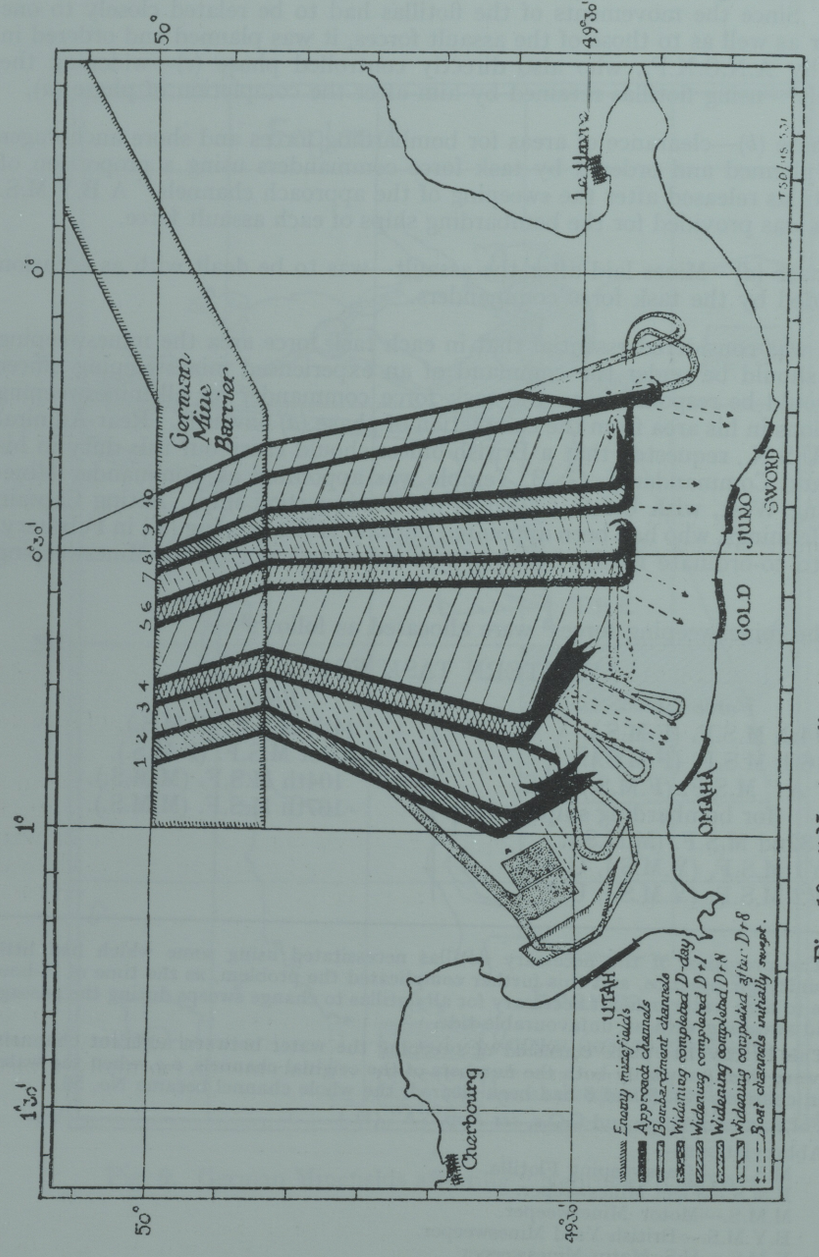

Fig. 10. "Neptune" minesweeping as actually carried out.

EASTERN TASK FORCE

Force "G"	*Force "J"*	*Force "S"*
[1]6th M.S.F. (F.M.S.).	[1]7th M.S.F. (F.M.S.).	[1]1st M.S.F. (F.M.S.).
[1]18th M.S.F. (F.M.S.).	[1]9th M.S.F. (F.M.S.).	[1]15th M.S.F. (F.M.S.).
150th M.S.F. (B.Y.M.S.)	159th M.S.F. (B.Y.M.S.).	40th M.S.F. (F.M.S.) (for bombarding ships).
		115th M.S.F. (M.M.S.).
		143rd M.S.F. (M.M.S.).
		165th M.S.F. (B.Y.M.S.).

A.N.C.X.F.'s RESERVE

101st M.S.F. (M.M.S.). For special duties with "Mulberries."
102nd M.S.F. (M.M.S.) } Escort on D-day, then available to relieve flotillas
205th M.S.F. (M.M.S.) } under task force commanders.
131st, 159th, 139th, 181st "LL" trawler groups. For captured ports.

An important corollary to the minesweeping operations was the marking of the areas cleared. As already mentioned this was done in the first instance by dan buoys laid by danlayers attached to the minesweeping flotillas. The dan buoys were replaced by ocean light buoys and A.G.A. type buoys laid by H.M. ships *Astral* and *Scott* and the Trinity House vessels *Alert*, *Discovery II*, *Warden*, *G. de Joli* and *A. Blondel* between D-day and D+1.[2] Subsequently, the buoy-laying craft continued to mark the channels and areas successively swept in accordance with a detailed programme laid down in Admiral Ramsay's operation orders.

25. Naval Bombardment Plan.[3] (Plans 1A, 1B)

The object of the naval bombardment was defined by Admiral Ramsay as "to assist in ensuring the safe and timely arrival of our forces by the engagement of hostile coastal defences, and to support the assault and subsequent operations ashore."

The enemy defences were the most formidable ever tackled hitherto in a seaborne assault. Their batteries included guns of almost every calibre, from modern 380 cm. (16-in.) down to old French 75 mms., of the 1914–18 war. Generally speaking, coastal batteries were sited as far forward as possible, so that most of them stood near the beaches. Howitzers formed an exception to this practice and often stood several miles inland and on reverse slopes. Both radar and visual methods of control were employed, the control positions being frequently placed at a considerable distance from the guns.

In addition to the coastal batteries the Germans held a certain amount of mobile artillery in reserve, with which to reinforce the fixed artillery in any sector assaulted. A large number of spare emplacements (normally armed only with light guns) were constructed along the coast ready to receive the heavier guns and howitzers from the pools further inland in case of need.

Abbreviations—*See* footnote [4] on p. 51.

[1] With two minesweeping motor launches and three or four danlayers attached.

[2] "The greatest co-operation was given by Captain Barber, Superintendent of Trinity House, Cowes, to whom considerable credit is due."—A.N.C.X.F. Report, Vol. 1, p. 15.

[3] *See* Gunnery Review: Normandy Bombardment Experience, June/September, 1944, which reviews the bombarding operations of the Eastern Task Force and the lessons learnt in detail.

The coast defences fell into four main categories :—

(*a*) *Heavy coast defence anti-ship batteries*

These consisted of 122 to 155 mm. guns, generally four to a battery, in massive reinforced concrete gun houses about 7 ft. thick on the sides and roof, with observation posts and control positions, sited with a field of fire to seaward.

(*b*) *Casemated field gun and howitzer batteries*

Field guns or howitzers of 105 to 155 mm. calibre, generally four to a battery, in casemates of reinforced concrete about 7 ft. thick, with a field of fire to seaward or on to the beaches. The guns were on wheeled mountings and could be brought out for all-round fire.

(*c*) *Open field gun and howitzer batteries*

Similar batteries to (*b*) above, but in open unprotected positions. They had no direct view to seaward, but were probably controlled from forward observation posts and their main role was to harass the beaches.

