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## 'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.'

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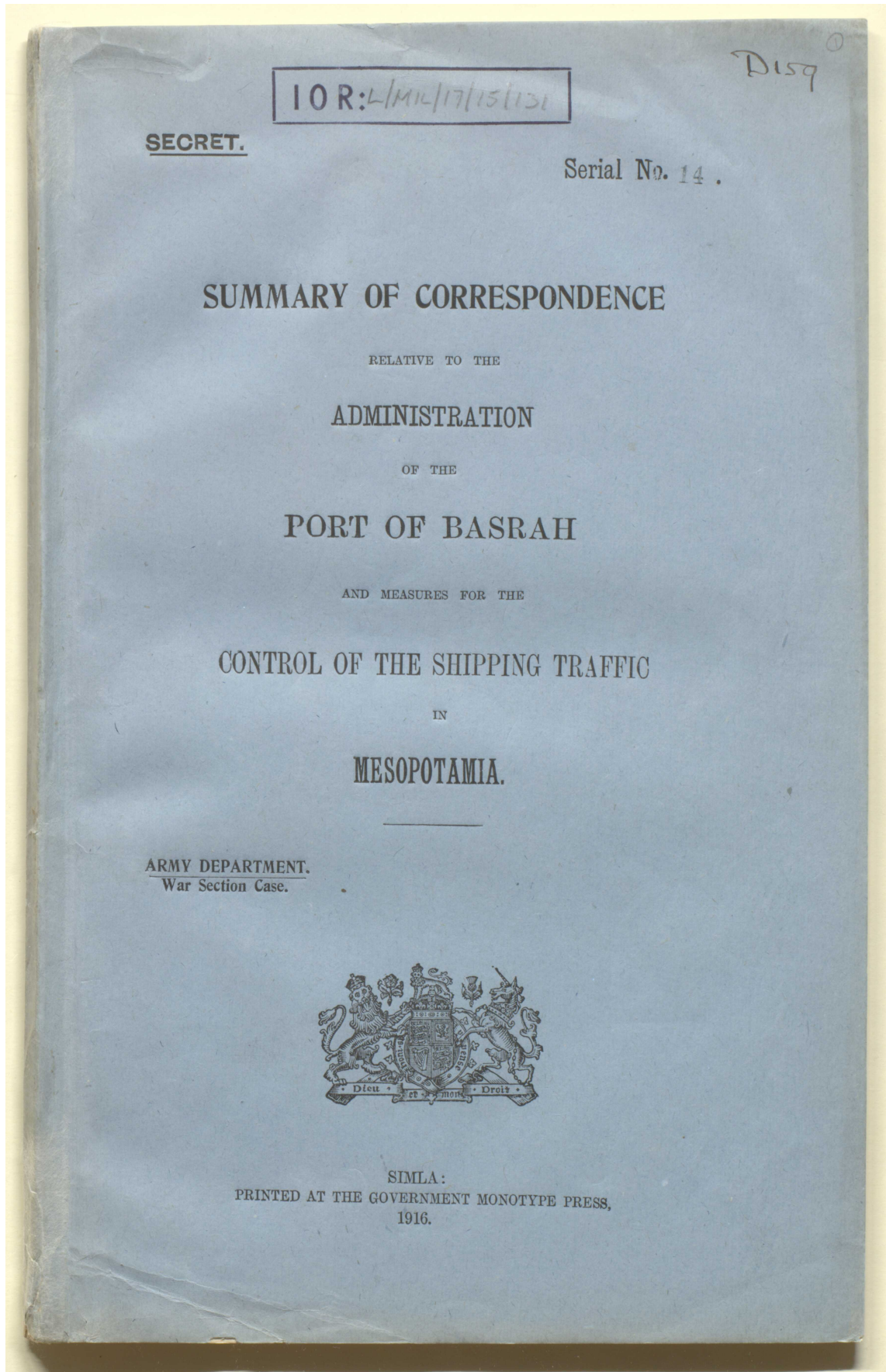


### About this record

This secret summary was compiled by the Army Department, War Section Case and printed in Simla in September 1919. It contains letters and telegrams sent from 11 December 1915 to 14 August 1916 between the officers of the Government of India and the Director-General of Port Administration and River Conservancy on the administration of the Port of Basrah [Basra].

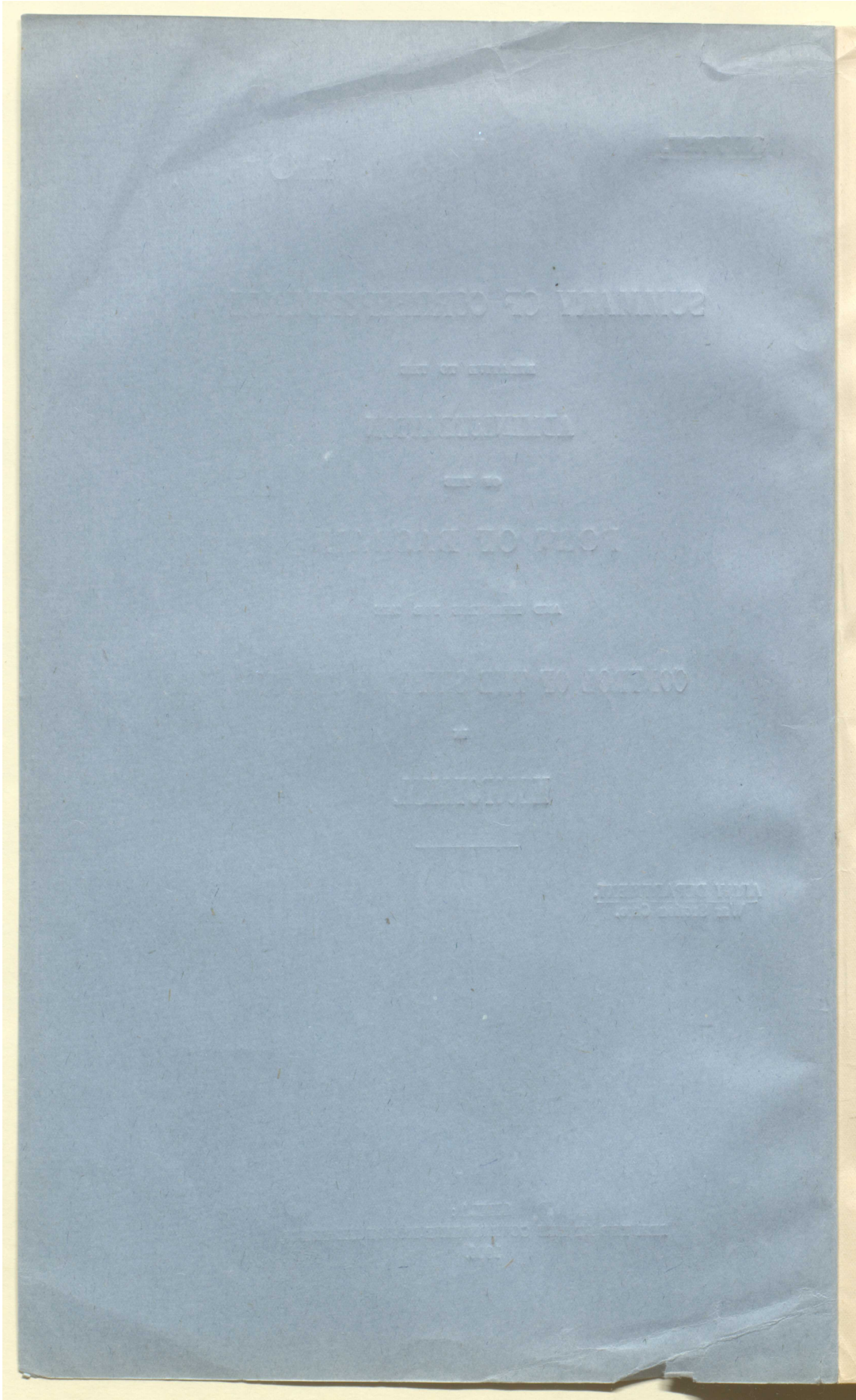
The summary also contains 'Report of Major-General G F MacMunn's Committee on the Organization of the River Service in Mesopotamia' (folios 58-66), with recommendations for the Royal India Marine Services, on the method of employing existing and forthcoming vessels, and measures for the control of the shipping traffic on the Tigris and Euphrates rivers.

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and measures for the control of the shipping traffic in Mesopotamia.' [front]  
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'Summary of correspondence relative to the administration of the Port of Basrah  
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SECRET.

ADMINISTRATION OF THE PORT OF BASRAH AND MEASURES FOR IMPROVING THE CONTROL OF THE SHIPPING TRAFFIC IN MESOPOTAMIA.

We have no definite information in respect of the arrangements made for the management and control of shipping in Mesopotamia up to December 1915, and so far as we were aware such control as was exercised was exercised by the Principal Marine Transport Officer and the Royal Indian Marine officers serving under him.

Serial No. 1. On the 11th December 1915, the General Officer Commanding wired to say that a harbour-master was required immediately at Basrah to deal efficiently and expeditiously with the large number of transports which were arriving. Maritime Local Governments were at once asked whether they could obtain a suitable man for the appointment.

Serial No. 2. In the meantime, however, on the advice of Sir George Buchanan, who happened to be then in Delhi, two officers of the Indian Army Reserve, who were then in Mesopotamia and had previously been employed as river pilots in Rangoon, were suggested to the General Officer Commanding.

Serial No. 3. who was asked whether he could make either of them available for the appointment of harbour-master at Basrah. In reply, the General Officer Commanding intimated that one of the officers suggested, 2nd Lieutenant Hendry, had been detailed for the appointment. Subsequent information received from the General Officer Commanding showed that another officer was employed as harbour-master at Basrah in addition to 2nd Lieutenant Hendry. Later on Mr. Scarr of the Karachi Port Trust was also appointed harbour-master at Basrah.

Serial No. 4. Serial No. 5. Serial No. 6.

Serial No. 5. Serial No. 6.

Sir George Buchanan was sent out to Mesopotamia to carry on, among other duties, those of Director-General of Port Administration, but the exact delimitation of his duties was left to the General Officer Commanding to decide. In April 1916 Sir George Buchanan came on deputation to India and visited Simla, and in a memorandum, dated the 17th April, which Sir George then submitted to the Government of India, explained that the arrangements at Basrah for the landing of goods and stores were of the most primitive order and the whole area a huge quagmire. Sir George also stated that he had written a report on this subject and had designed certain wharves which were about to be constructed, but added that there were so many different officers expressing views, frequently at variance with each other, that he would not be surprised if the wharves, when built, were not fully utilized. Further, his proposals for the control of the shipping traffic had been disregarded, so far as he was aware. It was decided as the result of the facts brought to light in the correspondence forwarded with Sir George's letter to remove Captain Huddleston from his appointment as Principal ~~Medical~~ *Marine* Transport Officer and orders accordingly were issued forthwith. Certain specified duties were also assigned to Sir George who was, with the concurrence of the War Office, who consulted the Admiralty on the subject, placed under the immediate orders of the General Officer Commanding.

Enclosure I to Serial No. 8.

Serial No. 9.  
Serial Nos. 10, 11, 12 and 13.

In a letter dated the 28th March, the India Office communicated a copy of correspondence received from the Admiralty relative to the appointment of a Shipping Adviser to the Principal Marine Transport Officer at Basrah. It was subsequently ascertained that Mr. P. H. Browne of the British India Steam Navigation Company, Limited, was appointed to the post. Some time previously His Excellency the Army Member had selected Mr. Browne for the appointment of Traffic Superintendent with Force "D" under Sir George Buchanan, and, as it was considered that Mr. Browne would be more useful in that capacity than in that proposed by the Admiralty, a representation\* on the subject was made to the Chief of the Imperial General Staff who obtained the concurrence of the Admiralty to Mr. Browne being employed as Director of Traffic.

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Sanction was accorded to the compliance in full with demands for various articles of plant, tools, machinery, material, and stores demanded by Sir George Buchanan. These demands included the provision of electrical installation with fans and lights for each of Sir George's two survey launches, steam travelling crane with rails, and trolleys. Sanction was also accorded to the construction of four pontoon wharves by Burn and Company for use at Basrah; these have all been completed and despatched from Bombay to Basrah.

The Government of India also sanctioned the employment of a contractor with some 160 men for the construction of weirs on the Tigris.

Requests for additions to his engineering and other personnel have been received from Sir George Buchanan from time to time, and these were sanctioned by Government in every case. In instances in which any particular individual asked for was unwilling to take up the appointment a substitute was obtained.

In telegram No. 55771, dated 24th May 1916, the General Officer Commanding was informed that it was desirable that the whole question of the organization, maintenance, repair, etc., of the river fleet in Mesopotamia should be referred under his orders to a Committee of which Sir George Buchanan should be President. The services of Mr. Horne of the Irrawaddy Flotilla Company were obtained to serve on this Committee and the General Officer Commanding was so informed, and instructed that he should appoint such additional members to the Committee as he considered necessary and forward their report with his own recommendations. At the request of the General Officer Commanding, however, it was decided to assemble two Committees, one Committee with Sir George Buchanan as President to deal with the numbers and natures of the vessels required to convey a certain

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tonnage for the maintenance of the troops and with the system on which the river fleet should be kept in a state of efficient repair, the other Committee with General MacMunn as President and Mr. Horne as a Member to deal with the organization, including provision of personnel, of the river fleet recommended and with the system on which the traffic up and down the river should be worked so as to get the best use out of it. The reports of these Committees have recently

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been received. The General Officer Commanding "D" has recommended that no action be taken on them at present in view of the appointment of Lieutenant-Colonel Gray as D. D. I. W. T.



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SECRET.

Telegram P., No. 1111-2-9, dated the 11th December 1915.  
(Despatched 5-30 P.M., received 5 A.M., 12th December 1915.)

Serial No. 1.

From—The General Officer Commanding, Force "D," Basrah,  
To—The Chief of the General Staff.

A harbour-master is required immediately at Basrah to deal efficiently and expeditiously with the large number of transports which are arriving. Fixed pay of Rs. 600 a month with usual fees for each ship handled and free rations are suggested. You must, however, settle the question of emolument.

His date of departure should be telegraphed.

Telegram No. H-9760, dated Delhi, the 13th December 1915.  
(Issued at 5-40 P.M.)

Serial No. 2.

From—The Secretary to the Government of India, Marine Department,  
To—The Chief Secretary to the Government of Bombay, Bombay.  
The Chief Secretary to the Government of Bengal, Calcutta.  
The Chief Secretary to the Government of Madras, Madras.  
The Chief Secretary to the Government of Burma, Rangoon.

(Repeated to the Director, Royal Indian Marine, Bombay.)

Harbour-master is required immediately at Basrah to deal efficiently and expeditiously with the large number of transports which are arriving. Fixed pay of Rs. 600 per mensem with free rations and usual fees for each ship handled are suggested. Please wire if suitable man can be obtained on these terms; if not, what terms would be acceptable. Matter most urgent. Addressed Bombay, Bengal, Madras, and Burma; repeated Director, Marine, for information.

Telegram No. S.-31273, dated 15th December 1915.  
(Despatched 11 P.M.)

Serial No. 3.

From—The Chief of the General Staff,  
To—The General Officer Commanding, Force "D," Basrah.

Your 1111-2-9 (*Serial No. 1*) of 11th December.

Sir G. Buchanan recommends either 2nd-Lieutenant Hendry, attached 4th Rajputs, or 2nd-Lieutenant Shand attached 33rd Cavalry as harbour-master. Both officers were river pilots in Rangoon.

Please say if you can make one of these officers available for harbour-master, Basrah; the question of emoluments being considered later.

Telegram No. 1111-54-Q., dated the 25th March 1916.  
(Despatched 3-30 P.M., received 4-20 A.M., 26th March 1916.)

Serial No. 4.

From—The General Officer Commanding, Force "D," Basrah,  
To—The Chief of the General Staff.

Your 43381, March 14th (not included in collection).

2nd-Lieutenant Hendry's fees for 2½ months average Rs. 1,080 per mensem.

\*Subsequently ascertained to be 2nd-Lieutenant Shand, I.A.R.O.

He is one of two permanent harbour-masters here. The other harbour-master\* receives pay of Rs. 600 plus Rs. 150 shore allowance. Harbour-master's share fees as this has been found the best practicable arrangement.

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Telegram No. H.-5045, dated Simla, the 14th June 1916.

From—The Secretary to the Government of India, Marine Department,  
To—The Secretary to the Government of Bombay, General Department.

(Repeated to the Embarkation Commandant, Karachi).

Your telegram 9th June. (Not included in collection.) Scarr's services accepted on terms stated. Please instruct him to proceed Basrah as soon as possible arranging with Embarkation Commandant, Karachi for passage.

Adressed Bombay General, repeated Embarkation, Karachi, with request that arrangements may be made for Scarr's passage and name of vessel and date of sailing communicated direct to General Officer Commanding, "D," and repeated here.

Serial No. 6.

Telegram No. 717, dated (and received) the 3rd July 1916.

From—The Secretary to the Government of Bombay, General Department,  
To—The Secretary to the Government of India, Marine Department.

Your telegram H-5692, dated 29th June. (Not included in collection.) Scarr sailed for Basrah on 19th June.

Serial No. 7.

Letter No. H-9859, dated the 17th December 1915.

From—The Secretary to the Government of India, Marine Department,  
To—SIR GEORGE C. BUCHANAN, KT., C.I.E., M.I.C.E.,

I am directed to acknowledge the receipt of your letter dated the 14th December 1915, (not included in collection) with which you submit a note on the whole subject of the proposed dredging and other river conservancy work in Mesopotamia.

In reply, I am to say that it has been decided that you should proceed to Basrah at the earliest opportunity in order that you may be in a position to give immediate assistance to General Sir John Nixon, K.C.B., in all matters connected with the port of Basrah, its administration, engineering works and river conservancy.

Your designation will be "Director General of Port Administration and River Conservancy," but the exact delimitation of your duties will be fixed by Sir John Nixon in consultation with you; the Government of India being informed of the decision arrived at.

As regards the recommendations contained in paragraph 13 of the note attached to your letter under reply, I am to ask that you will inform me in detail of your exact requirements in plant, personnel and equipment.

Serial No. 8.

Dated 17th April 1916.

From—COLONEL SIR GEORGE BUCHANAN, KT., C.I.E., M.I.C.E., Director-General of Port Administration and River Conservancy, Indian Expeditionary Force "D," Mesopotamia,  
To—The Secretary to the Government of India, Marine Department, Simla.

I have the honour to invite a reference to letter No 1142-12-Q., dated 3rd April 1916, (not included in collection) from the General Officer Commanding, I. E. F. "D," to the Chief of the General Staff, Army Headquarters, Simla, forwarding notes and a letter from myself with enclosures on the subject of delays to River Conservancy work.

2. It will be observed from a perusal of the papers that some of my complaints imply a lack of method in Port Administration; and I desire to explain that the delimitation of my duties by General Sir John Nixon was such that I have only



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held the office of Director General of Port Administration and River Conservancy in name.

3. I enclose a memorandum I have drawn up on the subject, with enclosures, and I respectfully request that the same be laid before the Government of India for orders.

In this connection I desire to emphasize the fact that I have not written the memorandum from a personal point of view but solely in the interest of military operations, because if the administration of the Port and River is efficient for military purposes my position is not of the smallest importance.

4. I have, however, in the course of my three months' experience in Mesopotamia formed the opinion that without better organization in the near future, military operations may be seriously hampered and I feel that I should be failing in my duty did I not lay my views before you along with my reasons for same.

Enclosure No. 1.

*Memorandum on three months' work in Mesopotamia, with some observations and suggestions by Colonel Sir George Buchanan, C.I.E., Director-General of Port Administration and River Conservancy.*

On the 17th December 1915 I was instructed by the Government of India to proceed to Basrah at the earliest opportunity in order that I might be in a position to give immediate assistance to General Sir John Nixon in all matters connected with the Port of Basrah, its administration, engineering works, and river conservancy.

My designation was Director-General of Port Administration and River Conservancy, and I was informed that the exact delimitation of my duties would be fixed by Sir John Nixon in consultation with myself, the Government of India being informed of the decision arrived at.

(2) I left Bombay on the 25th December and arrived at Basrah on the 1st January 1916, where I reported myself at General Head Quarters. I was seen by Major-General Cowper the D. A. and Q. M. G., who asked me to call again on the 2nd January. I had a conversation with General Cowper on the 2nd and he informed me that General Sir John Nixon wished to see me on the following day at 10 A.M. I presented myself at the appointed hour and was received by Sir John Nixon in the presence of General Cowper and Commander Huddleston the P. M. T. O.

The instructions of the Government of India were that my duties were to be defined in consultation with myself and by holding the interview and proceeding to define my duties before I had been given an opportunity of seeing the work before me, and further in the presence of and in consultation with the P. M. T. O., I was placed at a disadvantage. The interview was brief. General Nixon had beside him a paper on which was drawn out a list of various things I should not do and he remarked that he did not understand the title of my appointment as there was no port to administer. The wharves and jetties were purely temporary for military purposes and all he required me to do was to see if improvements could be effected on the Tigris and Euphrates to assist military operations. Sir John said he did not understand what the Admiralty were frightened at as he had no intention of dredging the outer bar. I explained shortly my interpretation of the orders of the Government of India and why I had been sent up in such haste, but Sir John Nixon dissented and repeated that all he wanted me for was the improvement of the River Tigris and the Hammar Lake on the River Euphrates, but that it would be advisable for myself and staff to collect data for future civil works in case Basrah was added to the British Empire. I replied, that under those circumstances, as I had no launch to take me on a preliminary inspection of the rivers, and was informed I could not get one, I might as



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well return to Bombay and thence to Burma as originally proposed, but General Cowper intervened and said he would try and borrow Sir Percy Cox's launch for my use. The interview then terminated. In due course I received written orders as to my duties and found that the construction of some wharves had been added to General Nixon's verbal programme, but as I did not think that the orders of the Government of India had been correctly interpreted I wrote a memorandum in reply and asked that the correspondence might be sent to the Government of India for perusal and record. (Appendix A.)

(3) Shortly after my arrival I asked if there was an officer conversant with the Port who could take me around and shew me the general arrangement of wharves, etc., but I was told it was quite impossible for an officer to be spared for such a purpose. I then made the acquaintance of General Rimington, the B. G. R. E., and he offered to shew me all that had been done in the shape of wharves and jetties, and on the morning of the 4th and 5th January we inspected the foreshore and wharves from the Ordnance Depôt to the General Hospital.

(4) I found it difficult to realize that we had been in occupation of Basrah for a year as the arrangements for the landing and storing of goods and stores of every description were of the most primitive order and in the absence of roads the whole area was a huge quagmire. To a new-comer appearances were such that troops and stores might have been landed for the first time the previous week, and I was particularly impressed with the great danger to be apprehended from fire with so many highly inflammable mat huts in close proximity to each other. I also inspected with the B. G. R. E. the new landing wharves at Magill and there the conditions were even worse, but I saw the great possibilities of that locality as there was deep water close in to the shore.

I will now continue these remarks under the heads of Port Administration and River Conservancy respectively.

**Port Administration.**

(5) When Sir John Nixon remarked that there was no question of port administration and that no question regarding such could be allowed to impinge on the military necessities of the situation or to interfere in any way with the work and duties of the P. M. T. O., I submit that he overlooked entirely the fact that the military situation itself called for the very best port administration. I was naturally unable a few days after my arrival to express an opinion, nor was I at that time acquainted with the duties of the P. M. T. O., but after three months' experience I can say with assurance that the lack of organization and co-ordination in all matters appertaining to the port and river is appalling, and the waste of money and energy corresponds accordingly.

The reason for this state of affairs is chiefly because amateurs without experience have been and are entrusted with the work usually given to trained men.

(6) The military expedition to Basrah, is I believe unique, inasmuch as in no previous case has such an enormous force been landed and maintained, without an adequately prepared base. In South Africa there were established ports at Cape Town, East London, and Durban; in France and Egypt there are excellent ports: but at Basrah there were practically no port facilities, neither docks, wharves, warehouses, moorings, nor last but not least a trained administrative staff. The only parallel case I can think of is Gallipoli but that was a temporary occupation under unusual circumstances. The result at Basrah has been that owing to the magnitude of military operations a huge port has been created with, as an accessory, a large river steamer business, but without the organization and trained administrative and executive staff necessary for efficiency.

(7) The requirements of a port whether it be for commercial or military purposes are primarily the same, *i.e.*—

- (1) The necessary Engineering Works,
- (2) Management of the traffic.

*Engineering Works.*

These comprise docks or wharves where transports or cargo boats can discharge their contents and sheds where goods can be classified and stored.



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I have written a report on this subject and designed certain wharves which are about to be constructed, but there are so many different officers expressing views, frequently at variance with each other, that I should not be surprised if the wharves when built were not fully utilized. The P. M. T. O. has placed it on record that he disapproves of the scheme and has written notes on the subject. Shed accommodation is a separate project under the control of the B. G. R. E., whilst just before leaving Basrah I was informed that an advanced base was to be made at Qurnah and the B. G. R. E. was requested to build five wharves in that locality.

