

1905  
Not for General Distribution.

NAVAL WAR COLLEGE,  
NEWPORT, R. I.

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RULES

FOR THE

CONDUCT OF THE WAR GAMES.

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## INTRODUCTION.

The object of the naval war game is to aid students of strategy and tactics in the comprehension of these subjects.

In their object, war games differ from other games in that the latter are merely for the purpose of exercise or diversion. They exist for their own sake, whereas war games are professional tools to be used for the sake of professional profit. In a war game a most important thing to remember is that the players should not look for victory, except incidentally, but for instruction.

The specific recommendation and distinguishing feature of any war game is that it enables tactical and strategical study to be prosecuted by the contest of mind against mind under circumstances which simulate, more or less exactly, the conditions of war.

The method of the war game is to make a tactical or strategic study using two opposing sides, under the limits of certain rules or conventions, which are previously assumed by the players, to represent conditions as they may actually exist in war. It is obvious that in such a game, as in any other solution of a problem which is the logical outcome of assumed premises, there can be no development which is not involved in the premises. The correctness of any apparent lesson of a war game is, therefore, inherently dependent upon the fidelity with which the assumptions represent the actual conditions of war.

For several reasons the War College claims no finality for the rules which follow, but expects that, as soon as officers become expert in them as they stand, they should learn to vary the rules so as to apply them to new situations.

In the first place, any new naval development may require a change in the war-game rules in order to take account of it. In the second place, some of the rules are based on ascertained facts in regard to certain vessels, but, obviously, can not be applied in considering questions



relating to ships materially differing in the points under consideration. Among such rules are those relating to turning curves, which, naturally, can represent only one type of ship. If it is desired to study the tactics of a very different type, the way to do it is to construct new curves. In the third place, a number of the rules are based, not upon undeniable facts, but upon the best opinion available as to what is the probability in battle. In such cases the rule usually embodies the mean between extreme opinions. Among such rules is that which states that a ship will suffer equal damage from a given volume of gun fire no matter what may be the angle of presentation to the fire. In deciding upon this rule it was found that some officers, for reasons which appealed to them, believed that the end-on presentation was very much safer than the beam presentation. Other officers, on the contrary, maintained that the beam presentation was much the safer. The rule adopted was a middle position, that the end-on and the beam presentation were equally vulnerable. But it has not yet been satisfactorily demonstrated that the rule is any more a correct representation of facts than is either of the two extreme views. In such cases as this it is desirable to vary the rule occasionally in order to examine whether any modification of tactics would ensue should we, at any time, arrive at definite conclusions as to the real conditions. Lastly, it may sometimes be found that a new rule is needed to represent the conditions under examination.

## RULES FOR THE WAR GAMES.

### Section I.

#### DUEL GAME.

The Duel Game represents the action between two hostile battle ships.

The appliances supplied for playing the game are made to the scale of 1 inch equals 100 yards.

Appliances.  
Scale.

They are:

- (1) The game paper.
- (2) The ship stencils.
- (3) The scale track curves.
- (4) The gun-fire wands (or gun-fire table).
- (5) The torpedo card.
- (6) The die.

The game may be played upon any paper. Manila Game Paper, paper cut in sheets about 3 by 4 feet is furnished.

Ship Stencils.

The ship stencils are rectangles of transparent material, with the outline of a ship cut out at the center of the rectangle (fig. 1). This outline represents to scale (1 inch equals 100 yards) a ship about 400 feet long. The center of the ship coincides with the center of the rectangle and the keel line is parallel to the length of the rectangle. Upon the rectangle is marked the 2 and 4 point lines on the bow and quarter, the thwartship, and the keel line of the ship. These stencils are used upon the board during the progress of the game to indicate the simultaneous positions of the vessels, to obtain their relative bearings at the end of each move, and to mark in the outline of the ship with a pencil, when desired, to determine the effects of torpedo fire, as will be explained later.

On the length of the rectangle, the distance a ship goes in one move of thirty seconds at a speed of 12 knots (2 inches) is divided into twelve equal parts making a scale, each part of which corresponds to the distance a ship will



go at the rate of 1 knot. This scale is used to plot the distance a ship will go in one move, at any speed, by simply laying off the number of divisions corresponding to the speed.

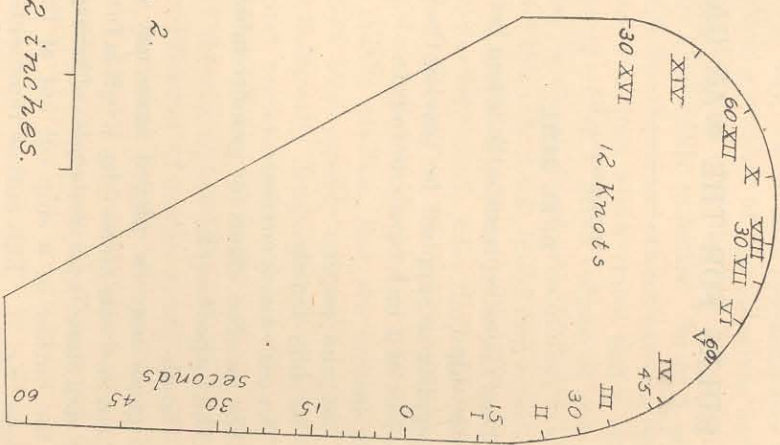


Fig. 2.

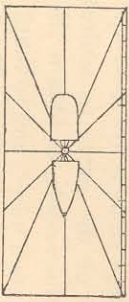


Fig. 1.

(The ship stencils supplied to the service are  $1\frac{1}{2}$  by 3 inches, and do not have the keel line and scale marked as described, nor is the outline of the ship cut out. These changes can easily be made.)

The 12-knot scale track curve supplied represents the track of a ship, with hard over helm, having a tactical diameter of 475 yards, a final diameter of 420 yards, and an advance of 390 yards.

The positions marked on this curve as those reached at intervals of fifteen seconds from the moment of putting over the helm, correspond to the performance of a ship which, with a speed of 12 knots on the straight, would make 9 knots on the final circle and take two and a half minutes to complete the 16-point turn.

The position on the curve for each change in heading of 1 point is also marked on the scale.

