

Chart limits shown are of the best scale charts issued to naval vessels by the U.S. Naval Oceanographic Office. Section numbers refer to the place in the text where a description of the designated locality begins.

CHAPTER 7—GRAPHIC INDEX

CHAPTER 7

THE SOUTHWESTERN SIDE OF THE PERSIAN GULF FROM RA'S RAKAN TO KHAWR 'ABD ALLĀH

- Part A.** Ra's Rakan to Ad Dammām
Part B. Ad Dammām to Ra's Abū 'Alī
Part C. Ra's Abū 'Alī to Ra's al Qulay'ah
Part D. Ra's al Qulay'ah to Khawr 'Abd Allāh

Plan.—This chapter describes the southwestern side of the Persian Gulf; the arrangement is north-northwestward from Ra's Rakan.

GENERAL REMARKS

7-1 The coast between Ra's Rakan and Khawr 'Abd Allāh, about 260 miles north-northwestward, is a low sandy desert with a few small hills and little vegetation.

The southern section of this coast is indented by a large bay, the approaches of which are encumbered with shoals, reefs, and the large island of Al Baḥrayn. Because of these obstructions, the shallow waters of this indentation of the coast are avoided by all vessels except small native craft and shallow-draft barges; however, large vessels can reach the oil loading facilities at Ra's at Tannūrah, Ad Dammām, and Sitrah Anchorage through narrow deepwater channels.

The coast northwestward of Ra's at Tannūrah to Al Kuwayt is indented by numerous small shallow bays enclosed by low sandy spits. The approaches are encumbered by many reefs, some of which are unsurveyed. Channels exist into the oil loading terminals at Ra's al Mish'āb, Al Fuhayhīl, and several smaller terminals. The coast northward of Al Kuwayt is indented by Kuwait Harbor, the best anchorage in the western part of the Persian gulf. The large marshy Jazīrat Būbiyān, northeastward of Kuwait Harbor, is fronted by an extensive shoal.

With the exception of the oil terminals and

a few towns, this section of coast is not visited except by local craft. It is not advisable to venture away from the towns on the mainland without an armed escort.

NAVIGATION

7-2 From a position 4 miles southward of Jazīreh-ye-Forūr (sec. 4D-11), a course of 279° for 75 miles leads to a position 3 miles southward of Stiffe Bank Light Float; thence a course of 303° for 186 miles leads to a position 5 miles northeastward of Jazīreh-ye Fārsī; thence a course of 306° for 91 miles leads to a position 3 miles northeastward of Madaira Reef. See sections 7D-18 and 7D-34 for directions from Madaira Reef to ports in the area.

This track passes over a least depth of 17 fathoms. The nearest approach to dangers are at Jazīreh-ye Fārsī and Madaira Reef, both of which are marked by navigational aids.

WINDS AND WEATHER

7-3 The prevailing wind along this section of coast is from northwestward. On relatively calm mornings the wind may follow the contours of the coast, resulting in an increase of westerly winds along the southern part of the coast.

For more detailed descriptions of the winds and weather along this coast, see section 1-43

and the various sections in this chapter pertaining to a specific place.

CURRENTS—TIDAL CURRENTS

7-4 The general current circulation along this coast is southeasterly at less than 1 knot for most places.

The currents are not uniform in nature or pattern; therefore section 1-29 and the particular area in question should be referred to for local conditions.

Part A. RA'S RAKAN TO AD DAMMĀM

7A-1 *Ra's Rakan* ($26^{\circ}11' N.$, $51^{\circ}13' E.$) is the northern extremity of Qatar, a large peninsula jutting northward into the Persian Gulf about midway along the south and west coasts of the gulf. The Cape is fringed with coral reefs.

COAST—GENERAL

7A-2 The large indentation of the coast between *Ra's Rakan* and the mainland as far as *Ad Dammām*, about 58 miles west-northwestward of *Ra's Rakan*, is fouled by numerous reefs and shoals and is further blocked by the large island of *Al Bahrayn*. *Bahr as Salwā* lies southward of *Al Bahrayn* and is shallow; it is used mainly by shallow-draft barges and native craft.

Al Bahrayn, the seat of the government, is the site of a large oil terminal. The approach is encumbered by many shoals, but a marked channel leads to the deepwater wharves. *Jazirat al Muharraq*, a small island lying northeastward of *Al Bahrayn* is surrounded by a reef.

Local knowledge is necessary for proceeding to most of the small native villages, as many of the channels are unmarked and there are numerous uncharted reefs and shoals in the area.

DEPTHS—OFF-LYING DANGERS

7A-3 Depths in the area described within this chapter part are generally less than 10 fathoms; most of the area has depths of less than 3 fathoms, with the exception of a few channels and isolated patches. With this in

mind, strict adherence to channels is essential, and if doubt exists as to the vessel's position, cautionary measures should be taken immediately.

The edge of Great Pearl Bank (sec. 6A-15) extends west-northwestward from a position about 35 miles northeastward of *Ra's Rakan*. Northward of this point there are overfalls in places on the bank.

An isolated 5-fathom patch, marked by a light buoy, lies about 20 miles north-northeastward of *Ra's Rākān*; an obstruction, marked by a light buoy, is about 11 miles farther northeastward. "Target" Light Buoy, black with spherical topmark and radar reflector, is about 38 miles northeastward of *Ra's Rākān*. The dangers in the approach to *Al Bahrayn* are described with their related features. Dangers lying in the approach to *Ra's* at *Tannūrah* are described in part B of this chapter.

NAVIGATION

7A-4 From a position on the coastal track 3 miles southwestward of Cable Bank Light Float, a course of 262° for 80 miles leads to Bahrain Lightship. The nearest approach to any danger is about $4\frac{1}{2}$ miles from the previously described 5-fathom patch northward of *Ra's Rakan*. See section 7A-21 for directions to the facilities at *Al Bahrayn*. This track passes over a least depth of $8\frac{1}{2}$ fathoms.

CURRENTS

7A-5 Tidal currents are felt everywhere on Great Pearl Bank, especially near the reefs and islands. From *Ra's Rakan*, the tidal currents set southward along the coast. Off *Al Bahrayn* and among the outlying reefs the tidal currents are very irregular and are much affected by the wind. To a certain extent they follow the general trend of the reefs. At springs they attain a rate of 1 knot to 2 knots and at times a rate of 3 knots.

WINDS AND WEATHER

7A-6 The *shamāl* reaches gale force at intervals but raises little or no ground swell at

most of the moorings in Al Baḥrayn; however, a short choppy sea makes up and is bothersome for small boats.

SITRAH ANCHORAGE, KHŌR KALIYA, BAHREIN HARBOR AND APPROACHES

7A-7 The principal islands in the vicinity of Sitrah Anchorage, Khōr Kaliya, and Bahrein Harbor are Al Baḥrayn, Jazīrat al Muḥarraḡ, and Jazīrat Sitrah.

Al Baḥrayn (Bahrein Island), about 35 miles westward of Ra's Rakan (sec. 7A-1) and about 27 miles in length in a north and south direction, has low coasts and, except for a belt of fertile land along its northern end, is uncultivated. Bahrein Harbor is situated northward of Al Baḥrayn and westward of Jazīrat al Muḥarraḡ, while Sitrah Anchorage is located about 10 miles southeastward of Bahrein Harbor. Between these two places is a basin known as Khōr Kaliya.

From a position about 4 miles southward of the north coast of Al Baḥrayn, a rocky tableland, 100 to 150 feet high, extends southward for many miles and stretches across the island; this tableland rises on all sides in small cliffs. Rifa ash Shargi, a village about 7 miles southward of the northeastern extremity of the island, stands partly on and partly at the foot of the cliffs on the northeastern side of the tableland; the village has a fort with several towers which attain an elevation of 210 feet; they are visible from northward but are said to be difficult to identify, even from aloft because of the trees. A conspicuous tower, 274 feet high, stands about 2½ miles eastward of Rifa ash Shargi. A large oil refinery is situated near the tower.

Jabal ad Dukhkhān, about 12 miles southward of the northern end of Al Baḥrayn and about midway between the east and west coasts, is a small compact group of dark hills, 443 feet high. The rig of an oil well on the southeastern slope of the hills is conspicuous when seen from northwestward; numerous oil tanks are in the vicinity. In clear weather, Jabal Dukhkhān is said to be the first part of the island to be seen. Al Manāmah, the principal town, is situated on the northeastern extremity of

the island. The western and eastern sides of the island are described with the approaches to Bahr as Salwā; the north coast is described with Bahrein Harbor. (See View No. 65.)

7A-8 **Jazīrat al Muḥarraḡ** (26°16' N., 50°38' E.), situated about 1¼ miles northeastward of the northeastern end of Al Baḥrayn, is low and sandy. Along the coasts of the island are conspicuous groves of date palms and several villages.

The Imperial Airways Landing Field is situated in the middle of the island. An **aeronautical radiobeacon** is located near the airfield.

Jazīrat Khasaifa, 8 feet high, lies about ½ mile northward of Jazīrat al Muḥarraḡ on the barrier reef which surrounds that island.

Qalāli, a village on the northeastern extremity of Jazīrat al Muḥarraḡ, has several towers, the easternmost being the largest, Samāhij, Dair, and Al Busaitīn are villages with date groves, the two former lying on the northern side of the island, and the third located on the western side. Raiya, situated near the northern extremity of the island, has a clump of date palms with two white buildings close westward of it. Al Muḥarraḡ is situated on the southwestern extremity of the island and is connected to Al Manāmah by a causeway. Al Ḥadd, conspicuous from eastward, is situated on the southeastern extremity of the island. Warning lights are shown from 7 of a group of 11 radio masts which range in height from 70 to 90 feet and are located about 1¾ miles north-northwestward of Al Ḥadd. About midway between Al Ḥadd and Al Muḥarraḡ is Arād Peninsula, on the southwestern part of which are a fort, a date grove, and a large white house.

A submarine pipeline extends about 13/5 miles southward from Jazīrat al Muḥarraḡ in the area between Arād Peninsula and Al Ḥadd. The outer end is marked by a black cylindrical buoy. An 80-foot hose, marked by a small white conical buoy, is attached to the end of the pipeline; two mooring buoys are close by. Small craft are warned not to anchor in this area.

The reef fringing Jazīrat al Muḥarraḡ extends a considerable distance offshore in places,

and a shallow flat with depths of less than 3 fathoms extends from the reef, causing shoal water as far as $3\frac{1}{2}$ miles from the northwestern, northern, eastern, and southern sides of the island. A narrow boat channel runs through the fringing reef and connects Khōr Kaliya with Bahrein Harbor. The causeway between Al Muharraq and Al Manāmah crosses this channel with a swing bridge over the deepest part. The bridge is opened daily from 1100 to 1200 hours and from 2300 to 2400 hours, local time.

See section 7A-45 for facilities on this island.

7A-9 Jazīrat Sitrah lies close off the northeastern part of the east coast of Al Bahrayn. The northern half of the island is covered with date palms, among which are a few settlements. Several oil tanks are located in the center of the island near the root of an oil pier (sec. 7A-10) which extends from the eastern side of the island. At the southern end of the island is the small village of Mahāna as Saghira. Two small piers project from the coast near the town. Barge Channel, a shallow dredged channel, leads from Sitrah Anchorage to these piers. Another channel, marked by light buoys, for shallow-draft vessels leads southward from the piers to Ra's Dukhan (sec. 7A-46). The channel separating Jazīrat Sitrah from Al Bahrayn is very shallow and is spanned by a bridge which carries oil pipelines from the refinery on Al Bahrayn to the oil pier on the eastern side of the island. The island is surrounded by sand and coral reefs with the above described channels passing through them.

Khōr Lupin, an extensive shallow backwater with general depths of about 1 foot to 11 feet, lies northwestward of Jazīrat Sitrah; but there is no clear passage into it. The best entrance is northward of An Nabī Sālih, an islet covered with date palms and situated about $1\frac{3}{4}$ miles southwestward of Ra's al Jufair (sec. 7A-27). The least depth in this channel is 6 feet, but navigation into the backwater is not recom-

mended because of the existence of many fish-traps in the entrances.

SITRAH ANCHORAGE

Position: 26°10' N., 50°41' E.
Depths: Approach, 41 feet.
 Anchorage, 7 to 9 fathoms.
 Wharves, 42 to 45 feet.
Tidal rise: MHWS, 7 feet;
 MHWN, $5\frac{1}{4}$ feet.

7A-10 Sitrah Anchorage, the main oil loading terminal for Al Bahrayn, is located off the northeastern side of Jazīrat Sitrah.

7A-11 Navigation.—See section 7A-4.

7A-12 Winds and weather.—The prevailing wind is from the northwest. During summer, the shamāl causes relatively cool and pleasant weather. The reefs afford some protection from the shamāl.

The climate is unpleasant from April to October, being hot and humid; it is reported however, that the weather is more comfortable than in other parts of the gulf. Very pleasant weather is experienced from November to March.

7A-13 Currents.—The tidal currents set northward and southward in the anchorage. Strong cross currents have been encountered in the approach. See section 7A-25 for a description of strong currents in the dredged channel leading into Khōr Kaliya. This channel is close to the oil wharves in Sitrah Anchorage.

7A-14 Depths.—There is a least depth of 41 feet in the approach from Bahrain Lightship to the oil wharves. Depths of less than 6 fathoms exist almost continuously on either side of the fairway; they increase to about 9 fathoms in the anchorage.

The mean range of the tide is about 5 feet; the spring range is about $6\frac{1}{4}$ feet.

Caution.—Later surveys indicate lesser depths than charted in Sitrah Anchorage area (1963).

7A-15 Aspect — Landmarks.—In clear weather, the first marks to be sighted are the white houses on Jazīrat al Muharraq (sec.

(8130) PERSIAN GULF—Bahrain Lightship.—Chart amendment.—The legend “HORN” charted against Bahrain Lightship ($26^{\circ}33.0'$ N., $51^{\circ}03.5'$ E. approx.) will be expunged.

(N.M. 53/66.)

(N.M. 47 (2122), London, 1966.)

H.O. Charts **3642, 3660, 3647.**

H.O. Pub. 112, No. **35390.**

H.O. Pub. 62, 1960, page **217.**

7A-8) and several towers on Jabal ad Dukhkhān (sec. 7A-7). The oil well rigs on the southeastern slopes of Jabal ad Dukhkhān are conspicuous from northeastward. Six radio masts and a flagstaff on Ra's al Jufair (sec. 7A-27) and three other radio masts about $\frac{3}{4}$ mile southwestward of Ra's al Jufair are good marks. Several of the landmarks used in the approach to Bahrein Harbor are also visible closer in; see section 7A-39.

In most parts of the Persian Gulf landmarks cannot be depended upon entirely, as they are often hidden from view because of excessive dust in the atmosphere.

7A-16 Harbor.—Sitrah Anchorage is primarily an open roadstead with Al Bahrayn and nearby islands and reefs protecting it from the shamāl. Two deepwater wharves, Sitrah No. 1 and No. 2 are in the western part of the anchorage. Sitrah No. 2 is at the seaward end of a $2\frac{1}{2}$ -mile causeway, which extends east-northeastward from the eastern side of Jazīrat Sitrah (sec. 7A-9). Three dolphins lie off the outer end of Sitrah No. 2; a light is shown on the northernmost and on the southernmost dolphins. Coastal Tanker Wharf extends north-northeastward from a position on the causeway about $\frac{1}{3}$ mile southwestward of Sitrah No. 2 Wharf.

Sitrah No. 1 Wharf, a detached wharf, is about 500 yards eastward of Sitrah No. 2. Two dolphins lie off each end of Sitrah No. 1; a light is shown on the northernmost and on the southernmost of these dolphins. Mooring buoys are positioned northwestward and westward of Sitrah No. 1.

Two small barge piers are located on the eastern side of Jazīrat Sitrah. See section 7A-9 for a more complete description.

7A-17 Navigational Aids.—Bahrain Lightship ($26^{\circ}33' N.$, $51^{\circ}03' E.$), consisting of a red hull with *Bahrain* in white letters on each side of the hull, is located about 28 miles northeastward of the northern extremity of Jazīrat al Muharraḡ. A light is shown from a black tower amidships; a bell and a foghorn are sounded. The vessel is equipped with a radar reflector. (See View No. 63.)

Light Buoys Nos. 1, 3, 5, 7, 9, 11, and 13 mark the northern and western sides of the

channel from Bahrain Lightship to Sitrah Anchorage. Light Buoys Nos. 2 and 4 mark the eastern side of the channel. All of the buoys, except Nos. 1 and 9, are equipped with radar reflectors.

Bahrain Approach Lighted Beacon, a red steel framework structure, is located about $9\frac{1}{2}$ miles northeastward of Jazīrat Khasaifa.

Sitrah Lighted Beacon, a conical framework tower, is located at the southeastern extremity of the shoal water which extends eastward of Jazīrat al Muharraḡ. (See View No. 64.)

South Shoals Light Beacon, a red pile structure, is situated about $1\frac{1}{2}$ miles southwestward of Sitrah Lighted Beacon and marks the northern extremity of the shoals extending southeastward of Jazīrat Sitrah.

South Range Light Beacon, a pile structure, stands about 450 yards south-southwestward of Sitrah No. 1 Wharf.

North Range Light Beacon, a pile structure, about 450 yards northward of Sitrah No. 2 Wharf, marks the southern extremity of the shoal water which exists eastward of the northeastern side of Jazīrat Sitrah.

Middle Ground Outer Light Buoy, conical and painted in black and white horizontal bands and surmounted by a cone topmark, is moored off the southeastern end of a shoal that lies between the two entrance channels leading into Khōr Kaliya (sec. 7A-23).

North Shoal Light Beacon stands about $1\frac{2}{5}$ miles northeastward of Sitrah No. 1 Wharf. Shoal water exists northward of the beacon.

A dangerous wreck, with 28 feet over it, lies sunk about 15 miles east-northeastward of the northern end of Jazīrat al Muharraḡ. A lighted buoy is moored about 130 yards west-northwestward of the wreck.

The after section of a dangerous wreck lies about $1\frac{1}{4}$ miles eastward of South Shoals Light Beacon. A can light buoy, painted green is moored about 190 yards northward of the wreck. Numerous obstructions exist in the immediate vicinity of Oil Wharf No. 1 and Oil Wharf No. 2; ships should not navigate in this area without an Oil Company Mooring Master aboard.

A wreck with 13 feet over it lies sunk about $\frac{3}{4}$ mile east-southeastward of South Range Light Beacon.

7A-18 Channels.—A natural channel exists from Bahrain Lightship to Sitrah Anchorage; it is marked by the above-mentioned navigational aids and has a least depth of 41 feet.

Several shoal patches lie in the channel, the principal ones being the $5\frac{1}{2}$ -fathom patch about 12 miles east-northeastward of Jazīrat Khasaifa, a $5\frac{1}{2}$ -fathom patch about 1 mile eastward of Middle Sitrah Light Buoy, and two $5\frac{3}{4}$ -fathom patches about $2\frac{1}{2}$ miles north-northeastward of Sitrah Lighted Beacon.

7A-19 Anchorage.—The anchorage for the port is just off the petroleum wharves in 7 to 9 fathoms, good holding mud and sand, with fair protection from the shamāl.

In 1962 it was reported that lesser depths than charted were in the Sitrah Anchorage area.

Anchoring is prohibited between Sitrah No. 1 and 2 Wharves, except upon advice of the mooring master.

7A-20 Pilotage.—Pilotage is normally provided only from the anchorage to the wharves by company mooring masters. A mooring master will meet the vessel off Sitrah Lighted Beacon, if requested; at least 24 hours advance notice of arrival should be given. Vessels are not moored at night.

Vessels are requested to keep "BAPCO-BAHRAIN" fully advised regarding estimated time of arrival at Sitrah and that ETA be sent not later than 48 hours steaming time from Sitrah.

A separate message should be sent to the Port Health Officer, Bahrain, advising last bill of health and present health conditions on board.

7A-21 Directions for entering.—The course and distance from the coastal track to Bahrain Lightship is given in section 7A-4.

During the sand haze in the summer months Bahrain Lightship may at times be difficult to pick up, but at other times it is often sighted before it is expected because of mirage. During spring and autumn it may be advisable to pick up the lightship at night because of the early morning fog or thick mist. In the pearl fishing season, a great number of dhows may

anchor on the banks in the vicinity of the lightship; therefore caution should be exercised at night. When passing the light vessel, it should be noted in which direction she is lying to her mooring cable in order to determine the direction of the tidal stream which may be setting across the channel. Some allowance in course may be necessary to correct for tidal set.

