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## 'Report of a committee of enquiry on the lighting and buoyage of the Persian Gulf. 1909'

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### About this record

A report of a committee of enquiry on the lighting and buoyage of the Persian Gulf, 1909.

The report discusses the existing lighting facilities in the Gulf (at Kuwait and Fao) and the details of a proposed scheme to construct a comprehensive network of lights at the following locations: Muscat, Musandam, Bunder Abbas, Tanb, Lingah, Shaikh Shuaib, Ras Al Mutaf, Bushire, Shatt Al Arab Bar, Koweit [Kuwait], Bahrein [Bahrain] and Debai [Dubai].

The members of the committee are listed as follows:

- Major Percy Zachariah Cox, Political Resident in the Persian Gulf.
- Mr. D W Hood, A.M. Inst. C.E., Trinity House.
- Commander S Litchfield, R.N., H.M.S "Sphinx".
- Commander W G Beauchamp, R.I.M., in charge of the Marine Survey of India.

The report includes an appendix (folio 8-9v) entitled 'Correspondence Regarding Buoys of the British India Steam Navigation Company'.



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**SECRET.**

B. 168.<sup>(3)</sup>

1909.

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**REPORT**  
OF A  
**COMMITTEE OF ENQUIRY**  
ON THE  
**LIGHTING AND BUOYAGE OF THE PERSIAN GULF.**

MEMBERS :

Major P. Z. Cox, C.I.E., Political Resident in the Persian Gulf.

Mr. D. W. Hood, A.M.INST.C.E., Trinity House.

Commander S. LITCHFIELD, R.N., H.M.S. "Sphinx."

Commander W. G. BEAUCHAMP, R.I.M., in charge of the Marine Survey of India.

1. The object of this Committee was to gather information and examine locally the general question of the proposed lighting of the Persian Gulf and improvement of the buoyage.

The subjects for examination were to include the number of lights and buoys required, the best sites for the erection of the former, with class of light most suitable in each case, and cost of erection, maintenance, &c.

2. Major Cox was unable to leave Bushire owing to the state of affairs in Persia, but the other members of the Committee, accompanied by Captain Trevor, First Assistant to the Political Resident, commenced their investigations at Muscat on 3rd April, when they embarked in the R.I.M.S. "Lawrence." Major Cox was subsequently able to join in the deliberations of the Committee at Bushire and is a party to the recommendations contained in this report.

3. The Committee were furnished with a copy of the report of an Admiralty conference on this question, and previous to the conclusion of their labours had the great advantage of meeting and conferring with Rear-Admiral E. J. Slade, M.V.O., Commander-in-Chief, East Indies Squadron, who was a member of that conference.

The proposals contained in that report have been carefully examined on the spot, and some modifications and additions are recommended in view of local conditions and experience. Cost has also been taken into consideration.

The Agent of the British India Steam Navigation Company, who was confidentially consulted by the Committee at Bombay, furnished suggestions for lighting the Gulf obtained from six captains of Gulf mail steamers.

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4. Abstract statement of the lights proposed by six officers in command of British India Steam Navigation Company's mail steamers in Persian Gulf:—

| Place.       | Proposed by<br>Number of Officers<br>indicated. | Place.            | Proposed by<br>Number of Officers<br>indicated. |
|--------------|---|-------------------|---|
| Muscat       | 6   | Shah Allum Shoal  | 2   |
| Jask         | 2   | Ras al Mutaf      | 5   |
| Ras al Kuh   | 2   | Bushire           | 4   |
| Musandam     | 6   | Karag Island      | 1   |
| Bunder Abbas | 1   | Shatt al Arab Bar | 3   |
| Tanb Island  | 1   | Ras al Arz        | 4   |
| Lingah       | 1   | Kubbar Island     | 2   |
| Abu Musa     | 1   | Farsi             | 1   |
| Farur Island | 2   | Rennie Shoal      | 1   |
| Nabiyu Farur | 1   | Bahrein           | 1   |
| Kais Island  | 2   |                   |   |

The above suggestions were, of necessity, rather hurriedly given, and would have been of greater value had they been put forward collectively instead of individually, and considerable divergence of opinion is apparent. The suggestions, however, include every place in the Gulf at which the establishment of a light could be reasonably entertained.

Lights at Muscat, Musandam (Quoin), Bunder Abbas, Tanb, Lingah, Ras al Mutaf, Bushire, Shatt al Arab Bar, Ras al Arz, Kubbar, and Bahrein are included in the recommendations of the Committee.

The lighting of Kais received special consideration, but Shaikh Shuaib is recommended in preference.

Shah Allum and Rennie Shoals are undoubted dangers in the fairway of ships making for Bahrein from the east and north respectively, but the lighting of these shoals is not considered to be warranted at present.

The lighting of Farsi Island will be desirable in the event of material development of trade between the north of the Gulf and Bahrein. It is not recommended at present.

A light on Ras al Kuh would be useful to navigation, but is not recommended. It would be necessary to maintain an armed guard for its protection.

It is not considered that lights are required at any of the other places mentioned.

EXISTING LIGHTS.

5. The only lights regularly exhibited in the Gulf at the present time are those at Koweit and Fao. The former is a fixed red light visible five miles, recently installed by the Government of India at the British Agency.

The Fao lights are maintained by the Turkish authorities and are too feeble to be of much service.

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The Agents of the British India Steam Navigation Company, at Bunder Abbas, Lingah, Debai, and Koweit are in the habit of exhibiting a light on their premises when their steamers are expected.

His Majesty's ships sometimes arrange with officials of the Indo-European Telegraph Stations at Bushire, Henjam, and Jask for a light to be hoisted when they expect to arrive at night.

