons	—	1911	—	126,615	33,281
Mine-layers	Pluton	Cherbourg	1910	1912	73,224	3,800
	Cerbère	„	1911	1912	59,904	16,022
River Gunboat	Balny	Cherbourg	1913	—	24,853	17,004
Transport	Seine	Toulon	1912	1913	55,264	34,064
Despatch-boat	To replace Ibis	—	1913	—	20,805	8,537
	Total building by Contract				£14,258,456	3,658,844

German Navy Estimates, 1913.

(*Converted at* £1 = 20·43 *marks.*)

Ordinary Permanent Estimates.

Heads of Expenditure.	Estimates for the financial year 1913.	Granted for the financial year 1912.
	£	£
Imperial Navy Office	120,319	115,960
Admiral Staff	17,792	17,521
Look-out Stations and Observatories	22,457	21,240
Station Superintendencies	45,742	43,841
Administration of Justice	11,380	10,727
Naval Chaplains and Garrison Schools	10,884	10,285
Navy Pay	2,333,213	2,037,400
Maintenance of Ships in Commission	2,792,560	2,472,396
Victualling	176,540	157,162
Clothing	29,145	28,503
Garrison Works and Administration	72,578	70,083
,, Building Materials	49,554	46,730
Lodging Allowance	219,514	207,709
Medical Department	181,525	164,040
Travelling Expenses, Freight Charges, &c.	210,620	207,866
Training Establishments	35,956	30,637
Maintenance of Fleet and Docks	1,872,460	1,810,310
Ordnance and Fortification	1,196,063	1,038,550
Accountants' Department	67,625	60,995
Pilotage, Coastguard, and Surveying Service	48,928	44,681
Miscellaneous Expenses	130,360	104,391
Administration of Kiau-chau Protectorate	7,708	7,619
Total of Ordinary Permanent Estimates carried to Summary, next page	9,652,923	8,708,646

German Navy Estimates—*continued.*

Special Ordinary Estimates.

Shipbuilding Programme for the Financial Year 1913.

For the Construction of—		£
Battleship Kaiserin (Ersatz Hagen)	final instalment	244,738
„ König Albert (Ersatz Ægir)	„ „	244,738
„ Prinzregent Luitpold (Ersatz Odin)	„ „	244,738
Large cruiser Seydlitz (J)	„ „	252,079
Battleship Ersatz Kurfürst Friedrich Wilhelm	3rd instalment	440,529
„ Ersatz Weissenburg	„ „	440,529
„ S	„ „	440,529
Large cruiser K	„ „	416,055
Small cruiser Karlsruhe (Ersatz Seeadler)	final instalment	73,420
„ Rostock (Ersatz Geier)	„ „	73,420
Battleship, Ersatz Brandenburg	2nd instalment	513,954
Large cruiser, Ersatz Kaiserin Augusta	„ „	538,420
Small cruiser Ersatz Irene	„ „	122,370
„ Ersatz Prinzess Wilhelm	„ „	122,370
Battleship Ersatz Wörth	1st instalment	342,633
„ T	„ „	342,633
Large cruiser, Ersatz Hertha	„ „	244,738
Small cruiser, Ersatz Gefion	„ „	122,370
„ Ersatz Hela	„ „	122,370
Gunboat C	„ „	44,052
Imperial Yacht Ersatz Hohenzollern	„ „	244,738
Despatch Vessel	full amount	29,368
Torpedo-boat division	final instalment	391,585
„ „	1st instalment	489,475
Submarines, construction and experiments		978,952
Alteration and improvement of large cruisers		39,158
„ „ small „		34,263
Total		£7,594,224

Summary.

Heads of Expenditure.	Estimates for the financial year 1913.	Granted for the financial year 1913.
	£	£
Ordinary Permanent Estimates	9,652,923	8,708,646
New Construction and Alterations	7,594,224	8,151,248
Armaments, Torpedoes, and Mines	3,582,183	3,832,110
*Other items	2,058,540	1,772,682
Total £	22,887,870	22,464,686

* Including improvement of docks at Wilhelmshaven, Kiel, and Danzig, coast fortifications and other buildings on North Sea and Baltic coasts, harbour for small vessels at Heligoland, &c.

Italian Navy Estimates, 1913-14.