The drift angle is assumed to be 1 point; therefore the ship is never tangent to the curve.

The straight part of the scale is also divided into intervals of fifteen seconds, and may be used in plotting the ship when advancing on a straight course. Part of this scale corresponding to 400 yards is further divided into twelve equal parts, the same as the scale on the ship stencil, and with it the distance a ship goes at any speed may easily be plotted.

A second track scale, for an initial speed of 14.4 knots on the same turning circle, is also supplied.

With suitable data, track scale curves may be constructed out of cardboard, or other material, for any tactical diameter and speed required.

A ship is allowed to gain or lose speed at the rate of 1 knot for each period of thirty seconds, thus:

A ship starting her engines from a stopped position goes 1 knot the first thirty seconds, 2 knots the second, 3 knots the third, and so on until she regains full speed, and in slowing down the reverse applies.

If a ship going 12 knots backs her engines full speed, she goes the first thirty seconds at a speed of 10 knots, the second thirty seconds at 8 knots, the third thirty seconds at 6 knots, the fourth thirty seconds at 4 knots, and the fifth thirty seconds at 2 knots. At the end of this period she is stopped. These rules approximate facts with sufficient accuracy for the purposes of the game.

The 12-knot scale track curve represents the speed of the ship on the final circle as reduced to 9 knots. Therefore, in resuming the straight course, the original speed should be regained in accordance with the rule governing changes of speed—i. e., regains 1 knot for each period of thirty seconds.

Changes of Speed.

Backing.

Speed Reduced by Turning.



The gun-fire wand supplied for the game is marked on the left side with the value in points for the pair of 8-inch guns in one turret, each alternate value of points being painted red. Twelve-inch guns are committed to 8-inch guns at the ratio of 1 to 3. The range is marked on the right side.

To measure gun fire, place the zero of the range on the target ship, and the approximate value of one pair of 8-inch guns will be shown at the point where the firing ship's mast falls on the wand; multiply this by the number of pairs of 8-inch guns (committed and actual) firing, and the result will be the number of points scored against the target ship.

Should it be desired to consider the fire of guns of smaller caliber than 8-inch, such smaller guns may be committed to 8-inch in the ratio of a half minute's fire of so many of the small guns to one 8-inch discharge.

The values on the wand were founded on an assumption of the time in which a battle ship with a life of a hundred points would be destroyed by the broadside fire of her equal, and that the time of reloading, etc., for a 12-inch gun was three minutes, and for an 8-inch two minutes. As the new rules double the rapidity of possible fire, and as there is no sufficient reason yet apparent to alter materially the assumption as to the time required to destroy, the life of the battle ship is taken as 200.

Should a longer range wand than the one supplied be desired, it may easily be made of paper, pasteboard, or wood.

**Gun-Fire Table.** If preferred, the ranges may be read off with the range scale and the values taken from a gun-fire table. Such a one is supplied.

**Torpedo Card.** The torpedo card is a quadrant struck with a radius equal to the effective range of the torpedo. On one edge is marked the run of the torpedo in seconds. The card is marked by circular arcs into zones of chance. It is used as follows: When a player fires a torpedo he plots the line upon which he desires the torpedo to run; with the edge of the torpedo card the time of the torpedo's crossing the enemy's track is ascertained; the position of the enemy at the time the torpedo crosses his course is then plotted and the outline of the enemy's ship is drawn in by means of the ship stencil; if the line of the torpedo does not cross this outline the torpedo misses; if it does cross the outline it shows that if the torpedo runs on the course

desired it will strike the enemy. The chance of the torpedo running true in the direction desired is decided by the zones of chance, and the proper chance is ascertained by placing the torpedo card with the edge marked "keel line of target" upon the keel line of the outline of the enemy's ship and the center of the quadrant upon the intersection of the line of the torpedo and the keel line of the enemy. The firing point of the torpedo then falls in the proper zone of chance. The zones are marked 1, 2, 3, 4, and 5, meaning chances of  $\frac{1}{6}$ ,  $\frac{2}{6}$ ,  $\frac{3}{6}$ ,  $\frac{4}{6}$ ,  $\frac{5}{6}$ , respectively, any one of which chances may be obtained by a single throw of one die.

The torpedo card supplied is constructed for a range of 600 yards. To meet the conditions of increased range, cards with radii equal to the range of the torpedo under consideration, constructed out of cardboard or stiff paper, will answer.

The die is one of the ordinary six-sided game dice in common use.

The score is most easily kept on the record paper. The position is numbered, a diagram shows the guns fired, an arithmetical expression records in the numerator the injury received in that position and in the denominator the total injury: e. g., position No. 6; fired forward 12-inch and starboard forward 8-inch.

|                            |    |
|----------------------------|----|
| Injury received.....       | 5  |
| Total injury received..... | 32 |

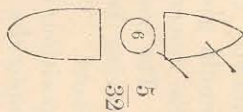
**General Assumptions.**

The broadside target and the end-on target are equal. The battery of any type of battle ship may be taken, the train of the turrets being that of the ship selected.

The rate of fire of 12-inch guns is once every one and one-half minutes, that of 8-inch guns is once every minute.

In ramming, if collision takes place while the vessels are on opposite courses, or if stem strike stem, the result is a draw. To deliver a successful ramming blow the ram must strike the side or stern of the enemy.

Each ship is assumed to have four submerged torpedo tubes, two on each side. All torpedoes are fitted with gyroscopic steering gear adjusted before the game, and set to fire abeam or at an angle previously announced. The tactical diameter of the torpedo is 1,000 feet.



Broadside and End-on Targets. Batteries.

Rate of Fire.

Ramming.

Torpedoes.

Score.



## Players.

The game is played by two players representing the commanders of the opposing ships.

## Umpire.

An umpire may be chosen by the two players. The duties of such an umpire is to superintend the game and to decide upon points upon which the players may differ. His decisions upon these points must be accepted as final by the players.

## Method of Play.

To begin the game each player places his ship at a distance from that of his opponent agreed upon, heading as he pleases or as mutually agreed, and marking this position (1).

This taking of the first or initial position constitutes the *first move*. The subsequent moves represent intervals of 30 seconds.