My report with plans and notes by the P. M. T. O. is appended (Appendix B).

*Traffic Management.*

By this is understood the arrangement for the discharging of transports and the delivery of the goods to the departments concerned. I have written a report on this subject also (Appendix C), but I have received no acknowledgment of the same nor do I know what action, if any, is being taken in the matter.

**River Conservancy.**

(8) I was asked by a staff officer at Basrah if river conservancy had anything to do with sanitation, and I will therefore explain that under the term river conservancy is included the management of a river and the execution of all the works thereon, *i.e.*, the regulation of traffic and drafting of rules in connection with same and the dredging, training, lighting, and surveying of the entire river along with the construction of all necessary works. As in the case of Port Administration, there are various officers making independent suggestions with the inevitable result that there is a general lack of efficiency.

(9) My most important works in connection with Military operations were to dredge a channel across the Hammar Lake and improve the facilities for navigation on the Tigris, and it was agreed when I left India that the dredger from Burma should not be despatched until I had made a preliminary inspection of the locality where she had to operate. I was unable to carry out this arrangement because for reasons beyond my control I did not complete my inspection until the 24th February. My report is dated 3rd March 1916 and is appended hereto (Appendix D). I was obliged to order the dredger before making any inspection so that its arrival in time for work would be possible, but although the dredger and all its component parts left Rangoon about the middle of January, the pipe line and other fittings had not all arrived at Basrah when I left on the 4th April.

I have reported fully on this matter and also on the delay on beginning my surveys, and my reports have been forwarded by the Army Commander to the Chief of the General Staff, Simla (Appendix E).

(10) In this connection I may say that I saw Captain Lumsden, the Director of the Royal Indian Marine, when I was in Bombay on the 13th instant, and I had some conversation with him on the subject.

Captain Lumsden, whilst regretting the delay, said that when all departments were asking for priority in transport it was difficult for him to satisfy the numerous demands and he said that my officers in Rangoon were responsible for the dredger requiring extensive repairs in Bombay, and that the pipes, and pontoons were despatched from Rangoon in three steamers and were so badly packed that they had all to be sorted out on arrival at Bombay.

(11) With reference to these remarks I beg to make the following observations:—

- (a) My officer in Rangoon had absolutely nothing to do with the dismantlement of the dredger and packing of the pipe line and pontoons, his instructions being to confine his attentions to the engagement of the survey, staff and collection of the equipment. The whole of the work in connection with the dredger and pipe line was done by the local officers of the Royal Indian Marine and the officers of the Public Works Department.

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I was aware that the dredger required renewal of the pump-casing. This was actually being done in Rangoon under the superintendence of the Public Works Department, but I am informed the Indian Marine officers at Rangoon, through some misapprehension, stopped the work and despatched the dredger to Bombay.

In the matter of the alleged despatch of the pipe line and pontoons in three different steamers, I invite a reference to telegram No. M. 169, dated 18th January, to my address which reads as follows :—

*Begins.* " Principal Port Officer, Rangoon, wires January 17th. *Begins.* 'Oolabaria' sailed to-day towing 'Myittha.' 'Oolabaria' has on board whole of pipe line of dredger 'Oswald' consisting of 40 pipes closed at each end and 36 feet by three and a half diameter weighing two and a half tons each. Twenty pipes open each end 40 feet by two and a half diameter weighing one and a half tons each. These pipes have projections on them which make towing difficult. Numerous other plant for dredging purposes. List is being posted. Also roofs and gear for 'Myittha' and 'Rebel.' Whole measures about six hundred forty cubic tons. *Ends.* Cargo for dredger will be transhipped in Bombay about 1st February. 'Myittha's' tow will be arranged onwards same date." *Message ends.*

As already stated I fail to understand why the whole of the pipe line and pontoons should not have been despatched direct to Basrah from Rangoon instead of laboriously transshipping at Bombay.

*Maintenance of Transport Service on the Tigris.*

(12) In connection with above I made the following remarks in my report, dated 3rd March, on River Conservancy operations in Mesopotamia.

*General remarks on transport service on the Tigris.*

I have been asked verbally whether any limit can be placed on the number of river transports that can be accommodated on the river and in my judgment there is no limit within reason, but I consider the transport service requires organization and institution of traffic rules and regulations.

The usual rule of the road is that steamers going up the river give way to steamers coming down because the former are naturally under better control, but I understand this rule is not enforced. With large increases in the number of river transports some crossing stations will possibly be required and a comprehensive scheme carefully drawn up.

I would point out that a perfect transport service depends upon the following :—

- (1) sufficient number of steamers,
- (2) adequate means of repairing and maintaining vessels,
- (3) a navigable river at all times of the year,
- (4) competent management of the transport service by one responsible officer,

and if all these are not co-ordinated there will be failures and breakdowns.

With reference to (4) I would suggest that whoever is in charge of the transport service should also issue orders for the upkeep and maintenance of the vessels, as divided responsibility in this case would militate against efficiency.

(13) In the matter of adequate means of repairing and maintaining vessels, I was asked my opinion on proposals for the establishment of a Marine Dockyard at Basrah. I examined the project and reported generally on the same, but the work is not under my control and I have no knowledge as to the progress being made. On the urgent necessity for the work I remarked as follows :—

" I would observe that I entirely concur with you that as adequate repairing base for river craft is an urgent and immediate necessity, and as I have had long



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experience in the maintenance of a flotilla, the following general remarks will perhaps not be out of place :—

(a) Although the military situation, combined with the limited number of craft, may render it necessary to work the river steamers and launches " month in and month out " as stated by you, it should be borne in mind that this state of affairs cannot be continued indefinitely, and the day must come when there will be a general break-down.

(b) Apart from the repairs to constant damage mentioned by you, it is absolutely essential that boilers should be periodically cleaned and engines overhauled.

To clean a boiler takes about 2 days, and it is usual to lay a vessel up for this purpose once in two months, and to have a general overhaul of the engines once in 6 months, and dock at least a year.

(c) A constant inspection of vessels by a qualified Engineer is also desirable, or the repairs will probably be carelessly executed. As an example of this I may cite the case of the launch "Mohammerah" which was, I understood, sent to the dockyard by the Political Department to be put in thorough repair, and in due course was handed over as fit for work.

The launch was lent to me to go on tour to Amarah, but the boiler burst 15 miles above Qurnah and I was informed that it had not even been cleaned for 11 months.

I enclose a copy of a report on the condition of the launch received from the Abadan Workshops before opening up, after which further repair was found necessary.

(d) The usual procedure is to have an officer styled Superintending Engineer who is made responsible for the maintenance and repairs to the various units of the fleet. This officer is independent of the workshop and one of his duties is to critically examine the work done in the shops and refuse to take over a vessel which has not been repaired to his satisfaction.

(14) Shortly before I left Basrah, orders were passed that some rules should be drawn up for the regulation of traffic on the Tigris, and I believe that a scheme has been drafted, but I have not been asked to advise in the matter.

**Observations and suggestions.**

(15) After three months' experience and close study of local conditions, I have formed certain opinions which I put down for what they may be worth. It being understood they refer solely to work in connection with the Port and River.

(a) Field Service Regulations, Chapter 2, paragraphs 4-6, say: The essence of all efficient organization lies in due sub-division of labour and decentralization of responsibility among subordinates, each individual being given duties which he can perform adequately. At the same time central control and co-operation of subordinate parts for the attainment of the common objective must be assured.

At Basrah, there is, in my opinion, not only insufficient decentralization but there are three or four officers trying to perform the same work, and individuals are given duties which they cannot perform adequately because they lack the necessary knowledge and experience.

(b) The staff officer who under the service regulations settles the numerous questions connected with the management of the port and river is the D. A. and Q. M. G., but the arrangement, whilst possibly suitable for a small expedition, is inappropriate in Mesopotamia, because it is quite impossible for this officer to have the time, even if he had the experience, to grapple with the number of strange problems in addition to his military duties.



'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [6v]  
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(c) Although I am well versed in official routine, there appears to be too much writing of memoranda and too much circumlocution. Responsible officers and Directors spend a great deal of time in writing to G. H. Q. or to a Director and sending copies to the other officers or Directors concerned. To take an example from Appendix B to this note the P. M. T. O. writes to G. H. Q. about jetties. G. H. Q. sends a copy to the B. G. R. E. and the D. G. P. A. and R. C. These officers write reports to G. H. Q. and at the same time send copies to each other and G. H. Q. sends copies to P. M. T. O. and probably to I. G. C. I feel sure that more could be accomplished by conferences and personal interviews. I see the B. G. R. E. nearly every day but I have only seen the P. M. T. O. once since my interview with General Nixon on the 3rd January 1916.

(d) Writing impersonally I have formed the opinion that my services have not been utilised to nearly the extent contemplated by the Government of India, and sufficient importance has not been attached to the specific works I was called upon to perform. Moreover, I have been obstructed, and I know that to be the opinion of Sir Percy Lake who said so in the course of an interview I had with him shortly before I left Basrah. At this interview I stated that I had felt for some time that I was not wanted, my work was not considered urgent and my advice on matters, concerning which I have expert knowledge, was brushed aside, that I had up to the present the reputation of being a man who would get things done whatever the odds and I did not wish to bury my reputation in Mesopotamia.

I do not propose to name any individual officers in connection with the indifference to my office and work, as the orders issued by Sir John Nixon in respect to my duties are responsible for my services not being fully utilised, and so long as those orders stand I shall remain more or less of a cypher. I can certainly effect considerable improvements in the administration of both the port and the river but not under existing conditions.

(1) I believe there is cause for anxiety in respect to the maintenance of communications in Mesopotamia, as there are so many links in the chain and such possibilities of failure. The evils that may arise from the delays to river conservancy work alone can hardly be over-estimated. There are indications of a low-water season and if I am unable to carry out on the Tigris the necessary works to give even moderate facilities for navigation, the river may be practically dry between Amarah and Ezra's Tomb, which I need not point out would be a tremendous calamity. In the matter of the Hammar Lake, the position is that had the Marine authorities in Bombay despatched the dredger, pipe line and fittings, when they arrive in Bombay, in accordance with the Director of Marine's telegram, or better still, had the gear been shipped direct from Rangoon to Basrah, there would have been a reasonable prospect of completing a channel 150 feet wide by 6 feet deep (below the lowest low-water level across the Lake by some time in the month of August. That is now impossible and as there is not time to build a railway or a road, Nasiriyah will be to a large extent cut off for the greater part of the low-water season.

(16) In conclusion I may say that as directed I am availing myself of the opportunity to gather a great deal of information which will be of service after the war, and when my investigations are completed, I shall be in a position to report fully on the following subjects :—

- (1) The removal of the Bar at the mouth of the Shatt-al-Arab.
- (2) The conservancy, on permanent lines, of the river to Basrah, and the establishment of a first class Port at Basrah, along with proposals for Administration and Finance.
- (3) The improvement on a permanent basis of the rivers Tigris and Euphrates.
- (4) Sir William Willcocks' irrigation schemes looked at from the point of view of River Conservancy.

SIMLA :

(Sd.) GEO. C. BUCHANAN, Colonel.

The 17th April 1916. }



'Summary of correspondence relative to the administration of the Port of Basrah  
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Sub-enclosure I.

APPENDIX A.

No. 1179-1-Q.

General Headquarters,

I. E. F. "D."

Basrah, the 5th January 1916.

TO SIR GEORGE BUCHANAN, Kt., C.I.E., M.I.C.E.,

Director-General of Port Administration

and River Conservancy.

MEMORANDUM.

With reference to your interview on the 3rd instant with Sir John Nixon, I am directed to record for your information the following points which were discussed and decided by the Army Commander:—

The present war necessities in Mesopotamia render desirable your advice and assistance in regard to the following points:—

- (a) Improvement in the navigation of the Tigris River between Ezra's Tomb and Qalat Salih.
- (b) Construction of a channel through the Hammar Lake.
- (c) Wharves and jetties at:—
  - (1) Magill.
  - (2) S. and T. Godown.
  - (3) Wharf opposite General Hospital.

Additional to the above, the following projects, though of equal importance but by reason of their larger scope and for other causes will probably have to be deferred for the present, should also receive your attention:—

- (d) The Qurnah Bar.
- (e) The Fao Bar.
- (f) Improved navigation of the Tigris River in regard to certain difficult reaches between Ali-al-Gharbi and Shaikh Saad.
- (g) Wharf or jetties at Custom House or Ashar Creek.

In regard to the exact limitation of your duties the Army Commander thinks it desirable that the points should be made clear:—

1. Port Administration.—

Hitherto there has been no question of Port Administration as understood in India and elsewhere, in Basrah.

The Administration of the Port of Basrah under Turkish Rule practically did not exist, and during our military occupation of the city it has neither been possible nor desirable to take this matter up.

It will, of course, be desirable for you to consider schemes and improvements for the establishment of the same on the conclusion of peace, when it is assumed that the Port and City of Basrah may possibly become a British possession and will be opened for trade on the lines of any other Port in the British Empire. In the meantime, however, any questions regarding Port Administration which may arise cannot, in the Army Commander's opinion, be allowed to impinge on the military necessities of the present situation, or to interfere in any way with the work and duties of the P. M. T. O. for Force "D."

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2. *Personnel and Equipment.*—

It will also be necessary for you to make all arrangements for equipment and personnel in regard to the execution of any work which you may have to undertake, and it is understood that this is being done.

Owing to the existing paucity of river craft of all descriptions, and of the constant use of the same for military requirements, it will not, at present, be possible to afford you any assistance from this source of supply. Hereafter, when additional craft have been received, it may be feasible to assist you with the same, and requests of this nature will of course receive every consideration. But at the same time, in order that there may be no misunderstanding on this point, I am to explain that all such applications will have to be submitted to the Army Commander, who will, in view of the military situation and requirements, decide whether craft, etc., can be made available or not.

(Sd.) M. COWPER, *Major-General,*

*D. A. and Q. M. G., General Headquarters.*

Copy for information to :—

- I. G. C.
- P. M. T. O.
- B. G., R. E.

No. 1179-2-Q.

General Headquarters, I. E. F. "D,"

*Basrah, the 8th January 1916.*

To the Chief of the General Staff,  
Army Headquarters,  
Delhi.

MEMORANDUM.

With reference to Government of India, Marine Department, letter No. H.-9859, dated 17th December 1915, relative to the appointment of Sir George Buchanan, Kt., C.I.E., M.I.C.E., as "Director General of Port Administration and River Conservancy," I beg to report and observe as follows :—

2. Sir George Buchanan arrived in Basrah on the 1st January 1916, and was interviewed by me on the 3rd instant.

3. At that interview I explained in detail :—

- (a) the general situation in regard to estuary, river and lake requirements in Mesopotamia;
- (b) the urgent requirements due to the military operations now in progress;
- (c) other questions and projects, though of great importance, of not immediate urgency.

4. I also laid down the exact delimitation of the duties to be undertaken by Sir George Buchanan. A detail of the same will be found in the attached letter.

5. In regard to the regularisation and permanent improvement of the Port of Basrah, this would appear to be a question which will have to be deferred, in view of the possible large expenditure entailed, until it is definitely decided whether the Basrah Vilayat is to become an integral part of the British Empire. In the meantime, therefore, it would only appear necessary for Sir George



'Summary of correspondence relative to the administration of the Port of Basrah  
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Buchanan to study the various eventual requirements of the Port of Basrah, and prepare projects and plans for the same.

There are, however, as will be observed from [the attached letter, certain urgent military requirements connected with the improvement of temporary jetties, etc., which I have had recently constructed here and which will engage Sir George Buchanan's immediate attention with a view to their improvement as considered necessary by him.

(Sd.) JOHN NIXON, *General*,

*Commanding, Indian Expeditionary Force "D."*

No. 1179-4-Q.

General Headquarters, I. E. F. "D."

*The 22nd February 1916.*

To the Chief of the General Staff, Army Headquarters, Delhi.

SIR,

I have the honour to forward herewith the attached correspondence for perusal and record.

I have the honour to be,

SIR,

Your most obedient servant,

(Sd.) M. COWPER, *Major-General*,

*D. A. & Q. M. G., General Headquarters, I. E. F. "D."*

The Director General of Port Administration and River Conservancy,  
I. E. F. "D."

For information.

BASRAH :

*10th January 1916.*

To the D. A. and Q. M. G.

MEMORANDUM.

I beg to acknowledge receipt of your memorandum No. 1179-1-Q., dated 5th January 1916; the instructions contained therein are noted and on the arrival of my staff and equipment in mediate action will be taken to give effect to same.

2. In the matter of Port Administration referred to by you I think it desirable to explain my understanding of the order of the Government of India more fully than I was able to do in my short interview with General Sir John Nixon at which the S. M. T. O. was present.

For the last 14 years I have been the Administrative Head of the 3rd largest Port in the Indian Empire, and I have had under my control the following departments, *i.e.*, Marine, Engineering, Traffic, River Conservancy, Secretariat and Finance. I gathered from my conversation with the Commander-in-Chief and other high officials that it was not intended, or for a moment contemplated, that I should exercise any control over the executive departments which are working the Port for the time being, solely for military purposes, but that the Government of India believed that from my intimate knowledge of the organisation and working of all departments of a modern port my advice and experience would be useful to the Army Commander on any points which might arise, and especially where a considerable expenditure of public money was involved, as for instance on wharves, warehouses, jetties, harbour moorings, docks, slipways, workshops, dredging operations, etc., etc. It was with this object in view that the Government of India directed me to proceed at the earliest opportunity to Basrah instead of, in the first instance, returning to Rangoon to collect my staff and equipment.



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3. Regarding "Personnel and Equipment," I have done my best to arrange for a complete and self-contained unit which, as will be readily understood, it is difficult to provide against all contingencies and for works which are in the stage of consideration.

For example, I have not provided a launch which will act as a tender to the dredger because I supposed that the two dredgers here had been given this necessary equipment, and I understand the launch "Barhein" has been so used to a recent date.

Also, although I have ordered two survey launches, I have not provided a motor boat or preferably steam pinnace which is an absolutely necessary auxiliary, because I was informed there were a large number of motor boats here, and that one could probably be spared.

4. If there is no objection, I shall be glad if a copy of this memorandum may be sent to the Government of India along with the Army Commander's order in regard to the exact delimitation of my duties.

(Sd.) GEORGE C. BUCHANAN,

*Director General of Port Administration and River Conservancy.*

No. 1179-3-Q.

FROM D. A. & Q. M. G.,

*General Headquarters,*

*Force "D."*

TO SIR GEORGE BUCHANAN, Kt., C.I.E.,

*Director General of Port Administration*

*and River Conservancy,*

*Force "D."*

BASRAH:

12th January 1916.

With reference to your letter unnumbered, dated 10th January, I am directed to observe as follows:—

In a separate communication I am forwarding to you for opinion proposals and estimates for the establishment of a Royal Indian Marine Dockyard at Basrah which was sanctioned by the Army Commander prior to your arrival in Mesopotamia and the work upon which is now in hand. This is the only outstanding matter connected in any way with Port Administration upon which you have not already been consulted. All other matters in regard to the wharves and jetties, conservancy of the estuary, rivers and lakes were dealt with in my letter No. 1179-2 Q., dated 8th January, and are therefore under your consideration.

3. In regard to personnel and equipment, I am to point out that in view of the present situation it will probably be better and quicker in the end if you arrange for a steam pinnace. The present situation in regard to river craft is as follows: In order to meet the despatch of urgent reinforcements to the front and to withdraw wounded we have to use every available river craft of every description. We are little by little getting further craft from India, but their date of arrival here is very uncertain and we are also faced with heavy losses in sea passage. If all goes well by the end of April next when we expect to receive all vessels, etc., from India and England, we should then have sufficient river craft here to be in a position to meet with requirements of yours for the same. But for the next two or three months, due to military operations and requirements, it is highly improbable that you can be assisted in any way from this source; unless, therefore, you consider it desirable to defer all surveys, dredging work, etc., it would seem best that you should demand from India everything that you consider necessary to enable you to put any work you contemplate in hand at once.



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With reference to paragraph 4 of your letter under reply the Army Commander is quite prepared to forward that communication on to the Government of India, but at present proposes to hold it over in case you may wish to amend or alter the same in view of this letter.

(Sd.) M. COWPER, Major-General,  
D. A. & Q.-M. G.

No. 1-A-16.

BASRAH :

19th January 1916.

To the D. A. and Q. M. G.

MEMORANDUM.

I beg to acknowledge receipt of your No. 1179-3-Q., dated 12th January 1916, and with reference to paragraph 3, I suggest that as the case is incomplete without my memorandum dated 10th January, it would seem advisable for the Government of India to have a copy for perusal and record.

2. In regard to paragraph 3 of your memorandum, I would again assure you that I am doing all that is in my power to collect staff and material in order to be as far as possible an independent water-tight compartment, and I fully realise that at present every available steamer and steam launch is required for military purposes.

I have ordered from India and Burma one large dredger, one paddle steamer, one steam launch and one steam pinnace; also sampans, rowing boats, etc., and my staff comprising surveyors, draughtsmen, clerks, boatmen and complete crews for dredger and launches is in process of collection and despatch for Basrah.

Under these circumstances there can be no question of deferring surveys or dredging work (unless unfortunately the launches are lost *en route*); indeed it is a matter of regret that the surveys were not put in hand six months ago.

(Sd.) G. C. BUCHANAN,  
Director General of Port Administration  
and River Conservancy.

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Sub-Enclosure II.

APPENDIX B.

No. 19-A-16.

Office of the Director-General of Port

Administration and River Conservancy,

Basrah, the 10th February 1916.

To the D. A. and Q. M. G.

MEMORANDUM.

With reference to your No. 1303-1-Q., dated 4th February, to I. G. C., I had already taken in hand the question of building new wharves at Magill, as directed in your No. 1179-1-Q., dated 5th January 1916, to my address.

I have now considered the situation in the light of the directions contained in your later communication to the I. G. C., and beg to submit the accompanying note and plans for the information and orders of the Army Commander.

GEO. C. BUCHANAN, Colonel.

Director-General of Port Administration  
and River Conservancy.

*Note on Wharfage accommodation at the port of Basrah, with proposals for improvement and extension.*

This note is intended to deal primarily with immediate war necessities, but it will be convenient to describe briefly the constitution of the port prior to the British occupation, and trace its development to the present time. It may also be laid down as an axiom that the chief requirements of a modern port irrespective of its use, are :—

- (1) Facility for prompt discharge and despatch of steamers ;
- (2) Ample storage accommodation for goods.

2. In the days of Turkish rule, although the trade was considerable, port accommodation was practically non-existent. All sea-going steamers laid at their anchors in the stream, and imports for Basrah were discharged into country boats and landed at the Custom House wharf where imports for Baghdad were discharged direct into the river steamers and flats and taken up the river on a through bill of lading. Exports consisting largely of dates were shipped into country boats at various points on the river, and thereafter conveyed to and loaded into the sea-going vessels.

There were no wharves, and even in the busy season the number of sea-going vessels in the port at the same time, rarely exceeded half a dozen.

3. The British occupation brought a great change in the affairs of the port, and it was necessary to establish a base where vast quantities of supplies and munitions of war could be stored, and thereafter transferred to the site of military operations, and along the lines of communication.

4. For this purpose temporary wooden jetties were erected along the foreshore between Khora Creek on the South and the Base Hospital on the North, and pieces of ground were allotted to the various military departments.

The general procedure remained, however, practically the same, as owing to the shallowness of the water alongside the jetties, the sea-going vessels discharged the whole of their cargoes into light country craft, the goods being landed at the various jetties and thereafter shipped into river steamers and flats, and conveyed up the river to their destination.



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5. So long as the force remained a comparatively small one, the arrangements cited above worked fairly satisfactorily, but with the advent of numerous reinforcements, and the necessity for addition to stocks and reserves, the tonnage of the port increased rapidly, and it has not been unusual to see 12 to 16 transports in the river at the same time all discharging into country craft.

6. To alleviate the congestion at the existing jetties it was decided to build more temporary jetties at Magill, 4 miles above the Ashar Creek (the centre of the existing jetties), and Magill had moreover the advantage of such deep water close to the bank, that the sea-going vessels were enabled to go alongside and discharge direct on to the land, thus saving the delay caused by the use of country craft of which there was only a limited number available.

7. It has not, however, been possible up to the present to make the fullest use of Magill for the following reasons :—

- (1) liability of ground to be flooded during the high water season ;
- (2) lack of shed accommodation for stores and buildings for use of personnel ;
- (3) temporary nature of jetties.

8. The Army Commander has now decided that the necessary accommodation is to be provided for the location of S. and T. and Ordnance Departments at Magill, and from the point of view of port work and administration, I beg to report as follows :—

*(A) Magill as the permanent port of Basrah.*

I would observe that having given the matter much consideration, I have formed the opinion that owing to its extensive deep water frontage, the whole future of the Port of Basrah lies at Magill ; any port works executed in that locality may be conveniently designed to form integral portions of a future project, and the Germans doubtless had this in mind when they located here the terminus of the Baghdad Railway, and built a small wharf.