Pass the lightship close off and then alter course so as to pass light buoys nos. 1, 3, 5, 7, 9, 11, and 13 to starboard, and nos. 2 and 4 to port. Round no. 13 buoy so as to leave Sitrah Lighted Beacon to starboard. From Sitrah Lighted Beacon alter course westward to the anchorage or to the wharves. If unfamiliar with the approaches, do not attempt to enter the port at night, unless the visibility is good.

7A-22 Sitrah Anchorage is the principal oil loading terminal for the refinery at Al Bahrayn.

Sitrah No. 2 Wharf can accommodate 4 large vessels; it is 1,100 feet long with 42 feet alongside (MLW). Two vessels can lie at the outer face and along the inner side, respectively. Vessels using this wharf must be equipped with 3 manila lines and 1 wire both forward and aft. Lines can usually be rented by giving advance notice. Cargo can be handled on the lighter pier, which is about 500 yards from Sitrah No. 2 Wharf.

Sitrah No. 1 Wharf is about 450 feet long with 45 feet alongside (MLW) and can accommodate two large vessels.

Spot approval is required for a vessel with a draft greater than 38 feet. A keel clearance of 3 feet is allowed so that vessels with a greater draft than 38 feet can only sail at high water.

Coastal Tanker Wharf can accommodate vessels not over 240 feet long with a maximum draft of 15 feet.

All vessels alongside must be prepared to clear the wharves immediately on instructions to do so.

Because of the pearl and other fisheries in the vicinity, vessels are requested to avoid pumping oily ballast overboard within 50 miles of Al Bahrayn.

A 20-ton stiffleg derrick is located on the lighter pier on Sitrah No. 2 Wharf.

There are about 13 tugs, ranging in size from 100 to 1,000 h.p. Numerous lighters and launches are available.

Fuel oil, diesel oil, and a limited amount of water are available at the wharves. Provisions and supplies can be obtained upon advance notice to ship's agent.

For repair facilities, communications, medical services and other supplies, see section 7A-45.

KHŌR KALIYA (MINA SULMAN)

Position: 26°13' N., 50°38' E.
Depths: Approach, 36 feet.
 Entrance channel, 27 feet.

(6452) **PERSIAN GULF—Khor Kaliya and Sitrah—Chart amendments.**—1. The following will be expunged:

(a) Lighted buoy in $26^{\circ}11'41''$ N., $50^{\circ}37'12''$ E.
(b) The magenta dashed line extending from Shoreham Beacon ($26^{\circ}12.1'$ N., $50^{\circ}37.1'$ E.), in a south-southeastward direction for about 0.4 mile, thence north-westward to the pier.

(c) The legend "Prohibited Anchorage" in $26^{\circ}11.9'$ N., $50^{\circ}37.0'$ E. (approx.).

(d) The mooring buoy in $26^{\circ}09'42''$ N., $50^{\circ}40'21''$ E.

(e) The mooring buoy about 160 yards southwestward of (1d).

(f) The mooring buoy about 350 yards west-southwestward of (1d).

2. The lighted buoy in $26^{\circ}11'44''$ N., $50^{\circ}39'11''$ E. is painted red.

3. Substitute the symbol for "*Fresh water spring in sea bed*" for the small circle and legend "Fresh Water connection" in $26^{\circ}13.7'$ N., $50^{\circ}37.0'$ E. (approx.).

4. The seaward end of the submarine pipelines at Sitrah will be recharted as follows: distances and bearings from North Range Light ($26^{\circ}10.0'$ N., $50^{\circ}40.0'$ E.)

(a) Northern pipeline; extending from a point about 740 yards 157° , in a $091^{\circ}15'$ direction to Oil Wharf No. 1.

(b) Southern pipeline; extending from a point about 790 yards $153^{\circ}30'$, in a $091^{\circ}15'$ direction to Oil Wharf No. 1.

Note.—The charted seaward extremities of the northern and southern pipelines, north of the new extension in (4 a and b) will be expunged.

5. A *Qk. Fl. R. 10 ft. 2 M.* light will be charted on the causeway, about 2,560 yards 226° from the light in (4).

6. A *F.W.R.G. (vert.) 3 M.* light, visible 190° to 340° , exists on the seaward end of the R.A.F. pier in $26^{\circ}13'25''$ N., $50^{\circ}35.53''$ E. (approx.).

7. The legend "Dredged to 27 feet (1957)" ($26^{\circ}11.4'$ N., $50^{\circ}37.5'$ E. approx.) will be amended to "*Dredged to 27 feet (1961)*".

8. The legend "Bns in line $356^{\circ}45''$ " ($26^{\circ}11.5'$ N., $50^{\circ}39.5'$ E. approx.) will be amended to read *Lts in line $356^{\circ}45'$* .

9. Dashed lines will be charted as follows:

(a) Extending from a point in $26^{\circ}10'10''$ N., $50^{\circ}39'30''$ E. in a $278^{\circ}30'$ direction to the shore of An Nabi Salih.

Note.—The legend "Southern limit of Mina Salman" will be inserted along the northern edge of the above line.

(b) Extending from the northern extremity of Ras an Nannas ($26^{\circ}13'48''$ N., $50^{\circ}35'39''$ E.) in a $115^{\circ}30'$ direction to Sitrah Harbor limit.

Note.—The legend "Northern limit of Mina Salman" will be inserted along the southern edge of this line.

(B.A. Chart 3796.)

(N.M. 41/66.)

H.O. Chart 6302.

H.O. Pub. 62, 1960, pages 217, 219.

Anchorage, 4 to 5 fathoms.
Wharves, shallow to 30 feet.
Tidal rise: MHWS, 7 feet.
 MHWN, 5¼ feet.

7A-23 Khōr Kaliya is a basin between Sitrah Anchorage and Bahrein Harbor. It is used primarily as an anchorage for naval vessels.

7A-24 Navigation.—Khōr Kaliya is entered from Sitrah Anchorage. For directions to Sitrah Anchorage, see section 7A-21. For directions from Sitrah Anchorage to Khōr Kaliya, see section 7A-32.

7A-25 Currents.—The tidal currents between Al Baḥrayn and Jazīrat al Muḥarraḡ set southeastward and northwestward.

In the entrance of Khōr Kaliya, the north-going or flood current commences from 5 hours before to ¾ hour after high water. The current sets particularly strong on the western side of the channel near the range beacons, where it attains a maximum rate of 4½ knots about 3½ hours before high water. The maximum rate through the dredged channel is 3½ knots.

There is practically no period of slack water, and the ebb current tends to set across the northern range line, running strongly on the eastern side of the channel. The current attains a maximum rate of 3½ knots through the dredged channel 4½ hours after high water.

7A-26 Depths.—A dredged channel, 27 feet deep, runs from Sitrah Anchorage to a dredged basin near Ra's al Jufair. In 1960 the controlling depth was 18 feet; the channel was being dredged to 27 feet and was also being widened and straightened. In the center of the inlet is an extensive shoal with depths of 1 fathom to 3 fathoms; the shores are fringed with reefs, and between these reefs and the central shoal are depths of 3 to 6 fathoms. There are depths of 4 to 5 fathoms in the anchorage. Several small piers have depths of 2 to 8 feet alongside. Mina Sulman Pier has a depth of 30 feet alongside, except for the two inner berths where it is 24 feet.

7A-27 Aspect—Landmarks.—The minarets in Al Manāmāh are conspicuous. The town forms part of the western side of Khōr Kaliya with Ra's al Jufair (Jasrah) being the easternmost point. On the point there is village with a

flagstaff and several conspicuous radio masts. Ra's Umm al Hasam lies a little over 1 mile southwestward of Ra's al Jufair. Umm as Shahin and Umm ash Shiyaira are two small islets on the reef which extends southward from Al Ḥadd on Jazīrat al Muḥarraḡ. Bu Shanin, a small islet, lies about ¾ mile northeastward of Umm ash Shahin.

The landmarks described for Sitrah Anchorage (sec. 7A-15) are also used for Khōr Kaliya.

7A-28 Harbor.—Khōr Kaliya is partially protected by extensive reefs on the east and south, by Al Baḥrayn on the west, and Jazīrat al Muḥarraḡ on the north. It is connected to Bahrein Harbor by the previously described boat channel (sec. 7A-8). Khōr Lupin (sec. 7A-9) lies in the southwestern corner of Khōr Kaliya. The inlet contains the facilities of a British Naval Base. A pier projects from the western shore of the harbor in front of the town of Al Manāmāh. Mina Sulman Pier is about ¾ mile southeastward of Ra's al Jufair. A basin is dredged around the pier for maneuvering room.

A dredged channel connects Khōr Kaliya to Sitrah Anchorage; it is the principal entrance into the inlet. Kassār Diwan is a rock, about 1 foot high, lying on the southern extremity of the reef which extends about 3¼ miles southward from the town of Al Ḥadd and close eastward of the entrance channel.

7A-29 Navigational aids.—The aids from Bahrein Lightship to North Range Beacon in Sitrah Anchorage are described in section 7A-17.

Diwan Beacon, a three-legged structure marked by a light, is located on the eastern side of the channel about 475 yards south-southwestward of Kassār Diwan.

Mina Sulman Light Buoy, painted in black and white horizontal bands, is moored about 433 yards northward of North Range Beacon.

Triad Beacon, a pyramid shaped pile of rocks surmounted by a staff and ball and marked by a light, is located 860 yards north-northwestward of Kassār Diwan. It is the best daymark in the approach. Triad Lighted Buoy, painted red and white, is moored close north-northeastward of Triad Beacon. Close southwestward of Triad Bea-

con are two lighted range beacons in range about 324° which indicate the centerline of the outer part of the dredged channel. A beacon, about 14 feet high with square red and white striped topmark, stands about 250 yards westward of the rear beacon; a similar beacon, with black and white banded topmark, stands about 100 yards south-southwestward of the rear range beacon.

Light buoys are positioned in relation to Triad Beacon, bearings and distances, as follows: Channel Lighted Buoy No. 1, painted black, about 500 yards north-northwestward; Channel Lighted Buoy No. 2, painted red, about 500 yards northwestward; Channel Lighted Buoy No. 2A, painted red and white, about 967 yards west-northwestward; Channel Lighted Buoy No. 4, painted red, about $5/8$ mile west-northwestward; Channel Lighted Buoy No. 3, painted black, about 1,066 yards west-northwestward and Channel Lighted Buoy No. 3A, painted black, about 1,633 yards west-northwestward.

Light Buoys are positioned in relation to Shoreham Beacon, bearings and distances, as follows: Channel Lighted Buoy No. 6, with a red and white topmark, about 2817 yards southeastward; Channel Lighted Buoy No. 5, painted black, about 2,300 yards southeastward; Channel Lighted Buoy No. 8, painted red, about 1,750 yards south-southeastward and Channel Lighted Buoy No. 7, painted black, about 1,333 yards south-southeastward.

A black and white banded light buoy is moored nearly $2/3$ mile north-northwestward of Triad Beacon; it marks the middle of the channel leading northward from Triad Beacon. A red can light buoy is moored about 2 miles north-northwestward of Triad Beacon.

Two tripod range beacons, each surmounted by two black and white cones, points together, and marked by lights (occasional), are about $1/2$ mile and 1 mile north-northeastward of Triad Beacon. They are in range about 357° and indicate the centerline of the inner part of the dredged channel.

Shoreham Beacon marks a shoal with a least depth of 1 foot situated about 1,300

yards southeastward of Ra's al Jufair. An 11-foot spot lies close east-southeastward of the beacon; a light buoy, painted black, is close southeastward of this spot. A light is shown from Shoreham Beacon.

Two lights are shown on the outer end of Nina Sulman Pier.

Two beacons, Nos. 5 and 7, stand within $1/2$ mile eastward and east-southeastward, respectively, of Ra's an Nannas, the north-eastern point of Al Manāmah. Beacon No. 5 is in ruins.

7A-30 Channels.—Khōr Kaliya is entered through a dredged channel which leads from the vicinity of the oil wharves in Sitrah Anchorage to Triad Beacon. From the beacon, the channel is divided into two parts by the extensive shoal in the center of Khōr Kaliya. One branch of the channel leads west-northwestward and lies to the south and west of the shoal; the other branch leads north-northwestward and lies to the east of the shoal area. These branch channels are marked by the above-mentioned navigational aids. The channel which leads west-northwestward is usually used by vessels proceeding to the western side of Khōr Kaliya.

7A-31 Anchorages.—The best anchorage in Khōr Kaliya is about $3/4$ mile northward of Triad Beacon in 4 to $4\frac{3}{4}$ fathoms in a position between the extensive shoal in the middle of the inlet and the reefs on the eastern side.

Naval vessels usually anchor off Ra's al Jufair. Mooring buoys are positioned close northeastward and about 1 mile northward, respectively, of Shoreham Beacon; others are close southward and southwestward of the head of Mina Sulman Pier.

Pilotage.—Pilotage is compulsory, when entering, leaving or underway in Khōr Kaliza. Berthing and unberthing only during daylight hours.

7A-32 Directions for entering.—Directions from Bahrain Lightship to Sitrah Lighted Beacon are given in section 7A-21.

From Sitrah Lighted Beacon, pass southward of Middle Ground Light Buoy and steer toward North Range Light Beacon (sec. 7A-17) until

the range beacons on the northwestern side of the channel are in range $323\frac{3}{4}^{\circ}$; alter course to this range, which leads through the southeastern part of the dredged channel. When Bar Beacon is abeam, alter course to bring the range beacons southward of Umm ash Shiyaira in range $356\frac{3}{4}^{\circ}$ and proceed northward until in the vicinity of Triad Beacon where the course is altered according to which channel is being used.

If proceeding to the anchorage off Ra's al Jufair, local knowledge is necessary.

If proceeding to the anchorage northward of Triad Beacon, alter course before reaching Triad Beacon so as to pass close westward of the black and white buoy which lies west-northwestward of the front range light ($356\frac{3}{4}^{\circ}$ range). Course may be shaped for the anchorage when abeam of the buoy.

Caution.—Because of the strong currents in the entrance, buoys may be out of position; therefore, the vessel's position should be fixed by permanent landmarks whenever possible. The advance of the vessel in a turn should be taken into account when rounding buoys or making course changes as the channels are narrow.

7A-33 Khôr Kaliya (Mina Sulman) is a commercial port for Bahrayn. The RAF Pier, extending eastward from Al Manamah, is about 1,200 feet long with 5 feet at its head.

A lighter pier is about $\frac{3}{4}$ mile westward of the head of Mina Sulman Pier. Two small boat piers, with 8 feet off their heads, project from the lighter pier. A 1-ton hand crane is available.

Mina Sulman Pier, about 1,600 feet long, has 30 feet alongside, except the two inner berths, where it is 24 feet; a causeway, $\frac{3}{4}$ mile long, connects it with the shore.

The port has 3 tugs, all equipped with radio and firefighting equipment. Discharging of cargo will be done by ships gear. Water is available.

Two marine railways, each with a capacity of 1,000 tons and capable of handling a vessel 220 feet long, are part of an island repair facility about $\frac{2}{3}$ mile westward of the head of Mina Sulman Pier. Vessels with a beam up to $41\frac{1}{2}$ feet can be accommodated. During spring tides there is a depth over the cradles of 24 feet with 17 feet of low water. Most major repairs can be accomplished. An 800-foot causeway connects the island with the shore.

Two marine railways, capable of handling vessels 200 feet in length and having a lifting power of 600 tons, are located on a masonry island near the swing bridge on the causeway which connects Al Manamah to Al Muharraq. Welding equipment and cranes up to 15-ton capacity are available.

Fuel oil and diesel oil are supplied by barge. Radio Telephone service is continuous on VHF of 156.8 mcs., and ships can be worked on either 157.0 mcs. or 157.1 mcs.

See section 7A-45 for other facilities.

BAHREIN (BAHRAIN) HARBOR

Position: $26^{\circ}15' N., 50^{\circ}33' E.$

Depths: Approach, 20 feet.
Anchorage, 28 to 30 feet.
Outer Harbor, 19 to 39 feet.
Inner Harbor, 6 to 18 feet.

Tidal rise: MHWS, $6\frac{3}{4}$ feet.
MHWN, $5\frac{1}{4}$ feet.

7A-34 Bahrein Harbor is situated northward of Al Bahrayn. It is an anchorage where vessels discharge into lighters.

It has been reported that Bahrein Harbor is a good radar target with an echo range of 25 miles under normal conditions.

7A-35 Navigation.—See section 7A-4 for directions from the coastal track to Bahrain Lightship. For directions from Bahrain Lightship to the harbor at Al Bahrayn, see section 7A-44.

7A-36 Winds and weather.—See section 7A-6.

Although Fasht al Jārim, the extensive detached reef northward of Al Bahrayn, protects the harbor from the shamāl, it does not prevent considerable sea from making up in the outer harbor. When the wind is strong, however, communication with the shore is seldom interrupted and vessels ride easily at the anchorage. Inner Harbor affords much better shelter but it is usually full of local craft.

7A-37 Currents. The tidal current northward of Jazīrat al Muharraq sets west-southwestward and east-northeastward at a velocity of 1 knot to 2 knots. The tidal current setting southward along the eastern side of Fasht al Jārim joins the west-southwest-going current and turns southwestward into Bahrein Harbor.

The tidal current setting northeastward across the entrance of Inner Harbor is appreciable and caution is advised.

7A-38 Depths and dangers.—The least depth in the approach channel to Outer Harbor is 20 feet; from Outer Harbor to Inner Harbor it is 16 feet, but vessels drawing more than 13 feet should not enter Inner Harbor. Depths in Outer Harbor are 19 to 39 feet, those in Inner Harbor are 6 to 18 feet.

The principal dangers in the approach to Bahrein Harbor are: Hair Sh'Taya, an extensive shoal with its eastern edge lying about 9 miles westward of Bahrain Lightship and having a least depth of $4\frac{1}{4}$ fathoms; Fasht al Jārim, a reef extending about $11\frac{3}{4}$ miles northward from a position about $7\frac{1}{4}$ miles northward of the northern extremity of Al Bahrayn. The middle and southern part of this reef consists of rock and sand, but on its northern end are black masses of coral. A pile beacon, 20 feet high, is on the eastern side of this reef in $26^{\circ}28'N.$, $50^{\circ}32'E.$ (PA). A continuous supply of fresh water runs from an outlet on this structure. Jādam, the southern end of this reef, is a large sandbank from which a shoal flat of less than 3 fathoms extends as far as $2\frac{3}{4}$ miles southward and about $6\frac{1}{4}$ miles eastward. A few detached 3-fathom patches lie as far as $3\frac{1}{2}$ miles eastward of the eastern end of this flat and on the northern side of the fairway.

A rubble island, 18 feet high, lies about $11\frac{1}{2}$ miles south-southeastward of the southern end of Jādam.

Hair al Adālah, with depths of 2 to 3 fathoms, extends about $2\frac{1}{2}$ miles northwestward from the northern end of Fasht al Jārim. Ra's al Ain is a detached reef lying north-northeastward of the southern extremity of Fasht al Jārim. A rock with less than 6 feet over it is situated about $2\frac{3}{4}$ miles east-southeastward and a 6 foot patch lies about $1\frac{1}{4}$ miles east-northeastward, respectively, of Ra's al Ain. Kalaia Rock, which dries 6 feet, is located about $4\frac{1}{4}$ miles northward of the southern extremity of Fasht al Jārim.

Ra's Khasaifa Spit is the extremity of the flat lying as far as $3\frac{1}{2}$ miles northwestward of Jazīrat al Muharraq. A few patches of $2\frac{3}{4}$ to 3 fathoms lie off this spit and on the southern side of the fairway. There are several patches of $3\frac{1}{2}$ to 4 fathoms in the fairway about 4 miles northward of Jazīrat Khasaifa (sec. 7A-8).

The north coast of Al Bahrayn is fringed with drying reefs. West Spit, the southeastern extremity of a shoal with depths up to 3 fathoms, is located on the western side of Outer Harbor. Liya, a rock which dries 3 feet, is situated about $1\frac{3}{4}$ miles northward of H. O. 62

Portuguese Fort (sec. 7A-39) and lies on a shoal spit extending $2\frac{1}{2}$ miles northward from the coast. Lighthouse rock, about 2 feet high, is located on the edge of the reefs about 1 mile northward of Portuguese Fort; it is inconspicuous, being hidden by numerous fishing stakes.