The players then write down their second moves, which being done, each player plots his move by means of the track curves, marking the position of his ship at the end of the move and numbering it (2). The path passed over by the ships to reach these positions may or may not be drawn. (It is thought by some that plotting the path would give to the opposing player more information of the movements of his adversary than he should have.)

The positions of the ships at the end of the second move having been plotted, each player writes down his third move. Then the ship stencils are placed upon the plotted positions of the second move, each stencil being placed upon the proper heading and the paths of the ships being drawn in, if necessary, to determine the proper heading of the ship. Each player then scores the gun fire his own ship receives for the second move.

The third move is then plotted in the manner explained for the second move, the positions of the ships at the end of the second move being marked (2). The fourth move is then written down, the gun fire for the third move scored, and so on until one of the ships has been sunk or the number of moves agreed upon before the beginning of the game has been played.

## Gun Fire.

All guns and torpedo tubes are assumed to be loaded at the beginning of the game.

A ship having received a number of points equal to 30 per cent of her total fighting endurance, will have her offensive power reduced to one-half, and having received 60 per cent will have her offensive power reduced to one-fourth of her original offensive power.

Each player must write down the time and direction of a torpedo he wishes to fire, thus "S. F. T., 15 NE," means that the player wishes to fire the starboard forward torpedo at fifteen seconds from the beginning of the move in a direction NE. If the setting of the gyroscope is changed from what it was when the game began, five minutes are required to change the setting.

The effect of torpedo fire is determined as is explained in the description of the torpedo card.

It requires five minutes to reload a torpedo tube.



The ships represented are about 400 feet long. The distinguishing colors of the opposing fleets are blue and red. Variations in the markings of hulls and wings may be used to distinguish the different classes of ships.

### Section II. THE FLEET TACTICAL GAME.

Object.

The Fleet Tactical Game has been devised to represent the conflict between two hostile fleets.

Appliances.

The appliances for carrying on the game are:

- (1) The board.
- (2) The ships.
- (3) The turning card.
- (4) The score wand.
- (5) The score card.
- (6) The record paper.
- (7) The rings.

The Board.

The board represents the surface of a portion of the ocean on a scale of 1 inch equals 200 yards. It is divided by lines into squares 5 inches on a side. On the boards issued to the service, each 5-inch square is further divided by lines into 1-inch squares.

A good substitute for the wooden boards, and by some considered as an improvement, consists of pads of several sheets of blotting paper (seven sheets to a pad are about enough to prevent the pin of the ship catching the table underneath), surmounted by a sheet of duel paper cut to the same size and ruled off into 5-inch squares.

An extra sheet of game paper underneath tends to strengthen the pad. The seven sheets and the game paper are held together by paper fasteners at the corners.

The advantage of these pads are that they lie flat, do not warp, are convenient to handle, are easily stowed in a chart portfolio, can be readily improvised, and that the pins enter easily and hold the ships firmly. There is the further advantage that notes can be made on the paper during the game, and torpedo runs directly plotted.

The dimensions of commercial blotting paper are 24 by 19, each one lacking an inch of being a multiple of 5. The difficulty is avoided by making the 5-inch squares a fifth of an inch short. This is quite close enough for practical purposes and exactly divides the sheet into five one way and four the other.

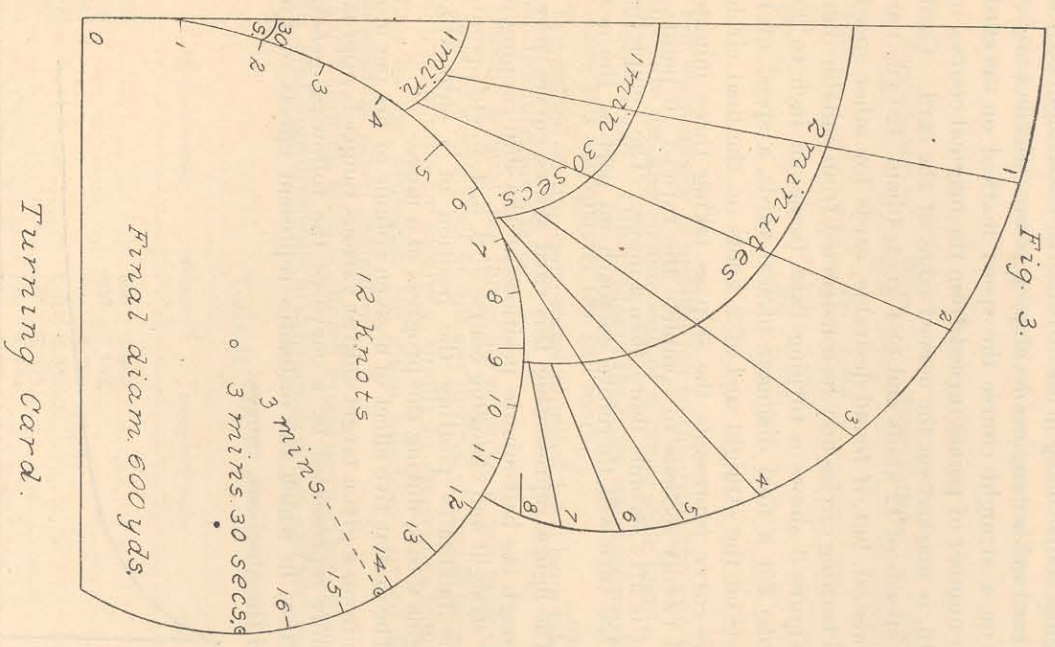


Fig. 3.

Turning card.