*(B) Liability of ground to be flooded.*

Bunds are under construction to keep out of a certain area the flood water from the Euphrates, but I suggest that having regard to the permanency of the work, it is desirable to reclaim the whole area to a level well above the highest floods, I estimate, approximately that 10 cubic yards will be required for every 10,000 square yards of area, and I suggest that the quickest means of accomplishing the work will be by running a light railway out into the desert and bringing in train loads of earth. I understand that labour is scarce and in that case one or more Priestman Jral Excavators might be engaged, each of which have an estimated out-put of 3 to 4 cubic yards a day.

*(C) Buildings and Roads.*

In the making of a port it is of importance that all buildings should be located with the greatest care, as it is sometimes found that after buildings have been erected they are in the wrong position, and interfere with roads, tramlines, etc., etc.

In the matter of communications I would suggest that it is of importance to build some macadamized roads from the wharf to various points in the new depôt.

I understand that there is practically no local stone available, but as until recently the whole of the stone for the roads of Rangoon, in Burma, was obtained from Bombay, there seems no reason why stone should not be imported to Basrah from Karachi.

*(D) General arrangement of wharves.*

For permanent use as a commercial port the usual and best arrangement is to have a continuous line of deep water wharves with roads and transit sheds behind same, as shown in drawing No. 1 accompanying this note, the light draught river steamers being accommodated below, but for the immediate military necessities I think it will be more suitable to provide detached berths for sea-going vessels, with floating pontoon landing stages between the steamer berths for the



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accommodation of river craft and flats, as shown in drawing No. 2 accompanying this note.

The procedure would then be as follows:—

- (1) Certain areas of land with a river frontage would be allowed to the Supply and Transport, and Ordnance Departments, respectively.
- (2) Sea-going vessels would discharge at the sea-going berths and their cargoes would be sorted and delivered to the department concerned.
- (3) Goods for despatch up country would be shipped into the river steamers from the floating pontoon landing stages.

The objection to this scheme is that inward traffic from the sea-going vessels would cross outward traffic to the river boats, but I do not see how this can be avoided.

The plan\* shews 5 berths for sea-going vessels and 4 berths for river steamers and if more are required they can be erected above the Baghdad Railway Wharf, where there is an ample length of deep water frontage. I have allowed a space of 200 feet between the jetties of each berth and 640 feet between the berths themselves, but these spaces can be altered if from the marine point of view others are more suitable for steamer hatches, etc.

\*Plan No. 2.

At the conclusion of military operations the floating landing stages could be removed, the gaps between the sea-going wharves filled in and the whole wharf extended one way into the river, the result being a fine wharf 2,800 feet long, with a depth alongside of 30 feet below mean sea level.

(E) *Construction of wharves.*

The existing jetties at Magill, although admirable for a sudden emergency can only be classed as very temporary (see photos attached), and the new wharves have been designed as cheaply as possible compatible with stability.

Whether they should be built of steel screw piles and steel bracing, or of wooden piles and bracing has received my serious consideration, and I have decided in favour of the latter method because it is cheaper, easier and quicker to make in a country where skilled labour is scarce, an almost as durable as steel in a river which is not affected by the marine motion.

I propose to do the work by degrees, one berth at a time, so that the existing temporary jetties would be kept in use until they were gradually supplanted by the new ones.

In the matter of actual construction, the whole of the port works have been executed hitherto by the Military Works Department, and they could no doubt carry out the building of the new wharves with speed and efficiency, if however in view of the numerous demands on his staff the B. G., R. E., would like to be relieved of this work, I should be quite prepared to carry it out entirely in my department.

(F) *Floating Pontoon Landing Stages.*

For permanent use steel bowstring girder bridges and steel pontoons tied together with steel girders are usually employed, but they will take some time to manufacture, and in this case I propose to utilise some of the pontoons which have been retained here from the pipe line of the dredgers "Jinga" and "Kalu," tie them together with timber bearers and make a wooden bowstring girder bridge.

In the event of the pipe line pontoons being required elsewhere, the Rangoon Port Commissioners have, to my knowledge, a number of small iron barges which are not at present in use and which I think could be made available.

(G) *Time.*

For military purposes speed is the essential element, but unfortunately engineering work requires a certain amount of time to collect material, and therefore a further period for construction.



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I estimate that it should be possible to erect one berth complete for sea-going vessels per month, and one floating pontoon landing stage per week after the arrival of the materials, and should the work be entrusted to my department, I will at once prepare complete indents for all the plant and material required.

(H) Cost.

I estimate approximately that each complete berth for a sea-going steamer will cost Rs. 50,000 : thus the 4 new berths provided for will come to Rs. 2,00,000.

The floating pontoon landing stages would probably not cost more than Rs. 5,000 each, if the pipe line pontoon can be used, or Rs. 15,000 if iron barges are procured from Rangoon.

Against this estimated cost may be placed, apart from the value of the wharves for military purposes—

- (a) The saving on demurrage to steamers and hire of country boats.
- (b) The permanence of the work.

(Sd.) G. C. BUCHANAN, Colonel,  
Director-General of Port Administration  
and River Conservancy.

No. 1142-13-Q.

GENERAL HEADQUARTERS, I. E. F. "D,"  
Basrah, the 29th February 1916.

To Director-General of Port Administration and River Conservancy.

MEMORANDUM.

The attached correspondence is forwarded for information.

(Sd.) C. R. INGRAM, Major,  
D. A. Q. M. G., General Headquarters.

No. A.-426.

BASRAH,  
Dated the 11th February 1916.

To G. H. Q.

MEMORANDUM.

The subject of increasing the very limited wharfage available for the embarkation of troops and stores requires very early attention—and with reference to the concluding portion of Marine Transport Note No. 4, forwarded to G. H. Q. on the 25th December 1915. I request that orders may be issued, if there is no objection to those concerned, to extend and build the following wharves and jetties :—

Commencing from Boosa pier. This pier requires extending south some 150 feet, and north as far as the present floating pontoon for boats, including the space occupied by it. A landing place for boats with 3 feet at low water being provided between this and the supply wharf.

A light wharf to be erected along the whole frontage from the north end of the supply wharf to the timber pier, with a number of leads to the shore as at the Boosa pier. The wharves are required by river craft and require to be suitably fitted with bollards as necessary in order that vessels may make fast alongside. Depths alongside to be 4 feet at low water. The Post Office jetty to be extended to 4 feet low water to admit of officers landing there instead of at the Army Commander's pier, which is not to be used by the public. Additional wharfage for river craft to extend from the Customs wharf to the remount wharf fitted as above, with a landing place for boats at one portion of it, preferably near Viceroy's wharf.

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The present German wharf at Magill to be extended 150 feet towards No. 2 Berth. The stranded vessel between the German wharf and No. 2 Berth to be removed if practicable without damaging the channel.

Landing places for boats at one or two places at and between the German wharf and No. 5 jetty. It is also for consideration of G. H. Q. whether additional wharfage for river craft should not be constructed on the left bank North of the Flying Corps wharf. If it is intended to embark or land troops on that side of the river, it is certainly necessary. If later it is found more wharfage is required for ocean-going vessels, separate proposals will be submitted.

(Sd.) W. B. HUDDLESTON, *Captain, R.I.M.*,

*Principal Marine Transport Officer, I. E. Force "D."*

Copy to I. G. C.,

B. G. R. E.

MARINE TRANSPORT NOTE No. 2.

The present new berths alongside the bank in the Magill Reach of the river are numbered from North to South beginning with No. 1 Berth which was formerly called the Magill wharf and comprises 6 berths for ocean-going vessels. These are at present merely temporary substitutes for wharves and are suitable for present urgent work; but in order to cope with future requirements, it is proposed that as speedily as possible heavier and more substantial wharves be erected in this place to allow vessels to lie alongside without the agency of mahallas which form their structure, material and size are only adapted for use as a temporary measure. Wharves are required to be continuous in order that more vessels can lie alongside and to take every advantage of the deep river frontage there available. I propose therefore that steel screw piled wharves with a width of 20 feet be substituted for the present arrangements when opportunity offers. These wharves will require fittings with bollards, cranes, etc., as necessary, and tram lines to rapidly clear them of cargo. It is estimated that berths for at least 8 vessels would be thus secured. This in itself will, to a very great extent, solve the mahalla question and give the maximum rapidity in disembarkation of troops and stores.

Proposal to substitute wharves for the present temporary structure at Magill as soon as possible.

Advantages of deep river frontage.

Necessary fittings for wharves.

For lighter craft, it is proposed that the whole front from the R. E. Park to the South as far as the present small jetty now used for discharging firewood to the North should be connected by numerous continuous wharves and landing places with occasional landing steps for boats. The want of these facilities greatly hampers my department.

If approved I request that necessary action may be taken by the B. G. R. E. at the earliest possible time to give effect to this proposal.

(Sd.) W. B. HUDDLESTON, *Captain, R.I.M.*,

*Principal Marine Transport Officer, I. E. Force "D."*

Copy to I. G. C.

No. A.-25. 20-12-15.

To the G. H. Q.

MARINE TRANSPORT NOTE 4.

To obtain the most rapid disembarkation of troops, animals and stores and embarkation of troops and stores. The object of wharves is to obtain rapid disembarkation of troops and stores. To do this efficiently and with the greatest economy, it is essential to have as many wharves in suitable places on the river front as we have material and labour to



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build them. It is not proposed that these wharves and jetties should at the present be of anything but the most temporary nature. But in order that such wharves and jetties should be capable of fulfilling our requirements, they must be sufficiently substantial to permit of large ocean-going steamers using them without knocking them out of action by so doing.

The use of wharves, wherever practical, will shew a saving in mahailas, in labour and in lighterage; moreover they will shew also a saving in our coal bills, and in the number of tugs employed which in this way are released to tow stores, coal and oil up river to the various points when required in the lines of communications.

Present berths at Magill. With the present system of berthing at Magill, it is found that space cannot be found for more than 5 berths, as vessels cannot be berthed close to each other as in regular wharves, as more space must be left for vessels to manoeuvre alongside. I have inspected above Magill and find that quarter mile above No. 1 Berth (the present Magill wharf) there is a large stretch of bank admirably suited for any extension of wharfage required. At present our requirements up there are for one more berth for transports, and one to permit of collier coming alongside, and of establishing another coaling depôt up there where vessels can be coaled directly alongside. The saving in time, expense and labour is immense, and well worth the expenditure incurred in fitting up the necessary wharf accommodation.

Another wharf is required off the present hospital, in order that the sick and wounded can be transferred direct from hospital to hospital ships alongside.

A wharf at the Ordnance Depôt to take vessels like the "Oporto" and "Rathway Hall" would result in a saving of labour and lighterage, a similar one being required for the R. E. Park. I request that consideration be given to these requirements and that approval be granted to as many temporary wharves being constructed as we can utilize.

(Sd.) W. B. HUDELSTON, *Captain, R.I.M.*,  
*Principal Marine Transport Officer, I. E. Force "D."*

No. A.-80.

To the I. G. C.

Copy to G. H. Q., B. G. R. E.

No. A.-546.

BASRAH,

25th February 1916.

To G. H. Q.

MEMORANDUM.

Reference paragraph 3 of G. H. Q. No. 1142-8-Q., dated 19th instant and attached letter, plans No. 19-A-16, dated 10th February, from the Director-General of Port Administration and River Conservancy, — I have carefully considered the suggested arrangements of the new permanent wharves and submit the following remarks.

With regard to plan 1, I have no remarks to offer except that such an arrangement of wharves, sheds and warehouses appear admirably planned for meeting the usual needs of merchants shipping when the amount of trade with the port warrants the expenditure of erecting it.



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2. With regard to plan 2, and the arrangement proposed to meet our urgent requirements for berthing ocean-going transports and river craft, I wish to make the following remarks:—

The proposed new berths consisting of two 36 feet square-headed jetties 200 feet apart with leads to the shore from each and a distance apart between berths from centre to centre of 640 feet, will be a great improvement (when erected) on our present mahaila platform arrangements which were designed by me as a very temporary expedient to fulfil our purposes, namely, to improvise something in the way of a jetty as quickly as possible to permit of the disembarkation of troops, animals and stores without loss of time on to the bank.

3. The distance between the mahaila jetties was arrived at to suit the average vessel and intended to be the same distance of 200 feet as now proposed and I am still of opinion that this is probably the best distance to work on.

4. It is, however, at best a compromise and cannot take the place of a continuous wharf, as it necessitates hauling vessels ahead and astern some 100 feet or so to work their hatches as required. It is seldom that we get a vessel of less than 400 feet in length, the average being 430—448 feet, and the longest we have dealt with being 474 feet.

5. I do not consider that the proposed scheme for ocean-going vessels berth, with river craft berths between each, is a workable one and am of opinion that it should not be adopted, as it would not permit of sufficient space for ocean-going vessels to either manoeuvre into a berth nor allow them space to work in when there.

6. I request that 600 feet distance from centre to centre of the proposed ocean-going vessels wharves be reserved for them and that sites to the north of No. 1 Berth and to the south of No. 5 be utilised for river steamers, and that sites be placed on the inside of berths in order that boats can land at them.

7. In view of the extreme urgency of our needs for wharves, both for ships and now in particular for river craft, that my requirements for marine transport work outlined in Marine Transport notes 1, 2 and 4, and in my No. A-426 of 11th February, may, so far as material is available, be taken in hand without delay, and such temporary expedients as suggest themselves to those responsible for the building of wharves and jetties be utilized as the lack of wharfage facilities for the river craft here and coming, is causing me the greatest anxiety.

(Sd.) W. B. HUDDLESTON, *Captain, R.I.M.,*  
*Principal Marine Transport Officer, I. E. Force "D."*

Copy to I. G. C.

No. 70-A. 16.

OFFICE OF THE DIRECTOR-GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY,  
53, Strand Road,

*Basrah, 2nd March 1916.*

To the D. A. and Q. M. G.

MEMORANDUM.

Please see your No. 1142-13-Q., dated 29th February 1916 and enclosures, with special reference to Memo. No. A-546, dated 25th February 1916, from the P. M. T. O. on the subject of the proposed new wharves at Magill.

2. In my note, dated 10th February 1916, on wharfage accommodation at the port of Basrah, I pointed out that under ordinary circumstances I should much prefer to have a continuous line of deep water wharves, the light draft river



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steamers being accommodated below the sea-going vessels but that for immediate military necessities I thought it would be more suitable to provide separate deep water berths with floating pontoon landing stages between them and I stated that I had allowed a space of 200 feet between the jetties of each berth and 640 feet between the berths themselves.

3. I said that these spaces could be altered if from the marine point of view others were more suitable for steamer hatches, etc. I proposed this reference because I was not in possession of the dimensions of the vessels visiting the port or of the river steamers and I supposed that if my space of 640 feet between the berths was insufficient, the P. M. T. O. would suggest another dimension and that possibly instead of 5 berths we should have to be contented with 4.

4. The P. M. T. O. seems, however, to have misunderstood the reference and expresses an opinion in favour of the scheme which I had given reasons for rejecting, and says the scheme which I am satisfied is the best for military requirements is unsuitable.

If it is necessary to give more room for the working of the ocean steamers I can cut out one berth and thus increase the space between the berths to 850 feet which should give ample room for a floating pontoon landing stage between each deep water berth.

(Sd.) G. C. BUCHANAN, Colonel,  
Director-General of Port Administration  
and River Conservancy.

*Copy of letter No. A-21-31, dated 2nd April 1916.*

From P. M. T. O., to G. H. Q.

It is requested that the necessary measures may be taken to repair and strengthen the existing wharves and jetties and to build more wharves for river craft. Please see former correspondence contained in my M. T. Note No. 2 of 20th December 1915, M. T. Note No. 4 of 25th December 1915, and my No. A-426, of 11th February 1916, on this important subject.

The existing wharves are quite insufficient to meet our requirements for the embarkation and disembarkation of troops and stores and I consider it most essential to build more wharves.

A long wharf from Customs pier to the rest camp pier would go far to meet requirements for embarkation and disembarkation of troops and stores. Another wharf to be made north of the German wharf at Magill for a like purpose. The Bhoosa wharf being extended to the north as far as the present pontoon landing place. This would meet present urgent requirements.

VERY URGENT.

No. 1142-13-Q.

GENERAL HEADQUARTERS, I. E. F. "D,"

Basrah, the 3rd March 1916.

To

D. G. P. A. & R. C.

B. G., R. E.

MEMORANDUM.

Please let me have your opinion on the above.

C. R. INGRAM, Major,

D. A. Q. M. G., General Headquarters.

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VERY URGENT.

No. 133-77-E.

GENERAL HEADQUARTERS, I. E. F. "D."

4th April 1916.

To D. A. & Q. M. G.

MEMORANDUM.

Reference your No. 1142-13-Q., of 4th, forwarding P.M.T.O.'s No. A-21-13, dated 2nd April 1916, I may remark that all the wharves asked for in M. T. note No. 4 of 25th December 1915 have been built, *i.e.*, 2 new ones above Magill, the Hospital, Ordnance and R. E. Piers.

2. I suggested in my No. 133-37-E., dated 14th February 1916, that the D. G. of P. A. and R. C. should decide what wharfage is necessary, but I have received no reply on this subject.

3. There are seven wharves at Magill and an eighth nearly ready, but I don't think, even with the recent press of traffic, I ever saw all these wharves occupied by steamers.

Is it likely that the number of ships in the future will be greater ?

4. Before entering on large schemes of construction of wharves such as the long stretches of wharf asked for at the Bhoosa and Customs piers, I think it is desirable to ascertain that they are definitely required, and for what purpose.

Once some definite and comprehensive scheme has been prepared and sanctioned, we should have something to work to.

J. C. RIMINGTON,

*B. G., R.E.*

Copy to D. G. of P. A. & R. C.

P. M. T. O.

D. D. Works.

No. 179-A-16.

OFFICE OF THE DIRECTOR-GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY,  
I. E. FORCE "D,"  
53, Strand Road.

To the D. A. & Q. M. G.

MEMORANDUM.

With reference to your very urgent No. 1142-13-Q., dated 3rd March 1916, forwarding copy of letter, dated 2nd April 1916, from the P. M. T. O., I submit that from reading Captain Huddleston's letter one would think no scheme for wharves at Magill, had been sanctioned and was in course of execution.

There will be 4 new pontoon landing stages for river craft at Magill, the pontoons for same have already arrived at Bombay and the chief object of my deputation to Bombay is to expedite all matters in connection with wharves at Magill.

I have already commented in paragraph 8 of my No. 88-A-16, dated 7th March on the Marine Transport Note referred to by the P. M. T. O. in his letter under reference and whilst I am anxious to do all that is possible to give more accommodation I submit the matter must be dealt with comprehensively and on a definite programme, the first item in which is I understand wharves for sea-going vessels and pontoon landing stages for river at Magill.

(Sd.) GEO. C. BUCHANAN, Colonel

*Director-General of Port Administration*

*and River Conservancy, I. E. Force "D."*

Copy to B. G., R. E.



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Sub-Enclosure III.

APPENDIX C.

No. 77-A-16.

OFFICE OF THE DIRECTOR-GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY,  
53, Strand Road;  
Basrah, 4th March 1916.

To the D. A. and Q. M. G.

MEMORANDUM.

I feel I should be failing in my duty of assisting the Army Commander in all matters connected with the port (*vide* letter No. H-9859, dated 17th December 1915, from the Secretary to the Government of India to my address), did I not make the following remarks on traffic management.

2. What is known in a commercial port as traffic management comprises all arrangements for the handling of goods from vessels arriving at the port and their delivery to consignees. For example if this port were run on business lines there would be a traffic department which would make adequate arrangements for discharging ships with promptitude and would see that the goods so discharged were delivered to the department to whom they were consigned.

The departments would be presided over by an officer experienced in the work and with business habits and the work would proceed automatically.

3. From observations and personal experience I think it will be generally admitted that at the present time the traffic management at the Port of Basrah requires immediate reorganization and that the system whereby officers with no experience in similar work are entrusted with these intricate operations is both costly and unsatisfactory.

In another communication I have commented on the absolute lack of system in the unloading of the S. S. "Havildar" and I believe that example could be multiplied many times.

4. I venture to express the opinion that efficiency will only be obtained by organizing a separate traffic department and placing a man of experience at the head of it and if the Army Commander will permit me I will gladly draft a scheme for his consideration.

I may say there is no difficulty in the matter, it simply means substituting methods with which I am familiar and which are used at ports all over the world for the present crude but doubtless well meant efforts of amateurs.

(Sd.) Geo. C. BUCHANAN, Colonel,  
Director General of Port Administration  
and River Conservancy.

DEMI-OFFICIAL.

General Headquarters, I. E. F. "D,"  
Basrah, the 5th March 1916.

My dear Sir George,

With reference to your official letter No. 77-A-16, dated 4th March, I should be very glad if you would kindly draw up a brief scheme of how you suggest this question of unloading ocean ships should be dealt with. From the enclosed letter you will see that the P. M. T. O. has at length woken up to the fact that all is not right. In fact, I think the much to be regretted return of your equipment, has, in reality, proved to be somewhat of a Godsend; at any rate, it has brought matters to a head, and some action must be taken as soon as possible to put matters on a sound workable basis.

Personally, I have recognised that the unloading of ships for the past two months has been in a very unsatisfactory state, in fact, I have had too much personal ocular proof to think otherwise.



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I yesterday interviewed the two chief partners of Gray, Mackenzie, and they are perfectly willing to take the whole business over on what I imagine reasonable, sound, workable lines. But they naturally postulate for a certain number of barges, mahailas and steam tugs being placed at their disposal, but this I intend to see is done.

However, will you kindly think over this matter, and I will see Gray, Mackenzie to-morrow and get a detailed statement out of them of what they are prepared to do.

Yours sincerely,

M. COWPER.

*P. S.*—Would you please come round and see me to-morrow (7th instant) and let me know what you have evolved?

M. COWPER,—6-3-16.

No. A.-645.

*Basrah, 4th March 1916.*

MEMORANDUM.

The question of speeding up the discharge of transports and the best manner to control the mahaila traffic of the Port and up river, has been under consideration for some time. I am now, I believe, in a position to improve matters by means of arrangements made with Messrs. Gray, Mackenzie and Messrs. Lynch Bros. who will place the whole of their resources at my disposal with regard to this most important and pressing work and will detail Europeans with a knowledge of Arabic and Persian to organise the labour afloat. I have detailed Lt. Ward, my personal assistant, for duty as Marine Transport Officer (Beach) and as Controller of Native Craft and to control all traffic within the port as regard tugs, lighters and mahailas for whichever department requires their services, subject to such orders issued by you regarding the urgency of any particular work required and which requires precedence over that of others. The co-operation of all departments concerned is requested in this matter, and if you approve, I request that they may be notified accordingly. There are only a certain quantity of mahailas and harbour crafts available and these will be dealt with by the Marine Transport Department in accordance with the urgency of requirements which may vary from day to day.

(Sd.) W. B. HUDDLESTON, *Captain, R.I.M.*,

*Principal Marine Transport Officer, I. E. Force "D."*

Copy to G. H. Q.

No. 88-A.-16.

OFFICE OF THE DIRECTOR-GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY,  
53, Strand Road,

*Basrah, 7th March 1916.*

To the D. A. and Q. M. G.

MEMORANDUM.

With reference to my No. 17-A.-16, dated 4th March 1916, I have the pleasure as requested, in submitting the following remarks on the traffic arrangements at the port with proposals for improvements.

2. I will begin by pointing out some of the defects of the present system which have come under my notice and I desire to preface my remarks by saying that any adverse criticism I have to make must be regarded as quite impersonal, as it is no more the fault of the P. M. T. O. that he cannot manage a large port



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than it would be my fault if I were given command of a R. I. M. Transport from here to Bombay and promptly ran her ashore.

3. In the early days of the Force when there was only one division, the transport work was not very heavy and the unloading of munitions and stores was a comparatively easy task, but at the present time there is an amount of tonnage coming in which would anywhere constitute a large port and it is necessary in the interests of economy and efficiency to adopt the ordinary business methods of Port Administration.

*Control.*

4. In my judgment the time has come for decentralisation and I should at once relieve the P. M. T. O. from a portion of his duties which must from their unusual nature be a burden to him. It is generally recognized that the business management of a Port or Shipping Company is entrusted to a different class of man to that who so skilfully navigate the ships and for that reason you will never find the Commander of a vessel appointed General Manager of the B. I. or P. & O. or of any of our great ports. It is merely a case of every man to his own trade.

5. I suggest that the P. M. T. O. should continue to carry out the usual duties of a marine officer, *i.e.*, the movement of vessels in and out, berthing, moving, provision of pilots and harbour-masters, etc., but that an independent officer who I should style Traffic Superintendent, be appointed and make responsible for the unloading of vessels, the despatch of goods to the various departments and the wharfage arrangements.

