

### **Fear God & Dread Nought Errata**

Thanks to Jim Broshot, Tony Chandler, Mark Eggert, Steve Eshner, Gabriel Garrido, Chris Heizer, Pat Hreachmack, Brooks Rowlett, Paul Wegner, and Jay Wissmann.

Note: two items in the Table of Contents where "Subject Index" is listed as being on page 6 and "Abbreviations" on page 7. In fact, these two items are reversed with page 6 having the Abbreviations and pages 7 & 8 having the Subject Index.

#### **Rules Book:**

Page 1-4, section 1.5: Delete the reference to *FG&DN* Form 3 – the Aircraft Mission Planning Sheet. It is not needed for the game.

Page 2-4, *Tiger* Sample Ship Reference Sheet: The coincidence rangefinder for the main battery is listed as having a range of 15 kyds. The correct number is 14.5 kyds. The MkV 13.5 in/45 guns fire the Heavy shell (specs in Annex C1), not the light shell.

The information listed in the torpedo section is incorrect. The correct type is Wemouth 21 in MkII\*. It has speeds of 38 kts for 3,800 yards and 25 knots for 10,900 yards. Its warhead inflicts 45 damage points.

Page 2-11, Section 2.6.5, *from Brooks Rowlett*: Regarding the CO who did not turn being court-martialed: In fact, the COs of the 7 lost destroyers, the squadron CO and one division CO, and lead navigating officers were court-martialed. Most of the COs who followed the leader ashore were acquitted, but the COs of the 4 destroyers (not one) that did not turn and the two who only touched ground but got off, were not charged with anything.

After WW II, it became a Navy legend that the ones who did not turn were the ones punished. (*Tragedy at Point Honda*, Vice Admiral Charles Lockwood)

Page 3-2, Ship Acceleration/Deceleration Rates, Notes, fifth line. Change "Changing course 45° or more..." to "Changing course 11° or more..."

Page 3-10, section 3.5.3: Steaming in Marked Channels. The destroyer must have a speed of 20 knots or more to use evasive steering. Increase the ship's speed in the example to 20 knots. The chance of it leaving the marked channel becomes 6 on a D10.

Page 5-8, section 5.2.5.4 Batle Smoke: In the example in the right-hand column, formation A should also use the +1 modifier for the wind blowing the smoke between the LOS.

In the paragraph following the example, in the second sentence, change "...but the Blind Fire Modifier of -30% is applied..." to "...but the Dead Reckoning Modifier of -20% is applied..."

Page 8-1, Critical Hit Table: Some Minor Surface Combatants are armored. Like Major Surface Combatants, their

armor must be penetrated before some criticals can be inflicted. Put an asterisk next to the following Critical Hits: Main Battery, Other Weapon, Flooding, Engineering, and Bridge.

**Page 8-9, 8.2.17 Rudder.** Once the jammed rudder is freed, course changes after moving the required advance are reduced from 45° to 15°. The reduction to 1/3 of the ship's undamaged speed remains in effect

Page 8-11, right column, paragraph describing a Gas Cell Critical Hit. On the line, change "B1" to "B2."

Page 9-5, second column, General Bombardment example. The modifier for visibility (50%) is +10%, not 0%.

Submerged torpedo tubes: These weapons can all be fired in the same turn. It takes two turns (six minutes) to reload each tube, and only one tube can be reloaded at a time. Port and Starboard-firing tubes shared a single space and a common magazine. If there is a bow-firing tube, it is served from this space as well. A stern-firing tube has its own space, since it has to be located near the stern, or it would have to run the length of the ship.

#### **Jumpstart Book:**

During the startup battle, in the 1309 turn (page 4, left column), *Seydlitz* makes a 60° turn, from 170° to 230°. She should have been assessed a -15% modifier on her gunnery that Turn, but was not. The correct total modifiers (after dividing by two) is -5%, which makes the modified chance to hit 10% instead of 17%.

#### **Annex Book:**

At the end of the left-hand column on page one, change "There are no Annexes G, Radars, or H, Sonars" to "There is no Annex G Radars."

#### **Annex A**

**Note:** Many of the size classes for ships are incorrect. The Table on page 2-6 of the rules and page 3 of the Player's Handbook is correct, and the size classes there should be used.

#### **Austria-Hungary**

Page A-1 *Wien* class: Add to remarks:

- 10 Dec 17 *Wien* sunk at anchor in Bay of Trieste by *MAS 9*.
- Mar 18: *Budapest* decommissioned to serve as accommodation ship for Pola submarine base.
- May-Jun 18: *Budapest* had forward turret removed, replaced with F(1)1 38cm/17 howitzer for planned shore bombardment, which never took place.

Add the following classes:

**Kaiser Karl VI** **CR**  
**Displacement:** 6166 n **In class:** 1  
**Size Class:** B **In Service:** 1900  
**Propulsion:** Coal Recip **Crew:** 475  
**Weapons:** **Armor Rtnng:** 15/6  
F/A(1)2 Krupp 24cm/40 **C**  
Casemate(1)8 15cm/40 **C**  
P/S(1)2 45cm deck TT w/1 A100/450 torp **E**  
**Lt Btry:** (1)16 Skoda 47mm/44,  
(1)2 Hotchkiss 47mm/33 **(3.0)**  
**Remarks:**  
Armored Cruiser.  
• 1916: 17cm/50 AA added.  
**Damage and Speed Breakdown:**  

<b>Dam Pts:</b>	0	42	85	127	152	169
<b>Surf Speed:</b>	22	17	11	6	0	Sinks

**Zenta** **CL**  
**Displacement:** 2313 n **In class:** 3  
**Size Class:** B **In Service:** 1899  
**Propulsion:** Steam Recip **Crew:** 308  
**Weapons:** **Armor Rtnng:** 3/2  
F/PW/SW/P/S/PA/SA/A(1)8 12cm/40 **C**  
P/S(1)2 40cm deck TT w/1 Fiume 14 in short torp **E**  
**Lt Btry:** (1)8 Skoda 47mm/44,  
(1)2 Hotchkiss 47mm/33 **(2.1)**  
**Remarks:**  
*Zenta, Aspern, Szigetvar.*  
• 16 Aug 14: *Zenta* sunk  
• 1918: *Aspern, Szigetvar* disarmed. Served as an accommodation ships.  
**Damage and Speed Breakdown:**  

<b>Dam Pts:</b>	0	27	54	80	96	107
<b>Surf Speed:</b>	27	20	13	7	0	Sinks

Page A-2, Modified *Admiral Spaun*. Change “an unknown number of mines” to “120 mines.” Change the torpedo from “A150/450(H)” to “A100/450(H).”

Page A-3, *Tb VII* class: Add to remarks:  
• Late 15: *Tb 14* modified. Aft torpedo tube replaced by Lohner seaplane (probably a Type L flying boat) and a crane allowing her to place it on the water and recover it.  
• 5 Oct 17: Mutinous crew members defected with *Tb 11* to Italy. Entered Italian service under name *Francesco Rismondo*.

France

Page A-4, *Normandie*: Change “M1910 5.4in/55” to “M1910 138mm/55.” This is how the gun is listed in Annex C1.

Page A-5, *Bretagne* carries 12 M1912 torpedoes, not 24. Change “M1910 5.4in/55” to “M1910 138mm/55.” This is how the gun is listed in Annex C1.

Page A-5, *Courbet*. Change “M1910 5.4in/55” to “M1910 138mm/55.” This is how the gun is listed in Annex C1. Add to the remarks: “Casemate battery can fire three guns into the Bow and Quarter arcs (Section 2.1.1.5).”

Page A-5: *Danton*: The M1902 240mm/50 is the same as the M1902-06 240mm/50 listed in Annex C1.

Page A-6, *Leon Gambetta*. In the second line of the remarks, change “torpedoes” to “torpedoed.”

Page A-6, *Amiral Aube*. There are five units in the class, not four. The fifth is *Sully*.

Page A-6, *Amiral Aube*. Change number in service from 4 to 5. Add the name “*Sully*” to the list of ship names in remarks. Add to remarks: • Feb 1905: *Sully* wrecked in Along Bay in Indo-China.

Page A-7, *Gueydon*. In the second line of the remarks, change “torpedoes” to “torpedoed.”

Page A-8, *Amiral Charner*. Delete the last line of the remarks, referring to *Democratie*. This ship is not one of the *Amiral Charner* class. “Beruit” should be “Beirut.”

Page A-8, *Arabe* class: Change the number of torpedoes carried for each mount from 1 to 4. Add to the remarks, “Carries a total of 8 torpedoes.”

Page A-9, *Enseigne Roux* class: On the third weapons line change “w/1 Model 1906 torp” to “w/2 Model 1906 torp.”

Page A-9, *Bisson* class: Delete the remarks. They accidentally repeat the remarks for the *Boucilier* class. On the third weapons line change “w/1 Model 1906 torp” to “w/2 Model 1906 torp.”

Page A-9, *Boucilier* class: On the third weapons line change “w/1 Model 1906 torp” to “w/2 Model 1906 torp.”

Page A-13, *Morse* class: Change “carried n external cradles” “carried in external cradles.”