PROPOSED SCHEME.

6. A comprehensive scheme of lighting the Gulf and its approach will necessitate the establishment of lights at the following places taken in geographical order :—

Muscat.  
Musandam (Quoin).  
Bunder Abbas.  
Tanb.  
Lingah.  
Shaikh Shuaib.  
Ras al Mutaf.  
Bushire.  
Shatt al Arab Bar.  
Koweit.  
Bahrein.  
Debai.

The above list includes the lighting at all places recommended by the Admiralty Conference with certain modifications (hereinafter detailed) for Bushire, Bahrein, Koweit, and Bunder Abbas, and additional lights at Tanb, Shaikh Shuaib, Ras al Mutaf, and Debai.

The object in view has been to provide lights at the most important salient points and outlying dangers for general guidance in the navigation of the Gulf and at the principal ports.

The lights at Tanb, Shaikh Shuaib, and Ras al Mutaf are considered to be very necessary. They have an incidental advantage in completing an approximately equi-distant chain of lights.

MUSCAT.

A 20-mile light on the summit of Ras Muscat, which has an elevation of 240 feet above high-water, is recommended as combining efficiency with greatest economy. This proposal is made after consideration of the following points :—

1. The entrance to Muscat harbour is remarkably blind, but the coast in the vicinity is bold and free from outlying dangers.
2. The requirements of the port would be fulfilled by a low-placed light of moderate power to indicate the entrance of the harbour.
3. From a navigational point of view Fisher's Rock offers an ideal site, but the cost of a safe structure, even for a small light, in such an exposed position would be very heavy.

The alternative site on Ras Muscat is therefore recommended. Compared with Fisher's Rock a light on Ras Muscat is less favourably placed in thick weather, which, however, is not frequent, and it is  $1\frac{1}{4}$  cables inside the outlying danger; on the other hand it would serve the double purpose of a

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land fall and harbour light and has this additional advantage that ships bound from the Red Sea to the Gulf would pass well within the range of the light.

No political difficulty with regard to the site is anticipated at Muscat.

The blue light shown on the chart of the harbour and referred to on page 41 of Gulf Pilot no longer exists. It was never very useful.

MUSANDAM (Quoin).

The Little Quoin provides a practical site for a light off Musandam, and is strongly recommended in preference to Musandam Island or Kachal Island, the alternative sites considered.

The Quoin is already accessible on its northern end, and landing arrangements can be made comparatively easy.

Owing to the severity of the climate and scarcity of sweet water in this part of the Gulf the establishment of an unwatched light was considered, but a light of that description of sufficient power is impracticable.

A 20-mile watched light is recommended. The site selected is 134 feet above high-water. Arrangements can be made for storage of water and for its supply in common with other isolated lights.

BUNDER ABBAS.

The Admiralty Conference proposed a 15-mile light on Kishm. A suitable site, about one mile south of Kishm town (near tanks marked on chart) was examined, a light at this position would guide a ship approaching Bunder Abbas through the western channel between Larak Island and Kishm, but it is considered to be unfavourably situated without the addition of a lighted buoy for rounding the shoals extending  $1\frac{1}{2}$  miles off Kishm point. A red sector over Larak would be advisable, as both ends of the island are low. In case political difficulties should arise in connection with the establishment of a light on Kishm Island, it is recommended as an alternative that a light vessel of small type with range of about 10 miles should be moored on the outer extreme of the shoals off Kishm point.

It is considered that the adoption of the alternative proposal, whilst largely overcoming any political difficulty, will effectively mark the shoal and be of sufficient range to afford guidance through the western channel.

The establishment of a light on the Quoin to a large extent discounts the urgency of an important light at Kishm. Ships approaching from the south will have a good departure from that light to pass east of Larak. Ships approaching from the westward can, without greatly increasing their distance, make the Quoin light and pass east of Larak if the weather is unfavourable for the passage of the western channel.

The present buoy marking the anchorage at Bunder Abbas is the property of the British India Steam Navigation Company, and should be replaced by a buoy with a distinctive top mark.

KAIS, TANB, AND SHAIKH SHUAIB.

The navigation of the gulf between Musandam and Shaikh Shuaib presents many dangers at night, notably the flat shoal south west of Kishm Island, Tanb Island (in hazy weather), Farur Shoal, Kais Island, and Shaikh Shuaib Island.

The efficient lighting of this portion of the Gulf is regarded as important and it will be convenient to consider it as a whole.

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Both Kais and Shaikh Shuaib being very low islands off high land are invisible at night.

Kais is most dangerous to a ship altering course to the eastward after passing Shaikh Shuaib.

A ship bound west can obtain an approximate position to enable her to clear Kais when passing Farur Island which is always visible on a clear dark night.

Shaikh Shuaib is most dangerous to a ship hauling up to the northward after passing Kais. A light on Kais would obviate the danger which that island presents and give a departure point for clearing Shaikh Shuaib, but it would leave Shaikh Shuaib an unmarked danger to ships bound south and east and does not lend itself to any future development of the lighting system.

A light on Shaikh Shuaib will eliminate the danger of that island, and give a departure point for clearing Kais on an easterly course.

Taking advantage of Farur Island as a night mark east of Kais, the lighting of Shaikh Shuaib in preference to Kais is indicated as the best means of eliminating the danger presented by both islands.

A 15-mile light on the south-west corner of Shaikh Shuaib is therefore recommended.

The lighting of Tanb is also recommended. Course is altered off this island which cannot be always clearly seen at night.