FINANCIAL YEAR 1ST JULY, 1913, TO 30TH JUNE, 1914.

(Converted at £1 = 25 lire.)

Heads of Expenditure.	Estimates, 1913-1914.	Revised Estimates, 1912-1913.
ORDINARY GENERAL EXPENDITURE.	£	£
Admiralty	90,060	87,240
Pensions	427,300	396,900
Expenditure on the Mercantile Marine for subsidies, &c.	1,105,844	934,096
Lighthouses, signal stations, &c.	64,404	56,720
Total	£ 1,687,608	1,474,956
ORDINARY EXPENDITURE FOR NAVAL SERVICES.	£	£
General Staff of the Navy	176,000	175,600
Corps of Engineers	77,200	77,200
Medical Service	35,600	35,600
Commissariat Service	38,400	38,400
Pay of Officers, and Wages and Clothing of Men	824,928	744,920
Gratuities, &c.	217,000	208,000
Forts—*Personnel*	24,000	18,480
Telegraph Service—*Personnel*	18,000	16,000
" " *Matériel*	7,360	5,3.0
Police (Dockyards)	19,984	13,600
Salaries and Travelling Expenses	50,520	48,400
Barracks, Maintenance, Lighting, etc.	10,800	10,400
Rents and Water Royalties	3,320	3,000
Ships fitting out, &c.	462,668	380,000
Fuel and Stores for Ships in Commission	409,000	363,000
Victualling	584,000	501,000
Hospital Services	35,200	31,800
Naval College and Engineering School	20,280	13,640
Scientific Services—*Personnel*	7,680	7,600
" " *Matériel*	7,672	6,880
Wireless Telegraph Stations, Benadir and Eritrea, and School of Telegraphy, Rome	16,000	14,000
Air Department—*Personnel* and *Matériel*	16,000	—
Workshops, Fortifications, and Stores—*Personnel*	74,200	74,400
Technical Department (Civil)—*Personnel*	39,960	39,520
Naval Constructors	32,560	32,600
Office Expenses and Civil Staff	9,116	8,900
Law Charges	1,344	1,344
Transport of Materials	9,600	9,600
Works Department—Repairs	95,440	95,800
Plant, Machinery and Tools; Reconstruction and maintenance of Workshops	74,200	70,000
Electric Power, Fuel and Stores for Shore Establishments	88,000	81,600
Materials for construction of new Ships and maintenance of existing Ships—Hulls, Machinery, and Armaments	2,800,000	2,400,000
Wages and Expenses of Dockyard employés	800,224	780,800
Guns, Torpedoes and Small Arms	150,800	130,800
Coast Defence—*Matériel*	12,000	12,000
Reserve Fund	20,000	20,000
Total (to next page)	£ 7,269,956	6,473,244

ITALIAN NAVY ESTIMATES—*continued.*

Heads of Expenditure.	Estimates, 1913–1914.	Revised Estimates, 1912–1913.
EXTRAORDINARY EXPENDITURE.	£	£
Temporary Civil Staff	3,440	4,800
General Expenses and Half Pay	4,400	3,800
Total . . . £	7,840	8,600
SUMMARY.		
Ordinary General Expenditure	1,687,608	1,474,956
„ Expenditure for Naval Services	7,269,056	6,473,244
Extraordinary Expenditure	7,840	8,600
Rent of Lands occupied by Government	111,613	108,940
Lighthouses and Buoys	16,000	32,400
Supplementary Fund, for Shipbuilding . . .	777,343	377,307
Purposes other than Shipbuilding	400,000	200,000
Grand Total . . £	10,269,460	8,675,447

Japanese Navy Estimates, 1913–1914.

Financial Year, 1st April to 31st March.

(9·8 Yen taken as equal to £1.)