6. I would explain there are points which arise in this connection in addition to the actual unloading of the vessels.

There will be the most suitable arrangements for wharves and landing stages apart from their actual construction, consultations with the Military Disembarkation Officer so as to fit in arrangements for moving troops with these for working cargo and see that no unnecessary delay takes place, co-operation with Heads of Departments in getting the boats discharged when they have left the ship and many other points. It may be possible to let a contract for actually discharging the sea transports, but I would point out that all contractors require supervision and work first and foremost for their own pecuniary benefit. It is doubtful if any contractor in Basrah will have sufficient labour to discharge say twelve transports simultaneously or whether there will be sufficient country boats, and discrimination and direction will be required.

7. I could name half a dozen men who are thoroughly conversant with the whole of this branch of Port Work and there is in the Force in the person of Lieutenant E. H. Kelling, I.A.R., an officer who in civil life was Traffic Manager for the whole of the Port of Rangoon under my immediate direction and to whom the business management of this port would present no difficulty.

8. In the matter of wharves and landing stages the usual arrangements is for the Traffic Superintendent and Engineer to meet in consultation the Director and decide upon what is required and the Director would report to his Board or in this case to G. H. Q. Here, however, nothing of that nature has been done; the P. M. T. O. has written Marine transport notes 1, 2, 4 and 426, but they are so indefinite as to be quite useless for practical purposes. I think I may say the only note attempting to deal in a comprehensive way with wharf accommodation is that written by myself giving designs for wharves at Magill.

9. Another reason for decentralisation is that when an officer controls a number of different departments of his own service he is apt, if he is of a sensitive nature to try and protect them all from adverse criticism even at a loss of efficiency. For example in the case of the "Havildar" it so happened that I, much interested in the discharge of my survey equipment and so very much upset when a portion of it was returned to Bombay that I reported the matter at once to G. H. Q. but I understand the "Havildar" also took away 49 cases of stores consigned to the Store-keeper, Marine Dockyard, and urgently required by that officer who reported the fact that they had not been discharged to the P. M. T. O. As, however, another department of his was responsible for the mistake he was hardly likely to bring the matter forward.

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*Defects in Present Methods of Discharging Cargo.*

10. I have had no opportunity of investigating the system in detail, but certain facts have come to my knowledge—

- (a) Coolies are engaged by time.
- (b) Country boats are engaged by time.
- (c) There has been most inadequate supervision of both coolies and boats.

The result has naturally been disastrous ; it is no part of the duty of a Ship's Officer to act as cooly mistry and make the coolies work and boatmen seem to have done what they liked even to the extent of deliberately hiding themselves and their boats when they were loaded up. I do not know what the coolies have been paid and how it compares with the market rate or whether there has been any check on the contractor's bills. It is by no means uncommon under such circumstances for hundreds of coolies to be paid for who have been non-existent. I do not attribute dishonesty to a high-class firm ; it is done by subordinates without the knowledge of the principals.

- (d) Boats have frequently been partially loaded.

There should be a tonnage mark on each boat and it should be some one's duty to see the boats are loaded to the mark.

- (e) Vessels remain a considerable time in port without any action being taken towards discharging them.

In most ports the anchor is hardly down before discharging begins and in Rangoon we had to pass a bye-law prohibiting boats coming alongside before the ship was ready.

- (f) Vessels at the wharves at Madgill are discharged on one side only.

Overside discharge should always be resorted to, that is to say that whilst the vessel was discharging on to the wharf on one side she should also be discharging into cargo boats on the other or river side.

- (g) The country boats are not promptly discharged.

I have seen country boats that have laid at their anchors for days and even weeks with some particular article that was most immediately required.

The co-operation of all departments should be asked for to release boats promptly.

- (h) Vessels arriving from Bombay or elsewhere with cargo have returned to Bombay with a portion of the cargo undischarged.

I am afraid this has happened more frequently than is generally known. It is due to carelessness and absolute irresponsibility of all concerned. Such an act should only be committed for the most serious reasons and should be reported in each case to the highest authority concerned.

- (i) Insufficient working hours. At a commercial port, and especially with freights what they are to-day, work at discharging and loading goes on night and day. The hours of work here could be considerably extended with advantage.

- (j) The system of having a number of officers with no experience of the work, and therefore to whom no real responsibility can be attached, working under another officer (the P. M. T. O.), who also has no experience of the work, but struggles with new schemes and endeavours to keep all the details in his own hands, must be inefficient.

- (k) Unsuitable country boats.

The native mahailas or country boat is for the purpose of receiving goods from a sea-going steamer and conveying them ashore just



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about as unsuitable as vehicle as it is possible to imagine; if a hundred large lighters had been brought here at the beginning of the occupation they would have paid their cost many times over and I think that a number of them should still be obtained. They can be built in India, taken to pieces for shipment and put together here.

(l) Unsuitable jetties.

The jetties which have been built along the foreshore between the Ordnance Department and the base hospital although admirably fitted for a temporary emergency in the early days of the occupation are unsuitable for what may be called permanent work.

*Proposed improvements in methods of work.*

11. Destructive criticism is of little use unless followed by proposals for the betterment of things.

The usual system in a commercial port is to pay well for supervision even to the giving of bonuses but to have as little to do as possible with time-working in any shape or form. When a vessel arrives at a port and is berthed at wharf a stevedore on behalf of the ship works the cargo on a tonnage rate and takes it from the ship hold and places it on the wharf. The Port Authority then takes charge and employs coolies on a tonnage basis to convey the goods to the sheds and sort and stack them and finally the consignee employs cartmen on a tonnage basis or by the trip to take the goods to their warehouses.

Boating in the stream is done by a boating contractor, also on the tonnage basis, and if the contractor wishes to make his business pay he must know where each one of his boats is at any hour of the day or night.

12. The P. M. T. O. in his A.-645, dated 4th March 1916, to I. G. C., says the question of speeding up the discharge of transports has been under consideration for some time and he believes he is now in a position to improve matters by means of arrangements made with Messrs. Gray, Mackenzie, and Messrs. Lynch Brothers, who will place the whole of their resources at his disposal. Unfortunately Captain Huddleston gives no details whatever as to the nature of the arrangements made and it is therefore impossible to discuss his scheme, but unless it is on a tonnage basis or is working up to a tonnage basis it is hardly worth consideration.

13. There is no doubt that the right course to pursue is to enlist the services of the local shipping firms; and the proposal you made to me yesterday to hire out to a firm Government tugs and boats, and let a contract at so much per ton for discharging cargo, is a reasonable basis on which to frame a scheme.

14. What Captain Huddleston terms speeding up discharge is known technically as "quick despatch," it comes first in a shipowner's mind (in this case Government being the shipowner) and if we can make arrangements whereby a transport can be despatched in five days instead of fourteen days, we can afford to be fairly liberal to a contractor.

15. It is difficult to say without trial what would be a fair rate to pay a contractor or what constitutes really "quick despatch" as conditions are different to what obtain at commercial ports and I believe some such arrangement as follows will be necessary as a preliminary to letting a contract:—

- (1) The contractor will undertake for one month to discharge all the sea transports.
- (2) He will be provided with the necessary boats and tugs.
- (3) He will provide coolies.
- (4) An accurate account must be kept of—
  - (a) The coolies and boats used at each ship.
  - (b) The tonnage of cargo discharged.
  - (c) The actual number of working hours taken to discharge each ship.

At the end of the month the contractor will be paid his coolie bills and a percentage or rate per ton for superintendence and profit and a careful analysis



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will be made from which a contract can be let on a tonnage basis. It will be to the interest of the contractor to do his utmost during the month because the contract rate will be based just as much on the speed of despatch as on the actual cost and once the contract is let, his profit will depend entirely on the speed of despatch. It may be necessary to differentiate between transports discharged at Madgill wharves and transports discharged in the stream, but this can be discussed at the end of the month's trial.

16. To facilitate operations the Traffic Superintendent should be advised as soon as possible of the probable date of arrival of transports and immediately they have crossed the bar. He should also have telegraphed to him from the port of sailing a summary of the manifest so that he might know beforehand what arrangements to make. For instance if he knew a week in advance that a transport was arriving full of a mixed cargo for the Supply and Transport he would make arrangements accordingly in consultation with the Deputy Director, Supply and Transport.

17. In the matter of hire of boats and tugs when the contract is made, some scheme must be framed. As tonnage varies from week to week, the number of boats can hardly be fixed arbitrarily. I think the best plan would be for the Traffic Superintendent to inform the contractor at the end of every week the number of transports expected the following week with their tonnage as far as ascertainable and the contractor to name the number of boats and tugs required by him.

These would be placed at his disposal at a fixed rate of hire which would be deducted from his bill at the end of the week or month as may be.

There are many details to work out to perfect the scheme but above are, on broad lines, what I recommend.

18. If my proposals are approved I shall be glad to assist with my advice whoever is placed in charge of the traffic and to help him to work out the various schemes for facilitating traffic operations. I will discuss the question of additional wharves with him. I believe the new coal wharf is susceptible of considerable improvement whereby the despatch of vessels can be hastened.

(Sd.) GEORGE C. BUCHANAN, Colonel,

*Director-General of Port Administration and River Conservancy.*

No. A.

To I. G. C.

*Basrah, 6th March 1916.*

MEMORANDUM.

Reference No. 517-1-L. C. of 5th instant.

The arrangements for which I now require sanction are as follows:—

Messrs. Gray, Mackenzie and Co. to be appointed contractors for the discharge of all vessels within the port, the necessary lighters, barges, mahelas and tugs being placed at the disposal of the contractors under the control of this department.

All mahelas and lighters to be completely under the control of this department, and no department to be permitted to make contracts outside of it, but to apply for their requirements to the C. N. C. appointed for the purpose of supervising and speeding up the discharge and control of all lighters, mahelas and tugs required for the work.

The contractors to supply all coolie labour both on board ships as now, as also on shore, goods to be taken from the ship and stacked where required by the department concerned, work to be carried on night and day as required to effect the speediest despatch.



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The remuneration of the contractors to be paid on the quantity in tons of goods handled overside or from one place to another.

Pay of Contractors.

The representatives of Departments who have stores on board ships must arrange to be on board to tally their own stores out. This is customary both in merchant vessels and transports and is not a new arrangement.

Departments to have tally clerks.

The contractors are prepared to indicate a minimum amount of tonnage per day provided their requirements are fulfilled with regard to the number of lighters supplied and suitable places are at their disposal to discharge it. This would act as a penalty rate, the inducement to them for a rapid discharge is work done, i.e., money earned and a quick turnover.

Inducement for contract to work expeditiously under penalty.

The contractors will continue the paying of the mahelas according to work done. No payment will be made to mahelas unemployed.

Payment of mahelas.

The contractors to report on work done each evening during the day and to receive the necessary instructions for the next day's work.

Progress report.

W. B. HUDDLESTON, *Captain, R.I.M.,*

*Principal Marine Transport Officer.*

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Sub-Enclosure IV.

APPENDIX D.

No. 80-A.-16.

Basrah, 3rd March 1916.

D. A. & Q. M. G.

MEMORANDUM.

With reference to your No. 1179-1-Q., dated 5th January 1916, detailing the points on which my advice is required I attach herewith a further note on improved transport facilities between Qurnah and Amarah on the Tigris and Qurnah and Nasiriyeh on the Euphrates.

(Sd.) GEORGE C. BUCHANAN, Colonel,  
Director-General of Port Administration  
and River Conservancy.

*Further note on proposed River Conservancy operations in Mesopotamia after an inspection of the rivers concerned.*

In my preliminary note dated 14th December 1915 to the Secretary to the Government of India, Marine Department, I discussed various proposals for the improvement of navigation on the rivers Tigris and Euphrates above Basrah and on the Shatt-al-Arab below Basrah after studying such data as was available, but I pointed out that in the absence of any engineering surveys an investigation on the spot was the only means of ascertaining to what extent, if any, improvements could be effected.

(2) I arrived in Basrah on the 1st January 1916, but owing to the great scarcity of river craft and the urgent demand for all available vessels for military purposes I was unable to get outside Basrah until the 14th February 1916, a delay much to be regretted but which under the circumstances was unavoidable. I have however now had an opportunity of making a personal inspection of those portions of the rivers requiring immediate treatment, and I submit this further note on the understanding, however, that the views expressed herein are subject to confirmation or otherwise when surveys have been made.

*The Tigris between Qurnah and Amarah.*

(3) Sir William Willcocks in his book "The Irrigation of Mesopotamia," stated that the very existence of the Tigris as a river was threatened in this reach by various large streams which took off from the main river and in three specified cases he designed waste weirs with crests 50 centimetres (19.68 inches) below low-water level in order to retain the bulk of the low-water flow in the Tigris proper.

These weirs were to be solid masonry and the estimate for the three was about £45,000. I am in entire accordance with Sir William Willcocks' diagnosis and I propose to put in hand working surveys of the various canal junctions at the earliest date.

(4) I noticed on my inspection the usual bars and difficult crossings which one would expect to find on a river flowing through an alluvial plain and also a number of awkward bends and I can quite understand that in the low-water season, navigation between Ezra's Tomb and Qualet Salih is extremely difficult.

I noted six places where engineering surveys are required and these will be made as soon as possible.

(5) When all the surveys enumerated above are completed, I will consider the practicability of executing the following works:—

(a) Lowering by judicious dredging of the various bars and casement of awkward bends.

(b) Construction of temporary emergency weirs for the next low-water season which will keep the bulk of the low-water flow within the Tigris.



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(6) To carry out (a) some small light-draft dredgers are an absolute necessity and in a separate communication I have described the type of machine required.

With reference to (b) it is neither possible nor desirable within the next few months to construct Sir William Willecocks' permanent weirs but I propose to build temporary structures of timber, earth and reed mattresses which will I think serve their purpose for the low-water months.

*The Euphrates between Qurnah and Nasiriyeh.*

(7) In his book Sir William Willcocks has described the bursting of the right bank of the Euphrates whereby for 110 kilometres (68 miles) the Euphrates has no bed at all and has its main junction with the Tigris at Garmat Ali, 40 miles below the old junction at Qurnah, and in connection with his irrigation scheme he proposed to allow the whole of the water of the Euphrates to find its way to Garmat Ali, but to restore the right bank from Qurnah and join it to the left bank at Sukess Sheyukh at a cost of £70,000, thus ensuring the passage of the spill water of the Tigris down the old channel of the Euphrates to Qurnah.

(8) For the purposes of navigation we must look at the matter from a different point of view, our immediate objective being the establishment of a channel whereby river steamers could navigate at all times of the year between Basra and Nasiriyeh. At the present time the Euphrates flows in a well-defined channel from its source to the neighbourhood of the town of Sukess Sheyukh some 80 miles in a direct line from Basrah but 5 miles above Suk a channel called the Haquikah takes off from the Euphrates whilst below Suk the Euphrates divides into the Mezlik and Umm Nakhalah channels and various streams. These channels spread fanwise and are lost 10 miles below Suk in vast shallow lakes and swamps extending to Garmat Ali and Basrah which in the low-water season are only 2 feet deep in parts; that is to say, navigation is limited to native boats.

(9) The problem before us is to make a channel through the lakes, and so far as depth of water is concerned, I can discover little to choose anywhere, but the distance across varies considerably; thus from Garmat Ali to the mouth of the Euphrates is about 60 miles but from Qurnah along the old bed of the Euphrates there is a deep well-defined channel to a point called Chabaish whence the distance across the Hammar Lake is about 15 miles more or less according to the channel taken on the opposite side.

Under the circumstances therefore the best course to take is *via* Qurnah to Chabaish and thence across the Hammar Lake.

(10) From the entrance to the lake, which is about 8 miles from Chabaish, two courses are open as a channel can be cut either to the mouth of the Mezlik or Haquikah channels respectively.

The Political Officer at Suk (Captain Dickson), with whom I had a long and most interesting conference, emphasized the desirability of making the Mezlik the main channel to Nasiriyeh for the following reasons:—

(a) The Haquikah is comparatively speaking a new channel and any works resulting in an increased flow of water will be at the expense of the Mezlik channel and result in many acres of ground being thrown out of cultivation. This was recognised by the Turks who placed a dam across the Haquikah channel but for military purposes the dam has been removed.

(b) The country through which the Mezlik flows and irrigates with its water is one of the richest in Mesopotamia but the people are exceedingly turbulent, possessing many good rifles and abundant ammunition. It is believed that improving the channel whilst increasing the area under cultivation will also improve the character of the people as there would be a constant passage of traffic in front of their doors.

(11) I made a close inspection of the Mezlik channel from Suk to the bar at the Hammar Lake and whilst appreciating greatly the views of the Political Officer, I am of opinion that for military purposes the Haquikah is the best channel to adopt.



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For the last few miles, the Mezlik channel is so shallow and tortuous that a great deal of work would be necessary to render it navigable in the low-water season for vessels of three feet draft whereas the Haquikah, which I also inspected personally, is a fine straight fairly deep channel throughout.

I also explored the Umm Nakalah channel which takes off from the Mezlik and flows into the lakes and swamps south of the Hammar Lake.

This channel is really the Euphrates' new bed and appears to carry more water than any of the others, but gets exceedingly tortuous and narrow as the outlet is reached.

(12) Having inspected all the channels I propose to make the cut from Chabaish to the mouth of the Haquikah and one dredger of a suitable type is at present *en route* from Burma, the cutting of the channel will be a tedious task and I fear it will not be possible to do more than 3 miles per month at the utmost. A survey is required before the exact line can be decided upon and if for military purposes great importance is attached to the work a second dredger of similar size could possibly be obtained from Burma but before coming to conclusion on the subject I should like to discuss the situation with the dredging master of the vessel which I hope will arrive in Basra shortly as the entire proposition is a novel one.

*Summary.*

(13) To sum up I do not think that any heroic engineering works are required either on the Tigris or Euphrates to improve navigation temporarily for military purposes, but any permanent scheme of river conservancy works will require more extensive surveys and study than it is possible to give at the present time.

If I can get men and appliances I have every hope of getting a greatly improved channel between Qurnah and Amarah in the low-water season and also have the cutting across the Hammar Lake well in hand. What is principally required is organisation and concentration of energy in proper places; in short to use an Indian colloquialism "a good bandobast."

(14) There is a great deal more survey work to do than I was led to expect and I have sent a requisition to India for more surveying instruments and for another surveyor. I would emphasise the fact that in hydraulic engineering, surveys are all-important, as the position of a dredged channel on a river like the Tigris has to be selected with great care after the survey has been made.

(15) As I shall have three survey parties at work simultaneously I shall be very short of river transport both for surveys and for conveyance of coal and stores to the dredgers.

I have coming from India one moderate draft steam launch, one shallow draft paddler and one steam pinnace, but it is quite impossible for me to carry out all the works. I have enumerated without a good steamer for working on the Hammar Lake and a motor boat for surveys on the lake. I therefore request that the "Shushan" or similar steamer be placed at my entire disposal and that sanction be accorded to the purchase of a motor boat.

The latter I have had offered me and have purchased, subject to sanction, from Messrs. Strick Scott and Co. as per details attached.

I may say that as I shall have competent men in charge I have no fear of the launch breaking down.

My deeper draft launch can tow barges with coal and stores as far as Qurnah and the "Shushan" from Qurnah to the lake, but I wish to make it quite clear that without the service of the "Shushan" or equivalent I cannot carry out the work entrusted to me.

I ask for nothing extravagant either in the way of men or appliances and have left so small a margin that very little will make the whole difference between success and failure.



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*General remarks on transport service on the Tigris.*

(16) I have been asked verbally whether any limit can be placed on the number of river transports that can be accommodated on the river and in my judgment there is no limit within reason, but I consider the transport service requires organisation and institution of traffic rules and regulations.

The usual rule of the road is that steamers going up the river give way to steamers coming down because the former are naturally under better control but I understand this rule is not enforced.

With large increases in the number of river transports some crossing stations will possibly be required and a comprehensive scheme carefully drawn up.

I would point out that a perfect transport service depends upon the following:—

- (1) sufficient number of steamers,
- (2) adequate means of repairing and maintaining vessels,
- (3) a navigable river at all times of the year,
- (4) competent management of the transport service by one responsible officer,

and if all these are not co-ordinated there will be failures and breakdowns.

With reference to (4) I would suggest that whoever is in charge of the management of the transport service should also issue orders for the upkeep and maintenance of the vessels as divided responsibility in this case would militate against efficiency.

*The Shatt-el-Arab below Basrah.*

With the large amount of work before me at Basrah and on the rivers Tigris and Euphrates I regret that I see no immediate prospect of taking up the question of the conservancy of the Shatt-el-Arab and removal of the Fao-Mohammerah bars, but the survey work will be put in hand so soon as any of my staff can be spared.

(Sd.) GEORGE C. BUCHANAN, Colonel,  
Director-General of Port Administration  
and River Conservancy.

3rd March 1916.

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Sub-Enclosure V.

APPENDIX

No. 149-A.-16.

OFFICE OF THE DIRECTOR-GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY.

I. E. FORCE " D. "

53, Strand Road.

Dated Basrah, the 28th March 1916.

To D. A. and Q. M. G.

MEMORANDUM.

As instructed by the Army Commander I submit the accompanying note on the delays caused to the River Conservancy operations in Mesopotamia due to non-arrival of plant and equipment and other causes.

(Sd.) GEORGE C. BUCHANAN, Colonel,

Director-General of Port Administration and River Conservancy,

I. E. Force " D. "

*Memorandum on delays to River Conservancy work in Mesopotamia due to non-receipt of plant, material and Survey Equipment from India, and to local inability to supply temporarily Inspection and Survey launch.*

1. On the 17th December 1915 I furnished the Government of India with detailed proposals for an Engineering and Surveying Staff and equipment which I proposed to obtain from Burma, and the Government of India approved of my proposals, and in a telegram to the Government of Burma said the work I was to be engaged upon was of vital importance to the success of military operations in Mesopotamia.

2. The Government of Burma did all that was possible to assist in the matter, my staff was engaged, a survey equipment purchased and a large dredger employed on an important public work in Burma along with three launches were placed at the disposal of Force " D. "

3. I arrived at Basrah on the 1st of January and was informed that it would be necessary for me to make all arrangements for equipment and personnel and that I should demand from India everything I considered necessary unless I considered it desirable to defer all surveys, dredging work, etc.

I replied that I was doing all in my power to collect staff and material as I fully realised that all available craft was required for military purposes, and I had ordered from India one dredger and three launches that there could be no question of deferring surveys or dredging work unless my craft were lost *en route*, and that it was matter for regret the surveys were not put in hand six months ago. I also telegraphed to Mr. Niven (my Chief Assistant) emphasising the necessity for his bringing everything with him from Rangoon.

4. I represented on my arrival the urgent necessity for my going up the river to inspect personally the sites of the works I was to carry out, and asked if a launch could be made available for a matter of ten days, but owing to the paucity of launches and military necessities I was unable to proceed until the 20th January when the launch allocated to the Chief Political Officer was placed at my disposal.

I did not however get more than a few miles beyond Qurnah as the boiler burst on the morning of the 21st January and after drifting for thirty hours I got a tow back to Basrah. The launch was repaired but the boiler burst again on the 1st February. I then wrote to General Cowper and asked if it would be possible to spare another launch and said that if none were available I should very reluctantly have to give up all idea of making my inspection before the flood season,



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which would mean I could form no ideas for improvements before the next low-water season. I was then arranged the launch "Shushan" should be placed at my disposal and I proceeded on tour on the 14th February, inspected the Tigris to above Amarah and the Euphrates to Nasiriyeh, returning to Basrah on the 24th February.

5. The subordinate staff and the survey equipment left Rangoon on the 14th January per S. S. "Orna" and arrived at Bombay on the 22nd January where they were to have been met by an officer of the Marine Department and transhipped to the Basrah steamer.

Mr. Niven left Rangoon overland on the 18th January and arrived at Bombay on the 24th January and found no arrangements had been made for transhipping the survey equipment from the "Orna." The result was that the subordinate staff left Bombay on the 25th January, arriving at Basrah on the 31st January. Mr. Niven arrived on the 5th February and the equipment on the 15th February. As I had given Mr. Niven specific orders to meet the staff and equipment in Bombay and accompany them to Basrah I asked him for a written explanation and received a reply (Appendix I) which I considered acquitted him of any blame in the matter.

6. The S. S. "Havildar" bringing the equipment arrived on the 15th February, but delivery of the equipment did not begin until the 29th of February, and on the same day the "Havildar" sailed taking a large portion of my equipment back to Bombay (see Appendix II).

7. A light draft paddler called the "Rebel" had been specially selected to convey the survey party and operate on the river above Basrah. This boat left Rangoon on the 15th January, being towed by the dredger as she was quite a small light craft, with the launch "Industry" steaming alongside. They arrived at Bombay on February 11th and on the 13th I telegraphed to the Director, Royal Indian Marine, that the greatest importance was attached to the despatch at earliest possible date of the dredger and both the launches.

8. The launch "Rebel" arrived at Basrah on the 4th of March but as the floats for the paddles, the roof and the cabins had been left in Bombay she was a useless hulk. These fixtures had left Rangoon on the 17th January per "Oolabaria," and the Director, Royal Indian Marine, had stated they would be transhipped from Bombay about the 1st of February. At the date of this note, i.e., 28th March, the gear has I believe arrived but delivery has not been given.