1 inch

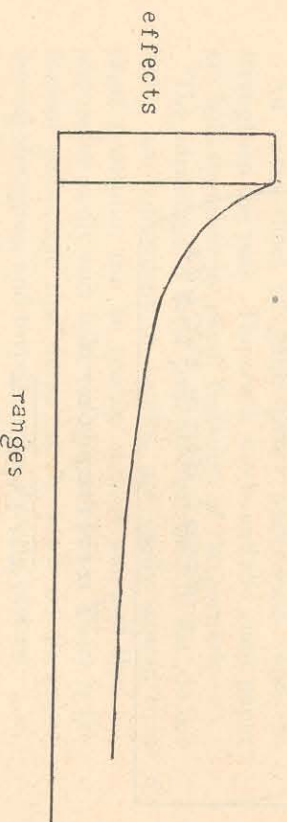
The turning cards are made to the scale of 1 inch equals 200 yards. The straight edge of each card represents on this scale the space passed over on a straight course by a ship during one move (two and one-half minutes), moving



uniformly at the speed marked on the card. The curved edge of the card is the locus of all positions that a ship may occupy at the end of two and one-half minutes, the ship starting at the corner marked "stbd. helm and port helm," her original course being in the direction of the straight edge of the card and her engines developing power sufficient to give her on a straight course the speed marked on the card. The number of points turned from the original course, up to 16, is marked on the curved edge of the card. Cards for speeds of 12 knots and 14.4 knots (diam. 420 yds.) are furnished, but, if found desirable, cards for other speeds and turning circles may be constructed from suitable data. Figure 3 shows a turning card (scale, an inch to 200 yards) for a final diameter of 600 yards, a speed of 12 knots on the straight and of 9 knots on the final circle. This curve represents the ship as taking three minutes and twenty seconds to complete the turn of 16 points—that is fifty seconds more than a move. The completion of the turn will therefore encroach on part of the next move.

The figure representing this card shows curves drawn through the half-minute positions of the ship running on the straight and changing course 1, 2, 3, 4, 5, etc., points. This facilitates plotting the position of a ship which begins a turn during the progress of a move.

**The Score** The destructive effect of a given volume of fire per minute upon a given target ship at various ranges is approximately represented by a curve of the following general nature, in which the ordinates represent effects of fire, and the abscissas, ranges:



In this curve the ordinate for a given range is a direct function of the weight of discharge and of the rapidity of discharge, and an inverse function of the resistance of the target. On the other hand, the range, for a given value of fire, increases with the accuracy of target practice.

The following table was worked out some years ago to show the destructive effect of the broadside fire of one first-class battle ship upon the broadside of another, her equal, in two and a half minutes, under the assumption that the total endurance or life of the target is 1,000 points, and that at 2,500 yards it could endure such a fire for fifty minutes.

TABLE I.

| Ranges in yards. | Points. | Ranges in yards. | Points. |
|------------------|---------|------------------|---------|
| 262.....         | 480     | 1,465.....       | 120     |
| 380.....         | 320     | 1,810.....       | 90      |
| 565.....         | 240     | 2,275.....       | 60      |
| 725.....         | 200     | 2,912.....       | 40      |
| 890.....         | 160     | 5,480.....       | 10      |

For convenience in application to the game the gun fire values are marked on one side of a range scale known as the score wand. Other sides of the score wand are marked to show half and quarter the full score.

The values on the score wand supplied have been taken from the foregoing table.

Bearing in mind the foregoing remarks, a new table can be readily worked out to suit any desired change in target, battery, rapidity or accuracy, simply by applying a factor, either to the ordinates for given abscissas, or to the abscissas for given ordinates.

The following table is offered as one more in accordance with later improvements in ship construction and accuracy of fire.

TABLE II.

| Ranges in yards. | Points. | Ranges in yards. | Points. |
|------------------|---------|------------------|---------|
| 0-125.....       | 360     | 2,650.....       | 80      |
| 380.....         | 300     | 2,915.....       | 70      |
| 645.....         | 250     | 3,235.....       | 60      |
| 930.....         | 210     | 3,635.....       | 50      |
| 1,260.....       | 170     | 4,115.....       | 40      |
| 1,595.....       | 140     | 4,770.....       | 30      |
| 1,870.....       | 120     | 5,805.....       | 20      |
| 2,210.....       | 100     | 8,450.....       | 10      |

A wand corresponding to this table can easily be made by the ship's carpenter.

In using the wand the following assumptions are usually made, but may be varied at the will of the player to suit the special conditions to be investigated.



(1) The broadside battery is twice as powerful as the end-on battery, the dividing line between the two kinds of battery being taken as the bow and quarter line on each side.

(2) The broadside target and the end-on target are equal.

(3) A battle ship is considered to have a fighting endurance of 1,000 points, an armored cruiser 500 points, and a protected cruiser 170 points. A ship having received a number of points equal to her fighting endurance is considered as having sunk, struck, or otherwise been rendered totally incapable of inflicting injury upon her opponents. A ship having received a number of points equal to 30 per cent of her total fighting endurance, her offensive power is reduced to one-half; having received 60 per cent, her offensive power is reduced to one-fourth of her original offensive power.

A ship torpedoed loses 500 points and all her speed.

The battery power of armored and protected cruisers is considered to be one-half and one-fourth, respectively, that of a battle ship, so that when these vessels are engaged, the wand values, being battle-ship values, must be divided by two or by four.

The wand supplied is limited to a length representing a range of 6,000 yards, as beyond that range the probable effect of gun fire, when the wand was designed, was thought to be too small to be considered. Longer wands, however, may be constructed.

In scoring the effect of gun fire between two ships, the colored end of the wand is placed against the mast of the target ship and the number of points is read off from the space wherein the mast of the firing ship falls. Each figure on the wand applies to the entire space in which it is stamped, the spaces being separated from one another by lines, and each figure being stamped approximately in the center of the space to which it applies.

**The Score Card.** The score card is for the purpose of recording graphically the gun fire scored against each ship. On it there are a number of parallel lines, one for each ship engaged, divided into inches and tenths of inches, each tenth of an inch representing 10 points.

**The Record Paper.** The record paper furnishes a means of preserving a record of the positions and strength of the opposing fleets at the beginning of each move for the purpose of subsequent study and discussion. Each small square of the record paper represents a large square of the board. The

injury inflicted upon each ship during a move should be placed abreast that ship on the sketch of the move. When a ship has had her offensive power reduced one-half a circle should be placed around that ship in the sketch of the move in which such reduction takes place and in the sketches of subsequent moves, until her offensive power has been reduced three-fourths, when a double ring is used. When a ship is destroyed such destruction is indicated by a cross drawn through the ship.