A light on Tanb will give a departure point to pass close to the north of Farur Island and clear of Farur Shoal, and serve as a clearing mark for the flat shoal off Kishm when making Lingah.

The site selected is on the summit of the island 165 feet above high water, and near the north-west point.

A 20-mile light is proposed.

No political difficulty is anticipated with regard to Tanb, which belongs to the Shaikh of Shargah.

The Persian Government would have to be approached with reference to Shaikh Shuaib or Kais.

Kais and Farur were also visited.

LINGAH.

The establishment of a port light to facilitate the approach to Lingah is recommended. It should be situated at a height of 30 to 40 feet above the ground in order to be conspicuous by its elevation above the lower lights in the town, and could be placed in the courtyard or in front of the new offices of the British India Steam Navigation Company. Local arrangements for the efficient maintenance of this light can be made.

RAS AL MUTAF.

A light at Ras al Mutaf is considered necessary. All traffic from Koweit, Shatt al Arab, and Bushire, converges on, and rounds this point, and the establishment of an 11-mile light vessel near the 10-fathom patch south-west of the shoals is recommended. A shore light is clearly unsuitable owing to the extent of the shoal off the shore.

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BUSHIRE.

The erection of a 15-mile lighthouse on shore as proposed by the Admiralty Conference was considered.

It is possible that the Persian Government may place obstacles in the way of the establishment of a light on shore. This difficulty can be avoided and the requirements of navigation better provided for by the establishment of an 11-mile light vessel moored in the outer anchorage, especially in hazy weather when, owing to the distance of the shore inside the 5-fathom line, the efficiency of a lighthouse on shore, both as a night and day mark, would be considerably reduced. A light vessel is therefore recommended.

There is a beacon on Ras al Margh marking western limit of Lakfa Sands which is a useful mark for the inner anchorage. There are no buoys.

The beacon and two buoys were established by the Belgian Customs officials at Bushire about four years ago. The buoys have disappeared, and the beacon is at present practically demolished.

A gas buoy to mark the position of the inner anchorage off Ras al Marg is recommended, in which case the reconstruction of the beacon will be unnecessary, and both anchorages will be accessible at night.

SHATT AL ARAB BAR.

A light vessel with an 11-mile range, to mark the approach to the Bar is required.

An approximate position four miles south-east of the outer buoy, as proposed by the Admiralty Conference, is concurred in.

The total number of buoys at present maintained by the British India Steam Navigation Company is seven, one of which, the "Lawrence," is in the old channel, now disused, and serves no useful purpose.

It is considered that, in addition to the light vessel, the lighting of the Bar channel buoys is necessary. There is no great difficulty in navigating the river between Basra and Fao at night, and it is frequently done. It is not proposed to deal with the lighting or buoyage of the river above Fao in this report, but it may be a matter for future consideration in the event of development of trade at Mohammerah and Basra. The passage of the Bar at night offers considerable risk and difficulty. Ships which arrive at Fao or the outer buoy at night, and wish to avail themselves of a high night tide, attempt the crossing of the Bar at night, and stranding is not infrequent.

British India mail steamers very often have to cross at night, but generally make arrangements for the buoys to be lit temporarily by a boat sent out from Fao.

As for six months of the year the night tides are considerably higher than the day tides, the safe passage of the Bar by night may be an important matter for a large steamer, as a deeper draught is permissible than would be the case if choice is restricted to a day tide.

A night passage might also, in some cases, obviate the necessity for completing with cargo outside the Bar, and would at all times of the year be of great advantage to the mail steamers which have to keep time.



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It is recommended that immediately before the light vessel is established a careful re-survey of the Bar should be carried out by a surveying ship, and the channel marked by a series of lighted buoys laid in accordance with the result of the new survey. This may also affect the position of the light vessel. It is anticipated that four buoys will be required. The British India Steam Navigation Company's mail steamers have ceased use of the Admiralty charts, and rely on a recent survey (1907) of the Bar made by one of their officers, Mr. Burgess. Until a new and official survey has been made, it is not considered practicable to put forward proposals for rearranging and relaying the existing buoys.

It is quite possible that a new survey may disclose the fact that the eastern channel is the better. This is indicated by the latest Admiralty survey.

The channel buoyed as proposed will require periodical examination to verify soundings, and it may be necessary to occasionally shift the buoys to suit variations in the channel. It is suggested that one of the officers of the vessel which will be required as a lighthouse tender should be a qualified surveyor.

The Fao lights maintained by the Turkish Authorities are feeble and unreliable, but navigation would be rendered practically independent of them if a five-mile gas buoy were placed on the inner Bar.

The lighting of the Shatt-al-Arab is regarded as the most important item in the whole lighting scheme for the Gulf.

It is pointed out that certain of these buoys will fall, as do the present ones, within the territorial waters of Turkey or Persia. Hitherto this fact has been ignored in practice, and it is believed that the Local Authorities have never interested themselves or raised objections in connection with the British India Steam Navigation Company's arrangements for buoying the Bar.

It does not appear to be the province of this Committee to do more than draw attention to this aspect of the case.

KOWEIT.

The Admiralty Conference proposed a 20-mile light on Kubbar Island, and a 10-mile light on Ras al Arz. There can be no doubt that from a navigational point of view the approach to the port would thus be effectively lighted, but it must be pointed out that the height of the tower required for a 20-mile light on Kubbar would be approximately twice that necessary for a 15-mile light.