9. The launch "Industry" arrived in Basrah in good order on the 4th March but was not intended for work above Qurnah, being of too deep draft.

10. The dredger "Oswald" arrived at Bombay on the 11th February and was detained for renewal of a pump casing. This should have been done in Rangoon; in fact it was in course of execution when the Principal Port Officer stopped the work and despatched the dredger. As without this renewal she would probably have broken down in the Hammar Lake I insisted on the work being done in Bombay but I understood it was only about a week's job. The dredger left Bombay on March 4th but as the dredging master reports that the engineers in the dockyard did all they could to push on this work I accept his statement.

11. The dredger on leaving Bombay was given a heavy paddler to tow and took six days to reach Karachi. The dredging master was then prepared to refuse to leave Karachi until he had communicated with me, but the Transport Officer, Karachi, on his own responsibility took off the tow and the dredger proceeded alone, arriving at Basrah on the 21st March.

12. The pipe line of the dredger consisting of about a thousand feet of 24-inch diameter piping with pontoons 40 inches in diameter anchors, winches and other gear measuring 642 cubic tons left Rangoon on the 17th January per "Oolabaria," and on the 18th January the Director, Royal Indian Marine, telegraphed that arrangements for transshipments would be made about the 1st February. It is not apparent why the "Oolabaria" should not have proceeded direct to Basrah, more especially as no transshipment was effected on the 1st February. Some pipes arrived on the 11th March and it is believed the remainder of the material was shipped on the "Braunfels" due here in the first week of



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April. The dredging master, who was fully alive to the necessity for all the pipes to arrive in Basrah before the dredger, as there was a great deal of work to do in rivetting them together, has reported to me on the subject and has stated he was not allowed to communicate with me. His report is appended (Appendix II) and I suggest his statement might be made the subject of enquiry as, if correct, it would appear that no attempt was made in Bombay to forward promptly the plant.

13. The terminal pontoon left Rangoon on the 7th of February, arrived in Bombay on the 24th February, and left Bombay for Basrah on the 8th March per the " Bhadra " which has not yet been arrived in port.

14. The net result of the delays aforesaid is that it is now impossible for me to carry out in time for the next low-water season the whole of my programme of works on the river above Basrah.

The works comprise :—

- (a) The dredging of a channel across the Hammar Lake.
- (b) The improvement of the Tigris between Ezra's Tomb and Qalat Salih, and the delays in execution will be attributable to delay in arrival of the plant and to inability to make the necessary surveys.

15. With regard to the dredging of a channel across the Hammar Lake, I estimated that the dredger would be at work three months after the date of order, that is to say, work would be now about ready to start. I can see no reason why that estimate should not have been fulfilled to the day if the pipe line and other material had either been forwarded direct to Basrah or been transhipped with reasonable speed from Bombay, as in that case the pipe line and pontoons would have been erected and rivetted and awaiting the arrival of the dredger. As things are, material which the dredging master when in Bombay urged should be shipped at once, and which the Director, Royal Indian Marine, had previously said would be shipped about the 1st February, was, according to the last advice, to be possibly shipped on the 24th March, and may therefore be expected here about the first week in April.

As nothing can be done towards even erecting the pontoons until all the parts have arrived and been delivered, I estimate that it will be impossible to begin dredging at earliest before the beginning of June, and if, as seems possible from the dredging master's report, any of the parts have been lost, there will be further delays.

16. There is ten miles continuous dredging to plough through across the Lake, and several miles each side to partially dredge and at three miles per month I estimated that by beginning at the end of March or first week in April I should just get through some time in August, but two months' delay upsets all calculations. It cannot be said that the delay in shipping was due to the using of all space for urgent war necessities because, to take an example, I have seen landed many tons of iron sheet piling which now that I am in charge of wharf construction have been handed over to me and for which no urgency of any kind exists.

17. In the matter of the improvements on the Tigris I have already pointed out that in hydraulic engineering surveys are all-important and work can only be designed after careful surveys have been made. My programme contemplated having my staff and survey equipment here by the beginning of February, and trying (after had they made a survey at Magill) to procure something to take them up the river pending the arrival of my survey steamer. Owing to the delay in forwarding the equipment from Bombay, the return of part of the equipment to Bombay and my survey steamer arriving minus paddle floats and cabins, no surveys of any kind were begun until the 14th March and the party only left to-day for the Tigris survey and then in an imperfectly equipped condition (Appendix III).

It is also matter for regret that owing to lack of transport I was unable to inspect the river before the 14th February as it is now almost too late to procure the small dredgers which an inspection at once showed me would be beneficial.



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I have, however, designed the weirs to check the flow of the Tigris into canals during the low-water season and I have heard of one small dredger which it may be possible to get up before the advent of the monsoon.

18. In conclusion I would say that my staff and myself will do everything that is humanly possible to expedite all the works, but we feel that these delays have deprived us of the power of making them the success which might have reasonably been anticipated.

BASRAH :  
28th March 1916.

(Sd.) GEORGE C. BUCHANAN, Colonel,  
Director General of Port Administration  
and River Conservancy.

APPENDIX I.

No. 74-A-16.

OFFICE OF THE DIRECTOR GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY,  
53, Strand Road,  
Basrah, 3rd March 1916.

To

The D. A. and Q. M. G.

MEMORANDUM.

The accompanying papers on the subject of the treatment by the Marine authorities at Bombay and Basrah of my survey equipment are submitted.

2. Briefly the facts of the case are as follows :—

When I was appointed to my present office the Government of India asked me to inform them in detail of my exact requirements in plant, personnel and equipment, and on receipt of same, Mr. E. C. Niven, an Executive Engineer in the service of the Rangoon Port Trust, was appointed my chief Engineering Assistant, and was instructed to get together a staff of subordinates and a complete survey equipment.

3. On my arrival at Basrah I found nothing could be procured locally and I was informed by you in your No. 1179-1-Q., dated 5th January, that it would be necessary for me to make all arrangements for equipment and personnel in regard to the execution of any work I might have to undertake, and that it was understood this was being done.

I accordingly telegraphed to Mr. Niven emphasizing the necessity for his bringing everything necessary for a complete survey equipment and said that neither men nor appliances could be obtained locally.

4. Mr. Niven carried out my instructions to the letter and a complete survey equipment was purchased (at a cost of Rs. 15,000) which was very carefully packed and despatched to Bombay per steamer "Orna" which left Rangoon on the 14th January 1916.

The Government of Burma asked the Government of India by telegram to kindly arrange for the reception of the equipment and personnel in Bombay and their transhipment for Basrah, and presumably this was done, but when Mr. Niven who travelled overland from Calcutta arrived in Bombay on the 24th January he found that the marine authorities had taken no action whatsoever and did not even know that the steamer from Burma had arrived on the 22nd January.

5. From that date our troubles began and instead of my instructions being carried out and Mr. Niven, his staff and equipment arriving together on the 31st January, the staff arrived on that date, Mr. Niven arrived on the 5th February, and the steamer "Havildar" with the equipment arrived on the 15th February.

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6. With reference to the partial discharging of the "Havildar" and the deliberate departure of the vessel with the portions of my equipment on board as lucidly described in the notes of Mr. Niven and Captain Lakin my feelings are such that I have no words that I can respectfully put on paper.

7. I would point out that the loss of portions of my equipment is of grave importance as an Engineer's instruments, drawing materials, and so on, are to him what a rifle is to an infantry man or ammunition to a battery, and we can no more do our work without these necessaries than a modern battle can be fought without rifles and ammunition.

I might add that as all the oars have been returned to Bombay I cannot even use the survey boats brought from Rangoon with such care and forethought.

8. I have been given to understand that it is of considerable importance I should contrive to improve river conditions for the low-water season, but as I have pointed out in my note dated 2nd March on river conservancy operations, I can do nothing until I have had some surveys made and under existing conditions the prospect of getting my staff to work seems remote.

It is possible that in this emergency the D. D. Works, the officer in charge surveys, and the Superintendent of the Dockyard might between them furnish material to enable me to carry on, pending the return of the material from Bombay, and I suggest that the urgency of the case be represented to these officers and they be directed to assist me to the best of their ability.

I would further suggest that a telegram be despatched to the first port at which the "Havildar" stops requiring the remainder of my equipment to be at once discharged and forwarded to Basrah by the first steamer with a special covering letter in the charge of the Commander to be delivered to me on arrival.

9. In conclusion I would remark that under existing methods of Traffic management at the port there seems no reason why a recurrence of this incident should not take place and perhaps when the timber arrives for the Magill jetties, half of it will be left in the steamer and be returned to India.

In this connection I may mention that the working drawings of pontoon landing stages, fixed jetties and wharves for which I telegraphed to Rangoon some time ago and which I require in connection with the new wharves here were in one of the cases the "Havildar" has taken back to Bombay.

10. I shall be obliged if these papers may be laid before the Army Commander for favour of perusal and orders.

(Sd.) GEORGE C. BUCHANAN, *Colonel,*  
*Director General of Port Administration and*  
*River Conservancy.*

No. 21-A-16.

OFFICE OF THE DIRECTOR GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY,

53, Strand Road,

*Basrah, 9th February 1916.*

To

E. C. Niven, Esq.,

Assistant Director, River Conservancy.

MEMORANDUM.

A great deal of valuable time is being lost owing to the delay in the arrival of the survey equipment; the survey staff arrived by the Transport "Edavana" on the 31st January, you arrived by the mail steamer "Dwarka" on the 5th



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February, and the equipment is expected by the S. S. "Havildar" on or about the 12th February.

Having regard to the fact that I telegraphed you on the 10th January that it was essential you should personally meet the staff and equipment in Bombay and accompany them to Basrah, will you kindly explain why you, the staff and the equipment did not arrive together by the transport "Edavana."

(Sd.) GEORGE C. BUCHANAN, Colonel,  
Director General of Port Administration  
and River Conservancy.

OFFICE OF THE DIRECTOR GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY,  
53, Strand Road,  
Basrah, 14th February 1916.

To the Director General of Port Administration and River Conservancy.

MEMORANDUM.

With reference to your No. 21-A-16, dated the 9th instant, I think the following explanation will make it clear that the piecemeal arrival of myself, the staff and the survey equipment was brought about by causes which were not within my control:—

(1) On January 8th the Government of Burma telegraphed to the Government of India, Marine Department, asking them to arrange for the transshipment of the survey staff numbering 44 persons and equipment from Bombay to Basrah and on the 14th January sent a further wire saying that the party and equipment had left on that date on the steamer "Orna" and were expected to arrive in Bombay on the 23rd January.

(2) On January 18th I left Rangoon for Bombay *via* Calcutta and arrived in Bombay on the 24th January. I was met at the station by the Surveyors, who informed me that they arrived in Bombay on the 22nd January, but no one met them on the "Orna" or made any arrangements for their housing and it was only after appealing to the Commissioner of Police that the party was provided with accommodation in one of the rest camps. The survey equipment meanwhile had been discharged at Victoria Dock and from a subsequent inspection I made it was obvious that no care or supervision had been exercised in the process. This equipment consists largely of carefully adjusted instruments, and to avoid their being damaged or unnecessarily handled I had them stowed in Rangoon on the top of the "Orna's" cargo. To instance the lack of care to which these cases were treated in Bombay I might mention that I found one of them being used as a loading platform for carts removing goods from the quay. The care bestowed on the equipment up to its arrival in Bombay was completely undone by the careless treatment it received there. I reported the matter to Commander Huddleston who told me that the Agents of the B. I. S. N. Co. were entirely responsible and that we should claim damages from them. It is clear however that, had the R. I. M., Bombay, arranged for the transshipment of the equipment according to the instructions, this would not have happened and I cannot see that the shipping Agents are in any way responsible.

(3) On arrival in Bombay I reported to the D. R. I. M. who informed me that the "Orna" with the staff and equipment had not yet arrived, but had been signalled down the coast. Captain Lumsden only credited my report of the "Orna's" arrival on my informing him that I had actually seen the staff.

(4) I then got in touch with the S. E. O. and found that all arrangements had been made for myself and the staff to leave for Basrah on the Transport "Edavana" sailing the following day, *i.e.*, Tuesday, 25th January. I pointed out that I could not possibly leave without seeing the equipment off and at my request the D. R. I. M. wired to the Q. M. G., Delhi, asking his approval to my remaining



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behind in Bombay for this purpose and sailing by the mail for Basrah on the 29th January.

This was agreed to and the staff sailed by the "Edavana" on Tuesday, 25th January.

(5) The survey equipment, as I have pointed out, was discharged from the "Orna" by the ships staff on the 23rd January—the date stated by the Government of Burma in their telegram, but the marine not being aware of the steamer's arrival in port, took no action and thereby the chance of shipping the equipment with the staff on the "Edavana" was lost. Commander Huddleston informed me that there would not be another transport to Bombay for some considerable time but I pressed the urgency of the matter upon him and he arranged in consultation with Commander Douglas for the "Havildar" to come into Port and take our equipment to Basrah *via* Karachi. This arrangement was made on the 27th January and I was told by Commander Douglas that the equipment must be alongside the "Havildar" on the following day otherwise it could not be accommodated.

As regards the actual transfer of the equipment from the Victoria to the Alexandra dock I was informed that Commander Douglas would see to this but on reference to that officer I found that he only dealt with stores delivered alongside the transport and he suggested I should write to the D. R. I. M. and get the assistance of the Marine Store-keeper. This was done, and I understand eventually the Commissioner's Contractor effected the removal of the equipment. I went to the dock and personally inspected the transfer of the equipment, but would point out that this was not work which I should have been called upon to do when I had so many other matters connected with the dredger to discuss and arrange with the Chief Constructor of the dockyard.

(6) I can state with assurance that had I *not* remained behind to arrange for the transhipment of the equipment that even more delays than those we are now faced with would have occurred. Had prompt action been taken on the arrival of the "Orna" on the 22nd to tranship the equipment, I consider it would have been placed on board the "Edavana" and brought to Basrah along with the staff and myself.

(7) In the matter of the dredger "Oswald," I would also like to point out that at the eleventh hour of my stay in Bombay, Captain Hordern informed me casually that the dredger was not coming into Bombay to have the pump casing renewed as had been definitely arranged but would proceed to Basrah from Colombo. I immediately wrote to the Director, Royal Indian Marine, and made it perfectly clear that if this were done I would accept no responsibility for the working efficiency of the dredger in Basrah, and that your orders were definite, *i.e.*, that the vessel was to arrive in perfect working condition. The Director accepted my views, but it is plain to me that had I not been on the spot and pressed the matter we would have had the "Oswald" arriving here with a cracked pump casing and a serious break down when she was in the middle of the Hammar Lake.

(Sd). ERNEST C. NIVEN,

*Assistant Director, River Conservancy.*

No. ....

OFFICE OF THE DIRECTOR GENERAL OF  
PORT ADMINISTRATION, AND CONSERVANCY,

53, Strand Road,

*Basrah, 2nd March 1916.*

To the Director General of Port Administration and River Conservancy.

MEMORANDUM.

In continuation of my No. 69-A.-16, dated the 14th February 1916, I now wish to report on the discharge of our survey equipment from the Transport "Havildar"



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and the attending circumstances which culminated in a valuable portion of the materials being taken back to Bombay in the same steamer.

The "Havildar" left Bombay on the 5th February and arrived here on the 15th February. On the morning of the 16th Captain Lakin went on board and was told by the Chief Officer that our gear was in No. 2 hold under some S. and T. clothing and would be discharged immediately after the clothing.

I interviewed the O. C. Mahailas on the 16th February and was informed that the discharging of the vessel was a duty of this department and that he would make all necessary arrangements for the delivery of our equipment.

The boats and sampans, which were carried on deck were delivered on the 17th February two days after the "Havildar" arrived.

After waiting several days for the discharge of the equipment and having, from personal observation, come to the conclusion that there was no serious effort being made to discharge the steamer, I reported the matter to the D. A. Q. M. G.

On the 28th February, 13 days after the "Havildar" arrived here, the first of our cases came to light, but not before boilers, boosa, timber, steel piles and other heavy cargo had been discharged in addition to the clothing first mentioned.

The actual discharge of the equipment did not begin until 10 A.M. on the 29th February, the day on which the "Havildar" sailed and a considerable number of cases and packages were only obtained by literally excavating amongst the timber and rails which the steamer is reported to have carried back to Bombay as undischarged cargo. During the time the gear was being discharged we had a clerk on board for our own satisfaction: this man on his own initiative searched amongst the undischarged cargo and it is largely due to his resourcefulness that we obtained so many of our cases and packages. The clerk reported that case No. 155 which has gone back to Bombay was found so rigidly embedded in the timber cargo that it could not be removed by hand and on drawing the Chief Officer's attention to it was informed that it would be removed by and by. It was while thus employed in the hold that the steamer got up anchor and sailed, and it is probable that if clerk had not been called up he would also have gone back to Bombay as he got ashore on the last Mahaila dropping away from the ship's side. The "Havildar" sailed at 2 P.M. on the 29th February or 4 hours after she began to discharge our equipment, having then been in port 14 days.

The M. L. O. informed me on enquiry that he understood the "Havildar" had sailed with rails undischarged but knew nothing about our cases.

The articles returned to Bombay are detailed below and their loss although possibly only temporary will occasion serious delay to all our work. The missing articles include two sounding lines mounted on reels. These lines are of stranded wire with a hemp core and are marked off in regular distances and cannot be replaced locally. These losses make the river survey staff and equipment inoperative, and as river surveys are an essential preliminary to all the works contemplated serious delay to river works will ensue as a consequence.

There is also a case missing which contained the drawing office equipment, such as drawing paper and tracing cloth, level books and in addition the plans of wharves and landing stages which you specially asked me to bring. Without this portion of the equipment, the draftsmen and surveyors cannot plot their surveys or prepare drawing, until the articles are returned or replaced no progress can be made. Tide gauges have also been returned to Bombay and can only be replaced after considerable labour.

I have only commented on the more important items missing, but would point out that every item of a carefully selected survey equipment is of value, and we can no more carry on without these things than a machine can work minus of its component parts.

*List of missing articles of survey equipment.*

The articles returned to Bombay are as detailed below:—

Case No. 155. Containing (1) all the drawing paper, tracing cloth, level books, etc., required for the equipment of the drawing office.

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(2) All plans of wharves, landing stages, etc., which you specially asked me to bring from Rangoon.

*It is impossible to do any drawing office work without the contents of this case.*

- Case No. 151. Containing 1 brass camp lantern.  
" " 7. " stores for repairs to boats, etc.  
" " 28. " special bottles for water sampling.  
Package No. 36. Containing special timber for repairing sampans.  
Packages Nos. 62 to 67. Containing all oars for boats and sampans.  
" " 68 and 69. Containing four teak wood tide gauges.  
" " 50 to 61. Containing long bamboos for survey marks.  
" " 107 and 108. Containing 2 reels with wire sounding line each 1,000 feet long marked every 10 feet.

*River surveys cannot be started without these sounding lines.*

- Package No. 127. Containing 12 life buoys.  
" " 129. Containing stands for drawing tables.  
Packages Nos. 109 to 119. Containing survey poles.  
Package No. 131. Containing survey poles.  
Packages Nos. 70, 75, 78; 83, 98 and 105. Containing rope, oakum and general stores for survey purposes.  
Package No. 132. Containing survey tent-umbrella.  
Packages Nos. 133 to 138, 139 to 143. Teak and junglewood plants for repairs to boats and sampans.  
" " 180 to 183. Teak wood rod floats for velocity observation and 3 anchors.

For your information I would like to state that what impressed me most on visiting the "Havildar" was the lack of supervision and consequent atmosphere of indifference that enveloped the unloading operations. Empty mahailas were to be seen lying alongside and no attempt being made to load them: other mahailas were leaving short of full loads: briefly it seemed to be no one's business to see either that the cargo was unloaded or that the mahailas were being used to the best advantage.

The delay in discharging the "Havildar" was largely due, in my opinion, to lack of supervision, want of method and shortness of working hours. It is frequently stated that such like delays are due to a shortage of lighterage craft, but the origin of the trouble is lack of system and if the working hours were increased and good supervision employed the mahailas might be found to be sufficient in number. As things are now the lighterage craft is not used to the best advantage and it will continue to be inadequate until system and method are incorporated in the proceedings. One cannot reasonably look for perfection in a port during a state of war, but the introduction of a few simple business ideas would transform the present chaos into reasonable order and one would not look for more in the circumstances.

(Sd.) ERNEST C. NIVEN,  
*Assistant Director, River Conservancy.*



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OFFICE OF THE DIRECTOR GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY.  
53, Strand Road,  
Basrah, 2nd March 1916.

To the Director-General of Port Administration and River Conservancy.  
MEMORANDUM.

As directed, I submit the following statement of my endeavours to get all our surveying equipment off the "Havildar":—

The "Havildar" arrived in Basrah late on the 15th February last.

On the morning of the 16th I went on board to see about getting the equipment ashore. The Chief Officer told me that he would discharge our things as soon as some clothing, which was on top. I left a clerk on board to check and tally our packages as they were discharged.

On the 17th I again went on board and found that, except for about a couple of boilers for steam launches, nothing had been discharged, and that there was not a single mahaila alongside the vessel. I then went and saw the Officer Commanding Mahailas, who said he would arrange to send down a couple of mahailas to take our things. In the evening I went on board with the assistant to the Officer Commanding Mahailas, and found that our boats and sampans had been discharged into a mahaila which was ordered to go to Ashar Bridge.

On the 18th I again went on board. There were then several mahailas alongside but nothing of our equipment was to be seen. The hold appeared to be full of bhoosa and some timber. The Chief Officer remarked to me that we were the only people who were worrying to get their consignments off the vessel. I then went and saw the M. L. O. and told him that I had been on board three days running to get our equipment, of which we were in very urgent need, and had not been able to get anything as it was under a lot of bhoosa and timber. He said he would see about it and would do what he could.

My visit to the "Havildar" on the 20th proved equally futile. There were four empty mahailas alongside and still nothing of any of our cases or packages was to be seen. I was informed by the clerk of the ship that all the bhoosa would be discharged that day, and we would get our equipment the next day.

When I went on board on the 21st, I found only one mahaila, almost fully loaded with bhoosa, alongside, and the vessel flying the signal for mahailas. Besides the bhoosa there was some timber and a small boiler in the hold.

On the 23rd I again went on board and found that all the bhoosa had been discharged, and the hold contained a great amount of timber and steel pilings. Nothing of our equipment was to be seen.

On the 24th there was still no sign of any of our things.

On the evening of the 26th I again visited the ship and was told that we may get some of our cases to-morrow.

My next visit on the 28th when I saw some coils of ropes and some bamboos belonging to us, the remainder of the equipment being still buried under some timber and steel pilings. The Chief Officer informed me that the vessel was sailing the next day, that they would work all night, and that everything would be discharged by noon the next day. On this visit I noticed 19 mahailas and one iron barge alongside the vessel. I always had a clerk and two men on board during the hours the vessel was working. On being informed that she was leaving next day and would be working all night I arranged for reliefs for our men on board during the night.

I have no personal knowledge of the happenings on board just prior to the departure on the 29th as I was on other duty that day, but they are being reported by the Assistant Director.

Incidentally I may mention that on the evening of the 29th while searching for the mahaila containing our equipment I met the Assistant Officer Commanding, mahailas, who gave me every help in examining and searching several of them for our gear. I asked him what the tindal of the mahaila would do in the event of his not receiving any specific instructions as to the destination of the goods in his craft. He replied that in that case the man would probably take his mahaila to some out of the way place where it would be difficult to find him.

(Sd.) C. LAKIN, *Captain,*



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APPENDIX II.

Dredger "Oswald."

To Colonel Sir George Buchanan.

Sir,

I have the honour to inform you that on the arrival of the dredger at Bombay I went to report to the Deputy Director, Royal Indian Marine. At the same time I asked for money to pay my staff for the month of January. The Deputy Director told me he knew nothing about us except that they were to fit the new pump, also that Sir George Buchanan should have made arrangements himself as to our pay. That he considered the changing of the dredgers a waste of money. They had already fitted out two dredgers and spent three lakhs of rupees in fitting them out and now these same dredgers were being sent back as useless. I pointed out that I was only a subordinate and knew nothing about this matter.

I must say that the gear belonging to the dredger and pipe line was handled in a very haphazard manner. I don't know whether Bombay was to blame for this or not, some of the cases containing spare gear are missing. One case was found in the hold of a paddle steamer that was fitting out. Two days before the dredger sailed I found another case and a number of plates and angle irons belonging to the floaters lying in a corner of the dockyard. I got my crew to put the case on board the dredger and to put the plates and angle irons into a barge where a lot more of my gear was. When we arrived in Bombay, all the floaters were in the dock and no one seemed to bother about them. As I had no authority to speak about the gear being there, and did not know what arrangements you or Mr. Niven had made, also the attitude the Deputy Director took up when I reported my arrival, prevented me from interviewing him again. Mr. Niven told me verbally also in his letter which he left for me at Bombay, that the dredger must be ready for work as soon as she arrives at Basrah and as nothing was being done to despatch the floaters and gear belonging to them I thought the only way out of it was to wire you for instructions but I am sorry to say I let it stand too long; I should have done that on my arrival at Bombay. I wrote out the following telegram and took it up to Mr. Knight, Inspector of Machinery. He asked me to leave it with him and he would put up before the Deputy Director. I saw Mr. Knight afterwards and he informed me that Commander Hordern sent his compliments and that everything was being done to get the gear to Basrah.