Fasht Rustan, westward of the reefs extending from Jazīrat al Muharraq, lies about 2 miles north-northwestward of Ra's ar Rummān (sec. 7A-39). Ra's Zurawen, on the eastern side of Inner Harbor about $1\frac{3}{4}$ miles northwestward of Ra's ar Rummān, is the western extremity of the reefs extending north-northwestward from that point.

A wreck with a depth of 5 fathoms over it lies sunk about $\frac{1}{4}$ mile westward of the entrance range line and about 2 miles north-northwestward of Ra's Zurawen. Another wreck, with a depth of 26 feet over it, lies about $13\frac{3}{4}$ miles southwestward of Bahrain Lightship.

7A-39 Aspect—landmarks.—The towns of Al Manāmah and Al Muharraq are situated opposite each other, the former being located on Ra's ar Rummān the northeastern point of Al Bahrayn, the latter on the southwestern part of Jazīrat al Muharraq. In Al Manāmah are several conspicuous minarets. About $2\frac{3}{4}$ miles southwestward of Ra's ar Rummān is the ruins of a large mosque with two minarets, each about 70 feet high. The upper parts of these minarets are visible over the tree tops until the vessel is near Inner Harbor and are good marks though not easily identified. The Shaikh's palace, which has a dome, is about $\frac{1}{4}$ mile southward of Ra's ar Rummān. A new palace, with a conspicuous dome, stands about 750 yards southeastward of the Shaikh's palace.

Abu Mahair Fort, a square structure with one large and three small towers, is situated at the southern end of Al Muharraq and is conspicuous from the anchorage at Bahrein; it stands on a low detached bank which becomes an islet at high water. A conspicuous flagstaff is located on the western side of Al Muharraq and at the inner end of the pier.

Portuguese Fort, which appears from seaward as a shapeless light-colored mass, stands in ruins in a gap of the date palms

about $3\frac{1}{2}$ miles westward of Ra's ar Rummān; the fort is conspicuous in the early morning sun but is difficult to distinguish when the sun is behind it. About $2\frac{1}{2}$ miles westward of Portuguese Fort is the village of Sharai-ba. Buday'ah is a town standing on the northwestern extremity of Al Bahrayn. (See View No. 69.)

7A-40 Harbor.—Bahrein Harbor, situated northward of Al Bahrayn and westward of Jazīrat al Muharraḡ, is divided into two sections. Outer Harbor is located about $3\frac{1}{2}$ miles northwestward of the town of Al Manāmah; Inner Harbor is situated in a bight of the reefs about 1 mile northwestward of the town. Outer Harbor is completely exposed to the prevailing northwesterly winds, but Inner Harbor affords better protection, although it is usually crowded with local craft. The shoreline is fringed with coral and sand; there are no protective structures against the sea.

There are several small piers for shallow-draft craft only. Customs Pier extends northwestward from Al Manāmah toward Inner Harbor. Vessels usually lie at anchor and discharge their cargo into lighters.

A small boat channel runs from Outer Harbor to Khōr Kaliya; it is crossed by a causeway, see section 7A-9.

7A-41 Navigational aids.—Bahrain Lightship is described in section 7A-17.

A light buoy, painted black and white is moored on the northern side of the fairway in a position about $5\frac{3}{4}$ miles northeastward of the northern extremity of Jazīrat al Muharraḡ.

A conical light buoy, painted in red and black bands and having a radar reflector, is moored on the northern side of the fairway in a position about $5\frac{1}{4}$ miles northwestward of Jazīrat al Muharraḡ.

A conical light buoy, painted red and surmounted by a black cone is moored on the western side of Outer Harbor to mark the eastern end of West Spit.

A white pole beacon, 35 feet high and surmounted by a cylinder, stands on Jazīrat as Saja, an islet 2 feet high and located about 800 yards off the western side of Jazīrat al Muharraḡ. There are said to be numerous fishing stakes in the area. A black and white pole

beacon stands at the head of a pier about $\frac{1}{2}$ mile northeastward of Customs Pier.

A light is shown from a black and white banded steel framework structure on a concrete base, situated on Ra's Zurawen.

Two lights, vertically disposed, are shown from the conspicuous flagstaff at the inner end of a pier at Jazīrat al Muharraḡ.

A light for the use of aircraft is occasionally shown from the single radio mast in the eastern part of Al Manāmah.

A light is occasionally shown from a black iron framework structure about midway on Customs Pier. A light is occasionally shown from the Shaikh's palace.

7A-42 Anchorages.—A vessel may anchor close westward of the range line leading into Bahrein Harbor (sec. 7A-44) in depths of 4 to 5 fathoms with the northern extremity of Jazīrat al Muharraḡ bearing between 085° and 090° .

Vessels drawing less than 13 feet may anchor in Inner Harbor over a bottom of sand with the lighthouse on Ra's Zurawen bearing 000° , distant $\frac{1}{2}$ mile.

Outside the harbor, good anchorage, completely sheltered from the shamāl, may be obtained eastward of Jādam.

7A-43 Pilots.—Native pilots usually proceed to a vessel when she is seen approaching the harbor.

7A-44 Directions for entering.—From Bahrain Lightship, steer to pass buoys nos. 1, 3, and 5 (sec. 7A-17) to starboard and then pass close on either side of the black and white buoy northeastward of Jazīrat al Muharraḡ; thence steer to pass close northward of the red and black buoy which lies northwestward of Jazīrat Muharraḡ, being careful to avoid Ra's Khasaifa Spit. When the western of the two minarets about $2\frac{1}{2}$ miles southwestward of the single conspicuous radio mast is in range with the western shoulder of Jabal ad Dukhkhān bearing 182° , follow this range and anchor as previously directed. Care should be taken to avoid a $23\frac{1}{4}$ -fathom patch close southeastward of the latter buoy.

As the buoys in the approach have been reported to be unreliable, the position of the vessel should be fixed frequently until the range marks are seen. If the range marks cannot be

seen, the vessel should steer for the old Portuguese Fort bearing about 195° until Jazīrat Khasaifa bears about 105° ; thence she may proceed to the anchorage as previously directed.

The edge of Fasht al Jārim is usually indicated by the pale green color of the sea, especially in the early morning. The reefs in Inner Harbor are all flat and show up well in good light. Numerous fishing stakes are on the reefs; with few exceptions they are all within the edge of the reef.

7A-45 Towns on Al Bahrayn.—Al Manāmah ($26^{\circ} 14' N.$, $50^{\circ} 35' E.$), the capital and commercial center of the principality of Al Bahrayn, is situated on the northeastern end of Al Bahrayn. It is the headquarters of the various government and commercial offices, which are situated mostly on the north coast. This town is connected by a causeway with the town of Al Muharraq, situated on Jazīrat al Muharraq about $1\frac{1}{2}$ miles northeastward. The population in 1959 was 143,213. A free transit port was established in 1962.

The deepwater wharves are at Sitrah Anchorage (sec. 7A-10) and Khōr Kaliya (sec. 7A-23). At Bahrein Harbor cargo is handled by lighters which land the cargo at Customs Pier. This pier has a depth of 4 feet alongside but at very low tides there is considerably less water. New Pier is close eastward of Customs Pier. A stone pier, about $\frac{1}{2}$ mile northeastward of Customs Pier, has steps. At Al Muharraq there is a boat pier which is available at all stages of the tide.

Mobile cranes with capacities up to $26\frac{1}{2}$ tons are available on Customs Pier.

Bahrein Harbor area has 13 tugs of 100 to 1,000 horsepower; 35 launches up to 60 feet long with 1,000 horsepower for various purposes, including passengers; about 60 barges of up to 600 tons capacity; and one 250-ton self-propelled barge.

A marine railway with a 10-ton lifting power is located at the seaward end of Customs Pier. See section 7A-33 for larger marine railways in Khōr Kaliya. There is a machine shop with lathes and a milling machine in town. A diver is said to be available.

Provisions, fresh or frozen, are in plentiful supply. Fuel and diesel oil can be obtained at the oil wharf in Sitrah anchorage or from bunkering barges. The local oil company carries a full line of marine lubricants and greases. An unlimited amount of brackish water can be supplied by a 45-ton water barge.

Regular steamer communication is maintained with the principal ports in the Persian Gulf. Al Bahrayn is served by airline connections to Great Britain, India, and Australia. It is connected to the general telegraph system, and a radio station is open to public correspondence.

Modern medical and surgical facilities are available. Dysentery, typhoid, and other intestinal disorders are common. As a result of strict quarantine regulations, there has been no outbreak of plague or cholera in many years.

BAHR AS SALWĀ AND APPROACHES

7A-46 Eastern approach—Coast.—Be-

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tween Ra's Rakan (Sec. 7A-1) and Ra's 'Ashairiq, about 17 miles southwestward, the coast of Qaṭar is low and of such a light color that it is difficult to distinguish, especially when enveloped in the prevailing haze. A reef, which nearly all dries and is visible in good light, extends 2 to 3 miles offshore as far as 13 miles southwestward of Ra's Rakan. Except at high water, landing on this coast is difficult.

An isolated coral head with a depth of 6 feet was reported (1956) to lie about 2 miles northwestward of Ra's Rakan.

All the villages on the northwest coast of Qaṭar were, in 1951, deserted and in ruins, having been sacked in recent years; a few fishermen camp temporarily among the ruins.

Ra's Abū 'Amrān, about $2\frac{1}{2}$ miles south-southwestward of Ra's Rakan, is low but rises to a small rocky mound. About $1\frac{1}{2}$ miles farther southward is Abū Dalūf, a small town. The small village of Al Yamīl lies $3\frac{1}{2}$ miles south-southwestward of Ra's Abū 'Amrān; about 600 yards inland from the village is a small clump of trees, appearing as a single tree, which is conspicuous from seaward.

From Al Yamīl, the coast trends about 2 miles southwestward to the head of a bay where the normal high water line is breached at high water springs, causing flooding of the low flats inland. From the head of the bay, the coast trends sharply northwestward about 1 mile to the village of Al Khadaj.

About $1\frac{3}{4}$ miles west-southwestward of Al Khadaj is the village of Al Khuwair; the shore of the bay between these two villages is also flooded at high water springs.

About 800 yards northward of Al Khuwair is a rocky islet, connected with the mainland at low water; thence an irregular sandy coast, with occasional rocky patches, trends southward to Zubara.

Ra's 'Ashairiq ($25^{\circ} 59' N.$, $50^{\circ} 59' E.$) is low and rocky with the ruins of a lookout tower on it. A reef extends about 200 yards from the point, and between it and the reefs extending eastward from Al Bahrayn are depths of from 2 to 3 fathoms. Ra's 'Ashairiq is the western entrance point of a shallow bay formed between it and the coast; the head of this bay is very flat and swampy, showing no definite high water line. A small rocky islet lies about $1\frac{1}{2}$ miles

northeastward of Ra's 'Ashairiq; on the eastern side of the bay are the ruins of the town of Zubarah. The shores of the bay and the coast immediately northward of it are sandy and dry for a considerable distance offshore. Zubarah Fort, about 3 miles eastward of Ra's 'Ashairiq, is a conspicuous substantial building with four towers.

Vessels locally acquainted and drawing up to 10 feet can **anchor** about $\frac{1}{2}$ mile northwestward of Ra's 'Ashairiq in $2\frac{1}{2}$ fathoms. Vessels drawing up to 15 feet can anchor in $3\frac{1}{4}$ fathoms about $6\frac{1}{2}$ miles northwestward of the point. In approaching these anchorages vessels should make Ra's Rakan or Ra's Abū 'Amrān and steer southwestward along the reefs keeping a good lookout for shoals.

About 2 miles southward of Ra's 'Ashairiq are the ruins of Rubaija, but from these ruins to the entrance of Dawhat al Adhwan (al Hasain), about 20 miles farther southward, there are no signs of habitation, Dawhat al Adhwan, the inner part of which is known as Dawhat Fayshākh, extends southward between the mainland on the east and a peninsula of the mainland on the west. The northwestern side of the peninsula is reported to consist of a range of moderately high stony hills. Northward of the peninsula are several islands; a **beacon** stands on the northern part of the western of the two islets situated about 2 miles north-northwestward of the northern extremity of Jazīrat Hawār. Another **beacon** stands on an islet about $1\frac{1}{4}$ miles east-northeastward of Jazīrat Hawār. A pile beacon with a diamond topmark, 9 feet high; is about $8\frac{3}{4}$ miles northward of the northern extremity of Jazīrat Hawār. On the shore of Dawhat al Adhwan are several forts and huts. The greatest depth in the inlet is 2 fathoms.

From Ra's Dukhan, the western entrance point of Dōhat az Zekrit nearly 30 miles southwards of Ra's 'Ashairiq, the west coast of Qaṭar trends southward about 46 miles to the head of Bahr as Salwā. A **beacon** stands on the coast about 9 miles southward of Ra's Dukhan.

7A-47 Off-lying dangers in the eastern

approach.—A shoal with a least depth of $3\frac{3}{4}$ fathoms is situated about 13 miles north-northwestward of Ra's Rakan. Vessels of deep draft should keep northward of this danger in depths not less than 6 fathoms.

Fasht ad-Dibal (D'Bal), about 14 miles west-northwestward of Ra's Rakan, is a reef which dries in places. On the northern side of this reef is a square coral mound, in the center of which is a fresh water spring; from a distance this mound and spring resembles a small dhow. Close eastward there is a much smaller mound, surmounted by a pipe marking a triangulation station. The northern edge of the reef is steep-to, and in a good light the reef can be seen at all stages of the tide. Shallow-draft vessels can pass between the $3\frac{3}{4}$ -fathom shoal and Fasht ad-Dibal. As the westgoing tidal current sets southward in the vicinity of Fasht ad-Dibal, vessels should keep well northward of this reef.

A wreck with 21 feet over it lies about $5\frac{1}{2}$ miles northward of Fasht ad-Dibal.

A 1-fathom patch lies about 2 miles north-westward of Ra's Rakan. A detached 2-fathom patch is located about 3 miles westward of the southern extremity of Fasht ad-Dibal. A shoal with depths up to 3 fathoms extends about 10 miles south-southwestward from Fasht ad-Dibal and joins the reefs extending eastward from Al Baḥrayn.

Katah ad Jaradeh, a reef which dries in places, is located about $2\frac{1}{2}$ miles southwestward of Fasht ad-Dibal, the channel between these two reefs having depths of $2\frac{1}{2}$ to 3 fathoms in the fairway. On the southeastern side of Katah ad Jaradeh there is a narrow strip of sand which dries 7 feet at its southern end. A pipe beacon, 7 feet high, is situated on the southern end of the reef. A detached shoal with depths of from $2\frac{1}{4}$ to $2\frac{3}{4}$ fathoms lies about 7 miles eastward of the beacon on Katah ad Jaradeh. A rock with less than 1 fathom over it lies about 7 miles southeastward

of the same beacon. A similar rock lies about $11\frac{1}{2}$ miles south-southeastward of the beacon.

About 8 miles southward of Katak ad Jaradeh is the eastern extremity of the reefs extending about 15 miles or more south eastward from Al Bahrayn, the whole area within that distance being encumbered with reefs and shoals. A coral mound, 6 feet high, marks a reef about 11 miles southward of the beacon on Katak ad Jaradeh. Katat Ekhchejera is the southeastern extremity of the shoal area; at low water it breaks and at high water it is said to be marked by an oily appearance and slight discoloration. On the northern extremity there is a patch which dries 6 feet, and about $3\frac{1}{2}$ miles southward is a coral cairn, 6 feet high, surmounted by a pipe. A reef with depths of less than 6 feet lies 1 mile to 2 miles south-southwestward of this cairn.

7A-48 Channels eastward of Al Bahrayn.—A channel, marked by light buoys, lies 2 to 8 miles off the west coast of Qaṭar and extends southwestward from the vicinity of Ra's 'Ashairiq to abreast Jazīrat Hawār.

A black conical light buoy, No. 4, is moored about $2\frac{1}{2}$ miles northwestward of the beacon on the western of two islets mentioned above; No. 5 light buoy, painted in black and white vertical stripes, is moored about $10\frac{1}{2}$ miles northwestward of Ra's Dukhan. Nos. 6 and 7 light buoys, painted black, are moored about 4 and 2 miles, respectively, northwestward of Ra's Dukhan.

From the vicinity of Ra's Dukhan, a channel, marked by lighted and unlighted buoys, leads northward about 35 miles to a pier on the eastern side of Al Bahrayn about $\frac{1}{2}$ mile southwestward of the southern end of Jazīrat Sitrah. Light buoys Nos. 5, 6, and 7 are common to both channels. Northward of No. 5 light buoy the two channels are separated by a reef on which are several low islets; the section of channel westward of the reef was marked by three black spherical buoys.

The northern section of the channel is marked by light buoy, No. 9, moored about 12 miles southward of the southern extremity of Jazīrat Sitrah.

7A-49 Western approach to Bahr as Salwa—Western side of Al Bahrayn.—On the western side of Bahrayn the date palms grow in clumps instead of continuously as on the northern side of the island. Reefs and shallow banks fringe the coast and extend as far as $4\frac{1}{2}$ miles offshore for some distance southward of Budai'a. Only small native craft can approach this part of the island. Jazīrat Umm Na'sān ($26^{\circ}09' N.$, $50^{\circ}24' E.$), a low and sandy island with two rocky peaks, is situated about 3 miles southwestward of Budai'a. The western peak is 68 feet high and conspicuous, while the eastern is 25 feet high. Jazīrat Jidi, about $1\frac{1}{4}$ miles northward of Jazīrat Umm Na'sān, has a cliff, 52 feet high, on its western end, but its eastern end is low and sandy. Umm as Sabbān, 5 feet high and covered with scrub, is situated about $1\frac{1}{2}$ miles eastward of Jazīrat Jidi. These three islands lie on the fringing reef of Al Bahrayn. A pipeline which starts at the oil refinery on Al Bahrayn runs across the island in a northwesterly direction to a position about 2 miles southward of Budai'a, thence west-northwestward to Al Khobar (sec. 7A-50). It passes between Umm as Sabbān and Jazīrat Jidi.

Az Zallāq, about 10 miles southward of Budai'a, is a small pearling village as well as the unloading port for the barges transporting goods from the Arabian mainland. **Anchorage** can be obtained about $2\frac{1}{2}$ miles offshore at this village in about 5 fathoms with the highest peak on Jazīrat Umm Na'sān bearing 335° , but the depths decrease suddenly from 5 fathoms to 3 fathoms. The anchorage should be approached with the village bearing about 081° . Landing is good at the village but is not recommended northward or southward of it. The face of a T-headed pier at the village has a length of 50 feet and a depth of 12 feet.

Southward of Az Zallāq the country becomes stony desert with small patches of camel grass

and scrub in places. Shoals extend a considerable distance offshore. Ra's al Barr, the southern extremity of Al Baḥrayn is a long low sandy point which cannot be approached closer than 5 miles because of the shallow flats. Along the east coast of Al Baḥrayn northward of Ra's al Barr, only small boats can approach the coast because of the extensive fringing reef.

7A-50 Coast westward of Al Baḥrayn.—**Ra's Kuwakib** ($26^{\circ}22' N.$, $50^{\circ}13' E.$) is situated on the mainland about 15 miles northwestward of the northwestern extremity of Al Baḥrayn. A reef extends about 8 miles eastward and 7 miles northeastward from the cape, and near its outer end are sand banks which dry.

Jabal adh Dhahrān (Jabal Umm er Rūs) (Aḡ Zahrān) (Dhahrān), about $5\frac{1}{2}$ miles southwestward of Ra's Kuwakib, is the conspicuous summit of a range of hills situated about 5 miles inland. It is a long sloping hill, from the middle of which rises abruptly a conspicuous flat-topped peak, 300 feet high. Jabal Midra Shemali, a conical peak about $3\frac{1}{2}$ miles northwestward of Jabal adh Dhahrān, is the northwestern summit of the range and rises to a height of 410 feet. The field office of the Arabian American Oil Company is located at Jabal adh Dhahrān. Numerous oil tanks are in the area; a pipeline runs from the area to Al Khobar. A small airfield is situated about 3 miles southeastward of Jabal adh Dhahrān. An **aeronautical radio range** is located close to the field.