The height of the site on Kubbar Island is only 5 feet above high water. In view of the heavy cost involved in the erection of a tower for a 20-mile light, a light of only 15-mile range is recommended, in which case the range of the light proposed for Ras al Arz should be increased to 12 miles, which would involve little extra cost. Although the range of a 15-mile light will not extend to the island and shoals south-east of Failaka Island, a ship bound from the Shatt al Arab Bar to Koweit should have no difficulty in clearing those dangers, as a run of about 20 miles after losing sight of the Bar light will bring a 15-mile light on Kubbar within range. Even a 20-mile light on Kubbar Island would not effectively guard the Madura shoal.

The suggestion with regard to Kubbar is only put forward provisionally in view of the incomplete survey of this locality. It is recommended that the

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neighbourhood be re-surveyed, the position and extent of the Madura shoal verified, and the absence of other dangers placed beyond doubt. The result of this survey may conceivably indicate the necessity for modifications in the position and type of the outer light proposed for this port.

With regard to the proposal to place an unwatched light on the existing beacon at Ras al Arz, it is found that the beacon is not suitably constructed for supporting a light.

A 12-mile light on a new structure adjacent to the site of the existing beacon is recommended.

As it is necessary to maintain a watchman to guard the day mark at Ras al Arz from depredation by Bedouin, it would be inadvisable to place an unwatched light at this point.

The Political Agent anticipates no danger of interference if local light keepers are employed.

Sheikh Mobarak of Koweit appears to be much interested in the proposal to light the port, and is unlikely to place any difficulty in the way.

Good water is available within a mile of the Ras al Arz site, but arrangements for storage of water would be necessary on Kubbar.

There are three buoys marking the anchorage, maintained by the British India Steam Navigation Company. No additional buoyage is required as far as the anchorage is concerned. The Political Agent desired that the question of the channel into Shweikh should be gone into in view of possible future developments.

It is considered that two small mark buoys will suffice, and that these should be preferably provided and maintained by local arrangement, as this Khor is only used as an anchorage for the Political Agent's launch, the Sheikh's steam yacht, and other small craft.

The light, fixed red, visible five miles, recently established at the Agency by the Indian Government, meets all requirements as a harbour light.

BAHREIN.

The Admiralty Conference propose the erection of—

- (1) a 20-mile light on Fasht ad Dibal, and
- (2) a 12-mile light on Muharrak.

While the usefulness of the former is apparent, the proposed light on Muharrak is considered to be situated too far from the navigable channel to offer complete facilities for entering the port by night.

It is possible that the establishment of a light on that island would not be altogether palatable to the Sheikh, but, in the Resident's opinion, his objection could be overcome. In any case it is recommended that, instead of this lighthouse, a small light vessel, or gas boat, be established half a mile outside the shoal near the present outer buoy, and that the existing Kaseifa and West Spit buoys be replaced by lighted buoys, the Jadum buoy being retained in its present position.

A 10-mile floating light at the entrance to the channel as above suggested would actually illuminate a more useful area than a 12-mile light on Muharrak, while it would indicate, without doubt, the entrance to the channel, which is necessary, if any scheme is to be effective.

A making light for the port from the east and north is necessary, and a light having a range of about 20 miles on the north side of the reef at Fasht ad Dibal would be in the best position.

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Although it is feared that the cost of building a suitable structure on an exposed site, such as the reef, may be considered prohibitive, no other position offers equal advantages from a navigational point of view.

The only alternative is to establish a light vessel about 5 miles north-east of the reef in such a position that the range of visibility will overlap that of the gas boat or smaller vessel at the entrance to the channel, to ensure that either one or the other will be seen by a ship approaching from the north.

There are numerous dangers in the approaches to this port. The tides in the locality are strong, and uncertain in direction. A large and totally unexpected set is no uncommon experience, and it is regarded as essential that when the lighting of Bahrein is undertaken it should be carried out as a whole, *i.e.*, the making light be established at the same time as the channel light and buoys.

Fasht ad Dibal shoal was visited and examined, but a detailed survey and borings will be necessary before any work is undertaken on the reef.

DEBAL.

There has recently been a considerable increase in trade at this place and it may be expected to still further develop. Mail and other steamers call there regularly, and it is recommended that a port light similar to that already proposed for Lingah be established on the sea front.

Local arrangements for the efficient maintenance of this light can be made.

ORDER OF IMPORTANCE.

7. It is considered that the lights proposed should be arranged in the following order of importance:—

- (1.) Shatt al Arab Bar, light vessel and four buoys.
- (2.) Musandam (Little Quoin).
- (3.) Muscat.
- (4.) Bushire.
- (5.) Shaikh Shuaib.
- (6.) Ras al Mutaf.
- (7.) Tanb.
- (8.) Kubbar Island (Koweit).
- (9.) Ras al Arz (Koweit).
- (10.) Bahrein.
- (11.) Lingah.
- (12.) Debai.
- (13.) Bunder Abbas.

The first seven lights, being those most urgently required, are suggested as a convenient first instalment of the general scheme.

The position assigned to Kubbar Island or its alternative in the above list has been determined upon what appear to be the claims of the port from the navigational point of view under existing conditions. Should there be grounds for taking specific account of the probability of Koweit increasing quickly in importance in connection with the building of the Baghdad Railway, its relative position in the list would be materially advanced.

The port lights proposed for Lingah and Debai being inexpensive items are recommended for early establishment in any case.

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BUOYS AND BEACONS.

8. The following is a correct list of the buoys and beacons now in the Persian Gulf :—

|                         | Buoys. | Beacons. |
|-------------------------|--------|----------|
| Bunder Abbas - - -      | 1      | —        |
| Bahrein - - -           | 4      | 1        |
| Bushire - - -           | —      | 1        |
| Koweit - - -            | 3      | 1        |
| Shatt al Arab Bar - - - | 7      | —        |
| Total - - -             | 15     | 3        |

All the above, with the exception of the beacons at Bushire and Koweit, are the property of, and are maintained by, the British India Steam Navigation Company.