The Marine Storekeeper informed me that his instructions were to give the R. I. M. stores the preference in shipment.

I received every assistance in looking for gear from Mr. Knight and his Assistant Engineer and they worked to get the dredger away with all possible speed. The dredger was not properly made fast till they started work taking out the old pump and they worked night and day when possible till it was finished. As the closing length of pipe for discharge side of pump did not fit a new casting had to be made for same. They also fitted a new sleeve on the impeller. I wrote to the Staff Officer, R.I.M., informing him about the missing cases and the contents of same. I herewith enclose reply. I also beg to state that the Chief Accountant, R.I.M. gave me all the money I asked for to enable me to pay my officers up to the end of February. I will render a statement of all money drawn and payments made to each officer.

When we left Bombay we had the paddle steamer "Damukdia" No. 21 in tow. Owing to this tow it took six days for the dredger to reach Karachi in fine weather, and the consumption of coal was 18 tons per day: steam was difficult to keep in the boiler. The consumption of coal between Rangoon and Bombay was 14 tons per day. Owing to the excessive delay being caused to the dredger I told the navigating officer in charge that I did not intend to leave Karachi with the tow until I got instructions from Sir George Buchanan which I intended to telegraph for from Karachi.

The Transport Officer at Karachi on his initiative took the paddler from us and after coaling we came on to Basrah alone.



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While we were fitting new pump two steamers came into the dock to load for Basrah and they could have taken our small gear quite easily and without much trouble as the barge was lying beside them and I don't think all the gear that was in the barge would weigh 20 tons.

I have the honour to be,

Sir

Your most obedient servant,

(Sd.) R. RENFREW.

*Copy of telegram which I intended sending Sir George Buchanan c/o Base Commandant, Basrah.*

Please wire Dockyard to have floaters and all gear from same sent at once to Basrah, it is imperative that this should be done as it will take time to put floaters together. No one seems to have had any instructions what to do here except fit new pump.

(Sd.) RENFREW,

Dredging Master, Dredger "Oswald."

No. 649.

R. I. M. Dockyard,

Bombay, 3rd March 1916.

From the Staff Officer, Royal Indian Marine Dockyard, Bombay.

Copy of a letter No. B. M.-1866, dated 1st March 1916, from the Agents, B.I.S.N. Co., Ltd., Bombay, to the Staff Officer, R.I.M., Dockyard, Bombay.

Forwarded to the Dredging Master, Dredger "Oswald" for information.

(Sd.) C. W. RAMSAY,

Commander, R. I. M.,

Staff Officer.

*Copy of a letter No. B. M.-1866, dated 1st March 1916, from the Agents B. I. S. N. Co., Ltd., Bombay, to the Staff Officer, R. I. M. Dockyard, Bombay.*

We have the honour to acknowledge receipt of your letter No. 640, of 24th ultimo enclosing letter, dated 21st idem from the Dredging Master "Oswald" regarding five cases alleged to have been short delivered to him *ex S. S. "Oolabaria"* and note contents.

In reply we have to advise that we are making enquiries into the matter and will let you know the result in due course.

We may say that we understand all the cargo was shipped at Rangoon as one lot without tally and was also discharged here in the same manner. As there is nothing on record to show the number of packages actually shipped no liability can accordingly be fixed against the steamer for the alleged missing packages.

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APPENDIX III.

No. 147-A-16.

OFFICE OF THE DIRECTOR GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY, I. E. FORCE "D,"  
53, Strand Road,

*Dated Basrah, the 28th March 1916.*

To the D. A. and Q. M. G.

MEMORANDUM.

With reference to your No. 16-221-Q., dated 9th March 1916, to the I. G. C. stating that the "Shushan" would be required by me within 10 days unless the dockyard could prepare the "Rebel" for service by that date, I enclose for favour of perusal a copy of a note on the subject by Mr. Niven, Assistant Director of River Conservancy, and I concur in the remarks made therein.

2. I may say that on the 19th instant Major Ingram telephoned to me and said the "Rebel" was ready for use and that under those circumstances would I require the "Shushan" and replied that if the "Rebel" were ready I should not require the "Shushan" until the arrival of the dredger.

On making enquiries, however, I found the "Rebel" was far from complete for service as apart from defects mentioned by Mr. Niven the engines would not work.

3. I sent Mr. Niven to your office on the 20th instant to report what had happened and see if the "Shushan" could be made available but unfortunately did not see you and he returned and stated he had been informed the "Shushan" was engaged on important work at Nasiriyah and could not be made available for our work either now or later on.

4. So soon as the "Rebel's" engines would work I sent her up to Amara with the survey party but she is not perfectly equipped and will have to return later to be properly fitted out. On account of the alteration in the arrangements my survey party only got away yesterday the 27th instant instead of as previously arranged on the 18th instant and this a loss of 9 days in the survey work is of serious importance because as already explained my improvement schemes cannot even be formulated until the surveys have been made.

(Sd.) GEORGE C. BUCHANAN, Colonel,  
*Director General of Port Administration  
and River Conservancy, I. E. Force "D."*

No. 128-A-16.

OFFICE OF THE DIRECTOR-GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY, I. E. FORCE "D,"  
*Dated Basrah, the 21st March 1916.*

To

The Director General of Port Administration  
and River Conservancy, I. E. Force "D."

MEMORANDUM.

When the launh "Rebel" was taken over in Rangoon for survey work in Mesopotamia she was equipped as follows :—

- (1) Roof over the bridge deck.
- (2) Two cabins on the bridge deck with fittings.
- (3) W. C. on the bridge deck with fittings.
- (4) Canvas curtain round the bridge deck.
- (5) Cabin on the main deck, forward.
- (6) Sponson deck both sides, forward and aft.
- (7) Sponson deck cabins which contained officers' galley and W. C. Store room and crew's galley and W. C.



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- (8) Canvas curtains all round lower deck.
- (9) Paddle floats.
- (10) Firing irons for stocking.
- (11) Engine room tools and equipment.

With the exception of item 5 (cabin on the main deck forward) the "Rebel" arrived here minus the whole of the above equipment and consequently useless for our work or indeed for any purpose: as the launch was required for urgent work, which would not admit of waiting until the "Rebel's" gear arrived from Bombay, the Marine Dockyard was asked to fit her up. The "Rebel" has now been handed over to us as ready for survey work, but she has only been provided with part of her equipment as follows:—

- (1) Paddle floats;
  - (2) Sponson deck, both sides, forward and aft;
  - (3) Rough timber cabin on bridge deck which admits sunlight and rain through the aperings between the roof boards;
  - (4) W. C. and bath-room on bridge deck;
- and is therefore still far from being complete for survey purposes.

I would point out that the engineering surveys on which the "Rebel" is to be engaged will have to be plotted as the work progresses and to suit this purpose the usual practice is for the bridge deck to be converted into a drawing office. In the absence of a bridge roof and side curtains this is impracticable and in my opinion the launch is now only adapted for the roughest of survey work. As the first survey is to be made near Amarah I am counting on getting accommodation in a building there for plotting the field work. It has been suggested that a launch as ordinarily equipped for conveying troops, is suitable for survey purposes and that the extras required for the "Rebel" are really luxuries; the suggestion is unwarrantable.

I may say the survey staff are not looking for luxuries but simply for the ordinary with which all river craft here are provided. The survey party will consist of at least one, and sometimes two British officers, 3 Native surveyors, 2 Sounding boat recorders, 2 gauge readers, and about 20 boatmen, sampanmen and leadsmen, in addition to the "Rebel's" crew of 14 hands.

This does not include an armed escort which it is understood will be required and for which some space will have to be provided. It is obvious that on the "Rebel" in her present condition practically the whole of the survey party will have to remain in the open day and night and as this is a mode of living to which they are not accustomed it would probably result in many of them being incapacitated by sickness.

As it would be impossible to replace these trained river Surveyors it is of great importance to the whole of our work that they be kept fit and efficient, but we cannot hope to achieve this with the "Rebel" in her present condition.

(Sd.) ERNEST C. NIVEN,  
*Assistant Director, River Conservancy.*

No. 169-A-16.

OFFICE OF THE DIRECTOR GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY, I. E. FORCE "D."  
*Basrah, 1st April 1916.*

To  
D. A. and Q. M. G.

MEMORANDUM.

With reference to my memorandum No. 149-A-16 forwarding a note on the delays caused to the River Conservancy Operations in Mesopotamia due to non-arrival of plant I beg to make the following additional and supplementary remarks.



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*Dredger and Component Parts.*

On the 30th March when Lieutenant Grant and Mr. Renfrew, the dredging master, were in the R. I. M. Dockyard, Mr. Renfrew by chance came across a number of indispensable fittings belonging to the dredger. Enquiries were made and the Storekeeper informed Lieutenant Grant that he did not know what the fittings were or to whom consigned and that he had intended putting them on the scrap heap on the following day to make room for his stores.

The Storekeeper was informed as to the nature of the goods and the officers departed making arrangements to take early delivery.

The following day I personally inspected the fittings and found 42 pieces there.

The same afternoon Major Niven and Lieutenant-Grant in the Dockyard noticed our gear had disappeared; they asked the Storekeeper who said he knew nothing about it. It then occurred to my officers to go to the scrap heap and on proceeding to the waste piece of ground across the road from the dockyard they found there dumped on the scrap heap the missing gear. Comment on an episode such as this seems unnecessary.

*Return of a portion of my Survey equipment on the "Havildar."*

In your telegram No. 1111-46-Q., dated 3rd March to Chief General Staff, Delhi, you gave me a list of the cases and packages not cleared from S. S. "Havildar" and said they were most urgently required and should be returned by the next ship leaving Bombay.

I have received no advice of the despatch of the cases from Bombay but as I heard the "Havildar" was coming back at once I supposed the gear would be on board and my officers made arrangements accordingly.

When, however, Lieutenant Grant was on board the S. S. "Warturm" looking for the "Rebel's" gear he came across some oars, poles and other survey equipment and on making enquiries he found that the missing 63 cases and bundles were on board but they were not consigned to any one and if Lieutenant Grant had not discovered them the cases would have been dumped on the bank at Magill where they might have remained indefinitely.

Had the authorities in India on receipt of your telegram advised me of the action taken we could have obtained delivery the day after "Warturm" arrived *i.e.*, the 24th March.

I have detailed Lieutenant Grant to visit every vessel in which we are advised there are goods for us but he cannot search every steamer on the chance of small parcels of goods having been shipped without advice being given to any one. Even when advices are received they are not reliable as we were informed that certain timber specified in detail had been shipped by the "Risaldar" and when the ship arrived none of it was on board.

I enclose a copy of Lieutenant Grant's report.

(Sd.) GEORGE C. BUCHANAN, Colonel,  
*Director General of Port Administration  
and River Conservancy.*

No. 164-A-16.

*Dated Basrah, the 31st March 1916.*

*D. G. of P. A. and R. C.*

I have to report that on the 30th instant I went with Mr. Renfrew (Master of the dredger "Oswald") to the R.I.M. dockyard by request to take delivery of two small motor engines; while taking them away Mr. Renfrew stumbled



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across some 19 angle iron seatings and about 23 pipe clamps which he identified as belonging to the dredgers pipe lines. On making enquiries the Store-keeper told me that he did not know what the fittings were, nor to whom they were consigned and that he intended putting them on the scrap heap next day to make room for more of his stores and he would be glad if I would take them away as he was satisfied they were intended for this department.

On the evening of the 31st Major Niven noticed that the pipe fittings had been taken away; I asked the Store-keeper what had been done with them and he said he had no knowledge of their having been removed. Major Niven and I then searched the scrap heap outside the dockyard and found that the missing parts had been dumped there. The same day I went on board S. S. "Warturm" to enquire about the launch "Rebel's" gear of which we had advice (see No. 766-Q., dated 20th March 1916.) The "Warturm" arrived in Basrah on the 23rd March and I went on board on the 27th but was told by the Chief Officer that the hold containing the "Rebel's" gear would not be opened for another 3 days. On the 30th I again went to the "Warturm" and found 5 cases of fittings for the "Rebel" and in addition what appeared to be cases of survey gear, sampan oars, rope, etc., as they were stamped with the mark used by Major Niven when sending such material from Rangoon. On asking the Chief Officers about them he informed me that he had 68 cases altogether sent by the R. I. M., Bombay, but did not know to whom they were consigned in Basrah. Five of these cases contained the "Rebel's" gear and there is no doubt that the remaining 63 packages are those which were taken back to Bombay by the "Havildar" on the 29th February. No advice whatever was received by this office of their being returned to Basrah and it was only by accident I happened to notice them.

Further advice was received of there being 8 teak 12" x 12" piles on board the "Risaldar" arriving in Basrah about the 19th March (see No. 1439 F. P., dated 26th March 1916). On enquiry the Chief Officer told me he knew nothing about this timber and it was not on the ship's manifest.

I was on board on the 29th March when the ship was nearly unloaded and there was no sign of timber and nobody on board knew anything about it.

(Sd.) J. G. GRANT,  
2nd Lieutenant, R.E.

Telegram P., No. 50570, dated the 26th April 1916.  
(Despatched 4-30 P.M.)

Serial No. 9.

From—The Chief of the General Staff, Simla,  
To—The General Officer Commanding, Force "D," Basrah.

A suitable officer will be temporarily appointed in the place of Captain W. B. Huddleston, R.I.M., who will be relieved of his duties of P. M. T. O., Force "D," at once. Captain Huddleston should be returned to Bombay, where he should report himself for orders to the Director, Royal Indian Marine.

Telegram No. 51764, dated the 2nd May 1916.  
(Despatched 10 P.M.)

Serial No. 10.

From—The Commander-in-Chief in India, Simla,  
To—The Chief of the Imperial General Staff, London.

In December last Government of India appointed (Serial No. 7) Sir George Buchanan, Chairman of the Rangoon Port Trust, to be Director General of Port Administration and River Conservancy in Mesopotamia, in order to have his expert advice and supervision in these essential matters.

It is now evident that Sir George has been unable to carry out these duties owing to obstruction of the subordinate staff, with whom he had to deal, and I propose that he should report direct to and take his orders from the Army Commander himself.

His duties will be :—

(1) *Port Administration.*

(i) All port works, including docks, wharves, workshops, moorings, lights, buoys, landing stages, sheds for storage of goods, surveys, etc.

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(ii) All port rules and regulations, including control of traffic within the port.

(2) *River conservancy.*

(i) All civil works from the light ship at the mouth of the Shatt-al-Arab to the furthest point under our control on the Tigris and Euphrates, *i.e.*, dredging, training, surveys, lighting, buoying, and the construction of wharves and sheds.

(ii) Rules and regulations for preserving the rivers in a navigable condition and for regulating the traffic thereon.

I have considered whether Sir George could not report to the Inspector General of Communication but find that Sir George's recent experiences have convinced him that his position is not sufficiently strong without direct access to the Army Commander, and we would run the risk of losing his services unless we meet him in this respect.

At the same time he has not yet had to deal with MacMunn and he grees that his works can only be carried on in close consultation with the Inspector General of Communication whose responsibility for the control and co-ordination of all traffic has been explained to him.

Buchanan has been told that his duties in regard to rivers are those of a conservator who is responsible for the river being kept in a navigable condition and who formulates the rules of the road so as to keep the channel fit for the Inspector General of Communication traffic at all time.

Before communicating this decision to General Officer Commanding, Force "D," I wish to have your concurrence, and that of the Admiralty.

Early reply is requested as Sir George Buchanan who is at present in India leaves this week for Basrah.

Serial No. 11.

Telegram P., No. 16229-Cipher-M.O., dated the 8th May 1916.

(Despatched 7-45 P.M., received 7 A.M., 9th May 1916).

From—The Chief of the Imperial General Staff, London,

To—The Commander-in-Chief in India, Simla.

Your 51764 of 2nd May (Serial No. 10).

After consultation with Admiralty, War Office concur in the proposal to place Sir G. Buchanan under the immediate orders of General Officer Commanding, Force "D."

Serial No. 12.

Telegram No. 53445, dated the 11th May 1916.

(Despatched 8 P.M.)

From—The Chief of the General Staff, Simla,

To—The General Officer Commanding, Force "D," Basrah.

Sir George Buchanan left India on 10th May for Basrah to resume his appointment of Director General of Port Administration and River Conservancy, in Mesopotamia. His duties in this appointment are as follows :—

A.—*Port Administration.*

(i) All port works, including docks, wharves, workshops, moorings, lights, buoys, landing stages, sheds for storage of goods, surveys, etc.

(ii) All port rules and regulations including control of traffic within the port.

B.—*River Conservancy.*

(i) All civil works from the lightship at the mouth of the Shatt-al-Arab, to the furthest point under our control on the Tigris and Euphrates, *i.e.*, dredging, training, surveys, lighting, buoying, and the construction of wharves and sheds.



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(ii) Rules and regulations for preserving the rivers in a navigable condition and for regulating the traffic thereon.

This allotment of duties has been referred to War Office and Admiralty and their concurrence has been obtained.

The scope of his duties has been discussed with Sir George Buchanan. He recognises that his work can only be carried on in close consultation and co-operation with the Inspector General of Communications and that the responsibility for the control and co-ordination of all traffic rests with the Inspector General of Communications.

In his duties as Port Administrator, he will exercise full control of traffic and works within the port under the direct orders of General Officer Commanding, Force "D."

His duties in regard to River Conservancy are keeping the river in a navigable condition and formulating the rules of the road so as to keep the channel fit for the Inspector General of Communication traffic at all times.

The Commander-in-Chief considers and War Office agrees that while in all matters Sir George Buchanan will work in close co-operation and consultation with the Inspector General of Communications it is desirable in the interests of smooth working that he should have direct access to you and take orders on matters from you himself in connection with his duties which require your decision.

A letter follows giving further details explanatory of Sir Buchanan's duties, but the above outline should be used as a working basis pending the arrival of further instructions.

Letter No. 54760, dated the 18th-19th May 1916.

Serial No. 13.

From—The Chief of the General Staff, Simla,

To—The General Officer Commanding, Force "D."

I am directed to inform you that it has been brought to notice that the intentions of the Government of India in regard to the appointment of Sir George Buchanan as Director-General of Port Administration and River Conservancy have not been carried out.

2. I am now, therefore, in continuation of my telegram No. 53445, dated 11th May 1916 (Serial No. 12), to issue the following detailed instructions:—

On his return to Basrah, Sir G. Buchanan in his capacity of Director General of Port Administration will be an independent Staff Officer of General Officer Commanding, Force "D," to whom alone he will report and from whom alone he will take his orders. Sir G. Buchanan will have entire control of the port itself under the direct orders of the General Officer Commanding, Force, saving and excepting the essentially marine duties such as the movement of vessels in and out berthing, moving, the provision and control of pilots and harbour masters.

3. In order that the traffic management may be properly regulated, arrangements will be made by the Government of India for the appointment of an official to be designated Traffic Superintendent, who will be placed directly under Sir G. Buchanan's orders. He will be responsible for the unloading of vessels, the despatch of goods to the various departments to which they belong and the wharfage arrangements generally.

4. Engineering works should be carried out partly by the Construction Staff of the Department of the Director General of Port Administration and partly by the B. G. R. E. In the matter of wharves, landing stages, sheds, and roads for port purposes, the B. G. R. E. and the Traffic Superintendent should meet in consultation with the Director General of Port Administration and decide on what is required, the Director General of Port Administration reporting direct to General Officer Commanding, Force "D," for necessary sanction.



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5. Sir G. Buchanan will have the following administrative duties:—

*Port Administration.*

- (1) All port works including docks, wharves, workshops, moorings, lights, buoys, landing stages, sheds for storage of goods, surveys, etc.
- (2) All port rules and regulations including control of traffic within the port.

*River Conservancy.*

- (1) All civil works from the light ship at the mouth of the Shatt-al-Arab to the furthest points under our control on the Tigris and Euphrates, that is, dredging, training, surveys, lighting, buoying and the construction of wharves and sheds.
- (2) Rules and regulations for preserving the river in a navigable condition and for regulating the traffic thereon.

6. The Principal Marine Transport Officer shall, on application by the Director General of Port Administration supply the latter with all information he may require on all points connected with the port, river, and their traffic.

7. Responsibility for the control and co-ordination of all river traffic will continue to be vested in the I. G. C. While, therefore, Sir George Buchanan will, as Port Administrator, exercise control of traffic and works within the port, it is essential that such control should be carried out in close consultation and co-operation with the I. G. C. Similarly in regard to river conservancy, Sir George Buchanan's duties will be confined to keeping the river in a navigable condition, and formulating the rules of the road so as to keep the channel fit for traffic at all times. These duties should also be carried out in close consultation and co-operation with the I. G. C.

Serial No. 14. M. 14099.

INDIA OFFICE,  
WHITEHALL, S.W.,  
28th March 1916.

DEAR SIR,

I am directed to forward a copy of correspondence on the subject of the appointment of a Shipping Adviser to the Principal Marine Transport Officer at Basrah.

From Admiralty, dated 26th March 1916, and  
enclosure.  
To War Office, dated 28th March 1916.  
To Admiralty, dated 28th March 1916.

Yours faithfully,  
E. G. BARROW, *General,*  
*Military Secretary.*

The Secretary to  
the Government of India,  
Army Department,  
Simla, India.

Enclosure I.

T. A. 44341-1916.

ADMIRALTY,  
26th March 1916.

SIR,

With reference to the proposed appointment of a Shipping Adviser to the Transport Officer at Basrah, which it is understood has the approval of the



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Secretary of State for India, I am commanded by My Lords Commissioners of the Admiralty to transmit copy of a letter to the Principal Marine Transport Officer. I am to add that the necessary steps are now being taken by their Lordships with a view to making the actual appointment.

I am, etc.,  
O. MURRAY.

The Under Secretary of State,  
India Office,  
Whitehall,  
S. W.

Sub-Enclosure I to Serial No. 14.

T. A.-44341-1916.

March 1916.

Sir,

I am commanded by My Lords Commissioners of the Admiralty to acquaint you that the shortage of tonnage necessary to meet the demands of the Allied Powers is a matter of grave concern to them. My Lords have every reason to be satisfied with the zeal and energy shown by the Naval Transport Officers throughout the Service. They are, however, impressed with the fact that the most economical method in the use of tonnage is not always followed, because its intricacies are not fully understood except by those who have been trained to the commercial use of shipping.

Their Lordships have therefore decided to appoint to your staff, in the capacity of Civil Assistant, a gentleman whose name will be communicated in due course.

The principal duty of the Civil Assistant will be to advise you on questions such as storage, bunkers, ballast, repairs, methods of loading and unloading and despatch, and general management of steamers.

You are to afford the Civil Assistant all reasonable facilities; the Civil Assistant will understand that Military requirements are paramount, and that, if he wishes to make representations to the Admiralty, he must do so through you.

The responsibility for accepting or rejecting any advice tendered by the Civil Assistant will be your own, bearing in mind that military requirements may often be met in the most prompt and effective manner by the application of business methods to Naval Transport operations.

My Lords are confident that Naval Transport Officers will co-operate with their Civil Assistants in order to effect the object My Lords have in view and that the result will raise still higher the standard of efficiency of the Naval Transport Service.

I am, etc.,

The Principal Marine Transport Officer,  
Basrah.

Enclosure II.

14099.

28th March 1916.

Sir,

I am directed to forward for the information of the Army Council a copy of letter from the Admiralty on the subject of the appointment of a Shipping Adviser

Dated the 25 March 1916, and enclosure.

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to the Principal Marine Transport Officer at Basrah. I am to add that there has been no previous correspondence with the Admiralty on the subject by this Office.

I have the honour to be,

SIR,

You obedient Servant,

General,

Military Secretary.

The Secretary,  
War Office.

Enclosure III.

I4099.

28th March 1916.

SIR,

In reply to your letter of the 26th March, No. T. A.-44341-1916, Sub-enclosure I to Serial No. 14, on the subject of the appointment of a Shipping Adviser to the Principal Marine Transport Officer, Basrah, I am directed to inform you that a copy of your letter will be forwarded to the Government of India. It is presumed that the Lords Commissioners of the Admiralty do not wish any action taken by this Office in respect of the issue of pay to the gentlemen so appointed.

I have the honour to be,

SIR,

Your obedient Servant,

General,

Military Secretary.

The Secretary,  
Admiralty.

Serial No. 15.

Telegram No. 54363, dated the 16th May 1916.

From—The Commander-in-Chief in India, Simla,  
To—The Chief of the Imperial General Staff, London.