(*d*) *Beach defence strong points*

The beach defences consisted mainly of a system of strong points spaced at intervals of about a mile along the coast, extending to about 100–200 yards in depth. Very strong concrete emplacements, some 7 ft. thick on the seaward side and overhead, housed 75 or 88 mm. guns sited to enfilade the beaches. Smaller concrete gun shelters, similarly protected from fire to seaward, but open on the landward side, housed 50 mm. anti-tank guns, which could also enfilade the beaches. An elaborate trench system connected the underground living quarters, many pill-boxes and a large number of Tobruk type machine gun and mortar posts. In addition there was a number of open 50 mm. and 75 mm. and mortar positions.

A combination of air bombing and naval bombardment was relied on to deal with these " impregnable " defences. In the first instance the selection of targets and co-ordination of naval bombardment with air bombing was carried out by the three Commanders-in-Chief, and a joint plan[1] was issued, in which was specified :—

(*a*) The batteries to be bombed, (i) before D-day, priority being given to those most menacing to the approach of naval forces[2] ; (ii) by heavy night bombers, during the night of D—1/D-day[3], and (iii) by medium bombers during the early hours of D-day[4].

[1] This plan was not arrived at without difficulty. The Graham Report on " Fire Support of Seaborne Landings Against a Heavily Defended Coast " in its conclusions and recommendations (p. 13) stated that : " The Committee recommends that the Chiefs of Staff should confirm the principle that the Army is responsible for stating the fire support requirements, both as regards type and quantity, and the Navy and Air Force for agreeing the method of meeting the Army's needs." This principle Admiral Ramsay considered to be entirely wrong. He was strongly of the opinion that " whilst the production of the plan must be a joint effort, prime responsibility for calculating the type and quantity of fire support required until the beaches are captured, and for deciding upon its application, must rest with the Navy, because the Navy bears the responsibility for the safe arrival of the assault convoys." A.N.C.X.F. Report, Vol. 1, p. 28.

The Air Forces, too, were reluctant to commit themselves until very late in the planning as regards the weight of air support which would be available and the times relative to sunrise at which the various bomber forces would operate. Uncertainty on these points considerably hampered the drawing up of the pre-arranged fire plan.

[2] The air effort which could be allotted to this task was limited by the necessity to bomb batteries in other areas for cover purposes.

[3] It was planned to drop 100 tons on each of ten batteries, of which four were in the British area.

[4] From Civil Twilight + 10 minutes (0520, 6th June) till H-hour. Six batteries, three in each task force area

(*b*) The batteries to be engaged by naval gunfire to cover the assault[1].

(*c*) The heavy and medium bomber effort available to supplement the naval beach " drenching " fire and its distribution between the task forces commencing at H-45 ; about 2,500 tons were to be dropped in the British and some 1,700 tons in the American area.

The plan aimed at the neutralization of all batteries capable of firing on the sea approaches or assault beaches until the capture or destruction of each battery, and the neutralization or destruction of beach defences during the final approach. After the assault, support was to be given to the Army by engagement of mobile batteries, counter-attacking formations, defended areas, etc., particularly during the period before the Army was fully deployed.

For the initial stages, bombarding forces[2] were organized as follows :—

WESTERN TASK FORCE

Bombarding Force " A "
(supporting Assault Force " U ")
U.S.S. *Nevada* (10—14-in., 16—5-in.).
H.M.S. *Erebus* (2—15-in.).
U.S.S. *Tuscaloosa* (9—8-in., 8—5-in.).
(Flag, Rear-Admiral Deyo, U.S.N.).
U.S.S. *Quincy* (9—8-in., 12—5-in.).
H.M.S. *Hawkins* (7—7·5-in.).
H.M.S. *Enterprise* (6—6-in.).
H.M.S. *Black Prince* (8—5·25-in.).
H.N.M.S. *Soemba* (3—5·9-in.).
8 U.S. Destroyers.

Bombarding Force " C "
(supporting Assault Force " O ")
U.S.S. *Texas* (10—14-in., 6—5-in.).
(Flag, Rear Admiral Bryant, U.S.N.).
U.S.S. *Arkansas* (12—12-in., 6—5-in.).
H.M.S. *Glasgow* (12—6-in.).
F.F.S. *Montcalm* (9—6-in.).
(Flag, Rear-Admiral Jaujard).
F.F.S. *Georges Leygues* (9—6-in.).
9 U.S. Destroyers.
3 Hunt Destroyers.

EASTERN TASK FORCE

H.M.S. *Scylla* (8—4·5 in.).
(Flag, N.C.E.T.F.).

Bombarding Force " D "
(supporting Assault Force " S ")
H.M.S. *Warspite* (8—15-in.[3], 8—6-in.).
H.M.S. *Ramillies* (8—15-in., 12—6-in.).
H.M.S. *Roberts* (2—15-in.).
H.M.S. *Mauritius* (12—6-in.).
(Flag, Rear-Admiral Patterson).
H.M.S. *Arethusa* (6—6-in.).
H.M.S. *Frobisher* (7—7·5-in.).
H.M.S. *Danae* (5—6-in.).
O.R.P. *Dragon* (6—6-in.).
13 Fleet Destroyers.
2 Hunt Destroyers.

Bombarding Force " E "
(supporting Assault Force " J ")
H.M.S. *Belfast* (12—6-in.).
(Flag, Rear-Admiral Dalrymple-Hamilton).
H.M.S. *Diadem* (8—5·25-in.).
7 Fleet Destroyers.
4 Hunt Destroyers[4].

[1] Task and assault force commanders were at liberty, however, to make last minute adjustments in the light of the latest intelligence, subject to A.N.C.X.F. being informed, in order that spotting aircraft could be rebriefed.

[2] For gunnery details, *see* Appendix " F."

[3] "A" and " B " turrets only were in action.

[4] In addition, assault force commanders were authorized by N.C.E.T.F. to use the destroyers allocated to forces for escort duties on the passage south. These amounted to three " Hunts " and three escort destroyers for Force " J," and two " Hunts " and one escort destroyer for Force " G."

WESTERN TASK FORCE
(*continued*)

In Reserve.

U.S.S. *Augusta* (9—8-in., 8—5-in.). (Flag, N.C.W.T.F.).
H.M.S. *Bellona* (8—5·25-in.).
17 U.S. Destroyers.

EASTERN TASK FORCE
(*continued*)

Bombarding Force "K"
(*supporting Assault Force "G"*)

H.M.S. *Orion* (8—6-in.).
H.M.S. *Ajax* (8—6-in.).
H.M.S. *Argonaut* (10—5·25-in.).
H.M.S. *Emerald* (7—6-in.).
H.N.M.S. *Flores* (3—5·9-in.).
9 Fleet Destroyers.
4 Hunt Destroyers[1].

In Reserve.

H.M.S. *Rodney* (9—16-in., 12—6-in.).
H.M.S. *Sirius* (10—5·25-in.).

H.M.S. *Nelson* (9—16-in., 12—6-in.) was held in reserve at Milford Haven, for use wherever she might be required.

On arrival in the assault area, bombarding ships formed part of the assault forces to which they were allocated. Flag and Senior Officers Commanding British Bombarding Forces were therefore requested to "exercise only such control over ships of their force as necessary to implement the intentions of Task or Assault Force Commanders." Similarly, U.S. Bombarding Forces came under the immediate control of N.C.W.T.F., or of the appropriate assault force commander as directed by N.C.W.T.F.

Ships were to open fire on their pre-arranged battery targets either when the assaulting convoys came within range of them, or when it became light enough for the enemy to spot the fall of his shot (about half an hour before civil twilight), whichever was later.

Close supporting fire by warships and gun support craft was to be employed to "drench" the beach defences at specified times prior to the assault.

The responsibility for detailing ships to the selected targets rested with task and assault force commanders.