The rings are small rings placed upon the masts of ships and serve as a reminder to the person measuring the gun fire that the wand values must be divided by two or four. In place of rings small squares of cardboard, with a hole punched in them, may be used, white for single rings, black for double rings, and purple or other color when a ship has been torpedoed.

#### Conduct of Game.

For the conduct of the fleet tactical game the following Detail of Players. may be assigned:

Two fleet commanders, who command the opposing fleets;

One umpire, who conducts the game and decides disputed points.

One recorder, who keeps the fire and sketch records.

Two assistants, who make the moves and measure the gun-fire score.

When found necessary, on account of scarcity of players, the recorder may act as umpire and the fleet commanders may perform the duties of the assistants. Two players may play the game, each player moving his own ships, measuring the gun fire of his own fleet against that of his opponent, and recording the fire received by his ships.

To open the game the opposing fleets are placed upon the board sufficiently far apart to be outside of gun-fire Placing of the Fleets. range, usually 11,000 yards or more. Each fleet is placed in such formation as its fleet commander may desire, the ships being placed at "distance" (400 yards) in numerical sequence.

Each fleet commander shall designate which ships are to bear his flag and that of the second in command, and the ships so designated will be distinguished by bits of colored ribbon, tape, or paper placed upon their masts. Flagships of Fleet Commanders and Second in Command.

When both fleets have been placed to the satisfaction of their respective commanders, each fleet commander will write out and submit to the umpire his "general instructions by each Fleet Commander."



tions." These "general instructions" are a summary of the special instructions, battle orders, and plans which he is supposed to have issued to his fleet, and with which the captains of the vessels of his fleet are supposed to be familiar before the battle begins. In general, they comprise the general plan of action, and instructions for the captains of the ships in certain contingencies in absence of signals to the contrary. Instructions contemplating movements incompatible with actual service conditions or possibilities should not be allowed.

**Fleet Speeds.** Each fleet commander will designate his fleet speed to conform with that of one of the turning cards furnished or constructed.

The umpire then calls for the first move, when each fleet commander will write out and submit to the umpire what he desires to have done in that move (representing two and one-half minutes).

If a fleet be in column with the flagship of the fleet commander leading, it may change direction of the head of the column without signal.

In all other cases, except those specially provided for in the "general instructions," the fleets will be maneuvered by signal.

Each signal must be flying at least one move (two and one-half minutes) before it may be hauled down, as it is believed that at least that length of time must elapse before it can be understood and answered by the fleet to which it is made. It follows that no signal can be hoisted and executed in the same move. If, therefore, a fleet commander at the beginning of the first move wishes to go "vessels 4 points right" he hoists the signal to that effect at the beginning of that move; the first move, however, is consumed in getting the signal answered, the fleet standing on during the first move in the direction and at the speed it had at the beginning of the move; at the beginning of the second move the signal is supposed to have been answered and the vessels to be in readiness to execute it. The fleet commander, therefore, may haul it down at the beginning of the second move or he may delay its execution by leaving it hoisted for such further time as he may see fit. The moves submitted in the case cited would read: First move, "Hoist vessels 4 points right;" second move, "Execute vessels 4 points right," or in case the fleet commander wished to delay the execution of the signal the second move would read, "Ahead."

Any signal still flying may be annulled and a new signal be hoisted at the same time that the annulling signal is hoisted, all signals being subject to the general rule that *signals must fly two and one-half minutes before they can be executed.*

The following abbreviations are useful in writing signals: Abbreviations.

|           |            |
|-----------|------------|
| A—ahead.  | V—vessels. |
| L—left.   | H—hoist.   |
| C—column. | X—execute. |
| R—right.  |            |

Thus, H V 4 R means "Hoist signal 'Vessels 4 points right.'"

When the first move of each fleet commander has been submitted to the umpire, he hands them to the assistants, who move the fleet accordingly, using the turning cards. The recorder sketches the new position. The assistants then measure the gun fire, and it is recorded by the recorder on the score card and noted upon the sketch record. The umpire then calls for the second moves and the operations described are repeated.

In measuring gun fire, each ship will generally be considered as having fired at only one of her opponents dur-

Measuring Gun  
Fire.

ing the move for which the gun fire is being measured. A ship's fire, however, may be divided between two of her opponents provided both do not lie in the same end-on quadrant of her battery, each of her opponents receiving the fire of her end-on battery. Each ship is considered to possess a battery so arranged that her forward end-on battery is equal to her after end-on battery, and her broad-side battery is equal to the sum of the two end-on batteries. Thus it will be seen that a ship can fire her forward battery at one ship and her after battery at another ship, but if she fires her broadside battery at one ship she has no other gun to fire at other opponents on that beam. On the opposite beam she still has guns available that can deliver a fire equal to one-fourth the broadside.

A ship fires during a move with the force that she possesses at the beginning of the move, so that ships are "rung," and destroyed ships are removed from the board at the end of the move in which they received the requisite number of points, but not until the gun fire for the move has been measured and recorded.

Gun fire shall not be scored upon a ship over an intervening ship whether the intervening ship be friendly or hostile.



Concentration of fire may be ordered by a fleet commander in his general instructions or by signal from time to time. In the absence of such specific orders, gun fire will be distributed in what appears to be the most natural and advantageous manner.

Every ship turning through more than 8 points during any one move loses one-half of her gun-fire score for that move. This is because it is believed that the rapid swinging will reduce the accuracy of her gun fire to that extent.

The speed marked upon the turning cards is the maximum fleet speed of the fleet for which it is used. Each vessel of the fleet, however, is supposed to possess a reserve speed of 20 per cent of the speed of the fleet to which it belongs. While a fleet as a whole can not maintain a speed greater than its fleet speed, the individual ships of which it is composed may utilize their reserve speed for short periods in order to close up, to avoid collision, or to gain their positions in certain evolutions, such as "Front into line from column."

Changes of speed are based upon the approximate general rule that ships gain or lose speed at the rate of 1 knot each half minute.

Following this rule, the average speed of ships during a move is the speed they are making in the middle of the move. Thus a fleet moving at fleet speed in obeying a signal to slow to half speed makes one move at three-fourths speed and thereafter moves at one-half speed. The reverse takes place to regain fleet speed. To obey a signal to stop from fleet speed, a fleet makes one move at three-fourths speed, one move at one-fourth speed, and thereafter is stopped. The reverse takes place to regain fleet speed. Similarly, to change from stop to half speed or from half speed to stop involves one move at one-fourth speed.