The beacon on Ras al Marg, at Bushire, was erected about four years ago by the Belgian Customs officials, and is the property of their department.

Two buoys were laid at the same time, but they have disappeared.

The spar buoys shown on plan of Bushire anchorage no longer exist.

The beacon is in a bad state of repair.

Koweit beacon was erected, and is maintained, on Ras al Arz by the Indian Government.

The Bahrein beacon is liable to be washed away, and needs reconstructing.

The Lawrence buoy on Shatt al Arab Bar marks the old channel which is now silted up, and serves no useful purpose.

The spar buoys shown on the chart of Shatt al Arab Bar east of inner Bar channel no longer exist.

*Proposals for improving Buoyage :—*

*Jask.*—A small unlit buoy on the tail of the shoal extending two miles north-west of Jask Point would be of great convenience to ships entering the anchorage.

*Bunder Abbas.*—A buoy with a distinctive top-mark in lieu of the existing anchorage buoy is recommended. If a lighthouse is erected at Kishm a lighted buoy in addition to that marking the anchorage will be required outside the shoals off Kishm Point.

*Bushire.*—A gas buoy to mark the inner anchorage is proposed. It should be moored off Ras al Marg and will render the re-construction of the beacon unnecessary and enable ships to enter the inner anchorage at night.

*Shatt al Arab Bar.*—Four gas buoys to replace the existing buoys have been provisionally recommended in the proposals for lighting the Bar. A re-survey of the Bar will be required before they are laid.

*Koweit.*—The present system of buoying the anchorage is satisfactory. The retention of the beacon will be unnecessary when the Ras al Arz light is erected.

*Bahrein.*—In dealing with the scheme for lighting Bahrein it has been proposed that a gas boat should replace the present outer buoy and that gas buoys should be moored off Ras Kaseifa and the West Spit. The existing buoy off Jadum should be retained. The beacon needs reconstructing.

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The foregoing proposals, if adopted, will involve the removal of the whole of the existing buoys on the Shatt al Arab Bar, the buoy at Bunder Abbas, and three buoys at Bahrein.

The only remaining buoys of the present system will be three at Koweit and one at Bahrein.

In the opinion of the Committee the British India Steam Navigation Company assess the value of their buoys at a figure which is not justified by their apparent condition. Nothing is known as to the condition of the moorings.

A copy of correspondence with the Company on this subject is attached.

In preference to taking over any buoys from the British India Steam Navigation Company it is suggested that a more satisfactory course will be to lay new buoys on the uniform system in those positions where it is proposed in this report that buoys should be retained or established.

9. SUMMARY OF PROPOSED LIGHTS AND BUOYS.

| Place.                      | Lighthouses and Light Vessels.        |                 |                 | Buoys.                              |               |
|-----------------------------|---------------------------------------|-----------------|-----------------|-------------------------------------|---------------|
|                             | Position.                             | Range in Miles. | Character.      | Position.                           | Description.  |
| MUSCAT                      | Ras Muscat                            | 20              | Fl.             | —                                   | —             |
| JASK                        | —                                     | —               | —               | Two miles north-west of Jask Point. | One unlit.    |
| MUSANDAM                    | Little Quoin                          | 20              | Fl.             | —                                   | —             |
| BUNDER ABBAS                | Kishm Point                           | 15              | Occ., W. and R. | Off shoals east of Kishm.           | One lighted.  |
|                             | —                                     | —               | —               | Anchorage at Bunder Abbas.          | One unlit.    |
| BUNDER ABBAS (alternative). | Light vessel off Kishm Point.         | 10              | Fl. or Occ.     | Anchorage at Bunder Abbas.          | One unlit.    |
| TANB                        | North-west summit                     | 20              | Fl.             | —                                   | —             |
| LINGAH                      | British India offices.                | 5               | F., red         | —                                   | —             |
| SHAIKH SHUAIB               | South-west Point                      | 15              | Fl.             | —                                   | —             |
| RAS AL MUTAF                | Light vessel south of shoal.          | 11              | Fl.             | —                                   | —             |
| BUSHIRE                     | Light vessel at outer anchorage.      | 11              | Fl.             | Inner anchorage                     | One lighted.  |
| SHATT-AL-ARAB BAR           | Light vessel                          | 11              | Fl.             | Bar channel                         | Four lighted. |
| KOWEIT                      | Kubbar                                | 15              | Fl.             | Anchorage                           | Three unlit.  |
|                             | Ras-al-Arz                            | 12              | Fl. or Occ.     |                                     |               |
| BAHREIN                     | Fasht-ad-Dibal                        | 20              | Fl.             | Ras Kaseifa                         | One lighted.  |
|                             | Light vessel near outer buoy.         | 10              | Occ.            | West Spit                           | One lighted.  |
|                             | —                                     | —               | —               | Off Jadum                           | One unlit.    |
| BAHREIN (alternative).      | Light vessel north of Fasht-ad-Dibal. | 11              | Fl.             | Ras Kaseifa                         | One lighted.  |
|                             | Light vessel near outer buoy.         | 10              | Fl. or Occ.     | West Spit                           | One lighted.  |
|                             | —                                     | —               | —               | Off Jadum                           | One unlit.    |
| DEBAI                       | Sea front                             | 5               | F. red          | —                                   | —             |

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Details of character of the various lights will be included in a supplementary report by Mr. Hood.