In the British area the pre-arranged naval fire plan was co-ordinated by the Naval Commander, Eastern Task Force and issued in his operation orders. The heavy batteries on either side of the Seine estuary on the eastern flank were considered the most serious threat. Those to the south of the estuary, Villerville, Benerville and Houlgate—all of which covered "Sword" area, but were outside the sphere of military operations—were to be neutralized by the *Warspite*, *Ramillies* and *Roberts* respectively. Those at Le Havre were not included as primary targets, as it was intended that they should have been put out of action by bombing prior to D-day; should they open effective fire, however, they were to be engaged as directed by Rear-Admiral Patterson,

[1] In addition, assault force commanders were authorized by N.C.E.T.F. to use the destroyers allocated to forces for escort duties on the passage south. These amounted to three "Hunts" and three escort destroyers for Force "J," and two "Hunts" and one escort destroyer for Force "G."

the Senior Officer of Force "D." All cruisers and the *Flores* were given counter battery tasks in the areas of the assault forces they were supporting. Fighter reconnaissance spotting aircraft were arranged for all these bombarding forces, and definite periods of 35 to 45 minutes each assigned to the various targets, as well as to impromptu shoots throughout D-day. Destroyers were allocated sectors of the beach defences on the fronts of the assault forces to which they were attached. In some cases, definite targets were specified, but it was appreciated that identification would be difficult, and commanding officers were allowed discretion, giving priority to (*a*) guns firing on our own forces, (*b*) pill-boxes, (*c*) suspected machine-gun posts and (*d*) possible observation posts.

Initial targets laid down in the pre-arranged fire plan are given in Appendix F(1) and Plan 1B.

In the Western Task Force area, following the U.S. system of greater decentralization than is customary in the Royal Navy, the pre-arranged fire plans were worked out by the assault force commanders. In general they were similar to that in the British area, but differed in one respect; whereas the British plan was based on the neutralization of selected strong-points using all available sea and air fire power and accepting the menace from the beach defences between these strong-points, on "Omaha" front—where, in the event, the infantry were most seriously held up[1]—the air and sea bombardment was spread evenly over the whole length of the beaches.

26. The Build-up Plan

The build-up problem was unique and of major importance. The enemy's system of defence—static divisions on the coast backed by mobile reserve divisions—required an immediate build-up of sufficient strength to oppose these reserves[2]. This entailed the continuous discharge for the first month after the assault of a daily volume of shipping and craft far greater than in any previous operation.

The plan for the build-up was worked out in great detail and included in the operation orders. Large numbers of pre-loaded stores coasters and merchant vessels—also for the most part pre-loaded—were assembled in the Isle of Wight area and the ports on the flanks respectively. These merchant vessels, together with the landing ships and craft returned from the assault area, were to operate in a continuous cross-Channel shuttle service to provide a daily build-up of sufficient strength to counter such movements or reinforcements as the enemy was capable of making. The estimate indicated that the beach capacities were sufficient to accomplish this task, but little margin remained and the early capture of a port such as Cherbourg was of great importance.

[1] Other factors, such as the failure of the pre-H-hour air bombing on this front, combined to render the task of the infantry more difficult, but Rear-Admiral Vian subsequently quoted the incident in support of the British method. A.N.C.X.F. Report, Vol. 2. Report by N.C.E.T.F., p. 26.

[2] "Had the enemy not been deceived by our cover plan and the latent threat to the Pas de Calais, it would have been possible for him to have built up his forces against us at a rate at least equal to that of which we were capable with the craft and shipping at our disposal assuming the optimum conditions on our part and minimum turn-round times. In the event the enemy was slow to commit his reserves . . . so that despite bad weather and other minor difficulties, our build-up was far quicker than his and assured the integrity of our initial position in the lodgement area." A.N.C.X.F. Report, Vol. 1, p. 94.

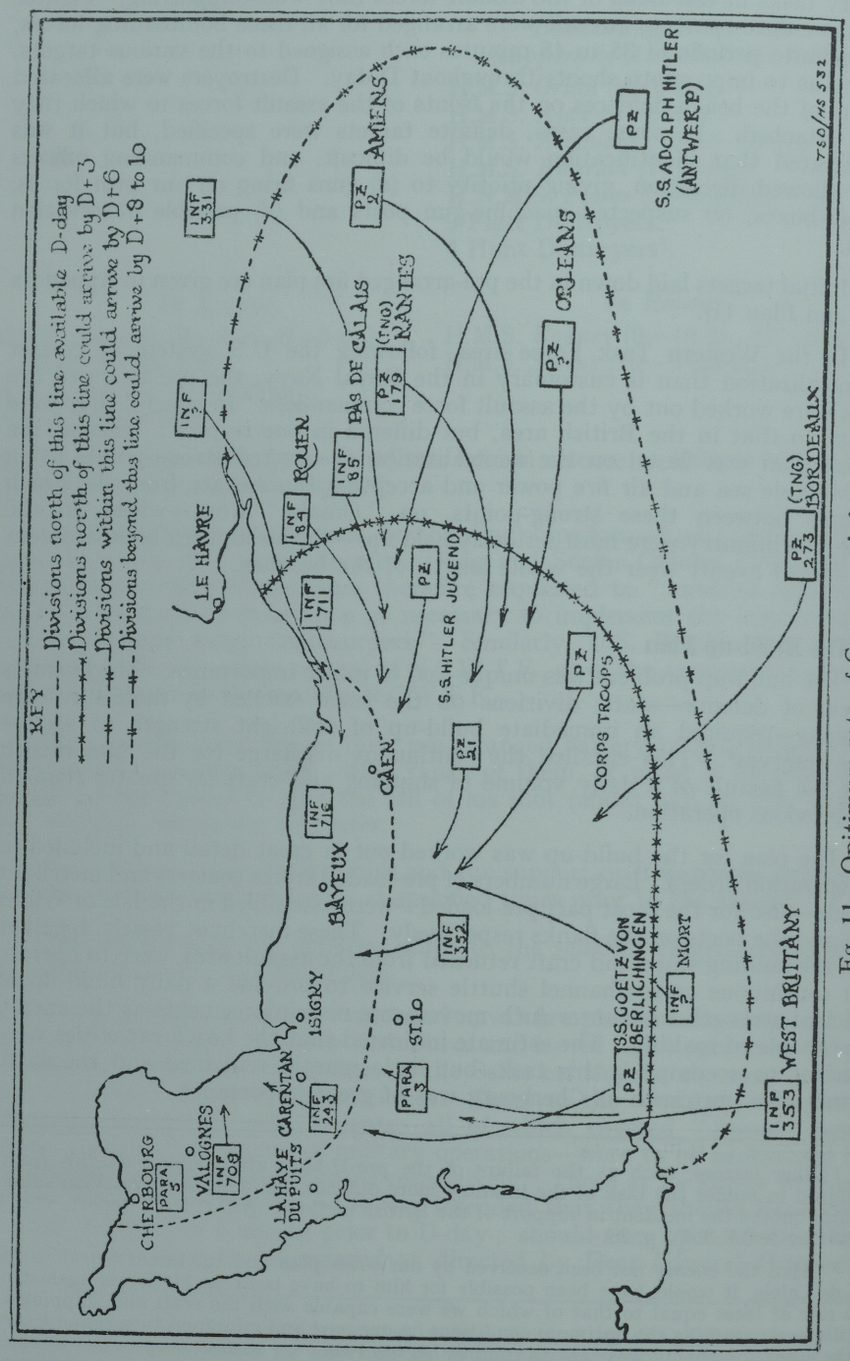

Fig. 11. Optimum rate of German reinforcement.