ORDINARY EXPENDITURE. Vote.	Estimates, 1913–1914.	Voted, 1912–1913.
	£	£
1. Admiralty	19,824	19,824
2. Pay and Allowances	1,309,034	1,289,633
3. Offices	44,134	44,134
4. Repairs to Buildings	26,390	26,390
5. Travelling Expenses	66,999	66,297
6. Miscellaneous Expenses	33,489	33,489
7. Allowances to Cadets and Petty Officers for Clothing	34,008	33,616
8. Clothing and Provisions	711,901	695,374
9. Shipbuilding, Armaments, and Repairs	1,243,556	1,173,524
10. Manœuvres	31,496	30,020
11. Hospital Expenses	25,426	24,738
12. Naval Harbours	37,893	37,893
13. Maintenance of Ships and Dockyards	662,769	627,776
14. Family Allowances to Petty Officers and Men	32,876	32,876
15. Prisoners	714	714
16. Hydrographic Service	16,471	16,471
17. Salaries to Foreigners	2,086	2,086
18. Secret Service	8,167	8,167
19. Maintenance	2,042	2,042
20. Law Costs, Compensation Claims, Bonuses, etc.	2,339	1,540
	£4,311,614	£4,166,604
EXTRAORDINARY EXPENDITURE. Vote.		
	£	£
1. New Works and Repairs	21,946	40,132
2. Chinkai Naval Station (4th instalment)	71,458	71,458
3. Repairs in Naval Dockyards to Ships not belonging to Navy	21,671	21,671
4. Works Department	5,089	5,089
5. Production of Charts	1,531	1,531
6. Armaments Replenishing Fund	5,386,768	5,086,014
7. Magazine Cooling Arrangements	30,625	30,625
8. Investigation of Aeronautics	10,210	10,210
— Renewing guns, etc., at educational establishments.	..	19,269
— Battle Practice Targets	..	7,172
— Entertaining Foreign guests at Grand Manœuvres	..	2,042
— Expenditure connected with Chinese revolution	..	72,180
	£5,549,298	£5,367,393
SUMMARY.		
	£	£
Ordinary Expenditure	4,311,614	4,166,604
Extraordinary Expenditure	5,549,298	5,367,393
Total	£9,860,912	£9,533,997

Russian Navy Estimates, 1913.

FINANCIAL YEAR, JANUARY TO DECEMBER.

(9·412 roubles taken as equal to £1.)

Heads of Expenditure.	Proposed, 1913.	Voted, 1912.
	£	£
Administration	348,380	333,164
Pay, Clothing, Harbour Victualling, etc.	1,517,017	1,356,590
Sea Pay, Sea Victualling, Fuel, Stores, etc.	2,206,744	1,927,302
Hydrographic, Lighthouse, Lifeboat, and Pilot Services	545,594	541,803
Shipbuilding	10,953,616	7,940,094
Armaments	5,041,820	3,244,705
Naval Ports and Establishments	3,065,333	1,676,727
Medical Service	169,682	154,598
Educational Services	156,731	129,891
Martial Law	20,503	20,276
Pensions, etc.	149,849	146,594
Amur River Flotilla	233,101	127,314
Miscellaneous	69,117	82,149
Total	£24,477,487	17,681,207

United States Navy Estimates, 1913-14.

(Converted at £1 = $4·8665, being par, as adopted by Congress.)

Objects of Expenditure and Appropriation.	Estimates for year ending June 30, 1914.	Appropriated for year ending June 30, 1913.
	£	£
Pay of the Navy	8,068,356	7,661,618
Pay, Miscellaneous	205,486	205,486
Contingent, Navy	9,452	9,452
Naval Station (for Lepers), Island of Guam	2,876	2,876
Bureau of Navigation	649,516	639,415
„ Ordnance	2,660,946	2,672,865
„ Equipment	2,328,161	1,838,753
„ Yards and Docks	334,942	314,393
Public Works under Bureau of Yards and Docks		
Public Works under Secretary of Navy (Naval Academy)		
Public Works under Bureau of Navigation (Training Stations and War College)	1,341,095	950,024
Public Works, Bureau of Ordnance		
„ „ „ Equipment		
„ „ „ Medicine and Surgery		
„ „ Marine Corps		
Bureau of Medicine and Surgery	137,470	111,372
„ Supplies and Accounts	1,955,909	1,888,897
„ Construction and Repair	1,889,270	1,783,445
„ Steam Engineering	1,303,194	1,355,388
Naval Academy	122,315	119,309
Marine Corps	1,655,558	1,525,937
Increase of Navy:—		
Construction and Machinery	3,986,586	2,023,261
Torpedo-boats and Submarines	422,969	518,163
Colliers	—	119,453
Armour and Armament	3,976,692	1,492,899
Equipment	72,947	72,947
Total £	*31,123,740	£25,305,953

* The amount actually appropriated by Congress for 1913-14 was £28,932,630. Under the head of Increase of Navy the number of battleships proposed was reduced from three to one.