Each ship carries four submerged torpedo tubes, two on each side. All torpedoes are supposed to be fitted with gyroscopic steering-gear capable of being set so as to make the torpedo run in any desired direction. All gyroscopes are supposed to be set to fire abeam or for any desired angle with the keel line of the ship. The players should submit to the umpire, at the beginning of the game, the angle the torpedoes are set to run.

Changes may be made in the angle the torpedoes are set to run by signal, subject to the rules of signaling. Five minutes will be required to change the setting of the gyroscope.

Torpedo Fire.

The target of the torpedo in the fleet tactical game is the enemy's line.

A player having written down the time and direction he wishes to fire a torpedo, submits it to the umpire with his move. The move is made. After the following move is submitted, the course of the torpedo may be plotted on the board or on the record paper. Suppose the torpedo, set to run 3,000 yards at a speed of 24 knots, is fired at the beginning of a move and that the target fleet is going at 12 knots. (These speeds are taken only for convenience of illustration.) From the point where the torpedo was fired lay off 3,000 yards in the direction in which it runs. If this distance does not reach the track of the target fleet the torpedo misses. If the distance reaches or goes beyond the track of the target fleet, plot the position where the torpedo would be at the end of one move (2,000 yards from where it was fired). The target fleet having been plotted for the same move, with a pair of dividers take half the distance of the position of the torpedo to the point where its course crosses the track of the target fleet, and with one leg on the intersection of the two tracks swing the dividers toward the target ships. If the dividers swing over one of the ships, that ship would reach the point of intersection at the same time as the torpedo and would be torpedoed. If the dividers pass between two ships the torpedo is considered to have missed. It must be remembered that the setting of the dividers is proportional to the speeds of the target ships and the torpedo. To be counted as successful a torpedo must strike the ship at an angle from the keel line greater than  $1\frac{1}{2}$  points.

The Fleet Tactical Game is usually played in open water with free maneuvering room for each fleet. It can, however, be played with shore lines marked upon the board to scale, and forts, torpedo boats, destroyers, and submarines may enter in this case. In such case extra players will be required to represent the commanders of such fortifications and vessels. The fire of forts is introduced by considering the fire of the forts as equivalent to the broadside fire of so many battle ships, a gun on shore being considered equivalent to four guns afloat. In case of mined channels the position of the mines will be made known to the umpire, but will not be made known to the fleet commander of the hostile fleet. In case the hostile fleet passes

Fire of Forts.



over a mine field, the umpire will determine the amount of damage it suffers.

If a fort receive 300 points during a move, its fire for the succeeding move will be reduced one-half; if it receive 500 points during a move, it will be considered as silenced during the succeeding move.

**Submarines.** The use of submarines is limited to the defense, but the fact of their possession is known to the offense. Their maximum speed is 7.2 knots.

Whenever a submarine runs awash to within 400 yards of the target without discovery, her chances of hitting may be taken as 1 in 3.

If a submarine be discovered running awash, but trimmed for diving within 1,000 yards of its target, and dives and fires without again rising, her chances of hitting may be taken as 1 in 6.

One torpedo only is allowed to a submarine for a single game.

#### Mêlée.

**Scale of Mêlée.** If fleets come so close together that a mêlée is imminent, in the opinion of the umpire, the game may be stopped or it may be transferred to the scale of the Duel Game and be fought out under the rules of that game as modified in the following paragraphs, a player to act as the captain being required for each ship engaged.

**Moves and Signals.** In the mêlée each move represents one-half minute, and signals can not be answered in less than five moves.

**Close Action.** If the vessels bid fair to come together so close as to prevent tactical maneuvers the umpire declares "Close action," and vessels will be maneuvered by their captains irrespective of fleet tactics. No signals can be understood, as long as such close action continues, in less than five minutes, at the discretion of the umpire.

Subject to the foregoing limitations each fleet commander retains the control of his fleet and may signal "Close action" if he sees fit so to do.

**General Instructions.** The fleet commander of either side may give in advance a plan of attack, informing his captains of his general scheme of concentration of effort and of any other particulars that he may think desirable.

**Ramming.** A vessel successfully ramming another will be motionless for two minutes, at least.

**Gun Fire and Torpedo Fire.** The gun fire and torpedo fire are subject to the rules of the Duel Game, and are under the control of the individual

captains in so far as such control is not modified by the "general instructions" and signals of the fleet commander.

It must be distinctly borne in mind that the object of this war game, as of all war games, is to represent truthfully on a reduced scale what may be done with actual forces, so that the foregoing rules must not be considered rigid rules that can never be violated. They are to be regarded as guides, resulting from long experience with the game, but they should never be construed so literally as to allow that which is evidently impossible with actual forces or to bar that which is manifestly practicable with ships upon the water.

The foregoing tactical games are designed to represent the broad and general features of battle; where it is desired to study the details of armor, armament, etc., in action, recourse should be had to the Jane War Game.



## SECTION III.

## THE STRATEGIC GAME.

## Object.

The Strategic Game represents a campaign between two or more opposing naval forces.

## Appliances and Players.

Charts of the theater of operations are necessary, one for the umpire and one for the commander of each detached force.

## Preparation.

## Statement of the Problem.

Several days before the game is to be played a statement of the problem is given to two players, who are to represent the commanders in chief of the opposing forces. These statements give the supposed conditions existing upon a certain date, the distribution of the forces, so far as is known to each commander in chief, the instructions from the home government under which each commander in chief is to act, and other information bearing upon the problem. As in war there is always more or less uncertainty about the enemy's movements and intentions, the information given the two commanders in chief is not, in general, the same; each is given definite information concerning his own forces and such information of his enemy's movements and intentions as he would probably possess in time of war.