Please refer to letter No. 14099 of 28th March 1916, (*Enclosure III to Serial No. 14*) from India Office to Secretary, War Office, regarding appointment of Shipping Adviser to Principal Marine Transport Officer, Basrah. Admiralty have appointed Mr. P. H. Browne of British India Company as Civil Assistant to Principal Marine Transport Officer, Basrah. Object of the appointment is to economise in tonnage, but neither I nor Government of India were consulted on the subject. With reference to my telegram No. 51764 of 2nd May, I have already selected Browne as suitable for appointment as Traffic Superintendent under Sir George Buchanan to carry out duties of unloading vessels, despatch of goods to various departments, and wharfage arrangements generally. I consider that this arrangement would be preferable to that proposed by the Admiralty, and would be glad if you could arrange with Admiralty for transfer of Browne to work under Buchanan in carrying out such of the Admiralty requirements as are suitable to existing conditions at Basrah.

Serial No. 16.

Telegram P., No. 17272-Cipher, dated the 28th May 1916.

From—The Chief of the Imperial General Staff, London,  
To—The Commander-in-Chief in India, Simla.

Your 54363, May 17th (*Serial No. 15*).

The appointment of Mr. P. H. Browne as Traffic Superintendent at Basrah under Sir George Buchanan is concurred in by Admiralty, it being understood that



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among his duties will be included advice on questions such as repairs, method of loading and unloading, despatch and general management of steamers, storage, bunkers and ballast.

As regards the Government of India not having been consulted before the appointment was made, the Admiralty obtained the approval of the India Office.

Telegram No. 56954, dated the 31st May 1916.

Serial No. 17.

From—The Chief of the General Staff, Simla,

To—The General Officer Commanding, Force "D," Basrah.

Reference concluding sentence of your P.-90, dated May 18th, (not included in collection) Chief of the Imperial General Staff has sent the following No. 17272-Cipher, dated May 28th. *Begins.*

Your 54363, May 17th. (*Serial No. 15*).

The appointment of Mr. P. H. Browne as Traffic Superintendent at Basrah under Sir George Buchanan is concurred in by Admiralty, it being understood that among his duties will be included advice on questions such as repairs, methods of loading and unloading, despatch and general management of steamers, storage, bunkers and ballast.

As regards the Government of India not having been consulted, before the appointment was made, the Admiralty obtained the approval of the India Office. *Ends.*

Dated Simla, the 22nd April 1916. (Confidential).

Serial No. 18.

From—COLONEL SIR GEORGE BUCHANAN, KR., C.I.E., M.I.C.E., Director-General of Port Administration and River Conservancy, Indian Expeditionary Force "D," Mesopotamia,

To—The Secretary to the Government of India, Marine Department, Simla.

(a) Note on Wharfrage accommodation at the port of Basrah, with proposals for improvement and extension. (Enclosure No. 1.)

(b) Further Note on proposed River Conservancy operations in Mesopotamia after an inspection of the rivers concerned. (Enclosure No. 2.)

(c) Memorandum No. 173-A-16, to the Chief Political Officer, I. E. F., "D," (Enclosure No. 3.)

(d) Telegram from Sir Percy Cox, to Bombay Political, dated 8th April 1916. (Enclosure No. 4.)

I have the honour to enclose herewith copies of the papers noted in the margin, and to say that the Army Commander has placed me on temporary deputation in India for the purpose of arranging for a contractor to undertake the construction of the works, and also to arrange for the necessary plant in connection with the same.

2. In the matter of the weirs on the Tigris, I have, as you are aware, submitted Sir Percy Cox's telegram to the Chief of the General Staff, who has communicated with the G. O. C., I. E. F., "D," on the subject. I can see no alternative to the construction of the weirs if our communications are to be maintained in the low water season, and the following proposals are on the assumption that the works will be carried out.

3. I arrived in Bombay on the 11th April, on the 12th and 13th I discussed the question of obtaining labour and material with the Chief Engineer, Bombay Port Trust, and I now submit for favour of approval, the following proposals.

4. *Labour.*—The conditions under which work is executed in Mesopotamia are so different from that which obtains in India, that it is impossible to arrange a contract, but I have obtained an offer from a Chinese contractor, who has done a considerable amount of work for the Bombay Port Trust, to execute the whole of the works in Mesopotamia on a wage basis, as shown in the attached copy of a letter\* from Mr. Ah Wee, dated the 13th April 1916.

\*Enclosure No. 5.

from Mr. Ah Wee, dated the 13th April 1916.



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I have discussed the rates fully with the Chief Engineer of the Bombay Port Trust, and we believe them to be reasonable.

The contractor pays income-tax on Rs. 600 a month in Bombay, and I agreed that in addition to his pay of Rs. 800 he should receive a small bonus for work done within a specified period, details respecting which would be settled in Basrah.

5. *Tools and Plant.*—I enclose lists of plants, etc., which I have arranged

\*Enclosure No. 6. to procure from the Bombay Port Trust,\*  
†Enclosure No. 7. Messrs Richardson and Cruddas†, and  
‡Enclosure No. 8. Messrs. Crowder and Co.,‡ respectively,  
§Enclosure No. 9. and also a list§ containing certain items

not included in above, and as to which I am making enquiries.

6. *Engineering Staff.*—I am of opinion that my staff of Engineers, Surveyors, etc., is very weak, more especially as some sickness must be anticipated in the hot weather.

The European Staff at present consists of—

Mr. E. C. Niven, Assistant Director of River Conservancy.

Lieutenant Grant, R.E.

Captain Lakin, I.A.R.

and I hope that Mr. Berrill from the Burma Public Works Department and Lieutenant O'Rorke, R.E., will join the next month or so.

I recommend that another Engineer accustomed to river works be appointed also a good Draughtsman and a Storekeeper.

The Secretary to the Government of India, Public Works Department, might be able to recommend an Assistant Engineer and a Draughtsman. When I was in Delhi in December last, a Mr. P. Smith from the Burma Public Works Department was mentioned by Mr. Russell as a suitable man if more Engineers were required. In the matter of Storekeeper, I recommend that Mr. B. F. Davidson, at present employed by the Bombay Port Trust, be appointed at a salary of Rs. 150 per mensem along with free quarters and free rations.

7. *Transport to Basrah.*—As it is of importance that all the men and plant should proceed on one steamer, I discussed the matter with the Senior Embarkation Officer, Bombay (Lieutenant-Colonel Dickson, Supply and Transport Corps), and he was good enough to express willingness to undertake the whole business if it was left in his charge. He was of opinion that he could conveniently pack bundles of hay between the boilers and winches.

8. I desire to acknowledge the great assistance rendered to me in Bombay by Mr. P. G. Messent, C.I.E., the Chief Engineer of the Bombay Port Trust, who recommended the Chinese contractor, and otherwise placed his knowledge and services at my disposal.

Enclosure No. 1.

*Note on Wharfage accommodation at the port of Basrah, with proposals for improvement and extension.*

This note is intended to deal primarily with immediate war necessities, but it will be convenient to describe briefly the constitution of the port prior to the British occupation, and trace its development to the present time. It may also be laid down as an axiom that the chief requirements of a modern port irrespective of its use are :—

- (1) Facility for prompt discharge and despatch of steamers ;
- (2) Ample storage accommodation for goods.

2. In the days of Turkish rule although the trade was considerable port accommodation was practically non-existent. All sea-going steamers laid at their anchors in the stream, and imports for Basrah were discharged into country boats and landed at the Custom House wharf where imports for Baghdad were



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discharged direct into the river steamers and flats and taken up the river on a through bill of lading. Exports consisting largely of dates were shipped into country boats at various points on the river, and thereafter conveyed to and loaded into the sea-going vessels.

There were no wharves, and even in the busy season the number of sea-going vessels in the port at the same time rarely exceeded half a dozen.

3. The British occupation brought a great change in the affairs of the port, and it was necessary to establish a base where vast quantities of supplies and munitions of war could be stored, and thereafter transferred to the site of military operations, and along the lines of communication.

4. For this purpose temporary wooden jetties were erected along the fore-shore between Khora Creek on the south and the Base Hospital on the north, and pieces of ground were allotted to the various military departments.

The general procedure remained, however, practically the same, as owing to the shallowness of the water alongside the jetties the sea-going vessels discharged the whole of their cargoes into light country craft, the goods being landed at the various jetties and thereafter shipped into river steamers and flats, and conveyed up the river to their destination.

5. So long as the force remained a comparatively small one, the arrangements cited above worked fairly satisfactorily but with the advent of numerous reinforcements, and the necessity for addition to stocks and reserves, the tonnage of the port increased rapidly and it has not been unusual to see 12 to 16 transports in the river at the same time all discharging into country craft.

6. To alleviate the congestion at the existing jetties it was decided to build more temporary jetties at Magill, 4 miles above the Ashar Creek (the centre of the existing jetties) and Magill had moreover the advantage of such deep water close to the bank, that the sea-going vessels were enabled to go alongside and discharge direct on to the land, thus saving the delay caused by the use of country craft of which there was only a limited number available.

7. It has not, however, been possible up to the present to make the fullest use of Magill for the following reasons:—

- (1) liability of ground to be flooded during the high water season;
- (2) lack of shed accommodation for stores and buildings for use of personnel;
- (3) temporary nature of jetties.

8. The Army Commander has now decided that the necessary accommodation is to be provided for the location of S. and T., and Ordnance Departments at Magill, and from the point of view of port work and administration, I beg to report as follows:—

*(A) Magill as the permanent port of Basrah.*

I would observe that having given the matter much consideration, I have formed the opinion that owing to its extensive deep water frontage, the whole future of the port of Basrah lies at Magill; any port works executed in that locality may be conveniently designed to form integral portions of a future project and the Germans doubtless had this in mind when they located here the terminus of the Baghdad Railway, and built a small wharf.

*(B) Liability of ground to be flooded.*

Bunds are under construction to keep out of a certain area the flood water from the Euphrates, but I suggest that having regard to the permanency of the work, it is desirable to reclaim the whole area to a level well above the highest floods, I estimate approximately that 10 cubic yards will be required for every 10,000 square yards of area, and I suggest that the quickest means of accomplishing the work will be by running a light railway out into the desert and bringing in train loads of earth. I understand that labour is scarce and in that case one or more Priestman Jral Excavators might be engaged each of which have an estimated output of 3 to 4 cubic yards a day.

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(C) *Buildings and Roads.*

In the making of a port it is of importance that all buildings should be located with the greatest care, as it is sometimes found that after buildings have been erected they are in the wrong position, and interfere with roads, tramlines, etc., etc.

In the matter of communications I would suggest that it is of importance to build some macadamized roads from the wharf to various points in the new depôt.

I understand that there is practically no local stone available, but as until recently the whole of the stone for the roads of Rangoon, in Burma, was obtained from Bombay, there seems no reason why stone should not be imported to Basrah from Karachi.

(D) *General arrangements of wharves.*

For permanent use as a commercial port the usual and best arrangement is to have a continuous line of deep water wharves with roads and transit sheds behind same, as shown in drawing No. 1 accompanying this note, the light draught river steamers being accommodated below, but for the immediate military necessities I think it will be more suitable to provide detached berths for sea-going vessels, with floating pontoon landing stages between the steamer berths for the accommodation of river craft and flats, as shown in drawing No. 2 accompanying this note.

The procedure would then be as follows :—

- (1) Certain areas of land with a river frontage would be allotted to the Supply and Transport, and Ordnance Departments, respectively.
- (2) Sea-going vessels would discharge at the sea-going berths and their cargoes would be sorted and delivered to the department concerned.
- (3) Goods for despatch up country would be shipped into the river steamers from the floating pontoon landing stages.

The objection to this scheme is that inward traffic from the sea-going vessels would cross outward traffic to the river boats, but I do not see how this can be avoided.

The plan\* shews 5 berths for sea-going vessels and 4 berths for river steamers and if more are required they can be erected above the Baghdad Railway Wharf, where there is an ample length of deep water frontage. I have allowed a space of 200 feet between the jetties of each berth and 641 feet between the berths themselves, but these spaces can be altered if from the Marine point of view others are more suitable for steamer hatches, etc.

At the conclusion of military operations the floating landing stages could be removed, the gaps between the sea-going wharves filled in and the whole wharf extended one way into the river, the result being a fine wharf 2,800 feet long, with a depth alongside of 30 feet below mean sea level.

(E) *Construction of wharves.*

The existing jetties at Magill, although admirable for a sudden emergency, can only be classed as very temporary (see photos attached), and the new wharves have been designed as cheaply as possible compatible with stability.

Whether they should be built of steel screw piles and steel bracing, or of wooden piles and bracing, has received my serious consideration, and I have decided in favour of the latter method because it is cheaper, easier and quicker to make in a country where skilled labour is scarce, and almost as durable as steel in a river which is not affected by the marine motion.

I propose to do the work by degrees, one berth at a time, so that the existing temporary jetties would be kept in use until they were gradually supplanted by the new ones.



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In the matter of actual construction, the whole of the port works have been executed hitherto by the Military Works Department, and they could no doubt carry out the building of the new wharves with speed and efficiency. If however in view of the numerous demands on his staff the B. G., R.E., would like to be relieved of this work, I should be quite prepared to carry it out entirely in my department.

(F) *Floating Pontoon Landing Stages.*

For permanent use steel bowstring girder bridges and steel pontoons tied together with steel girders are usually employed, but they will take some time to manufacture, and in this case I propose to utilise some of the pontoons which have been retained here from the pipe line of the dredgers "Jinga" and "Kalu," tie them together with timber bearers and make a wooden bowstring girder bridge.

In the event of the pipe line pontoons being required elsewhere, the Rangoon Port Commissioners have, to my knowledge, a number of small iron barges which are not at present in use and which I think could be made available.

(G) *Time.*

For military purposes speed is the essential element, but unfortunately engineering work requires a certain amount of time to collect material, and thereafter a further period for construction.

I estimate that it should be possible to erect one berth complete for sea-going vessels per month, and one floating pontoon landing stage per week after the arrival of the materials, and should the work be entrusted to my department, I will at once prepare complete indents for all the plant and material required.

(H) *Cost.*

I estimate approximately that each complete berth for a sea-going steamer will cost Rs. 50,000 : thus the 4 new berths provided for will come to Rs. 2,00,000.

The floating pontoon landing stages would probably not cost more than Rs. 5,000 each, if the pipe line pontoon can be used, or Rs. 15,000 if iron barges are procured from Rangoon.

Against this estimated cost may be placed, apart from the value of the wharves for military purposes—

- (a) The saving on demurrage to steamers and hire of country boats.
- (b) The permanence of the work.

(Sd.) G. C. BUCHANAN, Colonel,  
*Director-General of Port Administration  
and River Conservancy.*

Enclosure No. 2

*Further note on proposed River Conservancy operations in Mesopotamia after an inspection of the rivers concerned.*

In my preliminary note dated 14th December 1915 to the Secretary to the Government of India, Marine Department, I discussed various proposals for the improvement of navigation on the rivers Tigris and Euphrates above Basrah and on the Shatt-al-Arab below Basrah after studying such data as were available, but I pointed out that in the absence of any engineering surveys an investigation on the spot was the only means of ascertaining to what extent, if any, improvements could be effected.

(2) I arrived in Basrah on the 1st January 1916, but owing to the great scarcity of river craft and the urgent demand for all available vessels for military purposes I was unable to get outside Basrah until the 14th February 1916, a delay much to be regretted but which under the circumstances was unavoidable. I have however now had an opportunity of making a personal inspection of those portions of the rivers requiring immediate treatment, and I submit this further note on the



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understanding, however, that the views expressed herein are subject to confirmation or otherwise when surveys have been made.

*The Tigris between Qurnah and Amarah.*

(3) Sir William Willcocks in his book "The Irrigation of Mesopotamia," stated that the very existence of the Tigris as a river was threatened in this reach by various large streams which took off from the main river and in three specified cases he designed waste weirs with crests 50 centimetres (19.68 inches) below low water level in order to retain the bulk of the low water flow in the Tigris proper.

These weirs were to be solid masonry and the estimate for the three was about £ 45,000. I am in entire accordance with Sir William Willcocks' diagnosis and I propose to put in hand working surveys of the various canal junctions at the earliest date.

(4) I noticed on my inspection the usual bars and difficult crossings which one would expect to find on a river flowing through an alluvial plain and also a number of awkward bends and I can quite understand that in the low-water season, navigation between Ezra's Tomb and Qualet Salih is extremely difficult.

I noted six places where engineering surveys are required and these will be made as soon as possible.

(5) When all the surveys enumerated above are completed, I will consider the practicability of executing the following works :—

(a) Lowering by judicious dredging of the various bars and casement of awkward bends.

(b) Construction of temporary emergency weirs for the next low water season which will keep the bulk of the low water flow within the Tigris.

(6) To carry out (a) some small light draft dredgers are an absolute necessity and in a separate communication I have described the type of machine required.

With reference to (b) it is neither possible nor desirable within the next few months to construct Sir William Willcocks' permanent weirs but I propose to build temporary structures of timber, earth and reed mattresses which will I think serve their purpose for the low water months.

*The Euphrates between Qurnah and Nasiriyah.*

(7) In his book Sir William Willcocks has described the bursting of the right bank of the Euphrates whereby for 110 kilometers (68 miles) the Euphrates has no bed at all and has its main junction with the Tigris at Garmat Ali 40 miles below the old junction at Qurnah and in connection with his irrigation scheme he proposed to allow the whole of the water of the Euphrates to find its way to Garmat Ali, but to restore the right bank from Qurnah and join it to the left bank at Sukess Sheyukh at a cost of £70,000, thus ensuring the passage of the spill water of the Tigris down the old channel of the Euphrates to Qurnah.

(8) For the purposes of navigation we must look at the matter from a different point of view, our immediate objective being the establishment of a channel whereby river steamers could navigate at all times of the year between Basrah and Nasiriyah. At the present time the Euphrates flows in a well defined channel from its source to the neighbourhood of the town of Sukess Sheyukh some 80 miles in a direct line from Basrah but 5 miles above Suk a channel called the Haquikah takes off from the Euphrates whilst below Suk the Euphrates divides into the Mezlik and Umm Nakhalah channels and various streams. These channels spread fanwise and are lost 10 miles below Suk in vast shallow lakes and swamps extending to Garmat Ali and Basrah which in the low water season are only 2 feet deep in parts; that is to say, navigation is limited to native boats.

(9) The problem before us is to make a channel through the lakes, and so far as depth of water is concerned, I can discover little to choose anywhere, but the distance across varies considerably; thus from Garmat Ali to the mouth of the Euphrates is about 60 miles but from Qurnah along the old bed of the Euphrates there is a deep well defined channel to a point called Chabaish whence the



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distance across the Hammar Lake is about 15 miles more or less according to the channel taken on the opposite side.

Under the circumstances therefore the best course to take is *via* Qurnah to Chabaish and thence across the Hammar Lake.

(10) From the entrance to the lake which is about 8 miles from Chabaish two courses are open as a channel can be cut either to the mouth of the Mezlik or Haquikah channels respectively.

The Political Officer at Suk (Captain Dikson) with whom I had a long and more interesting conference emphasized the desirability of making the Mezlik the main channel to Nasiriyah for the following reasons:—

(a) The Haquikah is comparatively speaking a new channel and any works resulting in an increased flow of water will be at the expense of the Mezlik channel and result in many acres of ground being thrown out of cultivation. This was recognized by the Turks who placed a dam across the Haquikah channel but for military purposes the dam has been removed.

(b) The country through which the Mezlik flows and irrigates with its water is one of the richest in Mesopotamia but the people are exceedingly turbulent, possessing many good rifles and abundant ammunition. It is believed that improving the channel whilst increasing the area under cultivation will also improve the character of the people as there would be a constant passage of traffic in front of their doors.

(11) I made a close inspection of the Mezlik channel from Suk to the bar at the Hammar Lake and whilst appreciating greatly the views of the Political Officer, I am of opinion that for military purposes the Haquikah is the best channel to adopt.

For the last few miles, the Mezlik channel is so shallow and tortuous that a great deal of work would be necessary to render it navigable in the low-water season for vessels of three feet draft whereas the Haquikah, which I also inspected personally, is a fine straight fairly deep channel throughout.

I also explored the Umm Nakalah channel which takes off from the Mezlik and flows into the lakes and swamps south of the Hammar Lake.

This channel is really the Euphrates' new bed and appears to carry more water than any of the others, but gets exceedingly tortuous and narrow as the outlet is reached.

(12) Having inspected all the channels I propose to make the cut from Chabaish to the mouth of the Haquikah and one dredger of a suitable type is at present *en route* from Burma, the cutting of the channel will be a tedious task and I fear it will not be possible to do more than 3 miles per month at the utmost. A survey is required before the exact line can be decided upon and if for military purposes great importance is attached to the work a second dredger of similar size could possibly be obtained from Burma but before coming to conclusion on the subject I should like to discuss the situation with the dredging master of the vessel which I hope will arrive in Basrah shortly as the entire proposition is a novel one.

*Summary.*

(13) To sum up I do not think that any heroic engineering works are required either on the Tigris or Euphrates to improve navigation temporarily for military purposes, but any permanent scheme of river conservancy works will require more extensive surveys and study than it is possible to give at the present time.

If I can get men and appliances I have every hope of getting a greatly improved channel between Qurnah and Amarah in the low-water season and also have the cutting across the Hammar Lake well in hand. What is principally required is organisation and concentration of energy in proper places, in short to use an Indian colloquialism "a good bandobast."

(14) There is a great deal more survey work to do than I was led to expect and I have sent a requisition to India for more surveying instruments and for another surveyor. I would emphasise the fact that in hydraulic engineering,  
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surveys are all important, as the position of a dredged channel on a river like the Tigris has to be selected with great care after the survey has been made.

(15) As I shall have three survey parties at work simultaneously I shall be very short of river transport both for surveys and for conveyance of coal and stores to the dredgers.

I have coming from India one moderate draft steam launch, one shallow draft paddler and one steam pinnace, but it is quite impossible for me to carry out all the works. I have enumerated without a good steamer for working on the Hammar Lake and a motor boat for surveys on the lake. I therefore request that the "Shushan" or similar steamer be placed at my entire disposal and that sanction be accorded to the purchase of a motor boat.

The latter I have had offered me and have purchased, subject to sanction from Messrs. Strick Scott and Company as per details attached.

I may say that as I shall have competent men in charge I have no fear of the launch breaking down.

My deeper draft launch can tow barges with coal and stores as far as Qurnah and the "Shushan" from Qurnah to the lake, but I wish to make it quite clear that without the service of the "Shushan" or equivalent I cannot carry out the work entrusted to me.

I ask for nothing extravagant either in the way of men or appliances and have left so small a margin that very little will make the whole difference between success and failure.

*General remarks on transport service on the Tigris.*

(16) I have been asked verbally whether any limit can be placed on the number of river transports that can be accommodated on the river and in my judgment there is no limit within reason, but I consider the transport service requires organisation and institution of traffic rules and regulations.

The usual rule of the road is that steamers going up the river give way to steamers coming down because the former are naturally under better control but I understand this rule is not enforced.

With large increases in the number of river transports some crossing stations will possibly be required and a comprehensive scheme carefully drawn up.

I would point out that a perfect transport service depends upon the following:—

- (1) Sufficient number of steamers,
- (2) Adequate means of repairing and maintaining vessels,
- (3) A navigable river at all times of the year,
- (4) Competent management of the transport service by one responsible officer,

and if all these are not co-ordinated there will be failures and breakdowns.

With reference to (4) I would suggest that whoever is in charge of the management of the transport service should also issue orders for the upkeep and maintenance of the vessels as divided responsibility in this case would militate against efficiency.

*The Shatt-al-Arab below Basrah.*

With the large amount of work before me at Basrah and on the rivers Tigris and Euphrates I regret that I see no immediate prospect of taking up the question of the conservancy of the Shatt-al-Arab and removal of the Fao-Mohammerah bars, but the survey work will be put in hand so soon as any of my staff can be spared.

(Sd.) GEORGE C. BUCHANAN, Colonel,  
Director General of Port Administration  
and River Conservancy.

3rd March 1916.



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Enclosure No. 3.

No. 173-A.-16.

OFFICE OF THE DIRECTOR-GENERAL OF  
PORT ADMINISTRATION AND RIVER CONSERVANCY,  
I. E. FORCE "D."  
53, Strand Road.

To

The Chief Political Officer.

MEMORANDUM.

Referring to my interview with you yesterday I beg to place on record my proposals for the erection of temporary weirs across the Chala canal at Amarah and the Major Kabir and Macherera canals between Amarah and Qualat Saleh.

2. Sir W. Willcocks in his report on the Irrigation of Mesopotamia remarks that these branches whose beds are lower than that of the Tigris constitute a distinct menace to the existence of the Tigris as river and he proposed to close them entirely against navigation but to keep the crest of the weirs at a level low enough to allow sufficient water to pass over for irrigation purposes.

3. It is now over five years since the date of Sir W. Willcocks' report and during this period no further investigation has been made to see whether the deterioration of the Tigris is increasing or otherwise. But I have now a survey party at work collecting the necessary data for me to form an independent opinion. This will however take some time.

4. Whatever may be the nature of the final design for regulating these channels I think it will be agreed that at all cost they must be temporarily dammed before the next low-water season because apart from the urgent necessity for more water in the river Tigris between Qualat Saleh and Ezra's Tomb, there is just the possibility of the Tigris turning the whole of its water down the Chala during the floods and this would mean a complete breach of our lines of communications and therefore a terrible calamity.