In addition to the infantry and tank landing ships and craft (L.S.T., L.C.T. and L.C.I.(L)) which, together with a large merchant fleet, were to carry the build-up formations, equipment and stores, there was a further requirement imposed by the lack of port facilities, namely, craft with which to unload merchant ships on the far shore. This ferry service was provided by Rhinos, L.C.T.(5) and (6), L.C.M., L.C.V.P., L.B.V. and D.U.K.W.S.[1]

The administration of the ferry service in itself presented a large problem. Eleven depot ships were provided for the accommodation of personnel, four being allocated to the Western Task Force and seven to the Eastern.[2] Administrative control of the ferry service was entirely separate in the British and American areas; in the former it was exercised by Commodore H. T. England, D.S.O., who was appointed as Commodore Depot Ships (under the F.O. British assault area), with his broad pendant at first in the *Ascanius* and later in the *Hawkins*.

In view of the probable signal congestion during the first few days of the operation, full instructions for all early convoys and groups of landing craft and their escorts were laid down beforehand and provision made for contingencies of damage and delays. Later the build-up plan gave the maximum latitude to the Home Commanders-in-Chief and Flag Officers in Charge within the framework laid down.

To reinforce and maintain the Expeditionary Force at the rate required, it was necessary to run eight ship convoys a day—four to the British and four to the American areas—in addition to landing craft groups as required.

Mention has already been made of the special organizations set up in the United Kingdom ("Buco," "Turco," "Corep," etc., *see* Sec. 15) to expedite the build-up. It was recognized that the problem confronting the task force commanders in the assault area during the first few days of the operation would be even more difficult, since their organizations would perforce start

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[1] Abbreviations. (*See* App. "O.")

L.C.T. (5) and (6)	..	Landing Craft, Tanks, Mark V and VI. (55 men, 11 vehicles, 5½ knots).
L.C.M.	.. ..	Landing Craft, Mechanized. (Mark 1, 16-ton, Mark III, 30-ton, tank or vehicle).
L.C.V.P.	.. ..	Landing Craft, Vehicle, Personnel. (United States: Ramped, 18-cwt. vehicle)
L.B.V.	.. ..	Landing Barge, Vehicle. (Mark I, dumb, ramped; Mark II, stores, ferry, 4½ knots).
D.U.K.W.	.. ..	2½-ton, 6-wheeled amphibious truck.

[2] Initial allocation of depot ships :—

Gooseberry 1 (U.S.).	Mulberry "A" (U.S.).	Mulberry "B."	Gooseberry 4.	Gooseberry 5.
H.M.S. *Ceres* 1 Troopship (S.S. *Thomas B. Robinson*)	H.M.S. *Capetown* 1 Troopship (S.S. *Eleazar Whitlock*)	H.M.S. *Frobisher* S.S. *Thysville*	H.M.S. *Hawkins* H.M.S. *Southern Prince*[3] S.S. *Ascanius* U.S.S. *George W. Woodward*	H.M.S. *Danae* S.S. *Cap Tourane*

[3] After disembarkation of F.O.B.A.A.s staff.

untried and from scratch.[1] These included organizations on shore, reception and direction of convoys, control of unloading operations, and the turn round and despatch of return convoys.

In order to relieve the force commanders of as much detailed work of this nature as possible, two new naval authorities were introduced into the far shore organization of each assault force, viz. :—

(*a*) *The Beach N.O.I.C.*, the naval executive authority on shore responsible to the assault force commanders, on the beach sub-area level, and

(*b*) *The Senior Officer Ferry Craft* (S.O.F.C.), who was responsible for the control of ferry craft on a beach group front, working in close co-operation with the Principal Beach Master and Beach Group Commander.[2]

The reception of shipping and convoys in the assault area and the formation and sailing of return convoys to the United Kingdom were to be dealt with respectively by two authorities stationed to seaward of each task force area, known as " Captain Southbound Sailings " and " Captain Northbound Sailings." These and other requirements, such as the placing of " Gooseberries," " Mulberries," etc., minesweeping and the permanent buoyage of channels, surveying operations, laying moorings and defence of the area throughout the whole period of the operations were worked out in advance and covered by the operation orders of A.N.C.X.F., Task and Assault Force Commanders.

Special attention was paid to the problem of repair and salvage of damaged ships and craft on the far shore. Mr. T. McKenzie of Metal Industries, Ltd., was appointed to the Staff of A.N.C.X.F. as Principal Salvage Officer, with the rank of Commodore, R.N.V.R., and a complete salvage organization,[3] capable of dealing with large numbers of casualties simultaneously, was created. This organization abundantly proved its worth, especially in the days following the gale of 19th–22nd June.[4]

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[1] The British and American methods and systems differed widely in matters of detail. For Operation " Neptune " it was essential that common practice should exist in two respects, viz. (*a*) beach marking and sectoring and (*b*) control of shipping and ferry craft. in order to avoid confusion to ships and craft of one nationality which might be using the beaches of the other " This was achieved to a large measure in ' Neptune ' due to the co-operation of the U.S. Navy, who readily adopted new methods to conform to the British." A.N.C.X.F. Report, Vol. 1, p. 70.

[2] The early days of planning fortunately coincided with the convening of an Inter-Service Committee on Beach Maintenance, sponsored by the War Office. Two fundamental principles were agreed upon with regard to ferry craft :—

(*a*) The control of ferry craft should be exercised by the Navy to meet the Army's wishes.

(*b*) The organization should provide the maximum inter-service representation at all levels.

[3] *See* App. "A (3) " VIII.

Commodore McKenzie's requirements could not be met in full, since the number of rescue tugs requested could not be allocated and, owing to Mulberry and Military commitments, no shallow draught tugs at all were available. " This was later to prove the most serious deficiency in the ' Neptune ' Salvage Organization." A.N.C.X.F. Report, Vol. 1, p. 88.

[4] *See* Secs. 58, 61 to 62, 67, *postea*.

27. A.N.C.X.F.s Operation Orders

The naval plan thus fell into three well-defined phases, viz. :—

(*a*) *Preparation.* Assembly and passage, including cover plan and diversions.

(*b*) *Execution.* The assault landings.

(*c*) *Consolidation.* The build-up, including construction of Mulberry harbours and laying the petrol pipe line.

Each of these aspects was dealt with in considerable detail in A.N.C.X.F.s orders. These were arranged in three separate series[1] :—

Operation orders (short title) O.N.
Administrative orders (short title) O.N.A.D.
Communication orders (short title) O.N.C.O.

Admiral Ramsay defined his object as " The safe and timely arrival of the assault forces at their beaches, the cover of their landings, and subsequently the support and maintenance and the rapid build-up of our forces ashore."[2]

To carry out this object, the Admiral's intentions were stated under fifteen headings, the first six of which dealt mainly with the passage and assault and the remainder with the build-up, viz. :—

(*a*) To provide adequate surface covering forces to protect the flanks of the routes of our assault, follow-up and build-up convoys.

(*b*) To provide adequate close escort for all our convoys, both coastwise along the English coast and across the Channel.

(*c*) To route our forces prior to the assault so far as possible to avoid disclosure of their intended location.

(*d*) To make full use of counter measures against enemy radar.

(*e*) To provide minesweeping forces to sweep our assault forces in to the assault, to sweep the convoy anchorages, and later to establish swept channels from the assault area and captured continental ports to England and coastwise along the French coast.

(*f*) To provide the maximum available naval gun support for our landings.

(*g*) To establish a shuttle service of tank landing ships (L.S.T.), large infantry landing craft (L.C.I.(L)) and tank landing craft (L.C.T.) between England and France, in which, in addition to personnel ships, M.T. ships, and coasters, will be carried the build-up of our forces.

(*h*) To employ a proportion of the available tank landing craft (L.C.T.) and all available minor landing craft off the French coast to ferry vehicles and stores ashore during the build-up.

(*j*) To provide adequate forces for the protection of the anchorages off the enemy coast.