Al Khobar, about 5 miles southward of Ra's Kuwakib, is a barge port for cargo discharged for Ra's at Tannurah (sec. 7B-21). A wharf, 600 feet long and with depths of 1 foot to 13 feet alongside, is connected to the shore by a causeway about 600 yards long. One 25-ton stiffleg and 4 mobile cranes of 10- to 15-ton capacity are available on the wharf. Additional small boat berthing is available on a pier which extends from the wharf. A small ma-

rine railway is available. The wharf and the coast southward of it are fronted by a reef with depths of less than 6 feet. There is a narrow channel with depths of from 5 to 19 feet between the shoal and the coast. At Al Aziziyah, about $5\frac{1}{2}$ miles southward of Al Khobar, there is a 200-foot pier with a depth of 12 feet alongside.

Tall i Zabānat is one of a group of four sandhills near the coast about 10 miles southward of Ra's Kuwakib; an isolated hill, 50 feet high, stands about 2 miles farther southward. Both hills are good landmarks.

Dawḥat 'Ayn as Sayḥ, an extensive shallow bay indenting the mainland about 10 miles south-southeastward of Jabal adh Dhahrān, has a depth of 6 feet in the entrance. About $1\frac{1}{4}$ miles outside the entrance and lying parallel with the coast is a long, narrow shallow sandbank.

Dawḥat aḡ Zūlūm ($26^{\circ}00' N.$, $50^{\circ}05' E.$) is an extensive shallow basin entered about 7 miles southward of the entrance of Dawḥat 'Ayn as Sayḥ. The shores of this basin are uninhabited. Numerous sandhills extend in from the northern and western shores.

Hamadiya, a hill on the southern side of Dawḥat aḡ Zūlūm, is 120 feet high and extends eastward and westward for about 1 mile, while North Hill, about $2\frac{1}{2}$ miles west-northwestward of Hamadiya, is a small round hill about 110 feet high; both are good marks.

Channels in the western approach to Bahr as Salwā.—Between the western extremity of Al Baḥrayn and the mainland westward, the passage is obstructed to a great extent by reefs through which are narrow and shallow channels. Channels lead from Bahrein Harbor to the wharves on the Arabian mainland westward of the northern end of Bahrein Harbor and also from these wharves to Az Zallāq, on the western side of Al Baḥrayn.

Jabal adh Dhahrān, Jabal ad Dukhkhān, the higher peak on Jazīrat Umm Na'sān, Jazīrat Jidi, the Portuguese fort, and the north-

ern edge of the trees on Jazīrat al Muharraḡ are good marks by which to fix the position of a vessel when passing through the narrows westward of Jazīrat Umm Na'sān; but vessels may have difficulty because of mirage and refraction. The sandy islets on the western side of the passage are conspicuous. In the channel westward of Jazīrat Umm Na'sān the tidal currents set southward and northward, attaining a rate of 2 to 3 knots at springs. It is not advisable to proceed through the passage with a favorable tidal current.

7A-51 Bahr as Salwá.—Bahr as Salwá, an extensive inlet extending about 45 miles southward, is entered between Ra's Saiya, a low and sandy peninsula on the west, and Ra's as Sauwād, about 28 miles eastward. The eastern side of this inlet consists mainly of a sandy shore rising to sandhills, which, in the northern half are close to the coast but in the southern half are farther inland. The western side is indented by several bays, separated by headlands consisting of sand dunes. Nowhere in this inlet have any great depths been found. Caution is advised if a vessel intends to anchor off the eastern side of Ra's Saiya as the depths decrease suddenly.

Al'Oqain (Awqayr) is a settlement on the western shore of an inlet located on the western side of Ra's Saiya. The inlet is entered between the extremity of Ra's Saiya and Ra's as Sufaira, about 1 mile southward. The settlement consists of a few buildings, a customhouse, and an old fort; the latter is a low structure with four towers about 60 feet high. Near the fort is a jetty with a depth of 3 feet at its head. Depths of 4 to 6 fathoms are found in the inlet as far as the jetty, but a shoal with depths of 4 to 6 feet lies off the entrance of the inlet.

Ra's Umm al Awa, about 5 miles south-southeastward of the extremity of Ra's Saiya, is a sandhill terminating in a rocky point. A narrow shallow channel separates this point from Jazīrat Zakhuniya, a bare, narrow, sandy island on which are a village and a fort. Another

channel, with a depth of $4\frac{1}{2}$ feet, separates the southern extremity of this island from the northwestern extremity of a large promontory southward.

About $\frac{1}{4}$ mile offshore at Ra's Huwaiqīl, a point about 27 miles south-southeastward of Ra's Umm al Awa, **anchorage** may be obtained in a depth of 20 feet. Landing in this vicinity is good, the beach being steep-to.

Dōhat al Husain is a bight in the coast about 16 miles south-southeastward of Ra's Huwaiqīl. Khashm Husaini, a few miles westward of this bight, is a sandstone range rising in a bluff about 300 feet high and is a good mark.

Southward of Dōhat al Husain depths of 4 feet are found as far as $\frac{1}{2}$ mile off the coast. A plain extends 2 to 3 miles inland to hills about 300 feet high. At the head of Bahr as Salwá is the village of Salwá, in the vicinity of which are some ruins and several groups of palm trees.

There are said to be heavy tide rips in Bahr as Salwá.

CHANNEL FROM BAHREIN HARBOR TO RA'S AT TANNŪRAH

7A-52 From Bahrein Harbor a channel leads northwestward among the reefs and other dangers to the anchorage at Ra's at Tannūrah (sec. 7B-21), a distance of about 30 miles. This channel should not be used by vessels drawing more than 15 feet, and a pilot should be taken at Bahrein Harbor. This passage is entered between West Spit and the flat extending southward from Fasht al Jārim. For the first 6 miles the channel is about 1 mile in width, but then opens out into a basin known as Khōr al Bāb. In the fairway are a few 3-fathom patches, and in Khōr al Bāb is an extensive shoal with a least depth of $2\frac{1}{4}$ fathoms. The passage then leads between Najwa and Hair as Sarah and then to the anchorage.

Dangers in the channel.—West Spit is the southeastern end of a shoal extending about $4\frac{3}{4}$ miles east-southeastward from Marwadi, a

small reef. This reef is separated from Khōr Fasht by a narrow channel with a least depth of 16 feet in the fairway. On Khōr Fasht are a few sandbanks which dry; the eastern edge of the reef usually shows up well except at midday and highwater.

Hair ar 'Regah, an extensive sandbank, is separated from the southwestern side of Khōr Fasht by a channel with a least depth of 20 feet and a least width of 800 yards.

Jisjūs (Chaschus), 4 feet high, is one of several sandbanks on the outer part of a reef extending as far as $8\frac{1}{2}$ miles off the mainland west-northwestward of Al Baḥrayn. These sandbanks undergo considerable alteration because of the strong winds and tidal currents but are usually visible from southeastward when the tide is low. Shoals with depths up to 3 fathoms lie within $4\frac{1}{2}$ miles east-southeastward and $3\frac{1}{2}$ miles northeastward of Jisjūs, and form the western side of Khōr al Bāb.

Hair as Sarah, a pearl bank with a least depth of 2 fathoms, extends about $6\frac{1}{2}$ miles northwestward from the western part of Fasht al Jārim; over the rocky parts of this bank the sea is much discolored. Detached patches of $2\frac{1}{2}$ to 3 fathoms lie as far as 5 miles northeastward of Hair as Sarah.

Najwa, a low sandy islet, lies about $8\frac{1}{2}$ miles northward of Jisjūs. A **beacon** stands on the northwestern part of the islet. The islet is surrounded by reefs that extend northeastward from it for about 1 mile and southward for about $1\frac{1}{2}$ miles. Depths of less than 3 fathoms extend about 2 miles south-southeastward from the southern extremity of the reef and the same distance northward from the northern extremity of the reef. It was reported (1961) that a vessel drawing $23\frac{3}{4}$ feet, touched bottom at $26^{\circ}36'N.$, $50^{\circ}14'E.$ (approx.), close to the 6-fathom curve.

The channel between Hair as Sarah and Najwa has depths of 5 to 8 fathoms in the fairway, while the channel passing around the southern end of and westward of Najwa has a least depth of 3 fathoms. Ra's Khali, a patch which dries, is situated about 5 miles southwestward of Najwa.

Directions.—Vessels entering Khōr al Bāb from Al Baḥrayn must guard against the west-going tidal current, which is very strong at times along the southern edges of Khōr Fasht and Marwadi. From northward of Khōr Fasht, the marks to be seen are Kalaia Rock on Fasht al Jārim, Jabal ad Dukhkhān, Jabal Mudrah on the mainland, and, when a vessel is near them, the sandbanks on Jisjūs and Najwa. Vessels rounding the northern end of Najwa should keep in depths greater than 5 fathoms.

ANCHORAGES

7A-53 **Sitrah Anchorage.**—See section 7A-19.

Khōr Kaliya.—See section 7A-31.

Bahrein Harbor.—See section 7A-42.

Az Zallāq.—See section 7A-49.

Part B. AD DAMMĀM TO RA'S ABŪ 'ALĪ

7B-1 Ad Dammām ($26^{\circ}26'N.$, $50^{\circ}07'E.$) is located on the northeast coast of the Arabian Peninsula about 25 miles northwestward of Bahrein Harbor. It is being developed as the Persian Gulf's principal deepwater dry-cargo port.

COAST—GENERAL

7B-2 The coast trends about 60 miles north-northwestward from Ad Dammām to Abū 'Alī; it is fronted by many reefs and shoals. Channels exist between these reefs, most of which are marked. The shores are generally low and sandy, the oil tanks and refinery on Ra's at Tannūrah being the most conspicuous objects. Jabal Dhalaifain (sec. 7B-35) is also conspicuous. With the exception of the settlement at Al Jubayl, the coast between Ra's at Tannūrah and Ahū 'Alī is uninhabited except for several tribes of Bedouin.

DEPTHS—DANGERS

7B-3 This section of coast is encumbered by many reefs having depths of 6 fathoms and less.

The 6-fathom curve is very irregular, the closest approach to land being at Ra's at Tannūrah where it is about 1 mile off; in other places it lies as far as 30 miles off the mainland. Several isolated shoal patches lie as far as 40 miles off the nearest land. The dangers are described with their related features.

The water along this section of coast is not usually as clear as it is farther southward, for in places the bottom consists of white clay and the shoals do not, therefore, show up well. Many patches of whitish muddy color, apparently indicating shoals, are frequently seen where no shoals exist; however, the warning of discolored water must not be disregarded.

The Great Pearl Bank decreases in width off this coast and is said to end in the vicinity of Abū 'Alī.

NAVIGATION

7B-4 From a position on the coastal track about 3 miles southwestward of Cable Bank Light Float, a course of 270° for about 86½ miles leads to the Fairway Buoy at the entrance of the approach channel to Ra's at Tannūrah and Ad Dammām.

WINDS AND WEATHER

7B-5 See section 7-3 and the specific port descriptions.

COASTAL FEATURES

7B-6 From Ra's Kuwakib (sec. 7A-50), the coast trends about 8 miles to the town of Ad Dammām. Extensive reefs front the coast; for a description of the reefs eastward of this section of coast, see section 7A-52.

AD DAMMĀM

Position: 28°28' N., 50°08' E.
Depths: Approach, 36 to 50 feet.
 Anchorage, 6 to 8 fathoms.
 Berths, 11 to 36 feet.
Tidal rise: MHWS, 7 feet.
 MHWN, 5½ feet.

7B-7 The port of Ad Dammām is located about 2 miles southeastward of the old city of Ad Dammām. The port is situated in the southeastern part of an indentation known as Tarut Bay.

7B-8 Navigation.—See section 7B-4. For directions from the Fairway Buoy, see sections 7B-18.

7B-9 Winds and weather.—The location of Ad Dammām in Tarut Bay affords some protection from the rougher waters of the Persian Gulf. The highest swells usually occur with southerly winds. Inclement weather usually comes up suddenly and sandstorms greatly reduce visibility. Lighterage operations are particularly affected by the prevailing northwesterly winds and the choppy seas which usually accompany them.

Weather conditions are similar to those at Ra's at Tannūrah, see section 7B-23.

7B-10 Tides and currents.—The mean range of the tide at this port is about 4¼ feet. Tidal currents in the vicinity of the main wharf attain a maximum rate of 4 knots. The flood current lasts approximately 9 hours in a southwesterly direction, the ebb approximately 3 hours in a northeasterly direction.

7B-11 Depths—Dangers.—Depths in the entrance channel and in the anchorage are from 36 to about 50 feet. The main wharf, at the head of the causeway, has 36 feet alongside; the pier about 1,100 yards southward of the main wharf has 30 feet alongside. The small boat basin, about 1,600 yards farther southward, has a controlling depth of 8 feet. The approach between the 6-fathom curves is about 1 mile wide. A depth of 3 fathoms is about ½ mile east-northeastward of the northern end of the pier. A shoal area with a least depth of 7 feet lies about 700 yards eastward of the pier.

The dangers eastward and southward of the approach channel are described with the channel leading from Bahrein Harbor to Ra's at Tannūrah, section 7A-52. The dangers northward of the approach channel are described with the approaches to Ra's at Tannūrah, section 7B-25. Westward of the approach channel are numerous reefs, most of which are unsurveyed. A depth of 7 feet was reported (1959) to lie about 500 yards southeastward of Beacon No. 7.

7B-12 Aspect—Landmarks.—In the town of Ad Dammām there are several large resi-

(2109) PERSIAN GULF—Ras at Tannurah—Lights discontinued.—The light beacons in the following approximate positions have been discontinued and the structures removed:

(a) No. 36, 26°37.6' N., 50°16.3' E.

(b) No. 33, 26°37.9' N., 50°30.0' E.

(c) No. 34, 26°38.6' N., 50°30.4' E.

Note.—The southern approach channel to Ras at Tannurah is closed to ocean shipping.

(See N.M. 12(1804) 1966.)

(N.M. 14/66.)

(N.N. 44, 45, Bahrain, 1966.)

H.O. Charts 3631, 3642, 3641, 3660, 3653.

H.O. Pub. 112, Nos. 35180, 35155, 35160.

H.O. Pub. 62, 1960, pages 231, 232, 233, 235, 236, 237.

dences which are conspicuous from seaward.

West Causeway, about $1\frac{1}{4}$ miles in length, extends in a northeasterly direction from the shore fronting Ad Dammām. It is used mainly by small craft.

Southwestward of Ad Dammām are some rocky hills, about 50 feet high, which resemble, in form the hulls of Arabian coasters. An iron framework tower, 350 feet high, stands about $\frac{1}{2}$ mile southeastward of Ad Dammām.

7B-13 Harbor.—There is no clearly defined harbor at Ad Dammām. A causeway extends about 6 miles northward into the Persian Gulf from a coastal position about 4 miles southeastward of Ad Dammām. The main wharf is about 884 feet long and can accommodate two ocean-going vessels, one on each side. The pier is about 2,000 feet long and can accommodate 4 ocean-going vessels. A 2,300 foot wide turning basin eastward of the wharf has a dredged depth of 30 feet (1961).

7B-14 Navigational aids.—The aids in the approach channel from seaward to Ra's at Tannūrah are described with that channel. The approach to Ad Dammām from Ra's at Tannūrah, a distance of about $7\frac{1}{4}$ miles, is marked by lighted beacons, each consisting of a black 3-pile structure and platform. The numbers and position of these aids are as follows:

Dammām Lighted Beacon No. 6 and Light Buoy No. 7 are about $3\frac{1}{8}$ miles and $2\frac{1}{4}$ miles north-northwestward, respectively, of the outer end of the causeway.

Dammām Inner Harbor Lighted Beacons Nos. 8 and 9 are located about $\frac{1}{2}$ mile west-northwestward and $\frac{1}{2}$ mile east-northeastward, respectively, of the head of the main wharf.

Dammām Inner Harbor Lighted Beacons Nos. 10 and 11 are located about $\frac{1}{2}$ mile southwestward and 1,400 yards southeastward, respectively, of the head of the main wharf.

Lighted Beacon No. 6 is equipped with a black board showing its identification num-

ber in white. A spar buoy is moored about $1\frac{1}{4}$ miles southwestward of Lighted Beacon No. 6.

7B-15 Channels.—The main approach channel to Ad Dammām is via the southern approach channel to Ra's at Tannūrah (sec. 7B-29); thence the southern approach channel is left and the channel continues southward for about 6 miles to the main wharf. The latter part of the channel is well marked by the above-described navigational aids. Extreme care must be taken to stay in the marked channel as the water shoals very rapidly on either side of it. The approach fairway begins about 3 miles east-southeastward of the tip of Ra's at Tannūrah and has a controlling depth of 36 feet.

7B-16 Anchorages.—The Dammām anchorage has a capacity of seven large ocean-going vessels in the approach to the main wharf. Four of these berths lie on a line between Light Buoy No. 7 and Lighted Beacon No. 9, and the other three lie on a line between Lighted Beacons Nos. 6 and 8. Mariners are cautioned that the bottom is interspersed with areas of hard bottom, and that dragging of the anchor may occur. An explosives anchorage is about $\frac{3}{4}$ mile northeastward of the outer end of the causeway.

7B-17 Pilots.—Pilotage is compulsory for vessels using the anchorage or the pier. Vessels bound for Ad Dammām whose estimated time of arrival has been received, will be boarded at Dammām Lighted Beacon No. 6 by the Saudi Arabian Government Railroad Dammām Port Authority pilot. He will pilot the vessel to the anchorage or berth at the wharf. Pratique is granted at either place. Vessels awaiting a Dammām pilot should anchor in the area southward of the above beacon.

7B-18 Directions for entering.—From a position about 600 yards southward of the Fairway Buoy, steer a course of 250° for a distance of $17\frac{1}{4}$ miles to a position $\frac{3}{4}$ mile abeam of the light buoy about 12 miles west-southwest-

(2324) PERSIAN GULF—Ras at Tannurah—Aids discontinued.—The aids in the following approximate positions will be expunged:

(a) Beacon No. 31, $26^{\circ}39.2'$ N., $50^{\circ}49.0'$ E.

Note.—The structure has been removed.

(b) Buoy No. 32, $26^{\circ}37.6'$ N., $50^{\circ}35.6'$ E.

(c) The unlighted buoy close northward of (b).

(See N.M. 14(2109) 1966.)

(Supersedes N.M. 12(1804) 1966.)

(N.M. 15/66.)

(N.N. 48, 49, Bahrain, 1966.)

H.O. Charts 3631, 3642, 3641, 3660 (a, b), 3653 (a, b), 3647 (a).

H.O. Pub. 112, Nos. 35140, 35150.

H.O. Pub. 62, 1960, pages 232, 235, 236, 237.

ward of Beacon No. 31; thence steer a course of 283° for $5\frac{1}{4}$ miles to a position midway between Beacons No. 33 and No. 34. From this position steer 263° for $12\frac{1}{4}$ miles to a position a little less than 1 mile abeam of Beacon No. 36. Continue on this course for $3\frac{1}{2}$ miles; then alter course to 214° for a distance of about $3\frac{3}{4}$ miles, which will lead to a position about 600 yards off Dammām Lighted Beacon No. 6. At this position the pilot will board the vessel, or course may be altered to the anchorage.

7B-19 Ad Dammām (Port of Ad Dammām) is the eastern terminus of the Saudi Arabian Government Railroad, which extends westward to Riyadh. With the development of rail facilities, the importance of this port is increasing, and it is the principal deep-water dry-cargo port in the Persian Gulf. The port was built primarily to serve the principal oilfields in the area. It is the seat of the district government and has a population of about 10,000 people. Imports consist chiefly of building and construction materials and food-stuffs. There are no exports. Considerable expansion of the port is planned.

Deepwater berthing facilities at Ad Dammām consist of the main wharf and pier at the outer end of the causeway, with 30 to 34 feet, alongside.

There are eight 3 ton cranes on the pier. A number of cranes are on the pier. A rail-mounted crane of 20-tons capacity is available. A floating crane of 100-ton capacity can be obtained on 72 hours notice, also on 25-ton derrick.

Three 1,000-horsepower tugs and a number of smaller ones are operated from Ra's at Tannūrah by the oil company for berthing ships at Ad Dammām.

Boiler water and highly chlorinated drinking water are piped to the main wharf and can be delivered at the rate of 40 tons per hour. Provisions and supplies are available at high cost. Fuel oil can be obtained at Ra's at Tannūrah.

There are no major repair facilities; small emergency repairs may be made at the port machine shops or the railroad shops. Divers are available.