GERMAN NAVAL LAW AMENDMENT ACT.

AN official translation of the Bill which received the sanction of the Reichstag was published in 1912 as a Parliamentary Paper (Cd. 6117). The provisions of the new enactment, so far as they affect the increase of the Fleet, are best seen from the Appendix given below. The following is the Argument:—

The organisation of the Fleet still suffers from two serious defects.

The one defect consists in the fact that in the autumn of every year the time-expired men, *i.e.*, almost one-third of the crew in all ships of the Battle Fleet, are discharged and replaced mainly by recruits from the inland population. Owing to this, the readiness of the Battle Fleet for war is considerably impaired for a prolonged period.

The second defect consists in the fact that at the present time, with an establishment of fifty-eight capital ships, only twenty-one capital ships are available at first, if the Reserve Fleet cannot be made ready in proper time. Since the Fleet Law was drawn up, this latter has become more and more unlikely, as the moment at which the Reserve Fleet can be ready for war gets more and more deferred. This is a consequence of the ever-growing complexity of modern ships and of the steadily growing difficulty in training large organisations. At the present day, therefore, the Reserve Fleet only comes into consideration as a second fighting line; but in view of our great numerical strength in reserve men, it still maintains its great importance.

Both these defects are to be removed, or at any rate considerably ameliorated, by the gradual formation of a Third Active Squadron.

The requisite ships for this Third Active Squadron are to be derived:—

(*a*) By dispensing with the Reserve Fleet Flagship.
(*b*) By dispensing with the present existing Material Reserve —four battleships, four large and four small cruisers.
(*c*) By newly constructing three battleships and two small cruisers.*

As the maintenance in commission of ships in the Reserve Fleet can be reduced by one-half, in consequence of the increase of active organisations, the formation of a Third Active Squadron only renders

* Establishments increased respectively from thirty-eight to forty-one, and from thirty-eight to forty.

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the additional maintenance in commission of three battleships, three large and three small cruisers, necessary beyond those to be maintained in commission already provided for in the Fleet Law. This involves a corresponding increase in *personnel*.

A further increase in *personnel* is necessary as the complements of all classes of ships, including torpedo-boats, have to be augmented.

Moreover, an increase in submarines and the acquisition of some airships is contemplated. The submarines, which are still at the present moment without organisation, are to be organised—as regards manning—after the manner of the torpedo-boats.

Comparison of the Amendment with the Fleet Laws, 1900 *and* 1906.

Provisions of the Fleet Law.	Alterations of the Amendment.
I. *Establishment of Ships.*	I. *Establishment of Ships.*
§ 1.	§ 1.
There shall be:—	There shall be:—
1. The Battle Fleet, consisting of—	1. The Battle Fleet, consisting of—
2 Fleet flagships, 4 squadrons, of 8 battleships each, 8 large cruisers as scouts, 24 small ,, ,,	**1** Fleet flagship, **5** squadrons, of 8 battleships each, **12** large cruisers as scouts, **30** small ,, ,,
2. The Foreign Service Fleet, consisting of—	2. The Foreign Service Fleet, consisting of—
8 large cruisers, 10 small ,,	8 small cruisers, 10 small ,,
3. The Material Reserve, consisting of—	
4 battleships, 4 large cruisers, 4 small ,,	
II. *Maintenance in Commission.*	II. *Maintenance in Commission.*
§ 3.	§ 3.
The following principles obtain regarding the maintenance in commission of the Battle Fleet:—	The following principles obtain regarding the maintenance in commission of the Battle Fleet:—
1. The First and Second Squadrons form the Active Battle Fleet, the Third and Fourth Squadrons the Reserve Battle Fleet.	1. **1 Fleet flagship, 3 squadrons of battleships. 8 large cruisers, and 18 small cruisers, form the Active Battle Fleet. 2 squadrons of battleships, 4 large cruisers, and 12 small cruisers, form the Reserve Battle Fleet.**
2. The whole of the Battleships and cruisers of the Active Fleet, and one-half of those of the Reserve Battle Fleet, are to be kept permanently in commission.	2. The whole of the battleships and cruisers of the Active Battle Fleet and **one-quarter** of those of the Reserve Battle Fleet are to be kept permanently in commission.