(*k*) To support the advance of our land forces with naval bombardment.

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[1] Other authorities issuing orders in connection with " Neptune " conformed to this system, their orders being distinguished by self-evident suffixes, *e.g.*, O.N.C.O. East—Communication Order of Naval Commander, Eastern Task Force. O.N.A.D., Portsmouth —Administrative Orders, Portsmouth Command. O.N.West/G.O.1—Operation Orders of Commander, Group " O.1 " Western Task Force.

[2] A.N.C.X.F. Operation Order No. 1, p. 4.

(*l*) To make preparations to reform one assault force at short notice to carry out another assault if so ordered by the Supreme Commander.

(*m*) To provide adequate administrative repair, salvage and rescue facilities off the French coast.

(*n*) To provide five areas of sheltered water off the beaches by sinking lines of old merchant vessels.

(*o*) To provide two artificial harbours on the French coast for the landing of stores.

(*p*) To provide petrol and oil in bulk on the French coast by establishing—

(i) submarine pipe lines across the Channel;

(ii) tanker discharge points off the French coast.

In order that the earliest possible information of the details should be available for the necessary authorities, provisional orders were issued on 2nd April, 1944[1]. In form these generally followed those of the Commander-in-Chief, Mediterranean[2], for Operation "Husky" (the landing in Sicily); but the "Neptune" orders, in view of the complexity of the operation, were arranged chronologically and not separate for each force, as in Operation "Husky."

Orders directing the movements of over 6,000 ships for a complicated operation in confined waters were necessarily voluminous and Admiral Ramsay was "gravely concerned at the problems likely to arise in smaller vessels when, shortly before D-day, not only his orders but in addition the orders of the task force and lower commanders would be opened[3]." In spite of these considerations, the orders of A.N.C.X.F. alone when completed totalled approximately 1,000 pages of typescript—without amendments—and since security demanded the latest possible date for opening the orders, it appeared that genuine difficulties might occur. Arrangements were accordingly made for the commanding officers of all the smaller vessels to receive assistance by briefing after opening the orders.

The orders went to print on 10th April, 1944, and were issued on 24th April to a strictly limited number of authorities authorised to open them on receipt[4]. Two days later Admiral Ramsay and his Staff moved to his Battle Headquarters at Southwick Park, near Fareham in Hampshire, and the final stage of the long period of preparation was reached.

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[1] Admiral Ramsay subsequently remarked: "In an operation where a large number of command levels are concerned it is believed to be essential that the orders of the C.-in-C. should be issued as early as possible, but to do this inevitably means that when issued they are incomplete and incorrect. But it is strongly felt that it is far better to issue orders early and amend them later, rather than to delay until all details are reasonably firm." A.N.C.X.F. Report, Vol. 1, pp. 27, 28.

[2] Then Admiral-of-the-Fleet Sir Andrew Cunningham, G.C.B., D.S.O.

[3] This concern was shared by the C.-in-C., Home Fleet, who on the 18th May signalled some suggestions to A.N.C.X.F. "to avoid consternation and possible outcry from ships when these and other orders are opened by them."

[4] "The greatest assistance was rendered by Harrow Printing Press and by I.S.T.D. (Colonel Bassett, R.M.) the latter reproducing most admirably many complicated diagrams. Great credit too, is due to Mr. Cross (M. Branch (Books) Admiralty) who organized with great efficiency and unfailing cheerfulness the distribution of some 3,000 copies of three sets of orders with their amendments." A.N.C.X.F. Report, Vol. 1, p. 29.

III.—TRAINING AND REHEARSALS

28. Preliminary Training

Meanwhile the individual training of the various assault forces had been taking place, and at the time Admiral Ramsay opened his Battle Headquarters at Southwick Park was about to culminate in two large scale exercises, which took place between 24th/28th April (exercise "Tiger") and 3rd/8th May (exercise "Fabius").

Training facilities and assault firing areas had originally been designed to cater for a three-divisional assault, and it was not easy to expand these to accommodate the two new assaulting divisions (Forces "G" and "U") required for General Montgomery's plan. But thanks to "the great co-operation shown by all concerned, to the unselfishness of the commanders whose divisions were already nearly trained, and to the initiative and drive of the commanders of the new divisions, who had to fit a six months' programme into three, all difficulties were overcome, and on the day Forces "G" and "U" carried out their assaults with the precision of yet another rehearsal[1]."

Of the five assault forces, Force "J" started its training with a decided advantage over the other four, its nucleus having been formed as far back as October, 1942, under Captain Hughes-Hallett, with headquarters at Cowes. In 1943 it took part in the landing in Sicily, after which it returned to the Isle of Wight and was built up to lift a division. In November, 1943, Rear-Admiral Sir Philip Vian was appointed to command Force "J" and training with the 3rd Canadian Division, which had started in September, was carried out during the winter. This included twelve assault and three ferry exercises, as well as several beach reconnaissances—the latter in the actual "Neptune" area.

During this training period there was another change in the command, Commodore G. N. Oliver relieving Rear-Admiral Vian on the appointment of the latter in February, 1944, as Naval Commander, Eastern Task Force.

Force "S," commanded by Rear-Admiral A. G. Talbot, was based in Scotland for its training. Headquarters were set up in October, 1943, at Inverness, and training with the 3rd British Infantry Division commenced in December.

The training of this force was seriously handicapped by the restrictions in its assault training areas; not until the final exercise at the end of March, for example, could close support fire and the assault be practised at the same beach. Another great difficulty was the stormy winter weather of the Moray Firth, but this Rear-Admiral Talbot subsequently considered "a blessing in disguise." Putting aside the cancellation of exercises and losses of craft[2] and personnel the experience gained under these conditions stood them in good stead in the actual operation.

Five full scale exercises were carried out at Burghead, which, from a hydrographical point of view, closely resembled the beach which was to be assaulted in Normandy.

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[1] A.N.C.X.F. Report, Vol. 1, p. 7.

Admiral Ramsay concurred with the opinion expressed by Rear-Admiral Vian that "five to six months is the ideal period for a force to work up in." A.N.C.X.F. Report, Vol. 1, p. 56.

[2] For the first three months there were no slipways or docks in the area to enable underwater repairs to be carried out to the craft and the weather prevented their being sent further afield. Rear-Admiral Talbot paid tribute to the Repair Staffs of the Northern Bases under Captain J. I. Hallett, C.B.E., R.N., who "worked marvels by beaching the craft and working on them at low water."

During most of this period the entire staffs of Force "S" and the 3rd British Division were working together at Combined Force Headquarters in Cameron Barracks, Inverness, but the routine work in connection with the training was so intense that it was decided to seek a more peaceful atmosphere for the detailed planning of the operation, and for the month of March the Combined Planning Staff moved to Aberlour House, on Speyside. The Rear-Admiral subsequently expressed the opinion that the results fully justified this step.

At the beginning of April, 1944, Force "S" commenced to move south to the assembly area (Portsmouth), an operation completed without incident by the end of the month.

Force "G" started at a considerable disadvantage to the other two forces, as it was not formed until 1st March, 1944. Its task was to land the 50th (Northumberland) Division. Commodore Douglas-Pennant established his headquarters (H.M.S. *Purbeck*) at the Royal Hotel, Weymouth, on 14th March[1], and during the ensuing six weeks four brigade exercises were carried out in the Studland area. In this connection, the Commodore subsequently remarked that the Army possessed an advantage over the Navy in that its training staff was almost entirely separate from its operational staff, thus allowing the latter to concentrate on planning the actual operation. "It is hardly an exaggeration," he wrote "to say that my staff were so occupied in planning the five major exercises ('Smash' 1 to 4 and 'Fabius') that they could devote little time to the operation until the beginning of May[2]."