Communication with the port is through the Arabian American Oil Company Radio Station HZY. The station has VHF radiotelephone service.

A 250-bed hospital staffed by doctors from the World Health Organization, provides medical facilities.

COASTAL FEATURES (Continued)

7B-20 As Saihāt, a town with a large fort, is situated about $4\frac{1}{2}$ miles northwestward of the

town of Ad Dammām. Westward of As Saihāt are several sand dunes. Thick date groves extend from this town to beyond Al Qatīf, a town 5 miles northward. On the coast about midway between these two places is Anik Fort.

Numerous uncharted reefs, shoal water, and fish traps front the coast in this region. Channels exist through them, however, local knowledge is necessary, even for boats.

Al Qatīf is situated in an oasis which extends about 9 miles northward and southward from the town and lies about 3 miles inland. This oasis is bound northward and southward by desert. Conspicuous landmarks in the town are: a fort; a minaret, 80 to 100 feet high in the southern part of the town, and a citadel in the northwestern part of the town. About 5 miles westward of the town is Miliolite Hill, 68 feet high. The climate of the oasis is damp and unhealthy, and malaria is prevalent. Al Qatīf can be reached by boats drawing up to 7 feet, but a local pilot is necessary to take a boat drawing more than $2\frac{1}{2}$ feet to the town.

Jazirat Tārūt is situated on the coastal reef off Al Qatīf. On the eastern part of the island are thick groves of high date palms. Dārīn, on the southern extremity, is a town with a square fort on which is a conspicuous tower. Anchorage can be obtained in 3 fathoms with the fort bearing 270° , distant about $4\frac{1}{2}$ miles.

The low coast trends northward from Al Qatīf for about 6 miles to the western entrance point of a shallow bay. Salt pans are located near the coast between the above positions. The eastern shore of the bay forms a part of the western side of a peninsula which projects about 12 miles south-southeastward. At the tip of the peninsula is Ra's at Tannūrah. Fish

traps encumber the shallow bay; the entrance of which is crossed by pipelines.

RA'S AT TANNŪRAH (RAS TANURA)

Position: 26°38' N., 50°10' E.
Depths: Approach, 32 to 60 feet.
Anchorage, 5 to 12 fathoms.
Principal berths, 30 to 47 feet.
Tidal rise: MHWS, 7 feet.
MHWN, 5½ feet.
Port plan: See section 7B-34.

7B-21 The oil port of Ra's at Tannūrah is located on the western shore of the Persian Gulf and about 200 miles southward of the head of the gulf. The port lies on the extremity of a low sandy peninsula which extends about 12 miles southeastward from the mainland.

7B-22 Navigation.—See section 7B-4. In periods of low visibility it may be advisable to steer for Bahrein Lightship and then to the Fairway Buoy. A course of 262° for 83½ miles leads from a position about 3 miles southwestward of Cable Bank Light Float to Bahrein Lightship; thence a course of 340° for about 10½ miles leads to the Fairway Buoy. For directions from the Fairway Buoy to Ra's at Tannūrah, see section 7B-33.

7B-23 Winds and weather.—The winds in the area are unpredictable for more than a very few hours in advance, even by a well established meteorological bureau. Winds of varying strength may come from any quarter; the prevailing wind is from the northwest. Winds of any strength at all tend to create a sharp but short choppy sea, which comes up very quickly and calms down as rapidly.

In general, the visibility of this area of the Persian Gulf is fair to excellent, but at times, usually in the middle of summer or middle of winter, fine dust is held in suspension in the atmosphere and visibility is reduced to a very short distance. These dust phenomena are more deceptive than fog in that mariners are apt to believe visibility to be greater than it actually is. At times genuine sandstorms occur in this area. Also, fogs, without sand or dust, may occur in the early morning hours.

The local weather of Ra's at Tannūrah is, on the whole, favorable, and the exposed position

of the port tends to mitigate the heat of summer; however, the humidity is very great and frequently exceeds 85 percent.

Proper precautions should be taken against sun and heat stroke during the summer months.

7B-24 Currents.—The mean range of the tide is 4¼ feet; the spring range is 5½ feet. At times, however, winds may increase the range to 8½ feet or reduce it to nil.

Irregular or uncertain currents may be encountered in the approach to Ra's at Tannūrah, and mariners are cautioned to obtain a position fix as often as possible. Because of the configuration of the coast in the vicinity of the piers, a local system of tidal currents prevails in the vicinity of North and South Piers.

The flood tidal current sets southward and the ebb current sets northward. The rate of the spring flood current is from 3 to 4 knots and the spring ebb current from 1 knot to 3 knots, but the direction of the wind materially influences these rates and may even in the case of strong winds, during neap tides, stop or reverse the current.

Spring ebb tidal currents of 4 to 6 knots have been experienced off the extreme southern end of Ra's at Tannūrah.

7B-25 Depths—Dangers.—The southern approach channel, South Channel, has a controlling depth of 32 feet; however, there are a few 31-foot spots in the channel. Middle Channel has a controlling depth of 47 feet with isolated depths of 40 feet. North Channel has depths of 60 feet and greater. Depths of 24 to 35 feet are about ½ mile northward and north-northeastward of the northern oil loading pier and are near the maneuvering area for North Pier and North Channel.

Anchorage depths range from 5 to 12 fathoms. The freighter anchorage has a least depth of 7 fathoms; the explosives anchorage has a depth of 6 fathoms.

South Pier has 30 to 33 feet alongside; North Pier has 36 to 47 feet. West Cargo Pier has 16 feet alongside; the controlling depth in the fairway leading to it is 11 feet.

The dangers southward of South Channel are described with the approaches to Bahrein Har-

(1533) **PERSIAN GULF**—Rennie Shoals—Oil drilling structure.—A drilling platform, lighted and equipped with a fog signal, exists in $27^{\circ}18'11''$ N., $51^{\circ}02'16''$ E.

(See N.M. 47 (6793) 1965.)

(N.M. 10/66.)

(N.N. 36, Bahrain, 1966.)

H.O. Charts **3653, 3647.**

H.O. Pub. 62, 1960, page **234.**

bor and the channel leading from Bahrein Harbor to Ra's at Tannūrah, see sections 7A-38 and 7A-52.

Rennie Shoal consists of Fasht Annaywah and Fasht Naiwat Arragie, two rocky patches about $2\frac{1}{2}$ miles apart in a north-south direction; the southern patch, Fasht Annaywah, with a depth of 10 feet, is situated about 37 miles northeastward of Ra's at Tannūrah. The northern patch, Fasht Naiwat Arragie, has a least depth of 11 feet. There is no visible evidence of their presence.

A bank with depths of $6\frac{3}{4}$ to $9\frac{1}{2}$ fathoms is located about $3\frac{3}{4}$ miles south-southeastward of Fasht Annaywah.

Bu Athama, about 15 miles east-southeastward of Fasht Annaywah, is a shoal area having a least depth of 3 fathoms. Bu Amāma, a bank about 16 miles long with depths of 7 to 10 fathoms, lies about 11 miles south-southeastward of Fasht Annaywah.

Al Ashīrah, an extensive bank with depths of $6\frac{1}{2}$ to 10 fathoms, lies with its eastern extremity about $3\frac{1}{2}$ miles southwestward of Bu Amāma. Least depths of 35 feet exist on this bank.

Fasht Bu Saafa, a steep-to rocky patch with a least depth of 2 feet and marked by **iron piles**, is located about 16 miles west-southwestward of Rennie Shoal. The sea breaks heavily on this patch at times, but at high water and with a calm sea the patch cannot always be distinguished. The bottom around the patch is sand.

Hair al Khṣainah, a shoal with a least depth of 26 feet, lies on the southwestern extension of Fasht Bu Saafa about 5 miles west-southwestward of the iron piles. Ar Jayjeh, a shoal with a least depth of 19 feet, lies on the southeastern extension of Fasht Bu Saafa. Two lighted drilling structures stand about $5\frac{1}{4}$ miles east-southeastward of the iron piles; two similar structures stand about 2 miles farther eastward. A lighted drilling structure is about $10\frac{1}{2}$ miles southeastward of the iron piles.

Hair Naiwat al 'Washeer, a shoal with a depth of 39 feet, lies about $8\frac{3}{4}$ miles southeastward of the iron piles on Fasht Bu Saafa.

Retlawenna Shoals, an area with a least depth of 15 feet, lies about 10 miles west-northwestward of Fasht Bu Saafa. Several dangers are situated northwestward of this group of shoals. An underwater obstruction has been reported to lie about 2 miles eastward of the shoals. Umm al Hamail, a 1-fathom rocky patch, lies about 11 miles west-northwestward of Retlawenna Shoals; northward and westward of this patch are numerous other shoals over an extensive area. A 6-fathom patch lies about $3\frac{1}{2}$ miles southwestward of the southern end of Retlawenna Shoals, and a 7-fathom patch lies about $2\frac{1}{2}$ miles eastward of the same extremity.

Fasht al Eling, with a least depth of 1 fathom, is situated about $7\frac{1}{4}$ miles south-southwestward of Retlawenna Shoals and about 14 miles northward of Ra's at Tannūrah. A detached shoal, with a least depth of 14 feet, lies about 4 miles east-northeastward of Fasht al Eling. Hair al Bihaim is the southeastern extremity of Fasht al Eling.

A shoal with a least depth of 25 feet lies about $2\frac{1}{2}$ miles southeastward of Fasht al Eling. A shoal with a depth of 40 feet lies midway between Fasht al Eling and the above 25-foot shoal.

A shoal, with depths of 32 and 34 feet, lies about $1\frac{1}{2}$ miles east-northeastward of the southern extremity of Ra's at Tannūrah. A 35-foot shoal patch lies about 400 yards southward of the above shoal.

Khaura, an extensive shoal with depths of less than 6 fathoms and on the southern end of which is a coral patch with depths of 17 to 18 feet, lies with its center $8\frac{1}{2}$ miles northeastward of Ra's at Tannūrah.

Hair Shiggītah, has a least depth of 24 feet except for a 17 foot patch on its southern side near the center. This bank is separated from Khaura by a channel about 2 miles wide with depths of 6 to 12 fathoms.

The principal dangers adjacent to the approach channels have been described; however, numerous isolated shoals exist and no trouble

(7900) **PERSIAN GULF—Ra's at Tannurah approach—Retlawenna Shoals—Light discontinued—Buoy established.**—1. The light on Ra's at Tannurah Beacon No. 4 ($26^{\circ}59'23''$ N., $50^{\circ}13'04''$ E. approx.) has been discontinued.

2. A conical buoy, painted black and showing a *Fl. 20 sec.* light, has been established about 450 yards 180° from the beacon in (1).

(N.M. 51/66.)

(N.M. 141, Bahrain, 1966.)

H.O. Charts 3631, 3641, 3653, 3660, 3647.

H.O. Pub. 112, Nos. 35210, 35215.

H.O. Pub. 62, 1960, page 235.

(7752) **PERSIAN GULF—Ra's at Tannurah—Buoy withdrawn.**—The black buoy *Fl. G. 4 sec.* about 4.05 miles $068^{\circ}30'$ from Ra's at Tannurah Light ($26^{\circ}37.5'$ N., $50^{\circ}09.8'$ E. approx.) will be expunged.

(Supersedes N.M. 31 (4975) 1966.)

(N.M. 50/66.)

(N.N. 134, Bahrain, 1966.)

H.O. Charts 3669, 3631, 3642, 3641, 3660, 3653.

H.O. Pub. 62, 1960, page 235.

should be encountered if the channels are adhered to. Lighted aids marking some of the dangers are described in section 7B-28.

7B-26 ASPECT—LANDMARKS.—The peninsula of Ra's at Tannurah is low and sandy but near its outer edge are some sand hills, 10 to 30 feet high, which show clearly in the sunlight. The point itself is about 3 feet high and consists of sand over coral.

The first thing to come into view are the oil storage tanks, then the sheer legs and hose cranes on the wharves, and finally the wharves themselves with their connecting causeways. A conspicuous gas flare is located about 4 1/2 miles northwestward of the northern oil loading pier. This flare has been observed for a distance of 20 miles at night. The flare is considered as an unreliable navigational aid. Another flare stack is close southwestward of the northern oil loading pier. A radio tower, marked by a light, is located about 5 1/2 miles northwestward of the northern oil loading pier. Lights are shown from a tower about 1 mile southeastward of the radio tower. The lights from the floodlight towers on the oil wharves are among the first objects to be picked up at night.

7B-27 HARBOR.—Ra's at Tannurah, an open roadstead, is partially protected by the off-lying reefs and by the peninsula on which it lies. These shoals tend to keep the sea down to such an extent that tankers do not ordinarily register heavy sea movement while lying alongside. There is ample anchorage and maneuvering room eastward of the peninsula.

North Pier and South Pier on the eastern side of the peninsula, are deepwater oil-loading facilities; both are equipped with special fenders. Vessels over 1,000 feet long can be berthed. The maximum draft of a loaded vessel to leave North Pier was 50 feet 1 inch. West Cargo Pier on the western

side of the peninsula, is suitable for small freighters and lighters whose drafts do not exceed 18 feet.

A sea island loading terminal lies about 1 mile northeastward of North Pier, it is connected to shore by a submarine pipeline.

7B-28 NAVIGATIONAL AIDS.—Light beacons, each consisting of a 3-pile structure, 30 feet high, with light and davit and marked by a number cut in a metal plate, are located in the approach to Ra's at Tannurah as follows:

No. 2 Beacon stands on the southern side of Rennie Shoal; it is painted red and fitted with a radar reflector.

A LIGHTED RED BUOY is moored about 17 1/2 miles westward of No. 2 Beacon and about 1/2 mile north-northwestward of Fasht Bu Saafa.

No. 4 Beacon, painted red and having a quadrant type radar reflector, stands on the southern end of Retlawena Shoals.

No. 6 Beacon, painted red, is located on Hair al Bihaim, the southeastern part of Fasht al Eling.

No. 8 Beacon, painted red and having a radar reflector, is located about 4 1/2 miles northward of Ra's at Tannurah and marks the eastern edge of the 6-fathom curve.

A LIGHTED BLACK PILLAR BUOY is positioned about 15 miles southeastward of the iron piles on Fasht Bu Saafa.

A LIGHT BUOY, painted black, is moored on Bu Athama.

Light Buoy No. B5, painted black and having a radar reflector, is moored about 4 1/2 miles north-northeastward of No. 6 Beacon.

Light Buoy No. B7, painted black and having a radar reflector, is moored about 3 1/2 miles south-southeastward of No. 6 Beacon.

"Fairway Buoy" (Ra's at Tannurah Approach Lighted Whistle Buoy) is moored about 13 1/2 miles north-northwestward of Bahrain Lightship; it marks the eastern

terminus of Middle Channel. The buoy is equipped with a radar reflector.

A light is shown from a black framework tower with a white horizontal band and situated on the southern extremity of Ra's at Tannurah.

Lights are shown on both of the oil wharves.

An AERONAUTICAL RADIOBEACON stands on the southern end of the peninsula about 1/4 mile northward of the light on the extremity.

A light buoy is moored about 1,200 yards eastward of the southern extremity of the peninsula. This buoy is painted black and marks the northeastern extremity of a shoal having a least depth of 10 feet.

Two beacons stand in shallow water southwestward of the southern extremity of the peninsula and are used by shallow-draft vessels proceeding to the inner anchorage.

Range lights for approaching North Pier are located about 1/2 mile north-northwestward of that pier; in range about 285° they lead about 250 yards northward of the northern end of the pier.

Range lights for approaching South Pier are located on the eastern side of the peninsula about 1/2 mile northwestward of that pier; in range about 271° they lead about 230 yards northward of the northern end of that pier.

7B-29 CHANNELS.—There are two principal channels leading from seaward to Ra's at Tannurah.

"Middle Channel" is used principally by deeply laden outbound vessels. The eastern terminus of this channel is at the Fairway Buoy. The lighted black pillar buoy 15 miles southeastward of the iron piles on Fasht Bu Saafa, Beacon No. 6 Light Buoy No. B7 and Beacon No. 8 indicate the general trend of the channel and are used in its navigation.

"North Channel" is the longest channel; it is used by extremely deeply laden vessels or by vessels bound to or from ports in the northern part of the Persian Gulf. The eastern terminus of this channel is at Beacon No. 2. The lighted red buoy moored off the northern side of Fasht Bu Saafa and Beacon Nos. 4, 6, and 8 indicate the trend of the channel.

7B-30 ANCHORAGES.—A suggested anchorage arrangement is shown on the port plan. These anchorages are designed to protect shipping in general by indicating the best and most convenient anchorages and to expedite the movement of vessels.

In the suggested oil tanker anchorage, the bottom is mud and sand and the holding ground is fair. In rough weather it is recommended that vessels lie to a long scope of chain as strong winds create a short heavy sea. Tankers should notify the oil company as soon as they have anchored as to their time of arrival and their position in the anchorage.

The freighter anchorage is for vessels loading or unloading general cargo. It is clear of the tanker traffic and as close as possible to the barge piers. The bottom is sand and mud; vessels should anchor with a long scope of chain because of the fair holding ground.

The explosives anchorage adjoins the freighter anchorage and is used for the handling of explosives. Vessels with explosives will not be berthed at the oil wharves. The bottom in this anchorage is also sand and mud, fair holding ground; vessels should anchor with a long scope of chain.

The maneuvering area designated on the port plan is for maneuvering vessels only and vessels should not anchor in this area.

On the western side of the peninsula there is anchorage and mooring buoys for smaller vessels.

7B-31 Pilots.—The approaches to Ra's at Tannūrah are well marked; hence, a pilot is not necessary for proceeding to the anchorage via any of the three approach channels. Pilotage is compulsory and provided by ARAMCO without charge to vessels berthing at the main piers. All maneuvering of vessels in the vicinity of or at the berths must be under the supervision of a harbor pilot.

Normally the pilot will board the vessel in the anchorage; however, when a vessel arrives from seaward and a berth is available, the pilot will board the vessel while it is underway southward of Beacon No. 8 or westward of Beacon No. 36, depending on the channel transited.

7B-32 Regulations.—For safe maneuvering purposes, all tankers must have oil-free ballast water upon arrival. In order to avoid any pollution of the sea which would harm the pearl and other fisheries, tankers must discharge all oily ballast while eastward of the 52d meridian.

7B-33 Directions for entering.—The following directions are recommended by the Arabian American Oil Company for South and Middle Channels. The directions given for South Channel are for inbound traffic; those given for Middle and North Channels are for outbound traffic.

South Channel

From a position about $\frac{1}{4}$ mile southward of Fairway Buoy, steer a course of 250° for a distance of about $17\frac{1}{4}$ miles to a position about $\frac{3}{4}$ mile abeam of the light buoy about 12 miles west-southwestward of Beacon No. 31; thence steer 283° for about $5\frac{1}{2}$ miles to a position midway between Beacons Nos. 33 and 34. From this position steer a course of 263° for $12\frac{1}{4}$ miles to a position about $\frac{3}{4}$ mile abeam of Beacon No. 36; thence steer a course of 288° for about 5 miles to the anchorage or a position where the vessel will be met by the harbor pilot.

Middle Channel

From a position off the oil wharves, steer a course of 360° for about 10 miles, passing $\frac{1}{2}$ mile off Beacon No. 8. When Light Buoy No. B7 is abeam, steer 036° for about 2 miles until Light Buoy No. B7 bears 203° , distant $1\frac{3}{4}$ miles. From this position, steer 097° for about 20 miles, passing $1\frac{1}{2}$ miles off the lighted black pillar buoy about 15 miles southeastward of the iron piles on Fasht Bu Saafa. Then steer 105° for about 18 miles to Fairway Buoy; thence shape course as desired.

North Channel

From a position off the oil wharves, steer to a position about $1\frac{3}{4}$ miles due east of Beacon No. 8. From the latter position, steer a course of 349° for about $6\frac{3}{4}$ miles until buoy no. B7 is abeam to starboard, distant $\frac{1}{2}$ mile; a vessel on course 349° will have Beacon No. 6 directly ahead. When abeam of buoy no. B7, change course to 015° for about 7 miles until abeam of buoy no. B5, distant about $\frac{1}{2}$ mile to starboard; thence alter course to 044° for about 6 miles until Beacon No. 4 bears due west, distant about $3\frac{3}{4}$ miles. At this position change course to $063\frac{1}{2}^{\circ}$ for about $5\frac{1}{2}$ miles until $2\frac{1}{2}$ miles northward of the lighted red buoy moored off the northern side of Fasht Bu Saafa; thence steer 100° for about $17\frac{1}{4}$ miles, passing 1 mile southward of Beacon No. 2.