Germany

Page A-16, *König* class: Change “Narkgraf” to “Markgraf.” Add to remarks:

- 5 Nov 16 *Kronprinz* and *Grosser Kurfürst* torpedoed by British submarine *J1*, under repair until 6 Dec 16 (*K*) and 10 Feb 17 (*GK*).
- 5 Mar 17 *Kronprinz* collided with her sister ship *Grosser Kurfürst*, under repair until 14 May 17 (*K*) and 27 Apr 17 (*GK*).

Page A-16, *Kaiser* class: Change the Lt Btry rating from 6.6 to 9.1.

Page A-18, *Moltke* class: In the remarks, change “*Yavuz Sulatan Selim*” “*Yavuz Sultan Selim*.” Also, in the remarks, change “torpedoed by *E 42*” to “damaged by torpedo from *E 42*.”

Page A-18, *Scharnhorst* class: For the casemate 15cm/40 guns, delete the “QF.” The correct Light Battery Value is 14.8, not 20.5. Add this to the Remarks: The 21 cm casemate guns can be fired as part of the main battery (or separately), but because they cannot elevate as far, the

casemate guns cannot fire into the extreme range band. The damage point rating is also incorrect. The correct values are 0/66/131/197/236/262

Page A-19, Coln class. Change the spelling to "Cöln."

Page A-20, *Kolberg* class: The first two weapons lines are incorrect. The second line should be deleted. She has a total of 12 10.5cm guns. The first line should read: PW/SW/P/S/PA/SA(1)12 10.5cm SKL/45.

Page A-20: *Bremen*. Replace "*Bremen* and *Lübeck* had (1)2 15cm/45 QF and (1)6 10.5cm/40 and /45. *Lübeck* also fitted with (1)2 50cm deck TT and 4 torp." With "*Bremen* and *Lübeck* had F/A(1)2 15cm/45 QF and Casemate(1)6 10.5cm/40 and /45 for main and secondary battery. *Lübeck* also fitted with P/S(1)2 50cm deck TT and 4 torp."

Page A-21, *V99* class: Change the third weapons line from "PB/SB (1)1 50cm deck TT" to "PB/SB (1)2 50cm deck TT"

Page A-22, *B97* class: Change the number in service from 8 to 2.

Page A-23, *S13* class: Change the torpedo armament to P&S(1)2 and PB/SB(1)2 50cm deck TT.

Page A-23, *G7* class: Change the torpedo armament to P&S(1)2 and PB/SB(1)2 50cm deck TT.

Page A-23, *V1* class: Change the torpedo armament to P&S(1)2 and PB/SB(1)2 50cm deck TT.

Page A-24, *G137* class: Change the number in service from 5 to 1.

Page A-25, *S138* class: Change the number in service from 11 to 12.

Page A-30, *UC80* class: Change the Type from "SSCML" to "SM."

Page A-30, *UC16* class: Change the Type from "SSCML" to "SM."

Page A-30, *UC1* class: Change the Type from "SSCML" to "SM."

Add this ship. It is needed for the Gulf of Finland scenario:

### Deutschland

**Displacement:** 2882 grt

**Size Class:** C

**Propulsion:** Coal Recip

**Weapons:**

P/S(1)4 8.8cm SKL/40

F/A(1)2 8.8cm Flak L/35

2 Mine Rails w/200 Mines total

**AA Btry:** (1)2 8.8cm Flak L/35

**Lt Btry:** (1)2 5cm SKL/40

**Remarks:**

German Ferry taken over as auxiliary minelayer in 1914.

Merchant ship design, special damage modifier of -50%.

**AML**

**In class:** 1

**In Service:** 1914

**Crew:** ???

**Armor Rtnng:** 0

**C**

**C**

**—**

**(2.0)**

**(0.7)**

Number of mines estimated.

### Damage and Speed Breakdown:

<b>Dam Pts:</b>	0	7	14	21	25	28
<b>Surf Speed:</b>	14	11	7	4	0	Sinks

Great Britain

Data on the torpedo quantities is from the Royal Navy official 1921 wargame rules,

Page A-33, *Revenge* class: Carries a total of 20 torpedoes.

Page A-33, *Queen Elizabeth* class: Carries a total of 20 torpedoes.

Page A-33, *Erin* class: Carries a total of 16 torpedoes.

Page A-33, *Agincourt* class: Change 3 in/45 to 12 pdr/18cwt QF MkI

Page A-34, *Iron Duke* class: Carries a total of 20 torpedoes.

Page A-34, *King George V* class: Carries a total of 14 torpedoes.

Page A-34, *Orion* class: Change the arc for the main battery from "2/3P&S/A" to "F/3P&S/A". Change 7 torpedoes carried to 14 total.

Page A-34, *Colossus* class: Change the MkXI 12 in/50 to MkXI 12 in/45. Carries a total of 14 torpedoes.

Page A-34, *Neptune* class: Change the MkXI 12 in/50 to MkXI 12 in/45. Change "P/S/Stern(1)3 18 in subm TT w/? RGF 18 in MkVII torp total" to "P/S(1)2 18 in subm TT w/12 RGF 18 in MkVII torp total."

Page A-34, *St. Vincent* class: Change the MkXI 12 in/50 to MkXI 12 in/45. Change "P/S/Stern(1)3 18 in subm TT w/? RGF 18 in MkVII torp total" to "P/S(1)2 18 in subm TT w/9 RGF 18 in MkVII torp total."

Page A-35, *King Edward VIII*. In the Remarks section, delete "Being built by Chile, purchased by Britain." The 6 in deck guns referred to in the 1916-18 refit are MkVII BL 6 in/45.

Page A-35, *Formidable/London/Queen* class: Add to the Remarks: • 26 Nov 14: *Bulwark* destroyed by an accidental explosion while loading ammunition at Sheerness. The class carried 14 18 in torpedoes and 5 14 in torpedoes for its picket boat.

Page A-36, *G3* class: Change In Service from 1920 to 1923. In the Remarks, change Nov "18" to "18 Nov 20." Change the Lt AA Battery rating from 66 to 24.2.

Page A-36, *Hood* class: Carries a total of 20 torpedoes. Change the secondary armament from "P/S(2)6 MkI BL 5.5 in/50" to "P/S(1)12 MkI BL 5.5 in/50." Change the Area AA rating from 2.5 to 3.3.

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Page A-36, *Renown* class: Carries a total of 10 torpedoes.

Page A-36, *Tiger* class: Change the main battery arc from F/A to F/P&S/2A. This reflects the remarks regarding B turret's inability to fire over A turret.

Change "Lt AA Btry: 5 .303 Maxim mg" to "AA Battery: 2 Mkl 3 in/20cwt, 5 .303 in Maxim MG."

Page A-37, *Lion* class: Carries a total of 14 torpedoes.

Page A-37, *Indefatigable* class: Carries a total of 18 torpedoes. In the remarks, change "• 1915: Stern TT removed" to "• 1915: Stern TT removed, carries a total of 12 torpedoes."

Page A-37, *Courageous* class: Carried a total of 10 torpedoes as built. In the remarks, change "P/S(2)6 fixed 21 in fixed TT" to "P/S(2)6 fixed 21 in fixed TT w/2 RNTF 21 in MklIV torp."

Page A-38, *Lord Clive* class: First line: Change "*Lord Crau furd*" to "*Lord Craufurd*."

Page A-39, *Warrior* class: Change The MkX 9.2in/45 listed in Annex A to MkX 9.2in/47.

Page A-39, *Duke of Edinburgh/Black Prince*. Change MkIX 9.2 in/45 to MkX 9.2in/47.

Page A-39, *Devonshire* class: Add to Remarks: • 5 Jun 16: *Hampshire* mined off the Shetlands.

Page A-41, *Chatham* class: Change 7 Weymouth 21 in torpedoes to 8 Weymouth 21 in torpedoes.

Page A-41, *Weymouth* class: Add to remarks: • 19 Aug 16: *Falmouth* torpedoed by *U-66* and damaged, torpedoed and sunk by *U-52* the next day while under tow.

Page A-43, *Vindictive* class: Carries a total of 9 torpedoes for her submerged 21 in torpedo tubes.

Page A-47, Talisman class: Change "PA/SA/2P&S" to "PW/SW/2P&S."

Page A-53: The Mersey Ferry: Change the ship type from LKA(?) to AP.

Page A-53: Carmania: Change the 4.7 in gun arcs to PW/SW/2P/2S/PA/SA.

Page A-53, *Otranto*: Propulsion Type is Steam Recip. Number in class is two. Add "*Otranto, Otway*," to the remarks, and "• 22 Jul 17: *Otway* sunk by U-boat." Change the 4.7 in gun arcs to PW/SW/2P/2S/PA/SA. Change damage points to 23/45/68/81/90.

#### Italy

Page A-54, Garibaldi class: Delete the remarks referring to *Amalfi* and *Pisa*. On the last line of the remarks, change "Sunk by..." to "*G. Garibaldi* sunk by..."

Page A-55, *Bixio* class: Change "450mm deck TT w/A115/450 torp" to "450mm deck TT w/3 A115/450 torp." In the Remarks, add, "Carries 3 torpedoes for each 450mm tube, one ready to fire, two as manual reloads, 10 min per torpedo."

Page A-56, *Sirtori* class. Change the name to "Sirtori."