## General Plans and Orders.

With these statements in their possession, the commanders in chief draw up in writing their plans of campaign. Each commander in chief selects a number of assistant players to command the forces he intends to send upon detached duty, and each commander of a detached force will be furnished with written orders and a copy of the plan of campaign of his commander in chief. *Great care should be exercised in writing these plans and orders, so as to make them as clear and definite as possible.*

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On the day of the game the players and the umpire and his assistants assemble. A room is assigned to each commander in chief and to the commander of each detached force, and still another room is assigned to the umpire. Each of these rooms should be provided with a chart<sup>a</sup> of the theater of operations, a pair of dividers, a copy of the rules of the game, paper, pencils, and several sheets of tracing paper.

The umpire is provided with the plan and orders of each side. The umpire then calls in each side separately, and each commander in chief explains to the umpire his plan and orders.

The umpire has three assistants, one to plot the positions of the forces for each move upon the umpire's chart, which assistant is called the recorder, and two other assistants, who act as messengers between the umpire and each side.

When all is in readiness, the players retire to their respective rooms.

The umpire then announces the first move, giving its length in hours, the day and hour of its beginning, the day and hour of its end, and the state of the weather during the move.

Each player then plots the positions of his force at the beginning and end of the move and the track passed over by his force during the move.

This information is transferred to a sheet of tracing paper and brought by the messengers to the recorder, who transfers it to the umpire's chart.

The umpire then determines by inspection whether any of the forces sight each other or not. In case vessels sight each other, the umpire sends to the forces by a messenger, in writing, such information as he deems the forces concerned would obtain through such a meeting. Each force is then at liberty to modify the remainder of its move and will inform the umpire accordingly.

When all the positions for the first move have been plotted and adjusted, the umpire announces the second move and so on.

All information must go through the umpire and his decision upon any question is absolute.

<sup>a</sup>On board ship, where a sufficient number of charts is not always available, rough tracings can be made for use of commanders of the different forces.



The assistants are the sole means of communication between the players and the umpire. These assistants must be careful to refrain from criticism or comment during the game. They should determine the accuracy and correctness of all information that they convey to or from the umpire, and be able to explain such information, but must be careful in thus explaining any information not to add thereto.

#### Rules for the Strategic Game.

**Moves.**  
1. The length of time represented by a move is at the discretion of the umpire.

The umpire decides when each move shall begin. When ready, he rings a bell to call attention; the time represented by the move and the state of sea and weather are then announced. Each player must plot on his chart the change of position of his forces. The umpire may limit the time in which this should be done, and may affix a penalty of loss of speed during the move to such part of the forces as remain uncharted at the expiration of such time limit.

**Time Limit.**  
When vessels sight each other, the moves for these particular vessels may be reduced to fifteen minutes, at the option of the umpire, until a decision regarding them is made.

**Duels.**  
2. If armored vessels come within 2,000 yards, or unarmored within 4,000 yards, of each other, and remain within these distances for more than an hour; the action will be decided, at the option of the umpire, by the relative number of points at which each vessel is valued. Armored vessels can not be captured by unarmored vessels, whatever their numbers, though they may be torpedoed under proper circumstances.

**Telegraphic Messages.**  
3. In case a vessel wishes to transmit a telegraphic message through a consul or friendly agent, such a message will reach its destination in one hour in daytime and one hour and a half at night for each 1,000 miles, from the time of receipt by operator, provided the lines do not pass through the enemy's territory. Time of transfer by boat and other delays will be decided by the umpire.

All telegraphic and other messages should be written in full, with the pencil corresponding in color to the sending side, subject to the scrutiny of the umpire.

**Employment of Fishing Vessels.**  
4. The employment of tugs, fishing, or other vessels, cable steamers, or colliers, not stated in the conditions of the problem, is not allowed. If such vessels are desired, they must be fitted out after the game has commenced, the

umpire deciding upon the exact time when they may be considered as fitted out and ready for service, or he may disallow any or all of them.

**Destroyers and Torpedo Boats.**  
5. Torpedo boats shall not be used as scouts at sea. Destroyers can not be used as scouts at a distance of more than 500 miles from the fleet or base. They may be used for carrying dispatches or for scouting alongshore between the fleet and a squadron or fleet base. Torpedo gunboats, however, may be used for carrying dispatches at sea within their radii of action as prescribed in the Tables of Values. The use of destroyers is limited to an absence of five days from the fleet or base.

**Cable Cutting.**  
6. In cutting cables an allowance of six hours shall be made for cutting near cable stations and in less than 100 fathoms of water. In dragging for deep-sea cables success shall be determined by the umpire in 1,000 fathoms or less. If unsuccessful the first day, chances may be taken for the second, and so on until finally successful.

**Fleet Actions.**  
7. Two forces meeting, with odds of 2 to 1, the inferior will be removed from the game. With odds of 3 to 2, the inferior loses one-half his force, the superior remaining as before the action. With odds of 4 to 3, the superior is crippled in defeating his adversary and must withdraw temporarily; that is, he has crippled himself for any large operations during the limit of the game in progress. The time occupied by any of these actions is decided by the umpire.

**Sustained sea speed.**  
8. A single vessel moving independently may maintain for an indefinite time a speed 1 knot less than the maximum given in the tables. For twenty-four hours a single vessel moving independently may maintain the maximum speed given in the tables, but during the next twenty-four hours she can not exceed a speed 2 knots less than that maximum; after this, normal conditions again exist.

When a number of vessels move to a given point or rendezvous, independently or in company, the maximum speed of each class is 2 knots less than the maximum speed given in the tables for that class.

**Speed.**  
9. The maximum assumed speed of squadrons containing battle ships is 14 knots. When accompanied by convoy, the sustained sea speed shall not exceed 10 knots.

**Summary Decisions.**  
10. If at any time the umpire finds that accurate plotting will delay him more than usual, he will exercise his discretion in deciding summarily the question before him in order to announce the next move promptly.



Criticism After-wards. 11. After the game is finished complaints may be made and criticisms offered.

Table of Values, Strategic Game.

TABLE I.—Showing classification, maximum speeds, fighting values, and distances recognizable of various types of ships.