For vessels proceeding from Ra's at Tannūrah to ports in the northern part of the Persian Gulf, the following directions are recommended.

Proceed to a position about $3\frac{3}{4}$ miles due east of Beacon No. 4 as described in the directions for North Channel. From this position, shape course as desired.

Strong and irregular tidal currents are encountered in the Ra's at Tannūrah approaches, and in thick weather, when visibility is impaired, it is recommended that vessels anchor or proceed with the utmost caution. It is further recommended that vessels using the North Channel in low visibility do not attempt to

pass Beacon No. 4 until a reliable fix has been obtained.

7B-34 Ra's at Tannūrah (Ras Tanura) is one of the principal oil ports in the Persian Gulf operated by the Arabian American Oil Company (ARAMCO). It is the site of a large oil refinery; the chief exports are petroleum products, both refined and crude. Some general cargo is imported; however, most of the general cargo is discharged at Ad Dammām (sec. 7B-7).

The port has an estimated population of about 1,000 Americans, small groups of Dutch, Italian, Lebanese, Indian, and Pakistan nationalities, and about 4,000 Saudi Arabian nationals (1956). A United States consular officer is stationed at Jabal adh Dhahrān (sec. 7A-50), about 50 miles by road from the oil terminal.

There are two T-headed wharves that will accommodate oil tankers. These wharves, which project from the eastern side of the peninsula, are commonly referred to as North Pier and South Pier.

South Pier is connected to the shore by a causeway, 2,300 feet long. This pier has four berths and is 1,200 feet long and 105 feet wide. Depths alongside range from 30 to 33 feet. The seamen's recreation center is at the foot of the pier. The port doctor's and customs office is located close by.

North Pier, about $\frac{3}{4}$ mile northward of South Pier, is connected to the shore by a causeway 3,600 feet long. The pier is 2,200 feet long and 110 feet wide. It has seven alongside berths with depths of 36 to 47 feet.

Ten tankers can be loaded simultaneously at the two piers at a maximum rate of 75,000 barrels per hour.

West Cargo Pier, on the western side of the peninsula, is used principally for the handling of general cargo for the oil company. Cargo is generally barged in from Ad Dammām, Al Bahrayn, and other ports in the gulf. The pier is 315 feet long with a least depth of 16 feet alongside. A vessel 305 feet long and with a draft of 18 feet loaded cargo at this pier.

Southward of West Cargo Pier is Customs Pier; it has a depth of 12 feet alongside and is used by lighters.

Fuelling Pier, northward of West Cargo Pier, is used for fueling small craft and loading oil barges. A maximum draft of 12 feet is allowed.

Two 2,000-horsepower steam tugs are regularly stationed in the vicinity of North and South Piers to assist in mooring and unmooring. Eleven smaller diesel tugs, ranging from 150 to 450 horsepower, are berthed at West Cargo Pier and are used for handling lighters. A number of lighters, ranging in size from 75 to 120 tons, are available for cargo. There are a number of small craft for various uses.

Mobile tractor cranes serve the port area. A floating heavy lift crane of 85 tons capacity is available together with an A-frame barge rated at 20 tons lifting capacity.

All provisions and stores are imported and, as a result, they are expensive and available only in very limited quantities. Since provisions will be supplied under emergency conditions only, the oil company should be notified of requirements as soon as possible. Drinking water and boiler water, limited to 25 tons, and 100 tons, respectively, can be obtained.

Fuel and diesel oil for bunkers are available; it is loaded at all berths. Lubricating oils are available in limited drum quantities and must be ordered in advance.

The oil company has large well equipped workshops and diving equipment for the maintenance of their own equipment. Repairs will be made on vessels if approved by the Port Engineer; however, considerable charges are made for any service rendered.

ARAMCO owns and operates a radio station for the purpose of transacting company business with inbound and outbound tankers. The station also transmits weather bulletins, hydrographic notices, and medical advice without charge. The call letters are HZA. Vessels are requested to advise this station of their ETA 72 hours prior to arrival. Any vessel having anchored in the suggested anchorage area should immediately send the following information to ARAMCO by radio: The time of arrival, and the approximate position at the anchorage in relation to North Pier. Commercial messages are sent via the cable office at Al Manāmah, Al Bahrayn (sec. 7A-45). There is another cable office at Ad Dammām; however, this station is mostly engaged with local traffic.

VHF radiotelephone service on Channel 16 (156.80 mcs.) for calling, and on Channel 14 (156.70 mcs.) for working is available. Air communication is maintained with Jabal adh Dhahrān, and Al Bahrayn.

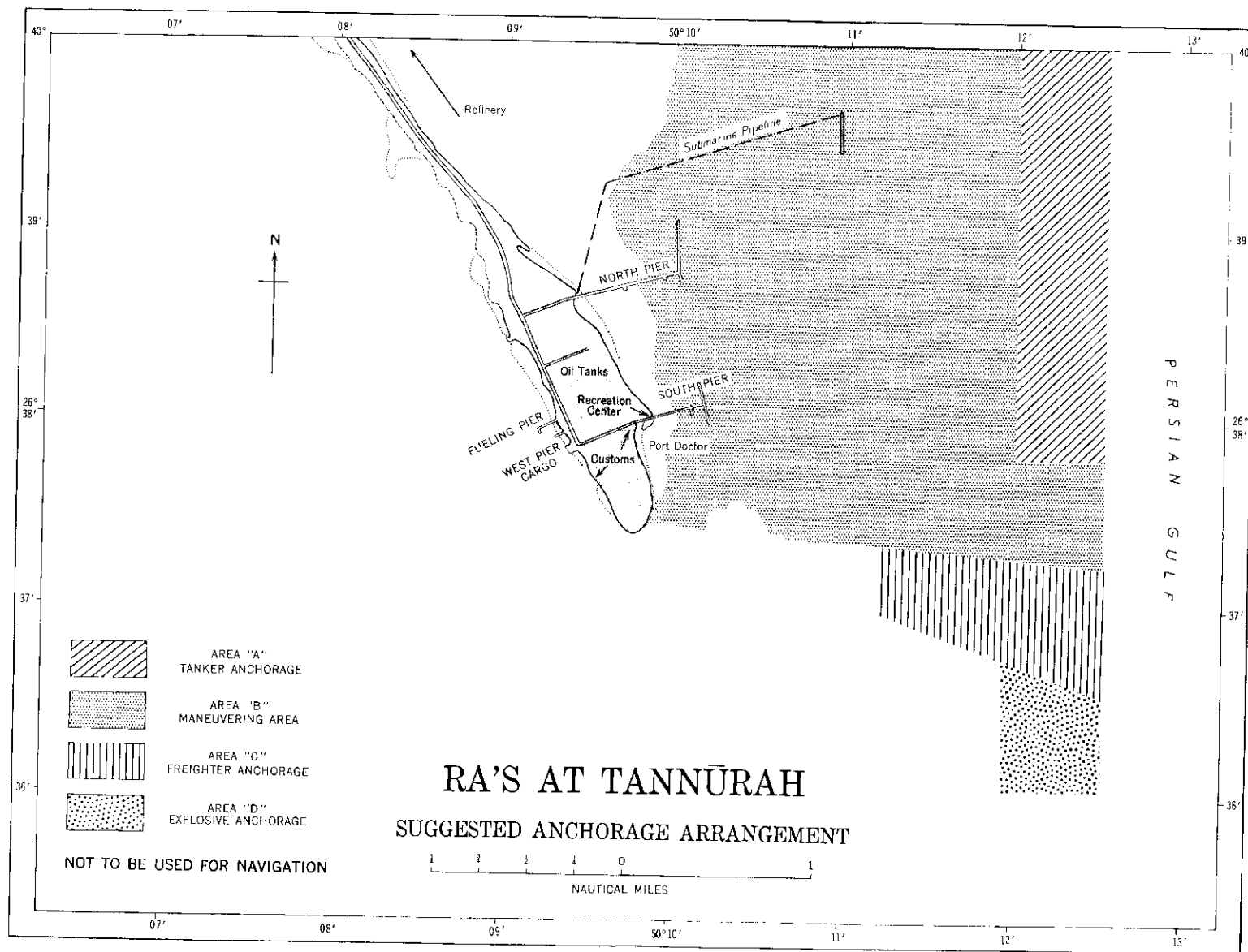
The oil company maintains a modern hospital in the vicinity of the refinery. The port doctor will attend personnel of the ships.

COASTAL FEATURES (Continued)

7B-35 From the southern extremity of Ra's at Tannūrah, the coast trends about $17\frac{1}{2}$ miles north-northwestward to Ra's al Kaliyah. The coast between these two places is generally low and sandy and covered with scattered bunches of camel grass.

On Ra's al Kaliyah is a high sandhill; the coast in front of the point is foul for about $1\frac{1}{4}$ miles. **Dhalaifain Anchorage** is off Ra's al Ghār, a cliff about 33 feet high and situated about 5 miles westward of Ra's al Kaliyah. Jabal Dhalaifain, about $1\frac{1}{2}$ miles southwestward of Ra's al Ghār, is a conspicuous black rocky hill, 79 feet high. The anchorage is in a depth of about 7 fathoms, sand and rock, with Ra's al Ghār bearing about 199° , distant 3 miles. This anchorage is open to the shamāl, which in this vicinity blows from northwest to north and is at times strong. The tidal currents set parallel with the coast at a rate of 1 knot to 2 knots. A steel framework tower, surmounted by a diamond-shaped topmark, stands about 8 miles east-northeastward of Ra's al Ghār on a 2-fathom shoal.

Ra's Basit Shira 'a lies about 4 miles north-westward of Ra's al Ghār. Jubayl al Bahri,



about 10 1/2 miles northwestward of Ra's Basit Shira 'a, is a high sandy islet lying close off a slightly projecting point on which is the settlement of Al Jubayl. A watertower stands about 1 3/4 miles westward of the point. Farther inland are some high sandhills, and on the coast a few miles northwestward of Al Jubayl is a stony hillock. Khuwair al Bahri, a small creek on the northern side of Jubayl al Bahri, has a good boat anchorage protected from most winds, but exposed to the nashi. A steel framework TOWER, surmounted by a spherical daymark, stands about 7 1/4 miles east-southeastward; and a similar TOWER, with a rectangular topmark, stands about 5 miles north-northeastward of Jubayl al Bahri.

Al Batinah, about 13 miles northwestward of Jubayl al Bahri, is an island which is separated by a narrow passage from Abu 'Ali, an island to the northward (sec. 7C-1). Al Batinah forms the western shore of Dawhat Abu 'Ali; Abu 'Ali forms the northern shore of the bay. Good ANCHORAGE can be obtained in the bay with protection from the shamal; local knowledge is necessary as shoal water extends nearly 6 miles off the western shore of the bay and reefs off the northern side. In depths of less than 9 fathoms the bottom is of hard sand; in greater depths it is mud. Depths are fairly regular in the bay. Southeasterly winds cause a heavy sea in the bay.

Jazirat al Jurayd, about 19 miles northeastward of Jubayl al Bahri, is a sand islet about 12 feet high and covered sparsely with scrub. It is fringed by a reef about 1/2 mile from its northern side and may be approached on the southern side to within 300 yards with no depths less than 9 fathoms. The southern side of the islet affords good anchorage in 25 to 30 fathoms with protection from the shamal. The bottom is of sand and mud affording fair holding ground. A BEACON stands on the islet.

Numerous shoals separated by deep channels lie southward of Jazirat al Jurayd. Shoals lie about 8 miles eastward of the island; extreme care should be exercised while navigating off this section of coast. A BEACON stands

about 7 1/2 miles south-southeastward of Jazirat al Jurayd.

ANCHORAGES

7B-36 AD DAMMAM.—See section 7B-16.

RA'S AT TANNURAH.—See section 7B-30.

DHALAIFAIN ANCHORAGE.—See section 7B-35.

Part C. RA'S ABU 'ALI TO RA'S AL QULAY'AH

7C-1 RA'S ABU 'ALI (27°18'N., 49°42'E.) is the eastern extremity of Abu 'Ali, an island lying about 37 miles north-northwestward of Ra's at Tannurah and close off the mainland. A light is shown about 1 3/4 miles eastward of the point; a BEACON stands about 4 miles southwestward of the point. The ruins of a tomb stand on a small hill close within Ra's Abu 'Ali. A sandspit, with depths of 4 to 18 feet and on which numerous cormorants are said to settle at low water, extends about 2 1/4 miles eastward from Ra's Abu 'Ali. The sea breaks heavily on this spit, vessels should give it a wide berth.

COAST—GENERAL

7C-2 The coast between Abu 'Ali and Ra's Al Qulay'ah, about 121 miles north-northwestward, is fronted by numerous reefs, drying banks, and shoals, many of which are unsurveyed. An inshore channel lies along this section of coast; however, because of the large number of uncharted dangers, no attempt is made in this publication to describe it as local knowledge is necessary to safely negotiate this channel. Channels lead from the coastal track to several small oil terminals or settlements and are described with their related features.

The coast along this section is generally low and sandy with marsh ground extending inland. Isolated small sandhills are seen occasionally; the desert rises to a bare gravel plain over 700 feet high about 50 miles inland.

(7754) PERSIAN GULF—Jazereh-ye Faisi—Oil structure north-northwestward—Information.—The oil structure in $28^{\circ}10'30''$ N., $50^{\circ}05'15''$ E. (approx.) is no longer visible above the surface of the water.

Note.—No information available as to whether any submerged obstruction remains at above position.

(~~See~~ N.M. 18(2847) 1966.)

(N.M. 50/66.)

(N.N. 129, Bahrain, 1966.)

H.O. Charts 6301, 3653, 3647.

H.O. Pub. 62, 1960, page 241.

DEPTHS—OFF-LYING DANGERS

7C-3 The greatest depths in the area are about 30 fathoms. The 20-fathom curve is very irregular and lies about 45 to 50 miles offshore. Most of the dangers are contained within the 20-fathom curve. The water is not usually as clear as it is farther south, and shoals do not show up well. In places, the bottom consists of white clay rather than sand, and there are muddy patches in the water.

The principal off-lying dangers of concern to the navigator are about half a dozen low islets and reefs which are steep-to and lie as far as 57 miles offshore. They are difficult to make out in a haze during and after a shamal, especially in the summer, they should not be approached at night. If anchoring off any of these islets, caution must be exercised when approaching them, for the depths shoal rapidly and the soundings give no warning.

JAZIREH-YE FARSI, the outermost islet about 48 1/2 miles north-northeastward of Ra's Abu 'Ali, is 10 feet high and covered with coarse grass and brushwood. The fringing reef of the islet shows up plainly and extends as far as 400 yards from its northern side, a greater distance from its western side, and about 200 yards from its southern side. A small lagoon is formed between the southern side of the islet and some rocks lying parallel to this side. In 1949 the passage into the lagoon was silted up, but landing could be made with ease on the western side of the islet. It has been reported that Jazireh-ye Farsi is a good radar target with an echo range of 17 miles under normal conditions.

A lighted oil structure stands about 12 miles north-northwestward of Jazireh-ye Farsi.

A LIGHT is shown near the middle of Jazireh-ye Farsi. Small birds settle on the islet at certain seasons; their cries can be heard on a calm night at a distance of about 1 mile, and sometimes even before the islet is sighted. Turtle abound on the islet. A depth of 13 feet lies about 1/2 mile east-northeastward of the light.

JAZIRAT 'ARABI, an islet about 13 miles southward of Jazireh-ye Farsi, is about 10 feet high and consists of sand on a rock base. The islet is fringed by a partly drying reef

which extends about 1/3 mile offshore. A CAIRN, about 4 feet high, stands close off the southern end of the islet. In 1924 a British naval vessel anchored southwestward of the islet, and in 1931 another British naval vessel anchored in a depth of 25 fathoms with the cairn bearing 330°, distant about 750 yards. Landing can easily be effected on the beach on the northern side of the islet; elsewhere landing is bad, and at low water it is almost impossible to get a boat ashore because of the large number of drying rocks. The island swarms with birds, chiefly cormorants, and at times it is covered with nests and young birds. At one time it had on it a deposit of guano a few inches thick. It is visited by fishermen for turtle.

A dangerous steep-to shoal, with a least depth of 1 1/2 fathoms, lies about 12 1/2 miles west-northwestward of Jazirat 'Arabi.

A lighted drilling platform lies 11 1/2 miles east-northeastward of Jazirat 'Arabi.

JAZIRAT AL HURQUS, about 38 miles northward of Ra's Abu 'Ali, is a bare sandy islet about 4 feet high, fringed by a narrow reef. Small boat landings are impossible at low tide and dangerous at high tide because of the rocks surrounding it. Because of its small size, it affords no protection.

A 3-fathom spot and a 4-fathom spot lie about 22 and 13 miles, respectively, north-northwestward of the above islet. A 17-foot spot lies about 7 miles southwestward of the islet.

AL QIRAN, an islet about 18 miles west-southwestward of Jazirat 'Arabi, is only a few feet high, quite level, and covered with brushwood. The fringing reef around the islet extends about 1 mile northwestward and 1/2 mile southward. The islet is frequented by fishermen.

Two shoals, with depths of 2 fathoms, lie about 4 and 5 miles eastward and southeastward, respectively, of Al Qiran. Anchorage can be obtained off the southeastern side of the islet. Vessels should not anchor in depths of less than 17 fathoms, for the fringing reef is very steep-to, a depth of 10 fathoms being found a few yards from its edge. This anchorage affords good protection from the shamal; the bottom of coarse sand is fair holding ground. Small boats can land at any of the sandy beaches on the southern side. A 50-foot tower is charted on the islet.

AL QURAYYIN, a sandy islet about 2 feet high, is located about 3 1/2 miles southward of Al Qiran; it is fringed by a reef and at times is covered with ducks so numerous that the islet appears black. In the early morning, late evening, or after a duststorm or other periods of reduced visibility, the islet cannot be seen. Because of its height and weather conditions, this islet does not always show up well on radar.

There is a channel between Al Qiran and Al Qurayyin; however, vessels are cautioned not to use it without local knowledge. It has depths of 7 to 14 fathoms.

MADAIRA REEF, located about 23 miles northeastward of Ra's az Zaur (sec. 7C-21) or about 92 miles northwestward of Jazireh-ye Farsi, is a steep-to coral reef with a least depth of 5 feet. In fine weather, the only indication of the reef are the slight overfalls in the vicinity, but in bad weather the reef probably breaks.

MADAIRA REEF LIGHT FLOAT, painted black and with a red tower with the name "Madaira Reef" in white letters on either side, is moored on the southern side of Madaira Reef. The float is equipped with a radar reflector.

A small detached steep-to reef, with a least depth of 5 feet and on which the sea breaks at low water, is situated about 5 1/2 miles southward of Madaira Reef. The depths in the vicinity of this reef and Jazirat Qaru, about 1 mile south-southeastward, are no guide to the proximity of the islet or reef.

JAZIRAT QARU (28°49' N., 48°46' E.), about 6 1/2 miles southward of Madaira Reef, is a sandy islet about 3 feet high, on which are some tufts of grass. The islet is surrounded by a drying bank and shoal ground to a distance of about 800 yards, except on its western side where the bank and shoal ground extend to a distance of about 300 yards. It has been reported that Jazirat Qaru is a good radar target at a distance of 7 miles under normal conditions.

An 8-foot shoal lies about 2 miles southwestward of Jazirat Qaru.

An area about 2 miles square, marked by four light buoys, dangerous to navigation, due

to drilling operations, lies about 12 1/4 miles eastward of Jazirat Qaru.

NAVIGATION

7C-4 See section 7-2 for the description of the coastal track passing near Jazireh-ye Farsi and Madaira Reef. See the particular part for the directions from the coastal track to the port.

See section 7C-23 relative to a prohibited area off the coast.

CURRENTS

7C-5 The tidal currents in the vicinity of Jazireh-ye Farsi and the surrounding area set westward and eastward. Between Jazireh-ye Farsi and Jazirat 'Arabi, the current attains a rate of about 1 knot. The currents are irregular along the coast.

COASTAL FEATURES

7C-6 Janah, a sandy islet about 1/2 mile in extent, lies about 11 miles east-north-eastward of Ra's Abu 'Ali; it is about 10 feet high and covered with thin scrub. A small steep-to reef fringes the islet and extends about 2 miles from its northern side. Shelter from either the shamal or the kaus can be obtained under its lee. A steel framework tower, 50 feet high and with a rectangular topmark numbered "M 10", is located on the islet.