Page A-56, *Soldati* class: Change the Annex Reference for the 12 pdr/12cwt QF Mkl gun from "C" to "C/GB"

Page A-57, Ex-Austrian TbVII: Add to remarks: "Named *Francesco Rismondo* by the Italians."

Page A-59, *Atropo* class: In the Remarks, delete the two lines referring to *Medusa* and *Jalea*. These refer to another class.

Page A-62, *MAS 1-2* class: On the second line of the remarks, change "5ts" to 5 kts."

#### Japan

Page A-62, *Kongo* class: Change "w/16 Type 44 No.1 21 in torp" to "w/24 Type 44 No.1 21 in torp total."

Page A-62, *Ibuki* class: Change "w/12 Type 42 18 in torp" to "w/9 Type 42 18 in torp total."

Page A-63: *Asakaze* class: Delete the remarks. They refer to another class.

#### Russia

Page A-63, *Imperatritsa Mariya* class: Change the number in class from 4 to 3.

Page A-64: *Pantaleimon/Potemkin* class: The correct spelling of its former name is KNAIAZ... not KNAZ....

Page A-64: *Borodino (Slava)* class. In the remarks, change Gernam" to "German."

Page A-64: *Tsearevich* class: Add to the remarks: "• 1906: Casemate battery reduced to 10 M1891 75mm."

Page A-64: the correct spelling of the *Rotislav* class is "*Rostislav*."

Page A-65: *Imperatsria Ekaterina* class: In the third line of the Remarks, change "*Sinop*" to *Sinope*."

Page A-65: The proper spelling of the *Muravev Amurski* class is "*Muraviev Amurski*."

Page A-66: *Kerch* class. Crew 172. Change the speed from 33 knots to 27/20/14/7/0 kts.

Page A-66: *Izyaslav* class: Change the number of mines carried from 60 to 80.

Page A-66: *Leitenant Illin/Orfej/Gavril* class: Change the number of mines carried from 60 to 80.

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Page A-67, *Khrabri* class: Delete first line of the remarks. It refers to another class.

Page A-69, *Krab* class: Change the type from "SSML" to "SM."

Add the following ship. It is needed for the Gulf of Finland scenario:

**Gromoboi** **CR**  
**Displacement:** 13220 n **In class:** 1  
**Size Class:** B **In Service:** 1900  
**Propulsion:** Coal Recip **Crew:** 877  
**Weapons:** **Armor Rtnng:** 12/5  
PW/SW/PA/SA(1)4 M1892 203mm/45 **C**  
PW/SW/4P/4S/PA/SA(1)12 Canet 1892 152mm/45 **C**  
Casemate(1)10 Canet 1892 152mm/45 **C**  
P/S(1)4 38cm subm TT w/1 M1898 torp **E**  
**Lt Btry:** (1)19 M1891 Canet 75mm/50,  
6 M1901 47mm/50 **(14.0)**

**Remarks:**

Armored cruiser. Specs as of 1906 refit.

• 1916-17: PW/SW/PA/SA 6 in replaced by F/A(1)2 203mm/45 and 4 M1915 76mm/30 AA (AA Strength 3.5).

**Damage and Speed Breakdown:**

<b>Dam Pts:</b>	0	72	143	215	257	286
<b>Surf Speed:</b>	20	15	10	5	0	Sinks

Add the following ship. It is needed for the Battle of Cape Sarych scenario:

**Almaz** **ACV**  
**Displacement:** 3285 n **In class:** 1  
**Size Class:** C **In Service:** 1903  
**Propulsion:** Coal Recip **Crew:** 336  
**Weapons:** **Armor Rtnng:** 0  
F/PW/SW/2P/2S(1)7 Canet 1891 120mm/45 **C**  
4 seaplanes **B**  
**Area AA Btry:** (1)4 75mm AA **(3.6)**

**Remarks:**

Armed yacht converted to seaplane carrier. Configuration as of transfer to the Black Sea Fleet in 1911. Special damage modifier of -50% for merchant construction.

**Damage and Speed Breakdown:**

<b>Dam Pts:</b>	0	10	21	31	37	41
<b>Surf Speed:</b>	19	14	10	5	0	Sinks

United States

Page A-70, *Tennessee* class: Change the armor rating from 12/4/75 to 30/8/75.

Page A-71, *Nevada* class: Change "2 Mk10 torp total" "8 Mk10 torp total."

Page A-71, *New York* class: Change "4 Mk8 torp total" "12 Mk8 torp total."

Pages A-71 to A-72, US Battleships and Old Battleships: many of these classes were refitted with 2 3 in/23 AA guns. There were Mk11 or Mk14 guns, with a combined area AA rating of 2.5

Page A-71, *Connecticut* class: Add to remarks: "• 29 Sep 18: *Minnesota* damaged by mine."

Page A-72, *Kearsarge* Class. On the second weapons line, change "Mk38 in/35" to "Mk3 8 in/35."

Page A-72, *Indiana* class: Add to the Remarks: "All in US Waters as training ships during WW I."

Page A-72, *Clemson* class: On the second weapons line, change "Mk7 3 in/23" to "Mk11 3 in/23." Add an Area AA Btry: (1)1 Mk11 3 in/23 **(1.2)**

Page A-72, *Wickes* class: Change the Lt AA rating from 3.0 to 1.3. The 3 in/23 described in the remarks section are the Mk11. Change the associated Area AA Battery rating from 2.1 to 1.2.

Page A-72, *Caldwell* class: Change the Lt AA rating from 3.0 to 1.3. The 3 in/23 described in the remarks section are the Mk11. Change the associated Area AA Battery rating from 2.1 to 1.2.

Page A-73, *Sampson* class: Change the Lt AA rating from 3.0 to 1.3.

Page A-74, K class: Delete the sentence in the Remarks section referring to H4 – H9. It refers to another class.

Annex B2

Insert this at the beginning of the Annex: "**General Note:** All of the airships in this Annex use Hydrogen gas in their envelopes. Helium was first used in US airships in 1923, and was only used in US airships."

Great Britain

Page B2-2, 23 class: 18 cells. Add to Remarks: No 23 successfully tested at end of war with two Sopwith Camels which could be dropped and flown (but not recovered). Also tested with one 2pdr in place of 2MG. No 24r never exceeded 34 knots. No 25r unstable, used mostly for training

Page B2-2, 23X class: 18 cells.

Page B2-2, C Star (or Coastal Star) class: 3 cells. Armament 1 Lewis mg, 2 230 lb and 2 100 lb bombs. Crew 4, radio equipped. Endurance 20 hours (but crew fatigue made most patrols 10-12 max

Page B2-2, Coastal Airship: 3 cells. Crew: 4, later 5 (gunner added to man second Lewis). Armament 2 Lewis, but only one manned at a time until 5th crew member added in May 17. Radio equipped. Endurance 20 hours (but crew fatigue made most patrols 10-12 max).

Page B2-2, No. 2 (Willows): Also known as HMA 2. Training airship, dual controls, total crew 3, envelope recycled February 1915 into SS.1 (B.E. 2c). 1 cell.

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Page B2-2, No 3 (Astra Torres): 1 cell.

Page B2-2, No. 4 (Parseval): 1 cell. Armament: 1 MG

Page B2-2, No 9: 17 cells.

Page B2-2, No. 17 (Beta): HMA.17 1 cell. Radio equipped. Training and observation, at one point spotted for Belgian artillery. Deleted 1916.

Page B2-2, No. 18 (Gamma): 1 cell HMA.18. Deleted May 1916

Page B2-2, No. 19 (Delta): 1 cell. HMA.19.

Page B2-2, No. 20 (Eta): In the Remarks, delete "Car is B.E.2c fuselage." 1 cell.

Page B2-2, North Sea Airship: Crew 10 - two watches of 5 - allowing 48+ hours endurance. Armament max 5 MG, normal 3. Up to 6 x 230 lb bombs. Radio equipped. 3 cells.

Page B2-2, Parseval Airships (Vickers): 1 cell. Armament: 1 MG

Page B2-2, SR-1: 1 cell, two engines, crew 8, max speed 40 knots, endurance 24 hours. Italian M class airship, flown over France to the UK late September 1918, refitted, no wartime patrols.

Page B2-3, SS Airship/B.E.2c: In the Remarks, change "Car is Maurice Farman fuselage" To "Car is B.E.2c fuselage." Armament 8 15 lb or 1 112 lb bombs. Crew 2. 1 cell

Page B2-3, SS Airship/Farman: In the Remarks, change "Car is Armstrong Whitworth fuselage" To "Car is Maurice Farman fuselage." Crew 2, later 3, 1 cell.

Page B2-3, SS Airship/Whitworth: In the Remarks, add "Car is Armstrong Whitworth fuselage." Crew 2 ,1 cell.

Page B2-3, SSP: Crew 3, radio equipped, 1 cell.

Page B2-3, SST: Crew 4-5, Radio equipped, 1 cell.

Page B2-3, SSZ: Crew 3, radio equipped, 1 cell, two 65 lb or one 230 lb bomb.