The disadvantage due to the shortness of the working up period was accentuated by the fact that the headquarters ship, H.M.S. *Bulolo*, did not arrive in the United Kingdom till 17th April, and then required the fitting of extra communications. She was thus only available for the final exercise ("Fabius"). The Commodore remarked that the collaboration of a force staff and the officers of the headquarters ship can contribute greatly to the success of an operation and regretted that the two did not have the opportunity of working together during the earlier exercises[3].

The force was transferred from the Portland–Poole area to the Southampton –Solent area on 28th April.

The two American assault forces of the Western Task Force—Forces "O" and "U"—were drawn from the U.S. Eleventh Amphibious Force, which was directed on 17th December, 1943, to arrange for amphibious training with the Army divisions assigned by the Commanding General, First U.S. Army. The V Corps was allotted to Force "O" and the VII Corps to Force "U."

Training was carried out on the south coast of England, particularly in the Slapton Sands (South Devon) area, Force "O" commanded by Rear-Admiral J. L. Hall, U.S.N., being based on the Portland area and Force "U," under Rear-Admiral D. P. Moon, U.S.N., on the West Country ports. Starting

[1] Commodore Douglas-Pennant arrived in London from India on 17th February and took over the Naval planning staff which was already carrying out preliminary planning with the Advanced Headquarters of the 30th Corps and 50th Division in a Combined Force H.Q. in London. The Advanced H.Q. of the 50th Division accompanied the Naval Headquarters to H.M.S. *Purbeck*.

[2] A.N.C.X.F. Report, Vol. 2. Report by Naval Commander, Force "G," p. 5.

[3] H.M.S. *Bulolo* had, however, already carried out the duties of Force Headquarters Ship at Oran, Sicily and Anzio, and Commodore Douglas-Pennant subsequently stated that the experience gained by her ship's company in these operations was of great value.

with exercises for battalions and regimental combat teams the forces worked up to full divisional and corps rehearsals with all supporting elements, every effort being made to simulate conditions that would obtain in the assault area. From the naval point of view great attention was paid to practice in keeping in narrow swept channels with currents running up to 3 knots, and to beaching and handling landing craft on flat beaches with a large tidal range[1].

29. Exercise "Tiger": Attack by E-Boats

The large assembly of ships in the southern ports caused some increase of enemy activity in the English Channel, and several encounters occurred between E-Boats and patrols from the Portsmouth, Plymouth and Dover Commands. According to prisoners, their objectives were mainly reconnaissance but as April drew to a close—when the final "Neptune" rehearsals were scheduled to commence—stronger enemy reaction was anticipated. Actually the only interference with the "Neptune" preparations occurred during exercise "Tiger," a full scale exercise including assembly, loading, assault and build-up, carried out by Force "U," then comprising 337 ships and landing craft under Rear-Admiral Moon, U.S.N. Slapton Sands was the scene of the assault and throughout the exercise covering forces from the Plymouth Command were stationed south of the line joining Start Point to Portland in four patrols, consisting of four destroyers, three M.T.B.s. and two M.G.B.s.

Force "U" sailed during the night of 26th/27th April from Plymouth, Salcombe, Dartmouth, Torquay and Brixham and, in order to simulate the long minesweeping approach to the Bay of the Seine, followed a route first to the northern part of Lyme Bay, then to the southward and finally west to Slapton Sands. That night H.M.S. *Scimitar*, one of the escorting destroyers, was damaged by collision with an American tank landing ship, and put into Plymouth for repair.

At daylight, 27th April, the assault was carried out successfully at Slapton Sands. The last convoy to simulate the build-up sailed during darkness that evening, being due to arrive at Slapton Sands at 0730, 28th. It consisted of eight tank landing ships and two pontoons, escorted by H.M.S. *Azalea*. Unfortunately the *Scimitar*, which had been detailed by Rear-Admiral Moon as part of the escort for this convoy, did not sail from Plymouth after her repairs[2]. At 0020, 28th April, three groups of E-Boats were plotted west-south-west of Portland Bill, apparently searching to the north-westward. Two hours later the convoy, then in position 254° Portland Bill 15 miles, was attacked by one, or possibly two, E-Boat groups. The single escort was unable to beat off the attack; two tank landing ships were sunk by torpedoes and one other was damaged. Casualties, two-thirds of whom were military personnel, amounted to 638 killed and 89 wounded. The enemy, escaping to the southward were engaged by the destroyers *Offa* and *Orwell*, but escaped by the use of high speed and smoke[3].

[1] Rear-Admiral Kirk, subsequently expressed the opinion that "this training paid big dividends." A.N.C.X.F. Report, Vol. 3. Report by Naval Commander, W.T.F. p. 61).

[2] This was due to a misunderstanding for which the C.-in-C., Plymouth, accepted responsibility.

[3] This, the first offensive success of the enemy against "Neptune" operations was apparently gained in ignorance of the real target, the subsequent routine German broadcast merely claiming to have sunk three ships in convoy totalling 19,000 tons.

30. Final Rehearsal : Exercise " Fabius "

Exercise " Fabius "—the final rehearsal for Forces " O," " S," " J " and " G "—was carried out between the 2nd and 6th May, 1944. During this period Admiral Ramsay as Allied Naval Commander-in-Chief assumed control of operations in the English Channel in accordance with the arrangements for command. Covering forces to the southward of the exercise area were provided by the Commanders-in-Chief, Portsmouth and Plymouth.

The exercise embraced port authorities and organizations and communications generally. Berthing, loading and sailing of the ships and craft of the four forces took place throughout the 3rd May. The next day assaults were carried out under conditions as realistic as possible by Force " O " at Slapton Sands, Force " S " west of Littlehampton, Force " J " at Bracklesham Bay and Force " G " at Hayling Island.

No noticeable enemy reaction was shown to the large naval forces at sea. Two incidents, however, occurred in the Portsmouth Command patrol line. At 0337, 4th May, H.M.S. *Offa* was attacked by aircraft—tentatively identified as Me. 210—in position Lat. 50° 13′ N., 1° 27′ W. (20 miles to the southward of St. Catherine's Point). One bomb hit the upper deck under the port after Oerlikon and a near miss caused splinter holes in the hull. Structural damage was light ; casualties, three killed, four wounded.

About a quarter of an hour later, in position 208° St. Catherine's Point 24 miles, M.T.B.s 708 and 720 were attacked by Beaufighters. M.T.B. 708 was set on fire and subsequently sank, four officers and seven ratings being wounded.

The weather was favourable at the outset of the exercises, which from the naval point of view were generally satisfactory, but at 1300 4th May it commenced to deteriorate, with freshening south-westerly wind which reached force 6 in the night, and the full programme had to be curtailed to avoid damage to landing craft.

With the completion of Exercise " Fabius " the training and exercise period of the assault forces came to an end. From then until the start of the operation, except for a defence exercise carried out off Brighton, 18th/19th May by Forces " S," " G " and " J,"[1] efforts were concentrated on making all craft operationally fit.

The majority of the assault ships and craft had necessarily been used continuously in training for months past, and an extremely heavy strain was thrown on the repair facilities on the south coast in these last few weeks. There had been frequent discussions during planning as to what percentage of landing ships and craft would be available for the operation. In the event, the high overall figures for all types, 97·6 per cent. for the British and 99·3 per cent. for the American, exceeded the most sanguine forecast and reflected the " very highest credit on all concerned in the maintenance and repair organizations of both countries[2]."

[1] Forces " S," " G " and " J " assembled off Brighton where they were assumed to have established a successful landing. Ships in the build-up were subjected to attack by craft simulating E-Boats, W-Boats (small fast submersibles) and dummy air and mine-laying. No noteworthy incident occurred during the exercise.