An extensive but shallow bay is entered between the northwestern side of Abu 'Ali and Ra's al Badi'ah, about 10 1/2 miles north-westward. RAI's AL BADI'AH (27°25' N., 49°19' E.) is a low sandy point on which are tufts of grass. In the northern part of the bay is an inlet extending westward, known as Dawhat Musallamiya; in the southern part is a branch extending southeastward, known as Dawhat ad Dafi.

Al Jinnah, about 2 1/2 miles southward of Ra's al Badi'ah and about 1 1/2 miles off the western shore of the bay, is a light-colored island, 180 feet high, the western part of which is low. On the level summit of the island is a (continued on page 243)

large fort and a round tower, and on the northern side is a village. Drying sandbanks extend about 2 miles northward and 1 mile eastward from the island. A small boat basin with depths of 3 fathoms is situated close northwestward of Al Jinnah.

Dawḥat Musallamīya is entered between Ra's al Badī'ah and Al Jinnah and extends about $9\frac{1}{2}$ miles westward. About 5 miles inside is Al Musallamīya, an island on which are some low sand hills and on the eastern side of which is a village standing among trees. The entrance is about 400 yards wide between Ra's al Badī'ah and the reef and sandbanks extending northward from Al Jinnah; these reefs and sandbanks are visible even at highwater. In places are bars with a depth of about 1 fathom, but inside there is a deep tortuous channel which leads almost up to Al Musallamīya. At high water boats are able to get to the village on the island.

The mainland on the northern side of the inlet is low, but just southward of Al Musallamīya is a conspicuous cliffy bluff. The coast for some miles southward of this bluff is 50 to 80 feet high, and on it is a growth of shrubs. A branch from Dawḥat Musallamīya trends southward between Al Jinnah and the mainland and has depths of about 3 fathoms. At high water boats can use a channel from this branch to the village on Al Jinnah.

The best **anchorage** when a vessel is visiting either the island of Al Jinnah or Al Musallamīya is in 4 to 5 fathoms about 5 miles northeastward of the fort on Al Jinnah, but there is little shelter from the shamāl or kaus here. Inshore of this anchorage are extensive sandbanks with numerous ridges and reefs running northward and southward. When anchoring in this locality, a vessel must allow for the difference in the level of the sea due to the action of the winds as well as that due to the tides. In a position where a depth of 18 feet was obtained after a strong kaus had blown for 12 hours, a depth of 14 feet was obtained the following day after a

strong shamāl had followed the kaus and had been blowing for several hours.

To approach the island of Al Jinnah, pass through the entrance of the bay and follow the main channel west-southwestward until the village on the island bears 180° ; then steer for it, keeping close to the sandbanks on the eastern side. If intending to go to the village on Al Musallamīya, keep in the main channel, steering toward the conspicuous bluff southward of the island; when close to the mainland, the channel turns toward the island.

7C-7 Ra's al Ghār, about $7\frac{1}{2}$ miles north-northwestward of Ra's al Badī'ah, is a low point, close within which are some brown rocky hillocks overgrown with shrubs. There is little coastal reef between these two points, but foul ground extends about 8 miles northeastward from Ra's al Ghār.

Fasht al Kash lies with its center about 13 miles eastward of Ra's al Ghār. It is an extensive area, about 14 miles in a north-south direction and about 9 miles in an east-west direction. The area is unsurveyed and numerous reefs and drying banks are known to exist on the shoal. A shoal which breaks lies about 12 miles north-northeastward of Ra's al Ghār. Another shoal considered dangerous to navigation lies about 18 miles north-northeastward of the same point. Two reefs with depths of less than 6 feet lie about $6\frac{1}{2}$ and 8 miles northwestward, respectively, of the same point. Depths of less than 10 feet lie about 13 miles north-northwestward of Ra's al Ghār. A **tower**, with a rectangular topmark and labeled "M 13," is located near the above depths of less than 10 feet.

Other shoals in the area are known to exist; vessels should pass through this area in daylight only, in conditions of high sun when shoals show up clearly.

Between Ra's al Ghār and Ra's Tanāqib, about 25 miles northwestward, the coast is mostly low. In places, foul ground extends as far as 5 to 9 miles offshore, the bottom consist-

ing chiefly of white clay. Jabal al Manīfa, situated on the coast about 17 miles west-northwestward of Ra's al Ghār, is a small hill. Dawḥat Manīfa is situated about 2½ miles southwestward of Jabal al Manīfa and close northwestward of this bay is another known as Dawḥat Balbūl, which affords anchorage to boats. A **buoyed channel** leads into Dawḥat Manīfa and terminates near the head of a small pier with a crane. This facility is for small craft only. An air strip is located about 2 miles eastward of the pier.

From Dawḥat Balbūl, the coast trends northward for about 10½ miles to Ra's Tanāqīb; it is indented by numerous bays, all of which are shallow. Ra's Tanāqīb rises steeply to a flat-topped, light-colored hill, 70 to 100 feet high.

Northward of Ra's Tanāqīb is an extensive bight in the coast known as Dawḥat al Kharais. Little is known about the bay except that the shore is low and on it are several hillocks. The northern side of this bay is formed by Ra's as Saffāniya, a low point about 15 miles north-northwestward of Ra's Tanāqīb. A barge pier projects from the shore on the northern side of the point. Several oil storage tanks and buildings are located near the root of the pier.

The coast remains low for the greater part from Ra's as Saffāniya to Ra's al Mish 'āb, about 15 miles north-northwestward. Jabal Thaluf, about 6½ miles westward of Ra's as Saffāniya, has a bluff on its northern side which rises in two steps to a height of about 40 feet. For a description of the port of Bandar Mish 'āb, see section 7C-8.

Off-lying dangers.—Fasht Bildāni extends about 21 miles offshore between Ra's Tanāqīb and Ra's al Mish 'āb. The reef is unsurveyed and numerous shoals are known to exist. A depth of about 10 fathoms is found about ½ mile outside the edge of the reefs. Numerous oil well rigs were on the reef in 1954.

The reefs should not be approached at night into depths of less than 18 fathoms, nor by day, when in clear weather they can be seen at a

distance of 10 miles, into less than 15 fathoms. The land is not in sight when a vessel is seaward of the reefs.

For dangers lying farther out, see section 7C-3.

BANDAR MISH 'ĀB (RA'S AL MISH 'ĀB)

Position: 28°07' N., 48°38' E.

Depths: Approach, 24 feet.

Anchorage, 30 feet.

Berths, 6 to 29 feet.

Tidal range: Mean, 4 feet.

7C-8 Bandar Mish 'āb, about 123 miles northwestward of Ra's at Tannūrah, is primarily a small cargo port on the western side of the Persian Gulf. It lies close southward of the neutral zone.

7C-9 Navigation.—From a position on the coastal track about 8 miles eastward of Jazīreh-ye Fārsī, a course of 285° for about 45 miles leads to a position midway between a 3-fathom patch and a 4-fathom patch; thence, a course of 279° for about 30 miles leads to a position about 2 miles northward of an entrance beacon. For directions from this beacon to the port, see section 7C-19.

In approaching Bandar Mish 'āb, mariners are advised to make a landfall at Jazīreh-ye Fārsī before daybreak, the light thereon being more readily visible than the island during daylight.

7C-10 Winds and weather.—The winds and weather are similar to that of Ra's at Tannūrah, except that the anchorage area and wharf area are slightly more protected from northerly winds because of their location on the lee side of Ra's al Mish 'āb.

7C-11 Tides and currents.—The tides are diurnal with a mean range of about 4 feet and a tropic range of about 4¾ feet.

The currents in the area are irregular. Pronounced currents setting in a northwest and southeast direction have been reported in the approach westward of Jazīreh-ye Fārsī.

7C-12 Depths—Dangers.—Depths of 30 feet or more exist in the approach to a position about 5 miles northeastward of Fairway Buoy (sec. 7C-16); from that position to the buoy, the depth is 27 feet. The least depth from Fairway Buoy to Sea Island is 24 feet.

A depth of 30 feet is available in the anchorage, and a least depth of 24 feet is found in the approach. Alongside depths range from 6 feet at the barge pier to 29 feet at Sea Island. A 17-foot shoal lies about 300 yards northeastward of Sea Island.

For a description of the off-lying dangers, see sections 7C-3 and 7C-7. Kassār al Mitma is a reef about $7\frac{1}{4}$ miles east-southeastward of Ra's al Mish 'āb. Numerous shoals lie between the mainland and Fasht Bildāni; however, the channel is well marked through the dangers.

7C-13 Aspect—Landmarks.—The coast in the vicinity of the port is low and sandy. The most conspicuous objects are the A-frames which support a cable for an aerial transporter, called "Skyhook"; the outer two A-frames are located on Sea Island, an artificial island lying about $1\frac{1}{4}$ miles offshore. Numerous radio masts stand about $\frac{1}{2}$ mile inland of the barge pier.

Jabal 'Amādah, about $2\frac{1}{2}$ miles southwestward of Ra's al Mish 'āb, is a dark hill, about 105 feet high, which appears to have four hummocks when seen from northeastward.

Jazīrat al Maqta', an island located close southward of Ra's al Mish 'āb, has cliffs 20 to 30 feet high on its eastern side and is covered with grass and brushwood. A sandy spit extends eastward and southeastward from the island.

7C-14 Harbor.—The harbor is primarily an open roadstead which has some protection from the surrounding reefs and from Ra's al Mish 'āb. The port consists of Sea Island (Main Wharf), barge pier, and an anchorage area eastward of Sea Island.

Sea Island is a detached wharf located about $4\frac{1}{2}$ miles southward of Ra's al Mish 'āb and about $1\frac{3}{4}$ miles offshore. It is 405 feet long in a northeast-southwest direction, 74 feet wide, and is constructed of steel pilings and a wooden deck. There are accommodations for two vessels, one on either side. The wharf is connected

to the shore by an aerial cableway, which consists of a car running on a traveler supported by a number of A-frames.

A steel barge pier with a T-head is about 1,350 feet long. The T-head is 200 feet long and 90 feet wide; it is located about $4\frac{1}{2}$ miles south-southwestward of Ra's al Mish 'āb.

7C-15 Anchorages.—Anchorage can be had in a depth of 30 feet over fine sand in a position about 1,000 yards, 286° from Sea Island.

Anchorage for small craft can be obtained southward of the spit extending eastward from Jazīrat al Maqta', and is in the northeastern part of a bay, most of which is shallow. The best berth is about $1\frac{1}{2}$ miles southeastward of the northeastern extremity of Jazīrat al Maqta'.

7C-16 Navigational aids.—The approach to Bandar Mish 'āb is marked by eight beacons, each a 3-pile structure, 30 feet high and carrying a yellow daymark. The daymark shape and position of each beacon is as follows:

Beacon No. 8, about 17 miles east-northeastward of Jazīrat al Maqta', is surmounted by a drum.

Beacon No. 7, situated about 5 miles westward of Beacon No. 8, or about 12 miles east-northeastward of Jazīrat Maqta', is surmounted by a circular topmark.

Beacon No. 6 stands on the northern part of Kassār al Mitma (sec. 7C-12). The beacon is surmounted by a cone, point up. A pipe stands about 700 yards southward of the beacon.

Beacon No. 5, about $3\frac{3}{4}$ miles northeastward of Sea Island, is surmounted by a square topmark and marks the extremity of a sandy spit.

Beacon No. 4, about $2\frac{1}{4}$ miles northeastward of Sea Island, is surmounted by a circular topmark.

Beacon No. 3, about 2 miles northeastward of Sea Island and close northwestward of Beacon No. 4, is surmounted by a square.

Beacon No. 2, about 2 miles eastward of Sea Island and south-southwestward of Beacon No. 4, is surmounted by a circular topmark.

Beacon No. 1, about $1\frac{3}{4}$ miles eastward of Sea Island and close west-northwestward of Beacon No. 2, is surmounted by a square topmark.

Fairway Buoy, painted in black and white vertical stripes, is moored about 2½ miles north-eastward of Sea Island.

7C-17 Channel.—A channel leads from the deeper waters of the Persian Gulf to Sea Island. It is well marked by beacons. Dangers exist on either side of the channel, however, if the channel is adhered to, a vessel will be clear of them all.

7C-18 Pilots.—Until familiar with the channels, vessels should not attempt to enter the port of Bandar Mish 'āb without a pilot. A pilot may be obtained at Ra's at Tannūrah, or, if 72 hours advance notice is given, the oil company will endeavor to have a pilot meet the vessel at Bahrein Lightship.

7C-19 Directions for entering.—See section 7C-9 for directions from seaward to Beacon No. 8. If Beacons Nos. 8 or 7 are extinguished, no attempt should be made to navigate these waters during darkness. If any beacon is not sighted at the calculated time, the vessel should be anchored until the visibility is satisfactory and an accurate fix is obtained.

From a position about 2 miles northward of Beacon No. 8, steer 268° for about 5¾ miles to a position where Beacon No. 7 bears 154°, distant 2 miles; thence a course of 235° for 11½ miles will lead to Fairway Buoy. From Fairway Buoy, steer so as to pass between Beacons Nos. 3 and 4 and Beacons Nos. 1 and 2 to a position where Sea Island bears 270°; thence steer on that bearing to the Sea Island or alter course to the anchorage.

7C-20 Bandar Mish 'āb was originally built for the purpose of providing a base camp for the construction of the Trans-Arabian Pipeline (TAPLINE). Since the completion of the pipeline, the oil company has continued to use the port in a limited capacity.

Sea Island has berthing space for 2 ocean-going vessels, one on either side of the island, in a depth of 29 feet. The aerial cableway connecting the island to the shore has a capacity of 100 tons; however, the cableway is no longer in use. All the cargo offloaded at Sea Island is barged to Barge Pier.

Barge Pier has about 200 feet of berthing space with a depth of 6 feet alongside. The pier is used primarily for the offloading of materials used in the development of new oil fields.

Several portable cranes of about 6 tons capacity are available on Barge Pier. A 40-ton stiffer crane is available on Barge Pier, but is in poor condition. No tugs or barges are stationed at the port; they are sent from Ra's at Tannūrah. No supplies are available. A machine shop is located in the port. The oil company has a small hospital which is modern and fairly well equipped.

An airport is about 1½ miles southward of Bandar Mish 'āb.

COASTAL FEATURES (Continued)

7C-21 Ra's al Mish 'āb (28°11' N., 48°38' E.) is a low and sandy point, faced in places with low cliffs.

Kasr Umm as Sahal, a patch which almost dries, lies near the edge of the coastal reef extending about 3½ miles north-northeastward from Ra's al Mish 'āb and over which are depths of about 2 fathoms. A rock, awash, lies about 7 miles north-northeastward of Ra's al Mish 'āb; **Al Kumrah**, with a least depth of 3 feet and marked by a beacon on its northwestern edge, lies about 17 miles northeastward of the same point.

From Ra's al Mish 'āb, the coast trends about 40 miles north-northwestward to Ra's al Qulay'ah. The depths are irregular and soundings afford little or no guide; in depths of less than 8 fathoms the bottom is sand or rock, but in greater depths it is mud. Except for small boats, no shelter can be obtained along this coast from the shamāl, which in this vicinity blows from north-northwestward and occasionally from northward, raising a considerable sea. The tidal currents set north-northwestward and south-southeastward along the coast and are strong.

Between Ra's al Mish 'āb and Ra's al Khafjī, about 13½ miles north-northwestward, the coast consists of low sandhills. About 11 miles north-northwestward of Ra's al Mish 'āb is Dawḥat al Aslī, a shallow bay.

RA'S AL KHAFJĪ

Position: 28°26' N., 48°35' E.

Depths: Approach, 56 feet.

Anchorage, 43 to 65 feet.

Berth, 53 feet.

Tidal range: Mean, 3.7 feet.

7C-22 Ra's al Khafjī is an oil loading port in the neutral zone. Its facilities include wells located 29 miles offshore.

Navigation.—Vessels bound for Ra's al Khafjī should pass about 3 miles north of Jazīreh ye Fārsī, then steer 303° for about 63 miles to Light Buoy No. 1.

Winds and Weather.—The local weather is hot and dry. The prevailing winds are light from north-northwest.

TIDES AND CURRENTS.—The diurnal inequality of the tide is great, with a maximum range of about 6 feet. Near the loading berth the tidal currents flow parallel with the shore and have a maximum speed of 1 1/4 knots.

DEPTHS—DANGERS.—Depths in the approaches and alongside the loading berth are adequate for supertankers. Depths of 52 feet are on the west side of the loading berth and 60 feet on the east side.

A dangerous sunken rock lies about 17 miles northeastward of Ra's al Khafji.

A shoal with a least depth of 6 feet is 20 miles east-northeastward of Ra's al Khafji.

These dangers are marked by light buoys having radar reflectors.

Coastal reef extends about 1 mile offshore from Ra's al Khafji.

LANDMARKS.—Several storage tanks and two radio masts are close northwestward of Ra's al Khafji.

At night the flames of a flare on Ra's al Khafji, and the flare stacks in the area of the offshore wells (about 23 miles eastward of Ra's al Khafji) and the lights on the radio masts are conspicuous.

A lighted oil platform stands about 13 miles northeastward of Ra's al Khafji.

HARBOR.—A detached offshore oil-loading pier, 670 feet long, with a mooring buoy about 300 feet off each end, is about 2 3/4 miles northeastward of Ra's al Khafji, tankers up to 950 feet in length with a draft of 49 feet can be accommodated.

A channel dredged to 18 feet (1961) leads to a small basin, 325 yards wide, inside the entrance of Khawr al Magta' (close northward of Ra's al Khafji). A general cargo wharf with 18 feet alongside, is in the northern part of the basin. On the southeast side of the harbor, there is a wharf for the use of coastal tankers. There are mooring buoys in the basin.

ANCHORAGES.—Tankers anchor within 1 mile of the position 28° 27.8' N., 48° 38.0' E.

Dry cargo vessels anchor within 1/2 mile of the position 28° 26.8' N., 48° 33.4' E.

Anchorage is prohibited in an area about 25 miles eastward of Ra's al Khafji because of offshore wells, a submarine cable, and pipelines. This area is marked by lighted buoys, painted red. Anchorage is prohibited within 1 mile of a line drawn from Ra's al Khafji in a 078° direction to the above area.

NAVIGATIONAL AIDS.—Lighted buoys, with radar reflectors are moored distances and bearings from Ra's al Khafji as follows:

- No. 1 about 35 miles east-northeastward.
- No. 2 about 27 miles east-northeastward.
- No. 3 about 15 miles east-northeastward.
- No. 4 about 5 miles northeastward.
- No. 5 about 5 1/2 miles northeastward.
- No. 6 about 9 miles northward.
- No. 7 about 20 miles east-northeastward.
- No. 8 about 17 miles northeastward.
- No. 9 about 18 1/2 miles eastward.
- No. 10 about 22 miles eastward.

Two lights in range 235 1/2° and two light buoys about 1 mile northward of Ra's al Khafji mark the dredged channel leading to the basin inside the entrance of Khawr al Magta'.

PILOTS.—A mooring master boards tankers at the anchorage for berthing at the offshore pier. Tankers are berthed and unberthed at any time.

REGULATIONS.—Tankers calling at Ra's al Khafji are required to be ballasted with clean water as follows:

Overall length (feet)	Required draft	
	Fore	Aft
400 to 480	9 ft.	17 ft.
481 to 560	12 ft.	20 ft.
561 to 630	14 ft.	23 ft.
631 to 685	16 ft.	24 ft.
686 to 780	17 ft.	26 ft.
781 to 850	20 ft.	28 ft.

From sunrise to sunset all vessels must fly the flags of Saudi Arabia and of Kuwait side by side.

DIRECTIONS FOR ENTERING.—From Buoy No. 1 steer 270° for about 9 miles to Buoy No. 2, then 245° for about 12 miles to Buoy No. 3. From Buoy No. 3 tankers steer 252° for about 9 miles to the tanker anchorage.

From Buoy No. 3 dry cargo vessels steer 265° for about 10 miles, then 218° for about 4 miles to the dry cargo vessel anchorage.

Two tugs are available.

Fuel oil and diesel oil can be supplied. No water is obtainable.

There is a radio station at Ra's al Khafji. No water is available.