Germany

Page B2-3, L1: 18 cells

Page B2-3, L3, L4 classes : 18 cells

Page B2-3, L10 class: 16 cells

Page B2-3, L20 class: 18 cells

Page B2-3, L30 class: 19 cells

Page B2-3,4, L42, L43, L44, L46, L 48 class: 18 cells

Page B2-4, L53 class: 14 cells

Page B2-4, L57 class: 16 cells

Page B2-4, L70 class: 15 cells

Page B2-4, L9: 15 cells

USA

All US blimps have 1 cell.

#### Annex C2 - Antiaircraft Guns

Add the US Mk11, 14 3 in/23 with a bore of 76.2mm, a caliber of 23, a max altitude of 5940 m, a max range of 3.5 nm, an AA rating of 0.81, and it has a naval application.

#### Annex E1 – Torpedoes

**On page E1-4, there are two entries for the British RNTF 21 in MkIV. The first entry should be for the MkIII, not the MkIV.**

#### Annex L1 – Conversion Factors & Scales

About halfway down the page, on the line referring to Warships built to mercantile standards, change "wantertight" to "watertight."

Under calculating warhead damage points, for above water, the second line is missing the operator. It should read "Warheads  $\geq$  325 kg = Warhead weight/6"

Under AA strengths, change:

Light and Area AA Strengths are calculated in the same way. Total the number of barrels of a particular caliber and divide it by the AA divisor in Annex C for that weapon. If no divisor is listed, the gun cannot fire at aircraft targets.

to

Light and Area AA Strengths are calculated in the same way. Total the number of barrels of a particular caliber and multiply it by the AA multiplier in Annex C for that weapon. If no multiplier is listed, the gun cannot fire at aircraft targets.

#### Annex M – WW I Ship Classifications

Patrol Vessels

Add "CMB – Coastal Motor Boat"

Add "PT – Patrol Torpedo Boat"

Mine Warfare Vessels:

Change "M/L" to "ML"

Change "M/S" to "MS"

Submarines:

Add "SSC – Coastal Submarine"

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Auxiliaries:

Add "ACV – Auxiliary Aircraft Carrier"

Add "ARS – Submarine Repair Ship"

Add "AML – Auxiliary Minelayer"

Add "AVM – Auxiliary Seaplane Carrier"

### High Seas Fleet Booklet

Page 26, Colonial Convoy: As written, the scenario calls for calls for several generic merchants but does not provide their characteristics. Here are generic specifications for those ships:

	Size Class	Displ. (tons)	Dam Pts.	Speed Kts
15 Med. transports	C	3000	38	10
2 Lg. transports	B	9000	90	15
7 Lg. cargo	B	6000	69	12
8 Med. cargo	C	4000	50	12

In the Operational Situation, change "...far-flung British colonies..." to "...far-flung British dominions and colonies...". Technically, since Canada is a dominion, it should be "Dominion Convoy," but it sounds all wrong.

Page 58-59, Battle off Durazzo

Allied Force 1:

The actual French destroyers were *Casque*, *Bisson*, *Renaudin*, *Commandant Bory*, *Commandant Lucas*

Allied Force 2:

The actual Italian Destroyers were: *Abba*, *Nievo*, *Mosto*, *Pilo*.

Austrian Group 1:

The torpedo boats with *Kaiser Karl VI* are *Tb 70T*, *Tb 71T*, *Tb 80T*, *Tb 81T*.

Suggested Variation: Add Austrian Group 4, consisting of *Budapest* (*Wien* class), *Aspern* (*Zenta* class) and *Novara* (modified *Spaun* class).

They can be colocated with Group 3, or alternately are at Cattaro but are at inport steaming status per rule 3.7 and must raise full steam to depart, taking an additional 10 Tactical Turns to exit Cattaro and appear at the Group 3 start point.

Page 65, The Run to the South. At the top of the right-hand column of page 65, delete the special rule referring to the optional coincidence rangefinder rules. They do not exist.

### Ship Reference Sheet (FG&DN Form 1)

The blank ship reference chart has 50% vs. Belt and 50% vs. Deck armor for Long Range. It should be 70% vs. Belt and 30% vs. Deck. A corrected Form 1 is available on the Clash of Arms website ([www.clashofarm.com](http://www.clashofarm.com)) as a .pdf document)

### Counter Sheet

HMAS *Australia* should have an Australian flag on its counter, not a White Ensign.

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# Lack of Direction? - Director Fits for *FG&DN*

[Taken from *The Naval SITREP*, issue 23, October 2002]

By Chris Carlson

During the development of *Fear God & Dread Nought (FG&DN)*, there were a number of important historical issues that we tried very hard to translate into the rules. One of these dealt with the significant advances in long-range gunfire control that began around 1910 in virtually all navies. In particular, we wanted to show the difference between those systems that could automatically determine range rate and bearing rate, such as Pollen's Argo range clock and the MkIV Dreyer Table, and those that couldn't.

To cut to the chase, we did provide all the necessary rules to account for the various types or modes of fire control on pages 6-1 and 6-2 in the *FG&DN* rules booklet. But what we forgot to include in either the rules or in Annex A was which ships had which type of system and how many directors did a ship have for its primary and secondary batteries. The only answer that we could give once we realized that we had dropped the ball on this was to hit our foreheads and say, to quote Homer Simpson, *DOH!*

How this could have happened wasn't all that hard to figure out, now that we knew where to look. Basically, it was the case of being too close to a project for too long - we couldn't see the forest for the trees and our numerous reviews kept looking at those leaves that had caused us the most trouble during the game design phase. We aren't trying to make any excuses for screwing up, rather we acknowledge this error on our part and the need to fix it.

This article provides the missing data needed to play out this interesting and significant facet of the Great War at sea. Because of space constraints, this will not be an in-depth discussion of the types of fire control equipment used by the various navies. [*Ed Note: much as Chris would love to*] Rather, it will just list the general types of fire control used by a particular nation, or

class of ship, along with the number of primary and secondary directors and roughly when they were fitted.

## Director Fits

For the most part, the navies of WW I allocated directors to their ships uniformly. The largest exception also happens to have been the largest navy during the war - Great Britain's Royal Navy (more on that in a moment).

Virtually every navy that saw action in WW I began installing directors on their ships between 1908 and 1912. Thus, the installation and procedures on how to use directors were already thoroughly integrated in to each nation's fleet by the beginning of WW I in August 1914. The typical director fit based on ship type is listed as follows in the Director Table below.

While there is a lot of good data on dreadnought director fits, the same cannot be said of pre-dreadnoughts. From the limited data available, it would appear that only those pre-dreadnoughts that were built after 1900 were ever backfitted with directors. While this was not universal in all navies, it is a reasonable assumption for the purposes of playing *FG&DN*.

There is little data on when smaller ships received their directors. For the most part, it seems that the Germans fitted directors and fire control equipment on their *Scharnhorst* and *Blücher* classes of armored cruisers and light cruisers early on (before 1914). Treat *Blücher* as a battlecruiser for the purposes of director fit. The Royal

Navy and most of the Allied nations, with the possible exception of Russia, did not fit directors on their light cruisers until 1916-1917. Based on almost a complete lack of data, it appears that Allied armored cruisers, again with the possible exception of Russia, were not fitted with directors.

Destroyers are even more difficult to pin down. While there is information that states destroyers had directors, there is very little on when they received them. As with light cruisers, German, Austro-Hungarian and Russian destroyers appear to have received directors before the other navies. It is reasonable to assume that the RN and the other Allied navies didn't install directors on their destroyers until 1916-1917.

Each director has all the necessary equipment and personnel to sight/aim the guns on a particular target and either issues firing orders to the guns or fires the guns remotely. The business of collecting target data and calculating the firing information for the guns is done in a central fire control position that is usually separate from the director itself.

There is little to distinguish the performance of one fire control philosophy and technology from another. Although considerable debate has gone on over the years arguing that a particular navy's director scheme was better than the another, there is little difference between most fire control approaches in terms of the number of hits achieved during battle. Therefore,

## DIRECTOR TABLE

<u>Ship Type</u>	<u>Main Battery (No. and Arc)</u>	<u>Secondary Battery (No. and Arc)</u>
BB, BC, BCL	1 - Fwd, 1 - Aft	1 - Port Side, 1 - Stbd Side
OBB, BM, OBM	1 - Fwd	1 - Port Side, 1 - Stbd Side
CR, CL, CM, CS	1 - Fwd	Uses Main Director
OCR, AMC	None	None
DD, DDL, DM	1 - Fwd	None
ODD, TB	None	None
PC, PG, CMB	None	None
SS, SC, SM, OSS	None	None
Auxiliaries, Merchants	None	None

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**Table 1: DIRECTOR INSTALLATION DATES (LATEST) FOR CAPITAL SHIPS AND MONITORS, 1910 TO 1916**

	1910 to 1913	1914 August	1915 May	1915 December	1916 May	1916 December
			<i>Invincible</i>		<i>Dreadnought</i>	
			<i>Superb</i>		<i>Indomitable</i>	
				<i>St. Vincent</i>	<i>Inflexible</i>	
					<i>Bellerophon</i>	
					<i>Téméraire</i>	
					<i>Vanguard</i>	
					<i>Collingwood</i>	
<i>Neptune</i>				<i>New Zealand</i>	<i>Indefatigable</i>	
					<i>Australia</i>	
				<i>Colossus</i>		
				<i>Hercules</i>		
<i>Thunderer</i>	<i>Monarch</i>	<i>Conqueror</i>	<i>Orion</i>			
		<i>Lion</i>	<i>Queen Mary</i>		<i>Princess Royal</i>	
<i>Ajax</i>	<i>King George V</i>					
	<i>Centurion</i>					
	<i>Iron Duke</i>	<i>Benbow</i>				
	<i>Marlborough</i>	<i>Emperor of India</i>				
		<i>Tiger</i>				
		<i>Queen Elizabeth</i>				
		<i>Warspite</i>			<i>Malaya</i>	
					<i>Barham</i>	
					<i>Valiant</i>	
					<i>Revenge</i>	<i>Resolution</i>
					<i>Royal Sovereign</i>	<i>(Ramillies</i>
					<i>Royal Oak</i>	<i>June 1917)</i>
				<i>Canada</i>		<i>Erin</i>
						<i>Agincourt</i>
						<i>Repulse</i>
						<i>Renown</i>
						2 monitors
				14 monitors		
<b>Installations per period</b>	3	5	9	21	16	7
<b>Total Installations</b>	3	8	17	38	54	61

with the exception of the Arthur H. Pollen's automatic Argo range clock, all other director concepts and equipment are treated as having identical performance in *FG&DN*. The only countries that did use the Argo range clock, or a system similar to it, were Great Britain, Russia and the United States.