The lights on all the buoys should have distinctive characters, and it is proposed that all lights be white, except those on the buoys at the West Spit (Bahrein), and the inner anchorage (Bushire), for which red lights are suggested.

The total number of lights and buoys in the proposed scheme is :---

|                 |   |   |   |   |   |     |     |     |     |
|-----------------|---|---|---|---|---|-----|-----|-----|-----|
| Lighthouses     | - | - | - | 8 | } or if alternative proposals are adopted | } 6 |     |     |     |
| Light vessels   | - | - | - | 4 |   |     | } 6 |     |     |
| Port lights     | - | - | - | 2 |   |     |     | } 2 |     |
| Lighted buoys   | - | - | - | 8 |   |     |     |     | } 7 |
| Unlighted buoys | - | - | - | 6 |   |     |     |     |     |
|                 |   |   |   |   |   |     |     |     |     |

FOG SIGNALS.

10. The question of fog signals has been considered, but though hazy weather is not uncommon, fog is of rare occurrence and short duration in the Gulf, and fog signals are not considered necessary.

LIGHTKEEPERS.

11. From inquiries made it is considered that the Gulf Arab could be trained into a reasonably good lightkeeper, and there are obvious advantages in the employment of local men, but in the case of the light vessels the lightmen might with advantage be recruited from India. In any case the crews of light vessels and lighthouses in isolated positions should be armed.

LIGHTHOUSE TENDER.

12. The whole of the Persian Gulf would form a large lighthouse district in itself, and it would be imperative that a specially constructed steamer, to act as the lighthouse tender, be built and kept in Commission solely for this duty which would occupy the whole of her time. A distilling plant and storage for the supply of drinking water to isolated lighthouses and light vessels should be special features of her equipment.

The construction of this vessel should be undertaken before, or concurrently with, the establishment of the earlier lights.

WATER.

13. One of the principal difficulties in connection with the maintenance of lighthouses and vessels in the Persian Gulf is obtaining and supplying them with fresh water. The only place in the Gulf where drinking water in any quantity can be procured conveniently is the Shatt al Arab River above Fao.

This would necessitate the lighthouse tender making frequent trips to the river and the provision of a large storage capacity which space could be more usefully devoted to other purposes. In view of these considerations a distilling plant on board the tender has been recommended.

REPAIRS, &c.

14. With the exception of Basra the Gulf offers practically no facilities for repair or constructional work.

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The works of Messrs. Lynch at Basra were, however, visited, and the opinion formed that that firm would be capable of executing most general repairs.

DEPÔT.

15. The establishment of a Depôt at Basra offers advantages, but there are political objections to that course, and the distance up the river is a considerable inconvenience.

Other places were considered and examined in this connection, notably, Koweit, which is the only port in the Gulf where a vessel of even moderate draught can approach near the shore. Land could be obtained there on the mainland opposite Jezirat Kurein.

The Committee consider that Koweit will be the most convenient place for the establishment of a Depôt.

The requirements of the Depôt will be detailed in a separate report by Mr. Hood.

GAS BUOYS.

16. The scheme proposed concentrates practically all the gas buoys at one end of the Gulf, which is an important consideration in view of their maintenance by the lighthouse tender.

MAINTENANCE.

17. From the point of view of practical convenience and expedience, apart from any question of the incidence of cost, it appears to the Committee that the Government of India are clearly in the best position to undertake the arrangements necessary for the up-keep of the lights and buoys decided upon, and for the administration of the lighting system generally, assuming that no international complications arise to interfere with such a course.

ESTIMATES.

18. The question of estimates of first cost and maintenance will be dealt with in detail in a supplementary report by Mr. Hood.

LIGHT DUES.

19. The problem of the recovery of light dues has not been overlooked but it appears to the Committee to be one of great complication, the discussion of which does not fall within the scope of their instructions.