A small medical clinic is available. Incoming vessels must request pratique by radio direct to the Quarantine Bureau of the Kuwait Government 4 days before arrival.

COASTAL FEATURES (CONTINUED)

7C-23 Ra's Bard Halg, about 6 miles north-northwestward of Ra's al Khafji, is a low, white sandy point from which a spit extends about 1 mile northeastward. About 4 1/2 miles northwestward of this point is Hadd al Hamarah, a small sandy point under the lee of which boats may obtain shelter.

A WRECK, with superstructure above water, lies about 4 1/2 miles east-northeastward of Ra's Bard Halg.

Jabal Banna, a small saddle-shaped dark hill about 10 miles northwestward of Ra's Bard Halg and about 1 mile inland, rises to a height of 70 to 100 feet; the coast in the vicinity consists of white sandhills. About 2 miles northward of Jabal Banna are Khawr Mufatta and Khawr al A'ma. Khawr al A'ma is a small inlet frequented by fishing boats.

KHAWR MUFATTA is shallow and can only be used by small craft. A bar at the entrance limits the draft to 2 feet. The AMINOIL Company has established a camp here and has limited facilities. There is a small concrete quay inside the bar where equipment and supplies are landed. Two cranes of 5 and 10 tons capacity are available on the quay. Water is available.

Near the mouth of Khawr Mufatta, several buildings, comprising the oil camp, can be seen; a radio station (KRDV) and several small tanks are nearby. Khawr Mufatta is reported to be a good radar target at a distance of 2 miles under normal conditions. Vessels anchor seaward of this buoy in about 33 feet. Discharging takes place in the roads into barges. There is one tug available. A drying shoal lies about 3 miles from the mouth and about 2 miles offshore. The wreck of a medium sized vessel lies stranded in the mouth of Khawr Mufatta.

About 5 miles northward of Khawr Mufatta is Ra's az Zaur, the extremity of a low sandy projection from which a spit, with depths less than 3 fathoms, extends about 5 miles northeastward.

MINA SAUD (28° 44' N., 48° 24' E.), an oil loading terminal of the Getty Oil Company,

is located at Ra's az Zaur. There are two large aluminum-painted oil storage tanks on a low sandy projection, a few small buildings, and a large warehouse. A conspicuous oil flare is near the extremity of the cape. A submarine pipeline runs eastward for about 1 1/2 miles from a beacon on Ra's az Zaur to two offshore tanker berths, both marked by mooring buoys. No. 1 Berth has a depth of about 45 feet, No. 2 Berth about 55 feet. Only one vessel can load at a time as a common line served both berths.

A small platform, which uncovers 5 feet at MLW, is about 7 1/2 miles eastward of Ra's az Zaur.

The winds are from northwest to north-northwest and southeast to east. The winds are not seasonal and, therefore, are not prevailing. During winter months, strong southeasterly winds occasionally suspend berthing. The currents set north-northwestward and south-southeastward along the coast at about 1 1/2 knots. In the berths the current sets north-northeastward and south-southwestward with a rate of 1 1/2 to 3 knots.

ANCHORAGE can be taken about 4 1/3 miles eastward of Ra's az Zaur.

The approach to the berths is made on a course of 245°, heading for the oil storage tanks and taking care to avoid the shoals in the approach. A company mooring master, or pilot, will board the vessel approximately 1 1/2 miles off the submarine pipeline berths. He will pilot the vessel into a berth, supervise the mooring and unmooring, and advise with respect to connecting and disconnecting the submarine loading hose. Vessels should arrive at the berths with clean ballast. No dirty or oily ballast should be discharged within 50 miles of any coastline. Arrival messages shall be transmitted at least 48 hours in advance of arrival.

Bunkers are available at both berths. There is one tug. Radiotelephone service is available as follows: Listening 2182kc., working 2582 kc. A signal station on the shore and a

special telephone used by the mooring master facilitate loading operations. A red obstruction light is shown from the 180-foot signal mast. The company has no medical facilities. Emergency cases are taken to a hospital at Kuwait. The quarantine officer will board the vessel at the anchorate or at the berths.

From Ra's az Zaur, the coast trends about 11 miles north-northwestward to Ra's al Qulay'ah, and forms a large bay known as Dawhat az Zaur. This bay has depths of less than 6 fathoms and is encumbered with several reefs.

Off-lying dangers, islets and buoys.—Dangers off the coast between Ra's al Khafjī and Ra's al Qulay'ah include Madara Reef and Jazīrat Qārū (sec. 7C-3). Other dangers, each marked by a light buoy with radar reflector are: A reef with a depth of 1 fathom about 20 miles northeastward of Ra's al Khafjī; a submerged rock about $2\frac{3}{4}$ miles west-southwestward of the 1 fathom reef; a 14-foot depth about $18\frac{1}{2}$ miles east-northeastward of Ra's al Khafjī; and a patch which dries 1 foot about 22 miles eastward of Ra's al Khafjī. A steel framework structure is about $2\frac{1}{4}$ miles northwestward of the drying patch.

Breakers were reported about 12 miles east-northeastward of Ra's al Khafjī. An area of breakers, about $\frac{1}{2}$ mile wide, was reported to lie about 23 miles east-northeastward of the same point. The area was visible for a distance of about 1 mile by day and appeared as light and dark patches.

A depth of 8 feet was reported (1958) to lie about $4\frac{1}{2}$ miles northeastward of Ra's Bard Halq.

A number of offshore oil rigs are operating in an area about 25 miles eastward of Ra's Bard Halq. Each rig is marked by two lights. Anchoring and fishing are prohibited in this area; a light is shown in its northwestern part ($28^{\circ}32'N.$, $49^{\circ}00'E.$). Anchoring is prohibited in an area about 1 mile north and south of a line drawn in an 078° direction for about 18 miles from Ra's al Khafjī to the oil rigs.

Two light buoys are moored off the coast, one is located about 9 miles northeastward, and

the other about $6\frac{1}{2}$ miles north-northeastward, respectively, of Ra's Bard Halq.

Jazīrat Umm al Marādīm, about 14 miles east-southeastward of Ra's az Zaur, is a sandy islet about 20 feet high and covered with brushwood. The islet is steep to on the edge of its fringing reef, which, except on its southern side, extends nearly $\frac{1}{2}$ mile offshore. A stone beacon, about 10 feet high, stands on the northeastern part of the islet. A shoal with a depth of 11 feet lies nearly $1\frac{3}{4}$ miles southeastward of Jazīrat Umm al Marādīm. A reef with depths of less than 1 fathom, the northern end of which dries and is marked by a white conical buoy surmounted by a drum and radar reflector, lies about 2 miles north-northwestward of the above islet.

ANCHORAGES

7C-24 Al Qirān.—See section 7C-3.

Dawhat Musallamiya.—See section 7C-6.

Bandar Mish'āb.—See section 7C-15.

Ra's az Zaur.—See section 7C-22.

Part D. RA'S AL QULAY 'AH TO KHAWR 'ABD ALLĀH

7D-1 Ra's al Qulay'ah ($28^{\circ}53'N.$, $48^{\circ}17'E.$) is low and from it a spit with depths of 3 fathoms or less, extends about 4 miles northeastward. Two light buoys are moored on the spit, one near the southeastern edge and the other at the northeastern extremity about 3 miles and $5\frac{1}{2}$ miles, respectively, northeastward of Ra's al Qulay'ah.

COAST—GENERAL

7D-2 Between Ra's al Qulay'ah and Ra's al Arq, about 30 miles north-northwestward, the coast is a low stony desert and brownish in color; a few miles inland are hills 200 to 300 feet high. The principal port on this section of coast is Mīnā al Ahmādī. About 10 miles inland from the port is Burqān (Burgan), the site of one of the richest oil fields in the world. Ra's al Arq forms the southeastern entrance point of a large bay, in which is the thriving town and port of Al Kuwayt.

The coast trends northward from the above large bay and is fronted entirely by the large swampy island of Jazīrat Būbiyān. A narrow

(5265) **PERSIAN GULF—Al Kubr—Drilling platform southeastward.**—A drilling platform, showing *Fl. 8 sec.* and equipped with a nautophone (blast 2 seconds, silent 18 seconds), has been established in 28°36'45" N., 49°37'30" E. (N.M. 33/66.)

(N.N. 96, Bahrain, 1966.)

H.O. Charts 3639, 3653, 3647.

H.O. Pub. 62, 1960, page 250.

(4696) **PERSIAN GULF—Al Kubr—Drilling platform east-southeastward.**—A drilling platform, showing a *Fl. 8 sec.* 8M. light and equipped with a *Fog horn* sounding 1 blast every 20 seconds, blast 2 seconds silent 18 seconds, exists in 28°31'40" N., 49°44'30" E. (approx.).

Note.—The fog signal operates continuously in all weather.

(N.M. 29/66.)

(N.M. 11, Iran, 1966.)

H.O. Charts 3653, 3647.

H.O. Pub. 62, 1960, page 250.

(4976) **PERSIAN GULF—Al Kubr—Drilling platform.**—An oil drilling platform (lighted) exists in (approx.) 28°57'50" N., 49°39'15" E.

(N.M. 31/66.)

(N.M. 91, Bahrain, 1966.)

H.O. Charts 3639, 3653, 3647.

H.O. Pub. 62, 1960, page 250.

(6928) **PERSIAN GULF—Al Kubr—Drilling structure southeastward.**—An oil drilling structure (F3), showing *Mo. (U) 15 sec.*, has been established in 28°28.9' N., 49°43.7' E. (approx.).

(N.M. 44/66.)

(N.M. 124, Bahrain, 1966.)

H.O. Charts 3653, 3647.

H.O. Pub. 62, 1960, page 250.

shallow channel is formed between the mainland and the island.

For the continuation of the coast northeastward, see chapter 8.

DEPTHS—OFF-LYING DANGERS

7D-3 The 10-fathom curve lies about 1 mile offshore between Ra's al Qulay'ah and Ra's al Arq. Northeastward of Ra's al Arq, the coast is fronted by numerous reefs and shoals; depths of 6 fathoms and less extend seaward as far as 37 miles southeastward of Jazīrat Būbiyān.

Al Kubr, about 26½ miles southeastward of Ra's al Arq and 18 miles northwestward of Madaira Reef, is a sandy islet about 8 feet high and overgrown with brushwood. A reef extends about 300 yards southward, 600 yards eastward, and 200 yards northward from the islet. A narrow rocky tongue, on which the sea breaks in bad weather, extends about 1,200 yards northwestward from the islet. Al Kubr is reported to be a good radar target at a distance of 14 miles under normal conditions.

A light is shown from a steel framework structure located in the center of the islet. **Anchorage** can be obtained in a depth of about 11 fathoms about ½ mile south-southeastward of the islet; but no shelter from the shamāl is afforded. In good weather landing can be made on the southwestern side of the islet.

A dangerous submerged rock lies ¾ mile north-northeastward of Al Kubr, and a detached 1-fathom patch is located about 1,330 yards westward of the same islet. Taylor Rock, a small coral patch with a least depth of 1½ fathoms, is located about 5 miles southeastward of Al Kubr and probably breaks in bad weather.

A light on a stilt platform is located about 7½ miles eastward of Al Kubr and about 4½ miles northeastward of Taylor Rock.

NAVIGATION

7D-4 See section 7-2 for the navigational track to the vicinity of Madaira Reef. From Madaira Reef, see the particular port description for further directions.

CURRENTS

7D-5 The tidal currents in the vicinity of the foregoing islets and dangers set northwestward and southeastward and at springs attain a rate of about 1½ knots.

COASTAL FEATURES

7D-6 From Ra's al Qulay'ah, the coast trends north-northwestward about 10½ miles to Minā' al Abdullah. About 3 miles northwestward of Ra's al Qulay'ah is a square hillock, which resembles a fort. It rises to a height of about 50 feet and is known as Jilaat al Abid; on it are the ruins of an old tower.

Minā' al Abdullah (Mena Abdula) (29°01' N., 48°10' E.) is an oil loading terminal of the AMINOIL Company. It is an open roadstead served by two submarine pipeline berths. There are several large oil storage tanks and small buildings near the root of the submarine pipelines.

The least depth in the approach is about 43 feet with a tidal range of about 6 feet. The rate of the tidal current is from ½ knot to 2 knots.

Two submarine pipeline berths extend about 2 miles eastward from shore and are marked by white mooring buoys with a staff topmark. No. 1 Berth has a depth of about 43 feet, and No. 2 Berth about 56 feet. At No. 1 Berth vessels up to 800 feet long with a maximum draft of 39 feet can be accommodated. No. 2 Berth has handled vessels with a draft of 52 feet. Vessels anchor and moor stern to buoys. A yellow spar buoy with black bands marks the end of the submerged pipelines. Tankers exceeding 60,000 tons must radio their ETA a week in advance so that the stern buoys may be adjusted as necessary. Weather permitting, vessels are moored day and night and may sail at any time. There is a small boat harbor for the use of tugs and launches.

A light is shown on the small craft pier at the terminal. Close southward of the pier is a pair of beacons in range 247°. The beacons lead toward the anchoring position at the loading berths. A conspicuous radiomast showing a fixed obstruction light is about ½ mile southwestward of the front beacon.

The usual approach is to pass northward of Al Kubr and then west-southwestward to the berths. Pilotage is compulsory; pilots meet vessels about 4 miles off Mina' al Abdullah.

Quarantine officials board vessels at the pipeline berths.

Kita al Arafayan, about 7 miles north-northwestward of Ra's al Qulay 'ah and 4 1/2 miles offshore, is a small detached reef.

Vessels should arrive at the berth with clean ballast. No dirty or oily ballast should be discharged within 50 miles of the coast. Arrival messages should be transmitted 48 and 12 hours in advance.

Provisions and supplies can be obtained, but notice must be given well in advance to order some from Kuwait. Two small diesel tugs are used for the mooring and unmooring of vessels. Radio communication is maintained by the oil company through their own station "KRDV", located in Khawr Mufatta (sec. 7C-21). Vessels may request transmissions from the station in order to obtain bearings on the vessel's radio direction finder. A signal station on the shore and a special telephone used by the mooring master, facilitate loading operations. The company has no medical facilities. The quarantine doctor will board the vessel at the terminal and treat seamen if possible. Emergency cases are taken to a hospital at Al Kuwayt.

The American Consulate is stationed near Al Kuwayt; the British Political Agency has an office at Mina al Ahmadi.

ABOUT 2 MILES NORTHWARD OF MINA' AL ABDULLAH, are four villages, collectively known as Al Qasur. Ash Shu 'aiba, the southernmost of the four, has a small square fort near which is a date plantation. A disused light tower stands close southward of Ash Shu'aiba.

MINA' AL AHMADI

Position: 29°04' N., 48°10' E.
 Depths: Approach, 11 fathoms.
 Anchorage, 10 to 11 fathoms.
 Roadstead, 6 to 10 fathoms.
 Berths, 40 to 60 feet.
 Tidal range: Mean, 4 1/2 feet.

7D-7 Mina' al Ahmadi, in the Shaikhdom of Kuwait, is an oil loading port located on the west coast of the Persian Gulf about 20 miles south-southeastward of Al Kuwayt, and

just southward of the native village of Al Fuhayhil. This is one of the largest oil ports in the Persian Gulf.

Mina al Ahmadi is reported to be a good RADAR TARGET at a distance of 26 miles under normal conditions.

7D-8 NAVIGATION.—See section 7-2 for the track to Madaira Reef. From this reef to the port area, see section 7D-18.

7D-9 WINDS AND WEATHER.—The shamal causes a moderate sea and impedes small boat handling. At times heavy swells and rough seas will close the port, as there is no protection from the wind or sea. Day-break is the most favorable time for a lull in the seasonal winds, which are usually strongest in the afternoon.

7D-10 TIDES AND CURRENTS.—The diurnal range of the tide is 6 3/5 feet, and the mean range is 4 1/2 feet. It has been reported that the maximum tidal rise is 11 1/2 feet. Fairly strong tidal currents set along this coast in a north-northwesterly and southerly direction; they attain rates of 1/2 knot to 1 1/2 knots.

7D-11 DEPTHS.—The minimum depths in the approach and in the anchorage are about 11 fathoms. The anchorage depths are 10 to 12 fathoms, and alongside depths are 40 to 60 feet, depending upon the berth.

7D-12 ASPECT—LANDMARKS.—The land in the vicinity of the port is mostly sandy. A number of large oil storage tanks are conspicuous and often appear as one tank when viewed from seaward. They are at an elevation of about 450 feet and have been seen at a distance of 26 miles. The oil wharves and six tall chimneys are also conspicuous. The town of Al Fuhayhil can be seen about 2 miles northward of the southern oil wharf, and the town of Mina' al Ahmadi is about 5 miles west-northwestward of the southern wharf. It has been reported that the skyglow from the port area at night is visible from a distance of 45 to 50 miles. The oil tanks and refinery towers make very good radar targets.

7D-13 HARBOR.—Mina' al Ahmadi is an open roadstead with no protection from the

wind or sea. The oil loading facilities consist of two wharves connected to the shore by two long piers, which are believed to be the longest of their type in the world. At the root of the southern pier, about 3 1/2 miles southward of the northern one, is a small artificial boat basin, the entrance of which is protected by an island breakwater. Submarine pipelines extend from the shore on either side of the southern oil wharf to loading berths equipped with the necessary mooring buoys.

Two small piers for launches are built about 3/4 mile and 1 3/4 miles northward of the southern oil wharf.

The northern boundary of the port lies about 1 mile northward of the northern oil wharf, the southern boundary lies about 3 miles southward of the southern oil wharf, and the eastern boundary lies on the meridian about 1 1/2 miles off the head of the southern oil wharf.

A pier is under construction about 1 3/4 miles southward of the southern oil wharf.

7D-14 NAVIGATIONAL AIDS.—Mina' al Ahmadi Light is located close southward of the town of Al Fuhayhil in a position about 1 mile north-northwestward of the root of the southern oil wharf. See section 7D-3 for additional aids in the approach.

A disused light tower stands about 2 1/4 miles south-southeastward of Mina' al Ahmadi. This tower is close southward of the village of Ash-Shu'aiba (sec. 7D-6).

Several obstruction lights are shown in the vicinity of the oil wharves. North Pier, the northern oil wharf, is bounded by amber fender lights in addition to the deck lights.

A fog signal, consisting of a diaphone, is located on the southern end of the southern oil loading wharf. Another fog signal, consisting of a diaphone, is located on the northern oil loading wharf.

A radiobeacon is situated close northward of Mina' al Ahmadi Light.

A conspicuous gas flare is located about 1 mile west-northwestward of the root of the southern wharf.

Mooring buoys, painted red and white, are moored in the vicinity of the southern wharf. These buoys are for the use of tankers loading at the submarine pipeline berths.

7D-15 CHANNELS.—The approach to Mina' al Ahmadi is made directly from seaward, and there is no clearly defined entrance channel.

7D-16 ANCHORAGE.—Arriving vessels should anchor outside the port limits as near as possible to a position about 3 miles north-eastward of the southern oil wharf. The bottom is of sand and soft coral with mud patches; the holding potential is good.

7D-17 PILOTS.—Pilotage is compulsory. The pilot or mooring master will board the vessel at the anchorage or about 1 1/2 to 2 miles eastward of the berths. The mooring master also serves as the Port Officer's representative.

Weather and conditions permitting, vessels can berth and unberth at all times at the wharves and at the three northernmost submarine loading berths. The two southern submarine berths are not available during darkness, but vessels may unberth at such times.

7D-18 DIRECTIONS FOR ENTERING.—From a position 3 miles northeastward of Madaira Reef (sec. 7-2), a course of 296° for about 20 miles will lead to a position about 1 3/4 miles northward of Al Kubr. From the latter position, vessels usually steer for the 6 chimneys by day and toward the gas flare by night, steer due west for about 15 1/2 miles to the anchorage.

Vessels are to arrive with clean ballast and should not discharge oily or dirty ballast within 50 miles of the coast.

The arrival message should be sent to the oil company 72 hours in advance, and the estimated time of arrival should be confirmed 24 hours before arrival.

7D-19 MINA' AL AHMADI (Al Fuhayhil), an oil port owned and operated by the Kuwait Oil company, has superseded the port of Al Kuwayt in importance. Possessing the largest oil loading wharves of their type in the world, Mina' al Ahmadi serves as the only direct outlet for the rich petroleum deposits at Burqan (sec. 7D-2). The port is connected to the oil fields by the world's largest diameter pipeline (34 inches in diameter).