### Fire Control Systems The Royal Navy

Great Britain's Royal Navy (RN) had a difficult time making up its mind on which fire control system, Arthur Pollen's or Frederic Dreyer's, the fleet would use and it had a difficult time getting sufficient sets made to outfit all of the capital ships. By the beginning of

the war, just over a quarter of the RN's dreadnoughts had a director for their main batteries and none of them had directors for their secondary batteries. And of these, only *Queen Mary*, *Conqueror*, *Centurion*, *Ajax* and *Orion* had an Argo range clock as part of their fire control system. However, many of the RN's later battleships and battlecruisers were fitted with the MkIV/IV\* Dreyer table that also provided range rate and bearing rate information automatically. The classes of ships thus fitted include *Queen Elizabeth*, *Revenge*, *Lion* (after 1916), *Tiger*, *Renown*, *Courageous* and all but one of the *Iron Duke* class (*Marlborough* had a MkI Dreyer table). Of note, the Dreyer-

Elphinstone clock used in the MkIV/IV\* bore a striking resemblance to Pollen's Argo clock and would be the major point of a patent infringement trial in 1925.

The main director issue was almost completely remedied by the Battle of Jutland, with only *Agincourt* and *Erin* still lacking the equipment, however, all of the dreadnoughts still lacked secondary battery directors even at this late date. Unfortunately, due to either funding constraints or the waxing and waning of the influence of the director lobby, all battleship classes after the *Orion* class and all battlecruisers after the *Lion* class have only one main director forward. The date of installa-

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tion of the main battery director (the Scott Director) is listed in a table taken from John Brook's article in *Warship 1996* entitled *Percy Scott and the Director*, on page 168.

The secondary director problem would finally be addressed after the Battle of Jutland, starting in November 1916 when the Royal Navy began a crash program to outfit their dreadnoughts with secondary battery directors. Those ships with 6-inch casemate batteries received the secondary directors first, followed by other ships as they came in for refit with the process completed by July 1918.

### Imperial Russian Navy

While Russia had its own producer of fire control equipment in the competent Geisler & Co. located in St. Petersburg, the Russian Navy was nonetheless intrigued by the claims of Arthur Pollen. After technical discussions in late 1913, the Russian Navy purchased four sets of instruments that were subsequently installed on the four *Gangut*-class battleships. Thus, only the forward main director on these battleships will get the Pollen type fire control bonus. The after main director is of purely Russian manufacture and the fire control bonus is not applicable.

### United States Navy

The U.S. Navy largely followed the Royal Navy in their concept of the director, although there were some differences as to when certain functions, such as single key or centralized firing of the guns was adopted. As the possibility of the United States becoming directly involved in the great European war loomed larger, the U.S. Navy ordered large numbers of the Ford Rangekeeper MkI which was very similar in operation to Pollen's Argo range clock. Initially accused of patent infringement by Pollen, Ford engineers were able to satisfy the British inventor that their approach was of Ford's own development. The first order for the Ford Rangekeepers (Mks I and II) was let in late 1916, and by the end of hostilities over 930 sets had been delivered to the navy.

Given the rapid production, it is very probable that the dreadnoughts of Battleship Division Nine (*New York, Wyoming, Florida* and *Delaware*) that were dispatched to Great Britain were all equipped with the new Ford Rangekeeper MkI in both the forward and after directors.

Unfortunately, the U.S. also followed Great Britain a little too closely on the issue of secondary directors and it wasn't until after the U.S battleships joined the Grand Fleet that they saw the utility of secondary battery directors. So impressed were the U.S. naval officers with the British Vickers director, duplicates were ordered by the Bureau of Ordnance in October 1917. The secondary directors, however, would not be installed on U.S. battleships until after the war.

### Conclusion

The director issue is one of the dominating issues in discussions of naval warfare during WW I. The impact of the director and automatic fire control on naval gunnery, while hotly debated was eventually accepted by all navies as key components if accurate long-range fire was to be obtained. While there were numerous different ways to implement the fire control concept, the only one that stands out as being better than the others was the one employed by Ford and Pollen, and copied by Dreyer, which could automatically solve a differential equation mechanically and provide a more accurate range rate and bearing rate information. The remaining approaches, while diverse, all provided about the same hit chance during actual battles and therefore, do not need a special modifier in *FG&DN*. Since wargaming is an excellent tool in the investigation of history, it is hoped this article provides players with a better understanding of what went into the gunnery system in *FG&DN*, as well as the important ship director fit data that was unfortunately left out of the published game.

### Sources:

Schleihauf, William: *The Dumaresq and the Dreyer Part I, Warship International*, Vol. No. 38, No. 1/2001, pages 6-29.

Schleihauf, William: *The Dumaresq and the Dreyer Part II, Warship International*, Vol. No. XXXVIII, No. 2/2001, pages 164-201.

Schleihauf, William: *The Dumaresq and the Dreyer Part III, Warship International*, Vol. No. XXXVIII, No. 3/2001, pages 221-233.

Brooks, John, "The Mast and Funnel Question Fire-Control Positions in British Dreadnoughts 1905-1915," *Warship 1995*, Conway Maritime Press (London, 1995), pages 40-59.

Brooks, John, "Percy Scott and the Director," *Warship 1996*, Conway Maritime Press, London, 1996

Groves, Eric, *Big Fleet Actions*, Arms and Armour Press, London, 1995

Friedman, Norman, *U.S. Battleships: An Illustrated Design History*, Naval Institute Press, Annapolis, Maryland, 1985

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# Magazine Explosions in WW I

[Taken from *The Naval SITREP*, issue 23, October 2002]

by Chris Carlson

During the Battle of Jutland, Royal Navy (RN) warships seemed to be more vulnerable to magazine and ammunition explosions than their German counterparts. The common wisdom of the inadequacy of flash protection as the primary cause of a nearly catastrophic fire on *Seydlitz* at Dogger Bank, the loss of three British battlecruisers, and nearly a fourth, at Jutland has echoed throughout the history books. Modeling this type of casualty in a wargame has always been hard, because there was no consensus on how much of the problem was material (faulty turret design, volatile cordite powder) or procedural (incorrect procedures, poor training).

There have been a number of articles on this subject, particularly from such noteworthy historians as John Campbell and Nicholas Lambert, and it comes down to this - there was no definite answer as to why RN ships had more magazine explosions than German ships. The usual reasons why RN ships tended to blow up when turrets were hit have been attributed to volatile RN cordite, poor flash protection and/or poor turret design. Historically, there is little evidence to support the claim that any of these were the driving issue. The chemical composition of German (RPC/12) and British (MD) cordite were virtually identical, although the Germans did have a better production process that removed more of the impurities that caused decomposition. Furthermore, many of the ships that exploded in port, such as *HMS Natal* and *HMS Bulwark* are reported to have had the much older, less stable Cordite MkI. The over-aged cordite, using essentially first generation production practices, was found to be more liable to spontaneously ignite and then explode.

Turret flash protection schemes were also very similar between RN and German ships. After examining the interned German capital ships, it was found that their flash protection was no better than the RN's in 1916. Finally, both German and RN battlecruisers had insufficient turret armor, particularly on the roof. Even the poorly designed RN capped armor piercing shell managed to penetrate the turret armor on some of the German battlecruisers at Dogger Bank and at Jutland.

At the time of our publishing *FG&DN*, the biggest issue appeared to be the fact that the RN, emphasizing high rates of fire, stored shells and powder bags in the backs of the turrets and had additional rounds in the transfer hoists. This required that the flash protection doors be left open. Thus, there was a complete powder train from the turret to the magazine. The Germans also used this type of firing philosophy, however, they may have stopped the practice after the near loss of *Seydlitz* at Dogger Bank.

Even with this excellent piece of historical research, it still did not explain why the Germans had fewer magazine explosions as the RN. Given that the most recent analysis was pointing to a procedural problem, but not a consistent one or one that was particular to the RN, I was having a difficult time integrating this concept into a "nationality" based rule.