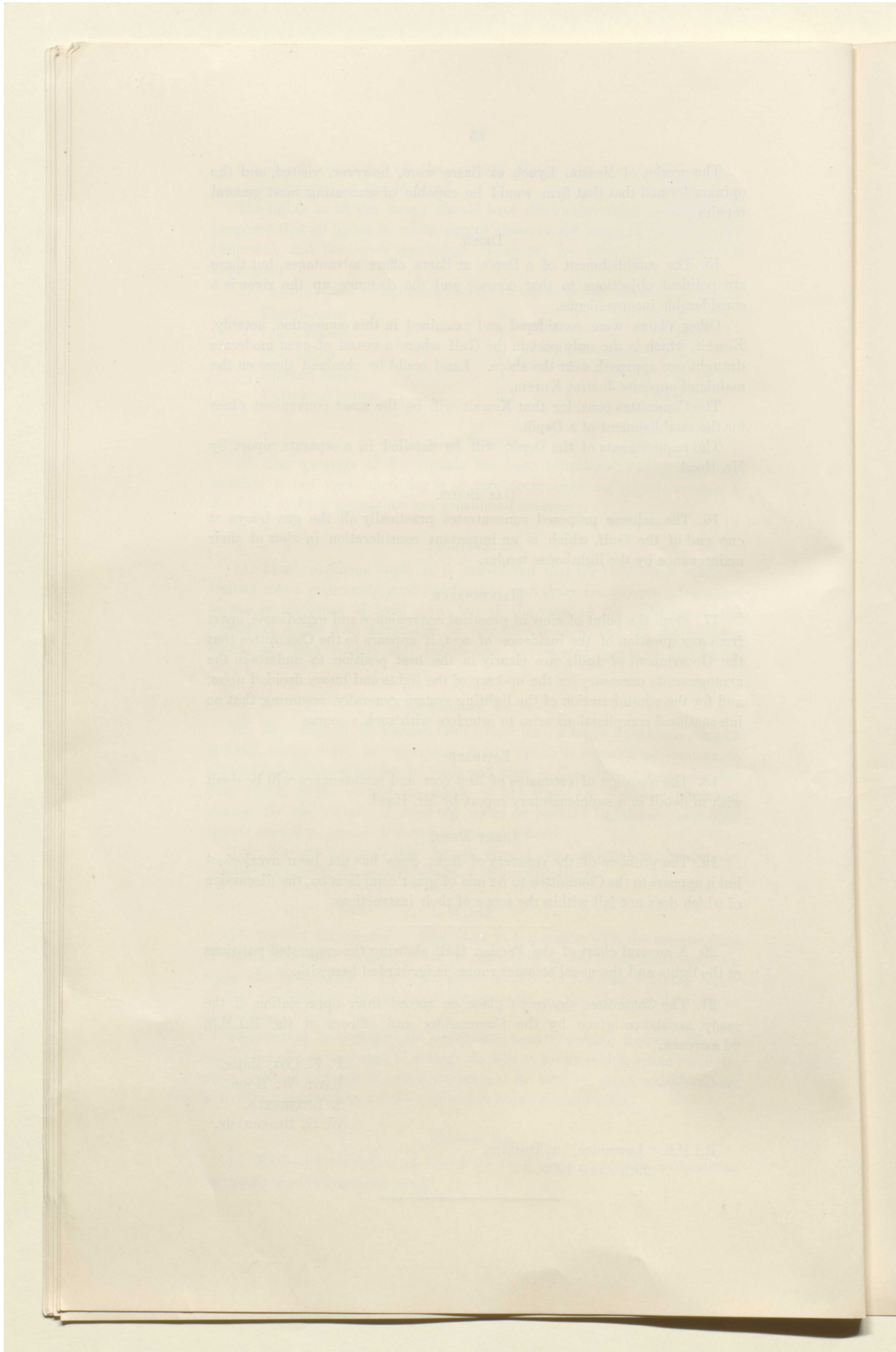
20. A general chart of the Persian Gulf showing the suggested positions of the lights and the usual steamer routes is forwarded herewith.

21. The Committee desire to place on record their appreciation of the ready assistance given by the Commander and officers of the R.I.M.S. "Lawrence."

P. Z. COX, Major.  
DAVID W. HOOD.  
S. LITCHFIELD.  
W. G. BEAUCHAMP.

R.I.M.S. "Lawrence," at Bushire,  
29th April 1909.

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15

APPENDIX.

CORRESPONDENCE REGARDING BUOYS OF THE BRITISH INDIA STEAM  
NAVIGATION COMPANY.

9, Throgmorton Avenue, London, E.C.,  
15th February 1907.

(Communicated by Foreign Office 19th February 1907.)

Dear Mr. Maxwell,

I mentioned to you the other day, when at the Foreign Office, that we had heard from India that the Hamburg-American Company had proposed to our people there that they should contribute to the up-keep of our navigation buoys in the Persian Gulf. We have told our people in reply that we prefer to continue to bear the cost of the maintenance of the buoys ourselves. As I mentioned to you, these buoys were put down by the British India Company some 20 or 30 years ago, and they have been kept in position and maintained by the Company ever since, and they have been used by all steamers frequenting the Persian Gulf without any charge having been made for their use by the British India Company. In fact we would have no means of collecting a charge had we desired to make one. It was, of course, no disadvantage to us that other steamers should use the buoys, and we had never thought of asking them to contribute. I cannot help fancying, as I mentioned to you at our meeting the other day, that there is a political move behind this proposal of the Hamburg-American Company, the object being to give Germany a vested interest in the Persian Gulf.

It has occurred to me that it might be a good thing politically for us to make over the ownership of these buoys to His Majesty's Government. I may say at once that I do not make the suggestion in order that the British India Company may benefit pecuniarily, either in the way of being repaid the cost of buoys or in escaping from the charge for their maintenance. In fact, to avoid any idea of this sort, we should be quite prepared to hand the buoys over to the Government for a nominal consideration, and we would still maintain them free of cost in return for their use.

Yours sincerely,

JAMES L. MACKAY.

Enclosure in Foreign Office Letter of 4th June 1908.

Dear Sir James Mackay.

Foreign Office,  
4th June 1908.

We have been considering, in consultation with the Board of Trade, the question of the buoys in the Persian Gulf. You are no doubt aware that the Germans are anxious to participate in the laying down and up-keep of the buoys: indeed, I understand that they have already offered to share expenses with the British India Steam Navigation Company in the matter.

S. 11.

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Sir E. Grey attaches great importance to the maintenance of this service in British hands, and he desires me to ask you whether, in order that our position in regard to the buoys may be made doubly secure, the British India Steam Navigation Company would still be willing, as suggested by you in your letter to Mr. Maxwell of 15th February 1907, to make over their existing buoys to His Majesty's Government, who would, Sir E. Grey hopes, be able to maintain them, free of cost to the Company, for the benefit of British shipping in the Gulf. I may add that we are at present in communication with the Admiralty with regard to the laying down of some additional buoys in the Gulf waters, which would be maintained by His Majesty's Government, in connection with those at present owned by the British India Steam Navigation Company, should the latter find themselves in agreement with the above proposal.

Yours sincerely,

Sir J. L. Mackay, G.C.M.G.,  
&c., &c., &c.

CHARLES HARDINGE.

Sir J. Mackay, British India Steam Navigation Company, Limited, to  
J. E. Ferard, Esq., Assistant Secretary, Political Department, India  
Office.