III. *Establishment of Personnel.* § 4.	III. *Establishment of Personnel.* § 4.
The following proportion of Warrant Officers, Petty Officers, and men of the Seamen, Dockyard, and Torpedo Divisions shall be available—	The following proportions of warrant officers, petty officers, and men of the Seamen, Dockyard, and Torpedo Divisions, **as well as of the Submarine Sections,** shall be available—
1. Full crews for the ships belonging to the Active Battle Fleet, for half of the torpedo-boats, for the school ships, and for the special ships.	1. Full crews for the ships belonging to the Active Battle Fleet, **for the whole of the torpedo-boats and submarines with exception of the Material Reserve of both these classes of boats, for the school ships and for the special ships.**
2. Nucleus crews (two-thirds of the engine-room *personnel*, half of the remaining *personnel* of the full crews) for the ships belonging to the Reserve Battle Fleet, as well as for the second half of the torpedo-boats.	2. Nucleus crews **(one-third** of the engine room *personnel*, **one-quarter** of the remaining *personnel* of the full crews) for the ships belonging to the Reserve Battle Fleet.

The remaining provisions of the Fleet Laws remain unaltered.

With regard to § 4.

In accordance with the Memorandum to the Estimates of 1906 there are to be :—

Altogether	144 torpedo-boats.
Of which ready for use . .	99 with full active service crews.
As Material Reserve . . .	45 without crews.

Nothing is altered in this by the Amendment. The Fleet Law of 1900 provided for seventy-two full crews and seventy-two nucleus crews, making together a total of 116 full crews. Only ninety-nine are required, and the Fleet Law, therefore, demands seventeen full crews too many. Article 3 of the *Amendment* brings the number of crews legally to be held in readiness into line with actual requirements, and therefore reduces the torpedo *personnel* demanded under the Fleet Law by seventeen boats' crews.

It is proposed to demand six submarines every year. With a twelve-years' life, this gives an establishment of seventy-two boats. For fifty-four of these boats active service crews are estimated for; eighteen form the Material Reserve without crews.

CANADIAN NAVAL PROPOSALS.

THE following is the text of the Bill submitted by Mr. Borden to give effect to the proposals of the Canadian Government in "An Act to Authorize Measures for Increasing the Effective Naval Forces of the Empire":—

"His Majesty, by and with the advice and consent of the Senate and the House of Commons of Canada, enacts as follows:—

"From and out of the Consolidated Revenue Fund of Canada there may be paid and applied a sum not exceeding $35,000,000 for the purpose of immediately increasing the effective naval forces of the Empire.

"The said sum shall be used and applied under the direction of the Governor in Council in the construction and equipment of battleships or armoured cruisers of the most modern and powerful type.

"The said ships, when constructed and equipped, shall be placed by the Governor in Council at the disposal of His Majesty for the common defence of the Empire. The said sum shall be paid, used, and applied, and the said ships be constructed and placed at the disposal of His Majesty, subject to terms, conditions, and arrangements to be agreed upon between the Governor in Council and His Majesty's Government."

The Naval Policy of the Canadian Government was announced, amid scenes of the utmost enthusiasm, in the Dominion House of Commons on December 5, 1912, and the very important speech of the Prime Minister is well worthy of being recorded here:—

Mr. Borden said: In addressing the House upon so important a subject as that which I propose to discuss, I shall speak in no controversial spirit. If a portion of my remarks may necessarily controvert opinions which have been expressed by gentlemen on either side of the House, let it be understood that I do so, not by way of criticism, but purely for the purpose of giving frankly to the House the reasons which have led the Government to adopt the course which I shall now outline.

It is not necessary to dwell upon the increasing power and influence of Canada within the Empire, due to its remarkable growth and expansion, and to the wonderful and rapid development of its resources during the past quarter of a century. With this increasing

power and influence there has necessarily come, by sure and gradual steps, a certain development in our relations with the United Kingdom and the other Dominions. The evolution of constitutional relations within the Empire during the past half century has not been less marked than its material progress. In this constitutional development we are necessarily confronted with the problem of combining co-operation with autonomy. It seems most essential that there should be such co-operation in defence and in trade as will give to the whole Empire an effective organisation in these matters of vital concern. On the other hand, each Dominion must preserve in all important respects the autonomous government which it now possesses.