By the end of 2000, we were sorely pressed to get *FG&DN* out the door and I didn't have a reasonable discriminator in which to write a fair rule, so I chose, rightly or wrongly, to not address the issue in the rules book. I knew there would be some complaints about this decision. But the cordite theory in particular would affect not just the RN, but a number of other countries as well, and even then not consistently as we would have to find out which ships were fitted with the older cordite - virtually an impossible task. So we sent *FG&DN* to the publisher in January 2001, and in the finest traditions of Murphy's Law, an article came out shortly thereafter that I believe provides a reasonable explanation for the RN magazine explosion problems.

In the summer of 2001, David K. Brown and Iain McCallum published an article in *Warship International*, No. 1 of 2001 entitled *Ammunition Explosions in World War I: A re-examination of the evidence*. In the article, the authors made a strong case that the nose-fuzed, Lyddite filled HE shells in RN service, coupled with the poor safety procedures, was the most logical explanation for the magazine explosion problems.

They further suggested that the TNT filler in German shells was more stable and less likely to detonate in a fire that resulted from a penetrating turret hit. Since Lyddite is a picric acid-based explosive, this problem would also affect a number of Allied navies (France, Japan and Italy) that used similar shell fillers.

The authors point out that the nose-fuzed Lyddite filled HE shells were withdrawn from service soon after the Battle of Jutland and a new, less sensitive explosive, Shelite was adopted. Given this article, and the one written by Nicholas Lambert in 1998, I became convinced that it was now possible to realistically track when procedural and technological changes were made to the firing doctrine and shell designs used by the RN and by those navies that used picric acid -based shell fillers. This new research would now support a fair and reasonable rule to be crafted that would provide a historically accurate depiction of magazine explosions. The modifications to the *FG&DN* Critical Hit rules are presented below:

## Critical Hit Modifications

**8.2.6 Casemate.** On a roll of 9 or 0 the ready ammunition detonates inflicting two times the Short range HE damage to the ship. (*Optional*) For the navies of France, Great Britain, Italy and Japan, add one (+1) to the die roll because they used a picric acid based explosives in some or all of their shells.

**8.2.15 Main Battery.** (*Optional*) Because some navies exercised poor flash protection procedures and/or used a picric acid based explosive in some or all of their shells, the following modifiers is applied to the main magazine detonation die roll. This modifier is only applicable to A, B and C size class ships.

<u>Nation and Time Period</u>	<u>Die Roll Modifier</u>
Austria-Hungary:	
1914 to Mid-1915	+1
Late-1915 to 1918	+0
France: 1914 to 1918	+1
Germany:	
1914 to Early 1915	+1
Germany	
Mid-1915 to 1918	+0
Great Britain:	
1914 to Mid-1916	+2
Late 1916 to Mid-1917	+1
Late 1917 to 1918	+0
Italy: 1914 to 1917	+1
Italy: 1918	+0
Japan: 1914 to 1918	+1
Russia: 1914 to 1918	+0
United States: 1914 to 1918	+0

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## FG&DN Annex C1 Errata

Country	Mount Name Bore/Calibre	Shell Type	Short Range			Med Range			Long Range			Extreme Range				
			kyds	Pen	Dam	kyds	Pen	Dam	kyds	B-Pen	D-Pen	Dam	kyds	B-Pen	D-Pen	Dam
France	M1902 47mm/50	CP	0-0.9	1	2	1-2.1	1	1	2.2-3.3	0	0	1	3.4-4.4	0	0	1
France	M1902 65mm/45	CP	0-2.1	2	3	2.2-5.1	1	3	5.2-7.8	1	0	2	7.9-10.6	0	0	2
France	M1902 194mm/50	SAPC	0-3.9	17	10	4-9.5	13	9	9.6-14.6	6	1	7	14.7-15.3	4	2	7
		CP	0-3.9	8	10	4-9.5	6	9	9.6-14.6	3	1	7	14.7-15.3	2	1	7
France	M1902-06 240mm/50	APC	0-3.9	33	15	4-9.5	25	12	9.6-14.6	16	3	8	14.7-15.3	11	5	7
		CP	0-3.9	11	16	4-9.5	8	14	9.6-14.6	5	1	11	14.7-15.3	4	1	10
France	M1910 305mm/45	APC	0-3.5	41	20	3.6-8.4	32	17	8.5-13	23	5	12	13.1-14.8	17	7	11
		CP	0-3.5	14	23	3.6-8.4	11	21	8.5-13	8	1	16	13.1-14.8	6	2	15
France	M1912 340mm/45	APC	0-3.9	46	26	4-9.5	36	21	9.6-14.6	26	5	15	14.7-15.9	19	7	14
		CP	0-3.9	15	29	4-9.5	12	26	9.6-14.6	8	1	20	14.7-15.9	6	2	19
GB	5.5 in/50 BL Mkl (Low Elev Mt)	AP	0-3.6	14	9	3.7-8.5	11	8	8.6-13.2	5	1	5	-	-	-	-
		CPC	0-3.6	13	8	3.7-8.5	10	7	8.6-13.2	5	1	5	-	-	-	-
		HE	0-3.6	3	16	3.7-8.5	2	15	8.6-13.2	1	0	12	-	-	-	-
GB	7.5 in/45 Mkl (2 crh shell)	APC	0-2.8	21	11	2.9-6.7	15	9	6.8-10.4	8	2	6	10.5-14	4	2	6
		CPC	0-2.8	15	9	2.9-6.7	12	8	6.8-10.4	6	1	6	10.5-14	3	1	6
		HE	0-2.8	3	19	2.9-6.7	2	19	6.8-10.4	1	0	15	10.5-14	1	0	15
GB	7.5 in/45 Mkl (4 crh shell - 1915)	APC	0-3	23	11	3.1-7.3	17	9	7.4-11.2	9	2	6	11.3-15.2	5	2	6
		CPC	0-3	17	9	3.1-7.3	13	8	7.4-11.2	6	1	6	11.3-15.2	4	1	6
		HE	0-3	4	19	3.1-7.3	3	19	7.4-11.2	1	0	15	11.3-15.2	1	0	15
GB	9.2 in/32 MkIII-VII (Low Elev Mt)	APC	0-2.9	20	14	3-7	15	12	7.1-10.7	10	2	9	-	-	-	-
		CP	0-2.9	7	20	3-7	5	19	7.1-10.7	3	1	15	-	-	-	-
		HE	0-2.9	3	27	3-7	2	26	7.1-10.7	2	0	21	-	-	-	-
GB	9.2 in/47 MkX (2 crh shell)	APC	0-4.7	27	11	4.8-11.3	21	9	11.4-15.5	14	3	6	-	-	-	-
		CP	0-4.7	9	15	4.8-11.3	7	13	11.4-15.5	5	1	10	-	-	-	-
		HE	0-4.7	4	18	4.8-11.3	3	18	11.4-15.5	2	1	14	-	-	-	-
GB	9.2 in/51 MkXII	CPC	0-5.1	24	9	5.2-12.3	18	8	12.4-22	12	2	6	22.1-31	8	3	5
		HE	0-5.1	5	18	5.2-12.3	4	18	12.4-22	3	1	14	22.1-31	2	1	14
GB	10 in/45 MkVI, VII	APC	0-4	30	16	4.1-9.7	23	13	9.8-14.8	15	3	9	-	-	-	-
		CP	0-4	10	22	4.1-9.7	8	20	9.8-14.8	5	1	16	-	-	-	-
		HE	0-4	5	28	4.1-9.7	4	27	9.8-14.8	2	1	22	-	-	-	-
GB	12 in/35 MkVIII (Low Elev Mt)	APC	0-4.6	29	17	4.7-11	22	15	11.1-13.9	16	3	10	-	-	-	-
		CP	0-4.6	10	24	4.7-11	7	22	11.1-13.9	5	1	18	-	-	-	-
		HE	0-4.6	5	30	4.7-11	4	30	11.1-13.9	3	1	24	-	-	-	-
GB	12 in/35 MkVIII (High Elev Mt)	APC	0-4.6	29	17	4.7-11	22	15	11.1-16.9	16	3	10	17-22.9	12	5	10
		CP	0-4.6	10	24	4.7-11	7	22	11.1-16.9	5	1	18	17-22.9	4	1	17
		HE	0-4.6	5	30	4.7-11	4	30	11.1-16.9	3	1	24	17-22.9	2	1	24
GB	12 in/40 MkIX (2 crh shell)	APC	0-4.6	33	18	4.7-11	26	15	11.1-15.6	19	4	11	-	-	-	-
		CPC	0-4.6	25	18	4.7-11	19	16	11.1-15.6	14	3	12	-	-	-	-
		HE	0-4.6	5	31	4.7-11	4	30	11.1-15.6	3	1	24	-	-	-	-
GB	12 in/40 MkIX (4 crh shell - 1916)	APC	0-5.3	37	18	5.4-12.7	29	15	12.8-19.6	21	4	11	19.7-20.9	15	6	10
		CPC	0-5.3	28	18	5.4-12.7	22	16	12.8-19.6	15	3	12	19.7-20.9	11	5	11
		HE	0-5.3	6	31	5.4-12.7	5	30	12.8-19.6	3	1	24	19.7-20.9	2	2	24
GB	12 in/40 MkIX (High Elev Mt)	APC	0-5.3	37	18	5.4-12.7	29	15	12.8-19.6	21	4	11	19.7-26.5	15	6	10
		CPC	0-5.3	28	18	5.4-12.7	22	16	12.8-19.6	15	3	12	19.7-26.5	11	5	11
		HE	0-5.3	6	31	5.4-12.7	5	30	12.8-19.6	3	1	24	19.7-26.5	2	2	24