[2] A.N.C.X.F. Report, p. 8.

IV.—EVENTS PRIOR TO THE OPERATION

(26th April–5th June, 1944)

31. A.N.C.X.F. Moves to Battle Headquarters

On 26th April, 1944, the Allied Naval Commander-in-Chief moved into Battle Headquarters at Southwick Park. This was conveniently near to the Supreme Commander and to the Portsmouth Combined Headquarters.

At this date the five assault forces—their individual training completed—were assembled in the following areas :—

Western Task Force.	*Eastern Task Force.*
Force " U " Plymouth.	Force " S " Portsmouth.
Force " O " Portland.	Force " G " Southampton.
	Force " J " Isle of Wight.

Follow-up Force " B " was in the Milford Haven area and Force " L " at the Nore.

The components of the artificial harbours, though as yet by no means operationally fit, were gradually arriving at their assembly points—" Phœnix " and most of the " Whale " units at Selsey and Dungeness[1], " Whale " roadways in the Solent, " Bombardons " at Portland and spare " Phœnixes " in the Thames. The " Corncobs " (blockships) were still in northern ports.

Everything was then going according to plan, but berthing facilities in the south coast ports were already a problem[2]. Plan 2 shows the berthing arrangements for the final assembly in the Isle of Wight area—the largest single concentration—which may be considered typical of the congestion experienced at all the other ports.

By 1st May it became evident that the programme of construction of the Mulberry units was falling behind and later in the month it was found that the

[1] Various factors had to be considered in the selection of " Phœnix " and " Whale " assembly areas, such as the nature of the bottom, the shelter afforded, accessibility to the building areas, vulnerability to enemy attack, and compliance with the requirements of the cover plan. For this latter reason Selsey and especially Dungeness were chosen in preference to places further west, *e.g.* Christchurch Bay. The choice of Dungeness and Selsey which was reached early in March, necessitated the establishment of skeleton port facilities. Under Vice-Admiral W. F. Sells (ret.) at the former and Rear-Admiral F. Burges-Watson (ret.) at the latter, these organizations were rapidly developed, the actual assembly and subsequent despatch of the Mulberry units being controlled by H.M.S. *Queen of Kent* (Lt.-Com. H. V. Todd, R.N.R.) in the Dungeness area and H.M.S. *Queen of Thanet* (Com. J. P. de W. Kitcat, R.N.) at Selsey. These two ships also provided accommodation for the " Phœnix "–" Whale " handling parties.

[2] A fortnight previously (11th April) Admiral Ramsay had written to the C.s-in-C., Plymouth, Portsmouth and the Nore, that he fully appreciated that saturation point had to all intents and purposes been reached ; the only additions which could then be foreseen were 60 trawlers for smoke making and 60 83-ft. U.S. motor launches to be used on sea rescue work.

pumping gear supplied by the War Office to pump out " Phœnix " units was totally ineffective[1].

Another difficulty lay in the shortage of tugs, and this, indeed, was never entirely got over. A special body, known as " Cotug " with Captain J. G. Y. Loveband, R.N., as its head, was organized on 24th May under A.N.C.X.F. to deal with all " Neptune " tug problems; but the fact was that there were not enough tugs in the country to satisfy all the demands—Civil, Naval and Military—on their services. As late as 31st May, of the tugs allocated for towage of " Phœnix " and " Whale " units the totals available were 48 out of 72 large, and only four out of 44 small, and on that date Admiral Ramsay directed that " the principle that Mulberry construction constituted a vital part of the whole operation must govern decisions as to the extent that tug assistance could be provided for other purposes[2]."

32. Enemy Reactions

Although the Germans were slow to react to the much publicised invasion preparations, enemy naval activity in the Channel did increase from the end of April onwards. As mentioned before (Sec. 29) Force " U " was attacked during exercises on 28th April, and the following night H.M.C.S. *Athabaskan* (Lieut.-Comdr. J. H. Stubbs, D.S.O., R.C.N.)—which, with H.M.C.S. *Haida* (Commander H. G. de Wolf, R.C.N.) was covering the 10th Minelaying Flotilla operating off the Ile de Bas—was sunk in an engagement with Elbing class destroyers. One of the enemy was driven aground by the *Haida*[3].

During May an increasing number of E-Boats and R-Boats were reported as having moved to Cherbourg and Havre. Their activities were successfully dealt with by the Commanders-in-Chief, Plymouth and Portsmouth.

A new feature, however, appeared on 20th May when a submarine was sighted and attacked in position Lat. 49° 01′ N., Long. 4° 09′ W. (roughly halfway between Ushant and Guernsey). On the following night another

[1] This defect was brought to light by the accidental stranding of a " Phœnix " unit about the middle of April. Operations for refloating it occupied a salvage vessel for a period of seven days. After discussions between the Admiralty and the War Office it was decided about the 20th May (less than three weeks before D-day) that the former should take over the responsibility for raising the " Phœnix " units. The work was then entrusted to the Admiralty Salvage Department. The Deputy Director, Captain J. B. Polland, R.N.V.R. was put in charge of the operation and all the resources of the department were put at his disposal. Space does not admit of a description of his activities, but Rear-Admiral Tennant subsequently reported: " The Salvage Department . . . performed in the very short time available a herculean task in getting the pumping situation under control and the thanks of the Allied Naval C.-in-C., Expeditionary Force, are due to them, and particularly to Captain Polland, for their great assistance." Report by R.A.M/P.

[2] The administration, servicing and operation of the large number of tugs employed in Operation " Neptune " presented a unique problem. Briefly, it was eventually solved by the appointment of Captain E. J. Moran, U.S.N.R., as " Tug Controller," with Headquarters at Lee-on-the-Solent and a Staff of British and American Officers and Ministry of War Transport Representatives, under whose able direction was carried out the operational control of some 200 tugs of various nationalities and services, during the assembly, assault and build-up stages of the operation.

The motor vessel *Aorangi* was detailed as Tug Depot Ship, to which all tugs reported for instructions as to fuel, water, defects, etc., on arrival in harbour.

Priorities of all towing requirements (other than local movements) were periodically reviewed and decided by a small committee consisting of the Head of Cotug, Captain Loveband (Chairman), the Tug Controller and Mr. Watkins of the M.O.W.T. The matter is dealt with at some length in the Reports of R.A.M.P., and the C.-in-C., Portsmouth.

[3] *See* Battle Summary No. 31. Cruiser and Destroyer Actions in the English Channel.

U-Boat was sighted by aircraft. This looked like a move against the " Neptune " convoy routes and special dispositions were made by the Commanders-in-Chief, Plymouth and Portsmouth, as well as the Air Officer Commanding-in-Chief, Coastal Command[1] to deal with the situation.

But Admiral Ramsay has left it on record that no weapon available to the enemy at this time caused him greater anxiety than did the potentialities of minelaying. Defensive minefields in the Bay of the Seine had caused the naval plan largely to be framed round the requirements for sweeping the allied forces through them. In the six weeks before D-day the enemy considerably intensified his minelaying off the south coast of England, using aircraft on a heavier scale than for over two years, and introducing two new types of mines. Fortunately these activities were confined to moonless periods. " Had D-day been in such a period it is doubtful whether the Portsmouth Channels could have been cleared in time. As it was, no interruption was caused . . . and it is considered that the enemy missed a great opportunity in not still further extending this form of attack. That he did not attempt more was yet another result of the air superiority we achieved before D-day[2]." Towards the end of May some of this minelaying was combined with small scale night bombing attacks on south coast ports, but very few casualties were caused either to ships or personnel.