9, Throgmorton Avenue, London,  
4th September 1908.

We have now received full particulars from Bombay, showing the buoys belonging to the British India Steam Navigation Company in the Persian Gulf, together with charts showing the positions of the buoys marked thereon. You will observe that there are no buoys belonging to the Company in Bushire. There are 17 buoys altogether in the Persian Gulf belonging to the Company; 15 are marked on the chart, and the other two, which were sent up in July 1908 to be placed at the mouth of the Shatt-al-Arab, had not been actually placed when Bombay wrote on 31st July, but we will get information from Bombay showing where these last two buoys had been placed.

I enclose a letter, dated 31st July, from Bombay, giving particulars of the buoys, showing their cost. I also send five charts, in which the position of all the buoys is marked, with the exception of the two at the mouth of the Shatt-al-Arab to which I have referred above. In case these charts should go adrift again, please note that I have kept a spare copy in this office.

JAS. MACKAY.

No. 270.

Dear Sir,

Bombay, 31st July 1908.

*Navigation in Persian Gulf.*

We duly received your telegram of 29th instant, reading—

“Our letter of 12th ultimo; send by first mail information asked for, also two copies charts showing Company's buoys marked in red.”  
and replied to-day as under:—

“Referring to your telegram of 29th, are sending charts information asked for by this mail.”

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With reference to your letter of 12th ultimo, No. 78, we have now to advise having sent you by Registered Parcel Post by this opportunity the under-noted charts showing the Company's buoys marked in red thereon :—

Bahrein Harbour, No. 20 - - - 2 copies.  
Bahrein Harbour, No. 3380 - - - 2 copies.  
Mouth of Euphrates, No. 1235 - - - 2 copies.  
Koweit Harbour and approaches, No. 22 - - 2 copies.  
Persian Gulf (with plan of Bunder-Abbas anchorage), No. 2837A - - - 2 copies.

All the Company's buoys are used as navigation buoys only.

The under-noted particulars show when the buoys were laid down, with the original cost moored complete :—

| Date laid down originally. | Place.               | Description of Buoys.                         | Where placed.                   | Original value. |    |    |
|----------------------------|----------------------|---|---------------------------------|-----------------|----|----|
|                            |                      |   |                                 | Rs.             | A. | P. |
| February 1881              | Bahrein              | 1 con. mark buoy                              | Outer fairway                   | 5,205           | 2  | 4  |
| August 1898                | "                    | 1 con. mark buoy                              | Khaseifa shoal                  | 1,832           | 0  | 6  |
| September 1894             | "                    | 1 con. mark buoy                              | Jedum shoal                     | 2,202           | 1  | 8  |
| October 1906               | "                    | 1 can mark buoy                               | West Spit                       | 1,601           | 15 | 0  |
| September 1894             | "                    | 1 whitestone beacon.                          | Ras Zarwan                      | 1,000           | 0  | 0  |
| February 1881              | Shatt al Arab mouth. | 1 con. mark buoy                              | Outer bar                       | 2,765           | 1  | 2  |
| April 1907                 | "                    | 1 mark buoy                                   | Outer bar (Lawrence buoy).      | 1,900           | 0  | 6  |
| March 1883                 | "                    | 1 cask buoy                                   | Bar east Channel (Muscat buoy). | 2,000           | 5  | 0  |
| February 1891              | "                    | 1 cask mark buoy, No. 3.                      | } Channel                       | 2,784           | 2  | 4  |
| "                          | "                    | 1 cask mark buoy, No. 2.                      |                                 |                 |    |    |
| July 1900                  | "                    | 1 cask mark buoy, No. 1.                      | Channel                         | 2,812           | 0  | 10 |
| March 1905                 | Koweit               | 1 con. mark buoy                              | North of Ras Ajuzah             | 1,981           | 3  | 8  |
| February 1904              | "                    | 1 con. mark buoy                              | Fasht al Hadeiba                | 2,000           | 0  | 0  |
| "                          | "                    | 1 cask mooring buoy (used as mark buoy only). | South of Fasht al Hadeiba.      | 1,360           | 0  | 0  |
| September 1888             | Bunder Abbas.        | 1 can mark buoy                               | Inner anchorage                 | 1,257           | 4  | 8  |
|                            |                      |   |                                 | Rs. 30,701 5 8  |    |    |
| July 1908                  | Shatt al Arab mouth. | Buoys (one conical, one cask).                | Bar Channel                     | 3,664           | 15 | 0  |
|                            |                      |   |                                 | Rs. 34,366 4 8  |    |    |

The dates given in respect of the buoys at the entrance to the Shatt al Arab are approximate only, as available records here do not go back to that date.

With regard to the present value of the buoys, we consider a fair estimate would be to take the original cost. Many of the original buoys, with their moorings, have been renewed since first laid down, and as the Company keeps the buoys, &c., in a good state of repair, and incurs considerable expense in upkeep, there is practically no difference between the original and the present value.

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We advised in our letter No. 226, of 3rd instant, that two buoys were being sent up owing to a change in the channel at the mouth of the Shatt al Arab.

We have no information so far as to whether both these buoys have been made use of, or whether the Commander of the "Megna," who is re-buoysing the bar, has been able to lift and make use of the old buoys. An attempt to lift one of the old buoys failed.

So soon as we can obtain definite information we shall advise you. The charts sent by this mail give the position so far as it is known to us, but do not include the two new buoys now being laid.

We are, &c.,

MACKINNON, MACKENZIE, & Co.,

P. W. Armour, Esq., Secretary,

Agents.

British India Steam Navigation Company, Ltd., London.