## FG&DN Annex C1 Errata

Country	Mount Name Bore/Calibre	Shell Type	Short Range			Med Range			Long Range			Extreme Range				
			kyds	Pen	Dam	kyds	Pen	Dam	kyds	B-Pen	Dam	kyds	B-Pen	Dam		
GB	12 in/45 MkX (2 crh shell)	APC CPC HE	0 - 3.9 0 - 3.9 0 - 3.9	37 28 6	19	4 - 9.2 4 - 9.2 4 - 9.2	29 22 5	16 16 30	9.3 - 14.4 9.3 - 14.4 9.3 - 14.4	21 15 3	4 3 1	11 12 24	14.5 - 16.5 14.5 - 16.5 14.5 - 16.5	15 11 2	6 5 2	10 11 24
GB	12 in/45 MkX (4 crh shell - 1915)	APC CPC HE	0 - 4.2 0 - 4.2 0 - 4.2	41 31 7	19	4.3 - 10.2 4.3 - 10.2 4.3 - 10.2	32 24 5	16 16 30	10.3 - 15.3 10.3 - 15.3 10.3 - 15.3	23 17 4	5 3 1	11 12 24	15.4 - 18.9 15.4 - 18.9 15.4 - 18.9	17 13 3	7 5 2	10 11 24
GB	12 in/45 MkXIII	APC CPC HE	0 - 4.2 0 - 4.2 0 - 4.2	41 31 7	19	4.3 - 10.2 4.3 - 10.2 4.3 - 10.2	32 24 5	16 16 30	10.3 - 15.3 10.3 - 15.3 10.3 - 15.3	23 17 4	5 3 1	11 12 24	15.4 - 18.9 15.4 - 18.9 15.4 - 18.9	17 13 3	7 5 2	10 11 24
GB	12 in/45 MkXIII (Higher Elev - 1917)	APC CPC HE	0 - 4.2 0 - 4.2 0 - 4.2	41 31 7	19	4.3 - 10.2 4.3 - 10.2 4.3 - 10.2	32 24 5	16 16 30	10.3 - 15.3 10.3 - 15.3 10.3 - 15.3	23 17 4	5 3 1	11 12 24	15.4 - 20.7 15.4 - 20.7 15.4 - 20.7	17 13 3	7 5 2	10 11 24
GB	12 in/50 MkXI - XII	APC CPC HE	0 - 4.2 0 - 4.2 0 - 4.2	43 32 7	20	4.3 - 10.2 4.3 - 10.2 4.3 - 10.2	34 25 5	16 16 30	10.3 - 15.7 10.3 - 15.7 10.3 - 15.7	24 18 4	5 4 1	11 12 24	15.8 - 21.2 15.8 - 21.2 15.8 - 21.2	18 13 3	7 5 2	10 11 24
GB	13.5 in/45 MkV Light Shell	APC CPC HE	0 - 4.8 0 - 4.8 0 - 4.8	46 35 7	27	4.9 - 11.4 4.9 - 11.4 4.9 - 11.4	36 27 6	22 23 44	11.5 - 17.6 11.5 - 17.6 11.5 - 17.6	26 19 4	5 4 1	16 18 36	17.7 - 23.8 17.7 - 23.8 17.7 - 23.8	19 14 3	8 6 2	14 17 35
GB	13.5 in/45 MkV Heavy Shell	APC CPC HE	0 - 4.7 0 - 4.7 0 - 4.7	47 35 8	29	4.8 - 11.4 4.8 - 11.4 4.8 - 11.4	37 28 6	25 26 49	11.5 - 17.5 11.5 - 17.5 11.5 - 17.5	26 20 4	5 4 1	17 20 40	17.6 - 23.7 17.6 - 23.7 17.6 - 23.7	19 14 3	8 6 2	16 19 39
GB	13.5 in/45 MkVI	APC CPC HE	0 - 4.6 0 - 4.6 0 - 4.6	47 35 8	29	4.7 - 11.1 4.7 - 11.1 4.7 - 11.1	37 28 6	24 26 49	11.2 - 17.1 11.2 - 17.1 11.2 - 17.1	26 20 4	5 4 1	17 20 40	17.2 - 23.1 17.2 - 23.1 17.2 - 23.1	19 14 3	8 6 2	16 19 39
GB	14 in/45 MkI	APC CPC HE	0 - 4.9 0 - 4.9 0 - 4.9	48 36 8	33	5 - 11.7 5 - 11.7 5 - 11.7	37 28 6	28 29 55	11.8 - 18.1 11.8 - 18.1 11.8 - 18.1	27 20 4	5 4 1	20 22 45	18.2 - 24.4 18.2 - 24.4 18.2 - 24.4	20 15 3	8 6 2	18 21 44
GB	14 in/45 MkII	APC CPC HE	0 - 4.9 0 - 4.9 0 - 4.9	48 36 8	30	5 - 11.7 5 - 11.7 5 - 11.7	37 28 6	25 26 49	11.8 - 18.1 11.8 - 18.1 11.8 - 18.1	27 20 4	5 4 1	18 20 40	18.2 - 19.5 18.2 - 19.5 18.2 - 19.5	20 15 3	8 6 2	16 19 39
GB	15 in/42 MkI	APC CPC HE	0 - 6.7 0 - 6.7 0 - 6.7	51 39 8	40	6.8 - 16.1 6.8 - 16.1 6.8 - 16.1	40 30 6	34 35 67	16.2 - 24.9 16.2 - 24.9 16.2 - 24.9	29 21 5	6 4 1	24 27 54	25 - 26.6 25 - 26.6 25 - 26.6	21 16 3	8 6 2	22 26 54
GB	15 in/42 MkI/N	APC CPC HE	0 - 6.7 0 - 6.7 0 - 6.7	51 39 8	40	6.8 - 16.1 6.8 - 16.1 6.8 - 16.1	40 30 6	34 35 67	16.2 - 24.9 16.2 - 24.9 16.2 - 24.9	29 21 5	6 4 1	24 27 54	25 - 33.6 25 - 33.6 25 - 33.6	21 16 3	8 6 2	22 26 54
GB	16 in/45 MkI	APC HE	0 - 7 0 - 7	55 9	44	7.1 - 17.9 7.1 - 17.9	43 7	37 72	18 - 29.5 18 - 29.5	30 5	6 2	26 58	29.6 - 39.8 29.6 - 39.8	22 4	9 2	23 57
GB	18 in/40 MkI	APC CPC	0 - 6.5 0 - 6.5	56 42	52	6.6 - 16.2 6.6 - 16.2	43 32	44 48	16.3 - 26.6 16.3 - 26.6	31 23	6 5	32 37	26.7 - 28.8 26.7 - 28.8	23 17	9 7	30 35
GB	18 in/40 MkI (High Elev Mt)	APC CPC HE	0 - 6.5 0 - 6.5 0 - 6.5	56 42 9	52	6.6 - 16.2 6.6 - 16.2 6.6 - 16.2	43 32 7	44 48 92	16.3 - 26.6 16.3 - 26.6 16.3 - 26.6	31 23 5	6 5 2	32 37 75	26.7 - 36 26.7 - 36 26.7 - 36	23 17 4	9 7 2	30 35 74