The Imperial Burden.

The responsibility for the Empire's defence upon the high seas, in which is to be found the only effective guarantee of its existence, and which hitherto has been assumed by the United Kingdom, has necessarily carried with it the responsibility for and the control of foreign policy. With the enormous increase of naval power which has been undertaken by all the great nations in recent years this tremendous responsibility has cast an almost impossible burden upon the British Islands, which for nearly a thousand years have exercised so profound an influence upon the world's history. That burden is so great that the day has come when either the existence of the Empire will be imperilled or the young and mighty Dominions must join with the Motherland to make secure the common safety and the common heritage of all. When Great Britain no longer assumes sole responsibility for defence upon the high seas she can no longer undertake to assume sole responsibility for and sole control of foreign policy, which is closely, vitally, and constantly associated with that defence in which the Dominions participate.

It has been declared in the past, and even during recent years, that the responsibility for foreign policy could not be shared by Great Britain with the Dominions. In my humble opinion, adherence to such a position could have but one, and that a most disastrous, result. During my recent visit to the British Islands I ventured on many public occasions to propound the principle that the great Dominions, sharing in the defence of the Empire upon the high seas, must necessarily be entitled to share also in the responsibility for and in the control of foreign policy. No declaration I made was greeted more heartily and enthusiastically than this. It is satisfactory to know to-day that not only His Majesty's Ministers but also the leaders of the opposite political party in Great Britain have

explicitly accepted this principle, and have affirmed the conviction that the means by which it can be constitutionally accomplished must be sought, discovered, and utilised without delay.

The Duty of Canada.

Before proceeding to declare and explain the proposals of the Government, I desire to call attention to certain remarks which I addressed to the House just two years ago in replying to inquiries as to the course we should pursue after attaining power. These remarks were as follows:

> It may be fairly asked what we would do if we were in power to-day with regard to a great question of this kind. It seems to me our plain course and duty would be this. The Government of this country are able to ascertain and to know, if they take proper action for that purpose, whether the conditions which face the Empire at this time in respect of naval defence are grave. If we were in power we would endeavour to find that out, to get a plain unvarnished answer to the question; and if the answer to that question, based upon the assurance of the Government of the Mother Country and the report of the naval experts of the Admiralty, were such—and I think it would be such—as to demand instant and effective action by this country, then I would appeal to Parliament for immediate and effective aid, and if Parliament did not give immediate and effective aid I would appeal from Parliament to the people of the country. Then as to the permanent policy, I think the people have a right to be consulted. I do not know whether I have made my position clear, but I have done so according to my humble capacity. I think the question of Canada's co-operation upon a permanent basis in Imperial defence involves very large and wide considerations. If Canada and the other Dominions of the Empire are to take their part as nations of the Empire in the defence of the Empire as a whole, shall it be that we, contributing to that defence of the whole Empire, shall have absolutely, as citizens of this country, no voice whatever in the councils of the Empire? I do not think that such would be a tolerable condition. I do not believe that the people of Canada would for one moment submit to such a condition. Shall members of this House of Representatives—men representing 221 constituencies of the country—from the Atlantic to the Pacific—shall no one of them have some voice with regard to those vast Imperial issues that the humblest taxpayer in the British Isles has at this moment? It does not seem to me that such a condition would make for the integrity of the Empire, for closer co-operation in the Empire. Regard must be had to these far-reaching considerations. A permanent policy will have to be worked out, and when that permanent policy has been worked out and explained to the people of Canada, to every citizen in the country, then it will be the duty of any Government to go to the people of Canada to receive their mandate and to accept and act upon their approval or disapproval of the policy.

Canadian Mission to England.