[The maximum speeds here given may vary in special problems.]

| Class.                                  | Maximum speed (knots). | Fighting value (points). | Distance visible (sea miles). |        | Distance recognizable (sea miles). |        |
|---|------------------------|--------------------------|-------------------------------|--------|------------------------------------|--------|
|   |                        |                          | Day.                          | Night. | Day.                               | Night. |
| Battle ships.....                       | A 16                   | 20                       | 12                            | 1      | 8                                  | 1      |
| Armored cruisers.....                   | B 20                   | 10                       | 12                            | 1      | 8                                  | 1      |
| Cruisers, first class.....              | C 17                   | 4                        | 12                            | 1      | 8                                  | 1      |
| Cruisers, second class.....             | F 14                   | 3                        | 12                            | 1      | 8                                  | 1      |
| Monitors and coast defense vessels..... | M 10                   | 10                       | 10                            | 1      | 6                                  | 1      |
| (Gunboats.....                          | D 12                   | 2                        | 10                            | 1      | 6                                  | 1      |
| Fast scouts.....                        | E 20                   | 2                        | 12                            | 1      | 8                                  | 1      |
| Destroyers.....                         | V 24                   | bx                       | 8                             | 1      | 6                                  | 1      |
| Torpedo boats.....                      | t 22                   | bx                       | 8                             | 1      | 6                                  | 1      |
| Torpedo gunboats.....                   | g 20                   | bx                       | 8                             | 1      | 6                                  | 1      |
| Submarine boats.....                    | s 7                    | bx                       | bx                            | bx     | bx                                 | bx     |

<sup>a</sup>The fighting value of monitors at sea is 8.  
<sup>b</sup>Torpedo destroyers have a maximum value of 7 (night or thick weather), and a minimum value of 2 (day and clear weather). The maximum and minimum values for torpedo gunboats are the same as for torpedo destroyers; the values for torpedo boats are 7 and 1, respectively.

The table distances here given are assumed to be true under ordinarily favorable weather conditions when the observer is on a large ship, and are therefore subject to change under different conditions at the discretion of the umpire.

TABLE II.—Special rules governing speed and runs of destroyers and torpedo boats, subject to coal consumption in Table III.

| Just out of port after long stay. | Maximum maintained speed. | Speed for 100 miles, not to exceed— |        |
|-----------------------------------|---------------------------|-------------------------------------|--------|
|                                   |                           | Knots.                              | Knots. |
| First 500 miles.....              | 20                        | 24                                  | 24     |
| Second 500 miles.....             | 18                        | 22                                  | 22     |
| Third 500 miles.....              | 16                        | 21                                  | 21     |
| Fourth 500 miles and after.....   | 15                        | 20                                  | 20     |

TABLE II.—Special rules governing speed and runs of destroyers and torpedo boats, etc.—Continued.

TORPEDO BOATS.

| Just out of port after long stay. | Maximum maintained speed. | Speed for 50 miles, not to exceed— |        |
|-----------------------------------|---------------------------|------------------------------------|--------|
|                                   |                           | Knots.                             | Knots. |
| First 400 miles.....              | 16                        | 22                                 | 22     |
| Second 400 miles.....             | 14                        | 20                                 | 20     |
| Third 400 miles and after.....    | 12                        | 18                                 | 18     |

In any one period of twenty-four hours a destroyer may not make over 100 miles nor a torpedo boat over 50 miles at spurting speeds.

Destroyers for each twenty-four hours in port, and torpedo boats for each forty-eight hours in port, can regain one step in the speed and run allowed, provided the crews do no work.

TABLE III.—Coal consumption for twenty-four hours in percentages of full amounts carried.

| Class. | Speed (knots). |    |     |     |     |     |     |     |     |     |     |
|--------|----------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|        | 0 <sup>a</sup> | 10 | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 20  | 21  |
| A..... | 3              | 6  | 7   | 8   | 11  | 13  | 17  | 11  | 12  | 17  | --- |
| B..... | 3              | 5  | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 17  | --- |
| C..... | 3              | 5  | 6   | 7   | 8   | 10  | 12  | 14  | --- | --- | --- |
| F..... | 3              | 5  | 7   | 9   | 11  | --- | --- | --- | --- | --- | --- |
| M..... | 7              | 20 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| D..... | 3              | 8  | 12  | --- | --- | --- | --- | --- | --- | --- | --- |
| E..... | 3              | 3  | 5   | 6   | 7   | 8   | 9   | 10  | 16  | --- | --- |
| V..... | 5              | 3  | 12  | 14  | 16  | 20  | 24  | 29  | 36  | 50  | 72  |
| t..... | 11             | 27 | 33  | 36  | 39  | 44  | 50  | 57  | 66  | 90  | 100 |
| g..... | 5              | 10 | --- | --- | --- | --- | --- | --- | --- | 100 | 150 |

<sup>a</sup>With heavy banked fires, under way, blockading.

Whenever the umpire directs, officers in command of squadrons or vessels acting singly will hand in with the tracing showing position at the end of each move a memorandum showing the coal remaining on board each class of vessels in accordance with Table III above.

Miscellaneous.

Wireless signaling is at the discretion of the umpire. The maximum limit of such signaling shall be taken to be 50 miles, unless otherwise stated in the problem. Battle ships and armored and first-class cruisers may



send wireless messages over a maximum distance of 50 miles; second-class cruisers, gunboats, and coast-defense vessels over a distance of 30 miles, and destroyers, if fitted, over a distance of 15 miles. Wireless chains of more than 350 miles length will not be allowed.

The speed of wireless transmission through a chain will vary between 15 and 200 miles per hour; at the discretion of the umpire, and may vary during the progress of the game.

The limit of day signaling by semaphore is from 6 to 10 miles, at the discretion of the umpire.

Day flag signals may be read up to 3 miles.

Very's night signals may be read up to 10 miles; Ardois, from 3 to 4 miles for small ships and 4 to 6 for large ships.

The limit of searchlight signaling is 30 miles, at the discretion of the umpire.

Visibility of smoke: By day, of a single ship, 15 miles; of a squadron up to eight ships, 20 miles; of more than eight ships, 30 miles. At night, of a single ship, 1 mile; of a squadron up to eight ships, 2 miles; of more than eight ships, 3 miles; of a large convoy, 4 miles.

The distance at which cannonading may be heard shall be taken as 10 miles; that at which signal guns may be heard shall be taken as 5 miles.

O