## FG&DN Annex C1 Errata

Country	Mount Name Bore/Calibre	Shell Type	Short Range			Med Range			Long Range			Extreme Range				
			kyds	Pen	Dam	kyds	Pen	Dam	kyds	B-Pen	D-Pen	Dam	kyds	B-Pen	D-Pen	Dam
GB	18 in/45 MkII	APC	0 - 8	62	57	8.1 - 20.3	48	49	20.4 - 33.3	34	7	35	33.4 - 45	25	10	33
		HE	0 - 8	10	103	8.1 - 20.3	8	101	20.4 - 33.3	5	2	82	33.4 - 45	4	3	82
Germany	21cm SKL/40	APC	0 - 3.6	23	12	3.7 - 8.5	17	9	8.6 - 13.2	9	2	6	-	-	-	-
	(Casemate Mt)	BHE	0 - 3.6	7	14	3.7 - 8.5	5	13	8.6 - 13.2	3	0	10	-	-	-	-
Germany	21cm SKL/45	APC	0 - 4.2	25	11	4.3 - 10	19	8	10.1 - 15.5	9	2	6	15.6 - 20.9	5	2	5
		BHE	0 - 4.2	8	12	4.3 - 10	6	11	10.1 - 15.5	3	0	9	15.6 - 20.9	2	1	9
Germany	28cm SKL/50	APC	0 - 4.2	38	15	4.3 - 10.2	29	12	10.3 - 15.7	19	3	8	15.8 - 19.5	13	5	7
		BHE	0 - 4.2	11	17	4.3 - 10.2	9	16	10.3 - 15.7	6	1	13	15.8 - 19.5	4	1	12
Germany	30.5cm SKL/50	APC	0 - 4.5	43	21	4.6 - 10.8	34	17	10.9 - 16.6	24	5	12	16.7 - 20.5	18	7	10
		BHE	0 - 4.5	13	23	4.6 - 10.8	10	22	10.9 - 16.6	7	1	17	16.7 - 20.5	5	2	17
Germany	35cm SKL/45	APC	0 - 5.1	41	29	5.2 - 12.2	32	24	12.3 - 18.8	23	5	17	18.9 - 25.4	17	7	15
		BHE	0 - 5.1	12	33	5.2 - 12.2	10	32	12.3 - 18.8	7	1	25	18.9 - 25.4	5	2	25
Germany	38cm SKL/45	APC	0 - 5.1	51	36	5.2 - 12.2	40	30	12.3 - 18.8	29	6	21	18.9 - 25.4	21	8	19
		BHE	0 - 5.1	15	41	5.2 - 12.2	12	39	12.3 - 18.8	9	1	32	18.9 - 22.2	6	2	31
Germany	38cm SKL/45	APC	0 - 5.1	51	36	5.2 - 12.2	40	30	12.3 - 18.8	29	6	21	18.9 - 25.4	21	8	19
	(Higher Elev - 1917)	BHE	0 - 5.1	15	41	5.2 - 12.2	12	39	12.3 - 18.8	9	1	32	18.9 - 25.4	6	2	31
Russia	130mm/55 M1911	SAP	0 - 4.3	7	10	4.4 - 10.3	5	9	10.4 - 15.8	3	1	7	15.9 - 18	1	1	6
	(Low Elev Mt)	HE	0 - 4.3	3	12	4.4 - 10.3	2	11	10.4 - 15.8	1	0	9	15.9 - 18	1	0	9
Russia	254mm/45 M1892	APC	0 - 4.5	33	9	4.6 - 10.8	25	8	10.9 - 16.6	17	3	6	16.7 - 18.4	11	5	5
	(Low Elev Mt)	CP	0 - 4.5	11	11	4.6 - 10.8	8	10	10.9 - 16.6	5	1	8	16.7 - 18.4	4	1	8
		HE	0 - 4.5	5	13	4.6 - 10.8	4	13	10.9 - 16.6	3	1	11	16.7 - 18.4	2	1	10
Russia	305mm/40 M1892	APC	0 - 4.4	37	16	4.5 - 10.6	29	13	10.7 - 16.3	21	4	9	-	-	-	-
	(Low Elev Mt)	HE	0 - 4.4	6	20	4.5 - 10.6	5	20	10.7 - 16.3	3	1	16	-	-	-	-

### Annex A Gun Errata

Country	Class	Type	Errata
France	Gueydon	CR	The M1895 100mm/45 gun should read as M1893 100mm/45 gun.
Russia	Evstafi	OBB	The M1910 305mm/40 gun should read as M1892 305mm/40 gun.
Russia	Imperator Pavel I	OBB	The M1910 305mm/40 gun should read as M1892 305mm/40 gun.

### Belt / Deck Armor Hit Determination

At long and extreme range, an incoming shell has a chance to hit either a ship's belt or deck armor. In *FG&DN*, we use a fixed probability to determine which type of armor is struck for both the Long and Extreme Range Bands as a means to simplify game play. There have been a number of comments from players, however, that have stated that the

increased gunnery ranges toward the latter part of the war would alter these fixed values. While we are in agreement with this particular comment, we still have a strong desire to keep game play as simple as possible. Therefore, an optional table is provided below that breaks up the belt/deck armor hit probabilities in greater detail. This table applies only to shell sizes of 10 inches (254mm) or greater.

Range Interval	Chance of Belt Hit	Chance of Deck Hit
≤11.9 kyds	100%	0%
12.0 - 14.9 kyds	70%	30%
15.0 - 19.9 kyds	50%	50%
20.0 - 24.9 kyds	40%	60%
25.0 - 29.9 kyds	30%	70%
≥30.0 kyds	0%	100%

## FG&DN Annex H Sonars

<i>Country</i>	<i>System Designation</i>	<i>IOC</i>	<i>Platform</i>	<i>Sonar Type</i>	<i>Active Range (Kyds)</i>		<i>Passive Range (Kyds)</i>		<i>Remarks</i>
					<i>Surface</i>	<i>Ship</i>	<i>Torpedo</i>	<i>Sub</i>	
France	Perrin Microphone	1917	Drifter/Trawler	Dipping	-	1.5	1.5	1.0	Ship must be DIW to use. Omnidirectional.
France	Walsler Plate	1918	Warship	Flank	-	3.0	2.5	2.0	Directional - good bearing data.
Germany	UT	1913	Warship/Sub	Flank	-	1.0	1.0	-	Left or right bearing (180°) only.
Germany	UG	1916	Submarine	Flank	-	1.5	1.5	1.0	Left, right, front, aft bearing only
Germany	UG + Wireless	1917	Submarine	Flank	-	3.0	2.0	1.5	Crude amplifier circuit.
Germany	GE	late 1917	Submarine	Flank	-	4.0	3.0	2.0	Directional, good bearing data.
Great Britain	PGS Hydrophone	late 1915	Drifter/Trawler	Dipping	-	1.5	1.5	1.0	Ship must be DIW to use. Omnidirectional.
Great Britain	PDH Mk I	1917	Drifter/Trawler	Dipping	-	2.5	2.0	1.5	Directional, rough bearing data ±30°
Great Britain	PDH Mk II	1917	Drifter/Trawler	Dipping	-	1.5	1.5	1.0	Bi-directional, provides two bearings of ±10°.
					-				The two bearings are 180° apart.
Great Britain	Tandem Hydrophone	1918	Submarine	Keel	-	2.5	2.0	1.5	Combined PDH Mk I and PDH Mk II
Great Britain	Station Hydrophone	1917	Fixed	Line	-	2.5	2.0	1.5	Line of hydrophones on the ocean floor.
Great Britain	Nash Fish	1917	Warship	Towed	-	2.5	2.0	1.5	Maximum tow speed is 15 knots.
Great Britain	Type 111	late 1918	Warship	Keel	0.5	-	-	-	Experimental ASDIC.
Great Britain	Type 112	late 1919	Warship/Sub	Keel	0.6	1.0	1.0	0.5	First production ASDIC.
USA	SC Tube	1916	Trawler	Dipping	-	1.5	1.5	1.0	Ship must be DIW to use. Bi-directional.
USA	SC Tube	1916	Submarine	Deck	-	1.5	1.5	1.0	Submarine variant. Bi-directional.
USA	MB Tube	1916	Seaplane	Dipping	-	2.5	2.0	1.5	Seaplane must land before deploying.
USA	MF Tube	mid-1918	Trawler/Warship	Dipping	-	2.5	2.0	1.5	Directional, good bearing data.
USA	MV Tube	late 1918	Warship	Flank	-	3.0	2.5	2.0	Directional, hull mounted system
USA	OV Tube	1917	Warship	Towed	-	1.5	1.5	1.0	Maximum tow speed is 18 knots.
USA	U-3 tube Eel	late 1918	Warship	Towed	-	4.0	3.5	3.0	Maximum tow speed is 25 knots.

## Annex H1 - Sonar Modifiers

### Passive Sonar Modifiers

Sonar Self-Noise		Ship Target		Sub Target		Convoy Modifier		Convoy	
Speed (Knots)	Range Mod	Speed (Knots)	Range Mod	Speed (Knots)	Range Mod	# of Ships	Range Mod	Noise	Self-Noise
1-5	1.0	1-9	1.0	1-4	1.0	1-4	1.0	1.0	1.0
6-10	0.7	10-12	1.5	5-9	1.5	5-9	1.5	1.5	0.9
11-15	0.5	13-15	2.0	10-15	2.0	10-19	2.0	1.8	0.8
16-19	0.3	16-19	2.5	16-20	2.5	20-39	2.0	2.0	0.7
20-24	Blind	20-24	3.0			40-69	2.2	2.2	0.6
25-29	Blind	25-29	3.5			70-99	2.4	2.4	0.5
30+	Blind	30+	4.0			100+	2.6	2.6	0.4

### Active Sonar Modifiers

### Probability of Detection Modifiers

Sonar Self-Noise		Ship & Sub Target		Coating		Alerted Operator	
Speed (Knots)	Range Mod	Speed (Knots)	Range Mod	Mod	Range Mod	1st Turn after DC attack	
1-10	1.0	1-5	1.0	0.6	1.0	15%	
11-15	0.9	6-10	1.2		1.5	-40%	
16-19	0.7	11-15	1.5		1.8		
20-24	0.5	16-19	2.0		2.2		
25-29	Blind	20-24	2.2		2.5		
30+	Blind	25-29	2.5				
		30+					

### Environment Modifiers

Sea State	Modifier	Layer	Rain	Modifier
1-3	1.0	None	None	1.0
4.0	0.9	Weak	Light	0.8
5.0	0.8	Strong	Medium	0.6
6.0	0.7		Heavy	0.4
7.0	0.6			
8+	0.5			