The present Government assumed office on October 10, 1911, and met Parliament on November 17th following. It is hardly necessary to point out that there was no opportunity until after the close of the Session to visit Great Britain, or consult the Admiralty in any effective way. Shortly after the Session closed I went to England, accompanied by some of my colleagues, and for several weeks we had the opportunity from time to time of conferring with the British Government, and consulting with technical and expert advisers of the Admiralty, respecting the whole question of naval defence, and especially the conditions which confront the Empire at present and in the early future. I desire to express my warm

Country in defence can receive and assert an adequate voice in the control and moulding of foreign policy. We were brought closely in touch with both subjects when we met the British Ministers in the Committee of Imperial Defence. That Committee is peculiarly constituted, but in my judgment is very effective. It consists of the Prime Minister of Great Britain and such persons as he may summon to attend it. Practically all the members of the Cabinet from time to time attend its deliberations, and usually the more important members of the Cabinet are present. In addition, naval and military experts and the technical officers of the various departments concerned are in attendance. A very large portion of the work of the committee is carried on by sub-committees, which often are composed in part of persons who are not members of the general committee itself, and who are selected for their special knowledge of the subjects to be considered and reported upon. The amount of work which thus has been performed during the past five or six years in particular is astonishing, and I have no doubt that it has contributed largely to the safety of the whole Empire in time of peril.

The committee is not technically or constitutionally responsible to the House of Commons, and thus it is not supposed to concern itself with policy. As so many important members of the Cabinet are summoned to attend the committee, its conclusions are usually accepted by the Cabinet, and thus command the support of the majority of the House of Commons. While the Committee does not control policy in any way, and could not undertake to do so, as it is not responsible to Parliament, it is necessarily and constantly obliged to consider foreign policy and foreign relations for the obvious reason that defence, and especially naval defence, is inseparably connected with such considerations.

A Canadian Minister in London.

I am assured by His Majesty's Government that, pending a final solution of the question of voice and influence, they would welcome the presence in London of a Canadian Minister during the whole or a portion of each year. Such Minister would be regularly summoned to all meetings of the Committee of Imperial Defence and be regarded as one of its permanent members. No important step in foreign policy would be undertaken without consultation with such representative of Canada. This means a very marked advance both from our standpoint and from that of the United Kingdom. It would give us the opportunity of consultation and therefore influence which hitherto we have not possessed. The conclusions and declarations of Great Britain in respect of foreign relations could not fail to be

strengthened by the knowledge that such consultation and co-operation with the Overseas Dominions had become an accomplished fact.

The Problem of Imperial Union.

No thoughtful man can fail to realise the very complex and difficult questions that confront those who believe that we must find a basis for permanent co-operation in naval defence, and that any such basis must afford the Overseas Dominions an adequate voice in the moulding and control of foreign policy. It would have been idle to expect, and indeed we did not expect, to reach in the few weeks at our disposal during the past summer a final solution of that problem, which is not less interesting than difficult, which touches most closely the future destiny of the Empire, and which is fraught with even greater significance for the British Islands than for Canada. But I conceive that its solution is not impossible, and however difficult the task may be, it is not the part of wisdom or statesmanship to evade it. So we invite the statesmen of Great Britain to study with us this real problem of Imperial existence. The next ten or twenty years will be pregnant with great results for this Empire, and it is of infinite importance that questions of purely domestic concern, however urgent, shall not prevent any of us from rising "to the height of this great argument." But to-day, while the clouds are heavy and we hear the booming of distant thunder and see lightning flashes above the horizon, we cannot and will not wait and deliberate until the impending storm shall have burst upon us in fury and with disaster. Almost unaided, the Motherland, not for herself alone, but for us as well, is sustaining the burden of a vital Imperial duty and confronting an over-mastering necessity of national existence. Bringing the best assistance we may, in the urgency of the moment, we come thus to her aid in token of our determination to protect and ensure the safety and integrity of this Empire and our resolve to defend on sea as well as on land our flag, our honour, and our heritage.

[Correspondence between the First Lord of the Admiralty and the Prime Minister of Canada was presented to Parliament subsequently to the delivery of Mr. Borden's speech (Cd. 6689). In a Memorandum of January 23, 1913, it was stated that the suggestion that the proposed battleships could be expeditiously built in Canada could not be "based on full knowledge of the question." Certain facts were then adduced, with the following conclusion: "Taking the above points into consideration, it is clear that it would be wholly unwise for Canada to attempt to undertake the building of battleships at the present moment." In a letter of

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