33. Selection of D-day

On 1st May a meeting was held at Supreme Headquarters to discuss the situation created by the extension of obstacles in the assault area. It was decided that they must be dealt with dry shod, *i.e.* when they stood in less than two feet of water[3]. This necessitated the adjustment of H-hour, which in its turn involved the fixing of a target date for D-day. After some days' consideration, Admiral Ramsay decided that the earliest acceptable dates from the naval point of view were the 5th and 6th June; the 7th June could be accepted in case of extreme necessity. This decision he communicated to General Eisenhower at a meeting on 8th May.

The next day Admiral Ramsay gave warning by signal that the naval plan would be " frozen " at 0900, 12th May. This was necessitated by the large number of alterations in plans of task and assault force commanders, which would, if continued, create a critical situation with authorities responsible for implementing the initial movements in " Neptune[4]."

On 15th May a meeting took place at 21st Army Group Headquarters at which a general outline of the complete " Neptune " plan was presented by each of the respective Commanders-in-Chief and Task Force Commanders. Included in the audience were H.M. The King, the Prime Minister and General Smuts, each of whom addressed the assembled Officers. " Great, if sober, confidence in the outcome of the operation was evident throughout the meeting. The need for flexibility to meet events which might not go in accord with plans was emphasized by both the Prime Minister and A.N.C.X.F.[5]."

[1] Air Chief Marshal Sir W. Sholto Douglas, K.C.B.

[2] A.N.C.X.F. Report, Vol. 1, p. 9.

[3] A number of reconnaissance landings, arranged by the Chief of Combined Operations, were carried out to investigate the extent of these obstacles. On the night of 17th/18th May, two officers failed to return from one of these missions in the Pas de Calais area.

[4] A.N.C.X.F. Report, Vol. 1, p. 35.

[5] A.N.C.X.F. Report, Vol. 1, p. 36.

The First Lord of the Admiralty[1] visited Admiral Ramsay at Battle Headquarters, and saw the preparations in the Portsmouth area on 21st May. Two days later, on 23rd May, the Supreme Commander signalled in special code that D-day was provisionally fixed to be 5th June[2].

34. Visit of H.M. The King

On 24th May H.M. The King visited the Portsmouth area. After being met by Admiral Ramsay, he embarked in each of the three force headquarters ships of the Eastern Task Force, and witnessed assault landing craft flotillas steam past in formation. His Majesty afterwards embarked in the royal barge and proceeded past major landing craft assemblies at Portsmouth and Southampton, and coastal craft in Haslar Creek.

The next day His Majesty visited Portland, where he was met by Rear-Admiral Kirk, U.S.N., and inspected ships and personnel of the Western Task Force, taking luncheon on board the Flagship, U.S.S. *Augusta*.

35. Operation Orders opened : Security

At 2330, 25th May, all holders were directed to open the operation orders[3] and on the 28th a further signal was made naming 5th June as D-day and specifying the five H-hours for the respective assault forces[4].

This brought security to the fore. About 24 hours previously, security measures had been increased in stringency by order of the Supreme Commander. All mail of personnel taking part in the operation was impounded; telephone and cable facilities were forbidden; and private telegrams might only be sent in emergencies by special permission of Commanding Officers. On the naming of D-day on 28th May, all personnel became " sealed " in their ships[5] in accordance with instructions contained in the operation orders.

Nevertheless, some breaches of security did occur. The premature issue (on 31st May) of charts of the Bay of the Seine area to tugs—which afterwards dispersed to various ports—was regarded as a serious danger. As a counter measure, each tug was promptly issued with a large-scale chart of the Boulogne area, marked " Immediate. Top Secret ".

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[1] The Rt. Hon. A. V. Alexander, C.H.
The Prime Minister, accompanied by the Dominions Premiers (with the exception of the Prime Minister of Australia) had visited the Portsmouth area on 13th May.

[2] The provisional fixing of D-day was necessary at an early date, since sailing orders to certain units, such as the " Corncobs " (Blockships) at Oban, had to be issued as early as D—8 days.

[3] A reassuring message had been promulgated by the Admiralty at Admiral Ramsay's request on 24th May, pointing out that the orders were of necessity voluminous, but that only a small part of them concerned each individual ship, and that difficulties would be cleared up during briefing. (Admiralty Message 241824 May, 1944.)
Admiral Ramsay was also concerned at the volume of signal traffic which the size of the operation entailed. Admiralty approval was obtained for various measures to reduce this, the most noteworthy being authority to take action on telephone conversations and personal letters to a much greater extent than was customary.

[4] It had been originally intended to include D-day and H-hour in the signal ordering the operation orders to be opened, but it was decided to hold them back until after the orders had been studied, in order to avoid possible confusion over the five newly decided H-hours.

[5] Difficulties arose over " sealing " personnel of minor landing craft who were accommodated ashore.

There were also several instances of indiscreet signals linking D-day with the calendar date. Happily, these had no ill effects, and on " the day " complete tactical surprise was achieved[1].

36. Final Preparations

With the promulgation of D-day on 28th May the long period of preparation entered on its last stage.

On this day Phase III of the minelaying plan (*see* Sec. 23, *ante*) was completed—five days earlier than originally planned—and the phase which was to last till the eve of D-day was started[2].

Restriction on air attack on surface ships in the Channel to the westward of a line from North Foreland to Walcheren Fort (near Dunkirk) was instituted on all aircraft except those of Coastal Command on 27th May[3].

On 31st May ten sonic underwater buoys were laid in positions marking the edge of the enemy mine barrage in the assault approach channels (Operation " Enthrone "). The buoys were laid sonically dead to come alive on D—1, when they would be used by motor launches acting as mark boats to enable the minesweepers to start sweeping the channels in the correct positions.

In Operation " Neptune " radar, radar-counter measures and communications interlocked to an unprecedented degree, and to avoid saturation of the ether and complete loss of all efficiency, drastic restrictions were imposed.

Several outstanding and recurring problems called for settlement during these last few days, the most important of which were in connection with the shortage of tugs and the Air Force plans.

As a result of enemy troop movements in the Cotentin Peninsula, the Air Force plans for the U.S. airborne operation in that area were changed, and a new air route was chosen, which passed dangerously close to the American forces in " Utah " sector. Admiral Ramsay decided that he must assist the Air Force by accepting, though with misgiving, the proximity of aircraft to ships, and imposed restrictions to A.A. gunfire similar to those already in force on the eastern flank[4] (*see* Sec. 16).

The question of an aircraft carrier to transport air O.P. aircraft was also revived, and H.M.S. *Argus* was actually sailed to Belfast to embark them; but on her arrival the army authorities decided they could not make use of her—to the relief of the naval authorities, who did not relish the employment of this very vulnerable ship in the assault area.

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[1] A curious point in security was investigated by the naval Intelligence Section towards the end of May. This arose from the " Daily Telegraph " crossword puzzle, in which a remarkable number of the codewords used in " Neptune " formed the correct answers to the clues. Not only was the word " Neptune " itself a solution, but also " Overlord," " Omaha," " Mulberry," " Whale," etc.

[2] It was estimated that enemy casualties due to the minelaying were seven ships sunk and eight damaged during Phase II, which ended on 10th May, and nine sunk and 29 damaged during Phase III—results which were considered by Admiral Ramsay to reflect great credit on all concerned. A.N.C.X.F. Report, Vol. 1, p. 40.

[3] The restriction was not applied to aircraft of the A.E.A.F. inside a 10-mile strip from the French coast till 29th May.

[4] Rear-Admiral Moon, the Assault Commander, Force " U," made a strong protest (through the Naval Commander, Western Task Force) against the proposed route of troop-carrying aircraft in the close proximity of the ships in his assault area.