5. Under these circumstances I have designed temporary weirs as per copy of cross section enclosed and although water will pass over for irrigation all navigation will be completely suspended:

I understand from you that there is at present a good deal of boat traffic on the canals and that considerable inconvenience will be caused to the villagers on the banks if they are closed but I fear that for this next low-water season there is no alternative but to close them entirely.

6. When my surveys are completed and accurate river discharge observations have been taken I will review the situation afresh and report whether navigation could be continued by the introduction of locks but as Sir W. Willcocks has made no proposals to that effect I assume he came to the conclusion that there would be insufficient water during the low-water season for navigation below the weirs and that therefore the construction of locks would not improve matters.

As an alternative to navigation roads might be made along the banks of the canals and tramways laid down and this may be considered later on.

7. To summarise, my proposals are as follows :—

- (1) To erect temporary weirs which will completely stop all navigation but will allow water for irrigation.
- (2) To prosecute the various studies and surveys with all speed and to submit a permanent scheme in the light of the information obtained.
- (3) To remove the temporary weirs at the close of next low-water season.

Will you kindly favour me with your views on this programme ?



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8. I shall require a considerable amount of labour, say about 800 men distributed over the various works to fill the sand bags and deposit them between the rows of piles. I understand that there will be no difficulty in procuring this locally.

Copy to:—

The D. A. & Q. M. G.

The C. G. S.

Enclosure No. 4.

Telegram dated the 8th April 1916.

From—SIR PERCY COX, Basrah,

To—Bombay Political, Bombay.

P. Demi-official. Will you kindly decypher the following and hand a transcription of it to Sir G. Buchanan, who will stop at the Hotel Majestic on his arrival from Basrah about the 12th instant?

*Begins.* With reference to your memorandum No. 173-A-16 received on the 5th March, explaining the projects for damming certain canals, it may be convenient to you to know that, after examining them in consultation with the Revenue Commissioner, I see good reason for apprehending that apart from loss of revenue their execution will involve the loss of rice crops over a vast area for which we may have to pay compensation and the projects are likely to arouse such active resentment on the part of the tribes concerned as really to make the remedy worse than the disease. I have advised that before it is decided to proceed with them the projects should be subjected to further expert examination.

Enclosure No. 5.

Dated the 13th April 1916.

From—MR. AH WEE, Contractor, Bombay,

To—COLONEL SIR GEORGE BUCHANAN.

With reference to your enquiry I beg to submit that the Rate list of men will employ for your work at Basrah. The wages will be pay every month, and I will draw all the wages from the office for payment, and you have to supply all the expenses for boarding and lodging and passage fare for going and coming back for all over men.

Further I beg to say that I want one month wages in advance before starting from Bombay to pay the men; if anybody will run away I am responsible for the same.

*Rate List of men will employ on work for Basrah.*

	Rs.
	Per month.
Contractor .. .. .	800
3 Foremen .. .. .	150 each.
4 Drivers .. .. .	120 "
1 Chinese Head Driver and Fitter .. .. .	200
5 Firemen .. .. .	45 each
60 Chinese Carpenters .. .. .	120 "
4 Sarangs .. .. .	80 "
4 Mucadams .. .. .	80 "
40 Khalasis and Bamboo coolies .. .. .	60 "
40 Coolies .. .. .	45 "
Clerk .. .. .	120



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Enclosure No. 6.

*Plant to be supplied by the Bombay Port Trust.*

One Pile Driver, 40 feet high from base to top pully, complete with boiler, winch and 2-ton monkey.

One Pile Frame, 30 feet high.

Two winches and two boilers.

No. six 20-cwt monkey complete.

6 Pile rings for 12" Pile.

*Note.*—The Bombay Port Trust will sell outright the 40 feet Pile Driver, and I understand the price is Rs. 7,166. The two winches and boiler they wish returned when done with in Basrah and they are prepared to quote a rate for hire. The monkeys and rings would be made in the Port Trust Workshops and a bill submitted.

Enclosure No. 7.

No. T.-2177-P., dated Bombay, the 13th April 1916.

From—MESSRS. RICHARDSON AND CRUDDAS, Bombay,

To—COLONEL SIR GEORGE BUCHANAN.

With reference to the list of Stores, etc., handed to our Mr. Lewis yesterday, we have now the honour to quote as under for:—

Item		Rs.	A.	P.
1.	3 Nos. Portable Vice Benches. We offer 6" staple Vices on stand .. .. .	80	0	0 each.
"	2. 12 Nos. Clyburn Spanners 16" × 1½" jaw .. .. .	10	0	0 "
"	3. 12 Nos. Clyburn Spanners 21" × 2" jaw .. .. .	14	0	0 "
"	4. 1 No. Engineers Stocks, Dies, Taps and Wrenches ¼" to 1½" (Whitworth thread) in case .. .. .	150	0	0 "
"	5. 6 Nos. Hack Saws Frames 12" .. .. .	3	8	0 "
"	6. 72 Nos. Hack Saws Blades for above .. .. .	3	12	0 doz.
"	7. 12 Nos. Chipping Chisels flat .. .. .	1	8	0 each.
"	8. 12 Nos. Chipping Chisels half round .. .. .	1	8	0 "
"	9. 2 Nos. Grindstones 18" dia.—not available, offer 24" in trough .. .. .	60	0	0 "
"	10. 60 Nos. Metal Files of kinds 6" .. .. .	4	8	0 doz.
"	11. 60 Nos. Metal Files of kinds 8" .. .. .	5	8	0 "
"	12. 60 Nos. Metal Files of kinds 12" .. .. .	10	8	0 "
"	13. 3 Nos. Anvils either about 1½ or 3 cwt. .. .. .	30	0	0 cwt.
"	14. 3 Nos. Portable Forges Circular Bellows 22" dia. of hearth .. .. .	55	0	0 "
"	15. 6 Nos. Sledge Hammers (6lbs.) .. .. .	0	4	0 lb.
"	16. 6 Nos. Flogging Hammers (8lbs.) .. .. .	0	4	0 "
"	17. 6 Nos. Engineers Hammers (2 lbs.) .. .. .	0	12	0 "
"	18. 1 No. Jimerow 2½" Screw .. .. .	60	0	0
"	19. 1 No. Jimerow 2¾" Screw .. .. .	80	0	0
"	20. 3 pairs Blacksmiths tongs .. .. .	0	8	0 lb
"	21. 1 No. Set Swage .. .. .	1	0	0 "
"	22. 2 Nos. Rod Handles for above .. .. .	0	8	0 "
"	23. 6 Nos. Bottle Jacks (6 tons) .. .. .	22	0	0 each.
"	24. 12 Nos. Straining Screws (to take ¾" dia. wire rope) .. .. .	10	0	0 "
"	25. 12 Nos. Shackles (¾" metal) .. .. .	10	0	0 "
"	26. 6 Nos. Chain Slings with hook and ring ½" dia. about 10' long .. .. .	32	0	0 "
"	27. 6 Nos. Cross cut Saws 5 ft. long .. .. .	6	0	0 "
"	28. 2 Nos. Felling Axes 4½ lbs. .. .. .	5	8	0 "
"	29. 6 Nos. of each—Augers — .. .. .	11	12	0 doz.

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	Rs.	A.	P.	
Item 30. 6 Nos. of each—Augers 1½"	..	..	..	2 0 0 doz.
31. 6 Nos. of each—Augers 7⁄8"	..	..	..	18 0 0 "
32. 6 Nos. Augers 1¼"	..	..	..	22 0 0 "
33. 12 Nos. Augers 1¼"	..	..	..	28 0 0 "
34. 2 Nos. Sets of Carpenters Tools	..	..	..	60 0 0 set.
35. 12 Nos. Foot Rules (24")	..	..	..	1 0 0 each.
36. 3 Nos. Spirit Levels (12")	..	..	..	1 8 0 "
37. 6 Nos. Crow Bars 1" dia., 5' long	..	..	..	25 0 0 cwt.
38. 3 Nos. Bill Hooks	..	..	..	2 8 0 each.
39. 12 Nos. Trollies with flat timber tops, cast steel wheels and steel axles 24' gauge as per figure 206 on page 182 of our catalogue	..	..	..	175 0 0 "
30. 2,000 lin. feet Light Railway Track 18lbs. per yard with fish plates and bolts and without sleepers	..	225	0 0	per 100 feet of track.
31. 2,000 Ncs. spikes for above	..	25	0 0	cwt.

We can supply all the above from stocks subject to remaining unsold, with the exception of items (26) and (39) which we could make and supply within two weeks from receipt of order.

Trusting to be favoured with your instructions.

Enclosure No. 8.

Dated Bombay, the 13th April 1916.

From—MESSRS. W. CROWDER and Company, Limited,

To—COLONEL SIR GEORGE BUCHANAN.

*Re wire ropes, pulley blocks, etc.*

With reference to the writer's interview with you yesterday, we now have pleasure in quoting for the Wire Ropes, etc., as follows:—

	Rs.	A.	P.	
250 Feet × 1" diameter Galvanized Flexible Steel Wire Rope at .. .. .	..	90	0 0	per cwt.
2 Single Sheave Snatch Blocks for 1" dia. Wire Rope at ..	..	15	0 0	each.
4 Double Sheave Pulley Blocks for 4" circ. Manila Rope at .. .. .	..	22	0 0	"
1,500 Feet × ¾" diameter Galvanized Flexible Steel Wire Rope at .. .. .	..	98	8 0	per cwt.
1,500 Feet × ½" diameter Galvanized Flexible Steel Wire Rope at .. .. .	..	105	0 0	" "
4 × 1" dia. Wire Rope Galvanized Thimbles at .. .. .	..	1	8 0	each.
12 × 1" dia. Wire Rope Clamps at .. .. .	..	2	12 0	"
24 × ¾" dia. Thimbles at .. .. .	..	1	4 0	"
50 × ¾" dia. Wire Rope Clamps at .. .. .	..	2	6 0	"
80 × ½" dia. Wire Rope Clamps at .. .. .	..	2	2 0	"
10 Single Sheave Snatch Blocks for ¾" dia. Rope at .. .. .	..	12	0 0	"

In the event of your confirming the order, we understand these goods are to be packed and each package addressed as follows:—

The Director-General of Port Administration and River Conservancy,  
Basrah,

and that we are to telegraph you at Basrah the name of the steamer carrying these materials. When confirming the order we understand you will be instructing us as to whether we are to hand the goods to the Embarkation Supply Officer, or other Department for shipment.

We take this opportunity of handing you another copy of our General Price List, a perusal of which will show that we specialise in all kinds of Paints, Ropes, Canvas, Cement, Metals, Hardware, Belting, Pulleys, Tools, etc., and we hope you will be able to place many orders with us.



'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [36r] (71/134)

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Enclosure No. 9.

*List of plant as to which enquiries are being made.*

1. One 3-ton steam travelling crane to travel on rails any gauge and have steam travelling and slewing motions, along with 600 feet 40 pounds rails with bolts and fish plates.
2. Two small electrical installations with fans to be placed on river survey steamers.

Telegram No. 55771, dated the 24th May 1916.

Serial No. 19.

From—The Chief of the General Staff, Simla,

To—The General Officer Commanding, Force "D," Basrah.

It is desirable that the whole question of organisation, maintenance, repair, etc., of the river fleet in Mesopotamia should be referred under your orders to a Committee of which Sir George Buchanan would be President, Government of India have already applied for the services of Mr. R. A. Horne of the Irrawaddy Flotilla Company to serve on this Committee, and Company has agreed to lend Horne's services for a period of 4 months from date departure to arrival back in Rangoon. You would appoint such additional members as you consider necessary and forward the report with your views and recommendations to me.

This Committee could consider question raised in my No. 53172, dated 10th May 1916. (Not included in collection.)

Telegram No. 1614-13-Q., dated the 13th June 1916.

Serial No. 20.

From—The General Officer Commanding, Force "D," Basrah,

To—The Chief of the General Staff, Simla.

I have now had an opportunity of discussing the terms of reference for the committee ordered by your 55771 of 24th May (not included in collection) with Sir G. Buchanan and General MacMunn who are the officers chiefly concerned. They agree in deprecating the question of the organization of the river fleet and the provision of personnel being referred to this Committee. Sir G. Buchanan writes that these are not subjects on which they can be of much assistance. He has stated he never understood it was meant to investigate these particular points. General MacMunn observed that the subject of the organization of and maintenance of an efficient river service is inextricably bound up with the question of the supply of personnel and involves an investigation not only into the organization of a branch (of the ?) Government Service, namely the Royal Indian Marine, in the field but also into his own organization of the lines of communications for which he alone must be responsible. There is force in these arguments, and friction is certain if an officer from outside as Sir G. Buchanan presides over a Committee which cannot avoid an enquiry into the organization of the Royal Indian Marine and its personnel and which is charged with suggesting an organization which must include personnel for river craft and in so doing may make proposals which may closely affect the administrator of system now in force in Royal Indian Marine. Do you attach importance to the Committee exactly as constituted by you, namely, with Sir G. Buchanan as President dealing with the whole subject as defined in your 56973 of 31st May (not included in collection), namely, a reference wide enough to cover all questions relating to organisation and maintenance of an efficient river service. Desirable as this might be, had I clean slate to work on, I cannot but fear, *first* that the Committee's investigations will take a long time, involving much delay before start is made with the additions to the river fleet; *secondly*, that General MacMunn's reorganization of his lines of communication must inevitably be delayed if he has to wait for the report of the Committee to be accepted or else be liable to be upset by what the Committee recommends, for it must be remembered that their report may open up many delicate and intricate questions; *thirdly*, I observe that in your telegram 55771, you contemplate Mr. Horne being required in Mesopotamia for nearly 3 months. During all this period



'Summary of correspondence relative to the administration of the Port of Basrah  
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a large portion of the organization for supplying the requirements of my force at the front must be in a state of flux and unrest, none of these things are desirable. I suggest that as an alternative that I be empowered to (use ?) my own discretion. In that case I shall appoint two Committees, utilizing Sir G. Buchanan's experience and ability to the best advantage. One Committee under Sir G. Buchanan would deal with the number and natures of the vessels required to convey a certain tonnage for the maintenance of troops and with the system on which the river fleet should be kept in a state of efficient repair including the preparation of proposals for the establishment of a thoroughly equipped marine dockyard or dockyards capable of dealing with all repairs to the present and prospective fleet. The other Committee under General MacMunn's presidency and with Mr. Horne as a member would deal with the organization including provision of personnel for the river fleet recommended and with the system on which the traffic up and down river would be worked so as to get the best use out of it. Delay is objectionable and in either case unavoidable: impossibility of anticipating it will be far less under my proposals. I shall be glad to hear if my proposals are approved and when Mr. Horne may be expected.

Serial No. 21.

Telegram No. 59804, dated the 16th June 1916.

(Despatched 2 P.M.)

From—The Chief of the General Staff, Simla,

To—The General Officer Commanding, Force "D," Basrah,

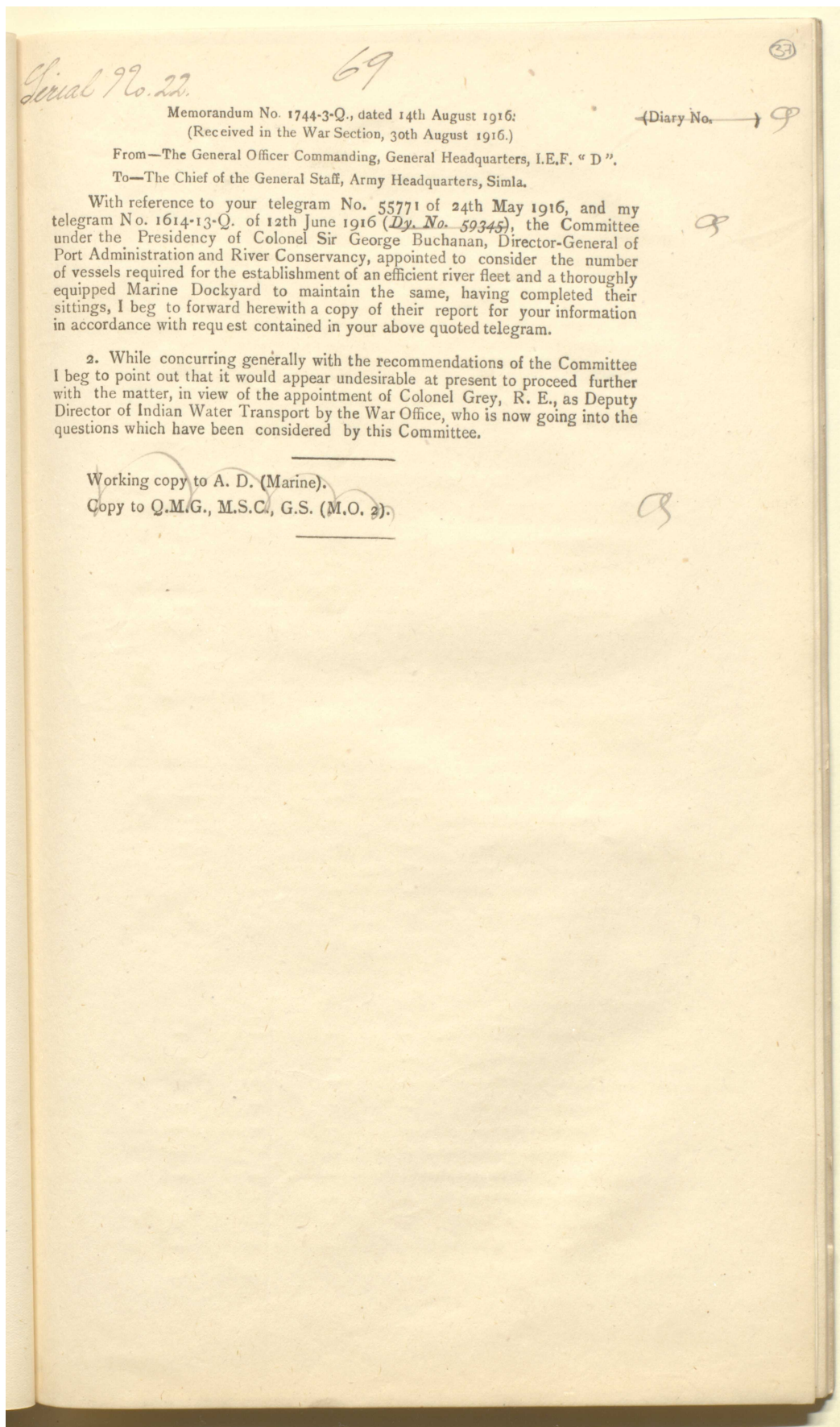
Your telegram No. 1614-13-Q., dated 13th June 1916.

Your proposal to form two Committees is agreed to. We understand that full advantage will be taken of Horne's experience by both Committees.

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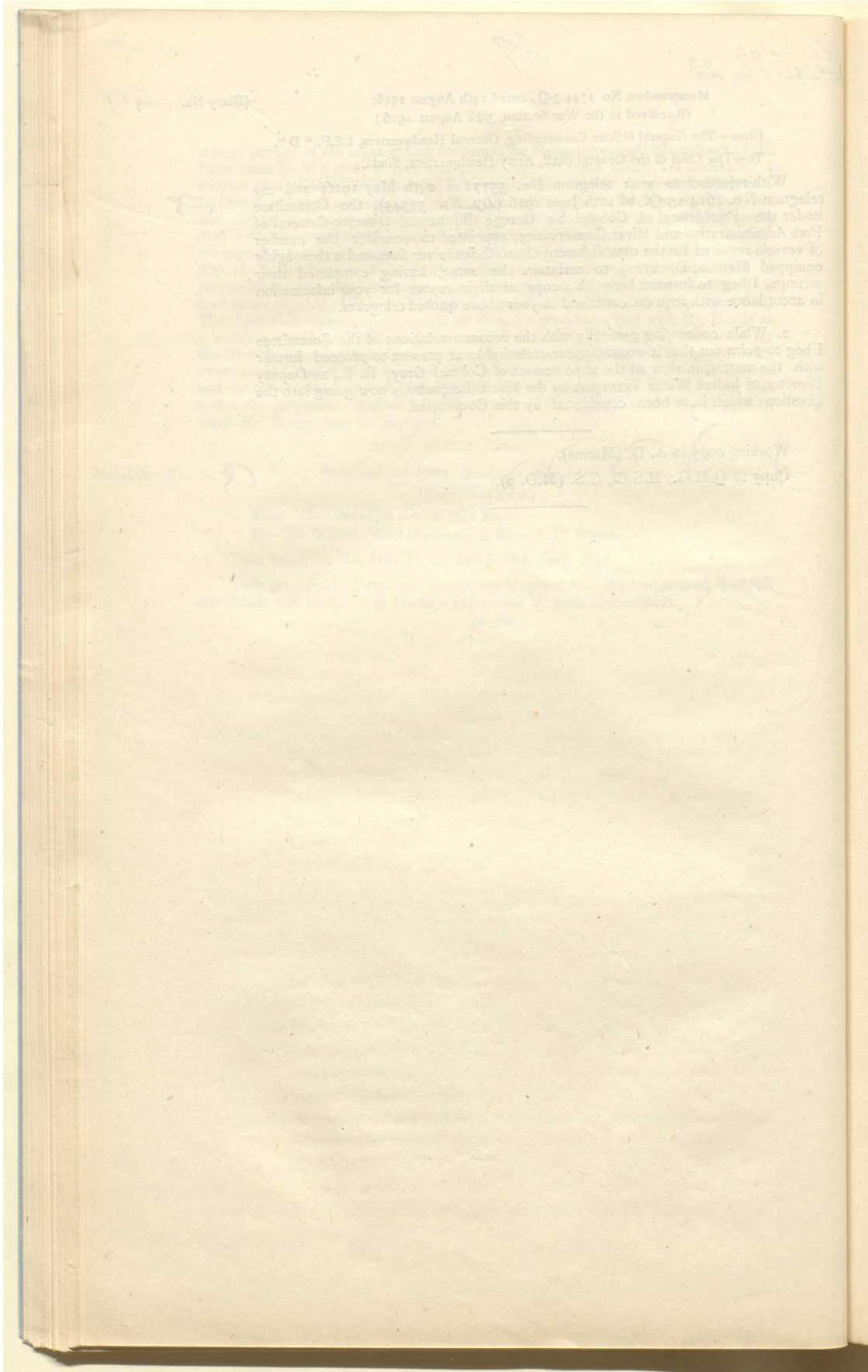


'Summary of correspondence relative to the administration of the Port of Basrah  
and measures for the control of the shipping traffic in Mesopotamia.' [37r]  
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'Summary of correspondence relative to the administration of the Port of Basrah  
and measures for the control of the shipping traffic in Mesopotamia.' [37v]  
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'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [38r]  
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Report of Colonel Sir George Buchanan's Committee on  
the Constitution of the River Fleet and Establishment  
of a Marine Dockyard at Basrah.

CONSTITUTION OF COMMITTEE.

President.

Colonel Sir George Buchanan, Kt., C.I.E., Director General of Port Administration and River Conservancy.

Members.

Major-General G. F. MacMunn, C.B., D.S.O., Inspector-General of Communications.

Lieutenant-Colonel C. B. Winter, Assistant Quartermaster-General, General Headquarters.

Commander E. Harold, R.I.M., Director of River Transport.

Major R. A. Horne, on deputation from the Government of India.

The Committee met at the Office of the Director General of Port Administration and River Conservancy on the 27th July 1916.

The following note by the President, which had previously been circulated to the members of the Committee, was taken as a basis for discussion :—

The following are the specific references to the Committee appointed under General Headquarter order conveyed in Memorandum No. 1614-21-Q., dated the 24th June 1916 :—

To consider and report upon the following :—

- (a) The number and nature of the craft required to provide a satisfactory river service for the Army in Mesopotamia, specifying the various descriptions of vehicles (vessels ?) recommended and the number of each class. The greatest possible use being made of vessels of the existing fleet. The data upon which to frame an estimate of requirements will be furnished by Army Headquarters.
- (b) The system on which the above river fleet should be kept in a state of efficient repair including detailed proposals for the establishment of a thoroughly equipped Marine Dockyard at Basrah and repair workshops on the lines of communication capable of dealing with all repairs to the present and prospective fleet.

Respecting (a) A great deal of information has been collected and certain decisions have been arrived at, and a number of vessels have been ordered. I propose to gather the facts together and lay my own views before the Committee; we can then hold a meeting and after discussing the various points, come to a conclusion on the main issues.

With reference to (b). I have, in conjunction with Mr. Horne, prepared a separate report, which has been circulated to the Committee and can be considered at our meeting.

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'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [38v] (76/134)

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*Constitution of the River Fleet.*

It will be of interest to record briefly the growth of the river flotilla, and the following statement has been supplied me by the P. M. T. O. :—

*January 1915—(After capture of Basrah).*

Paddlers	...	...	...	...	...	3
Stern wheelers	...	...	...	...	...	3
Tugs	...	...	...	...	...	5
Barges	...	...	...	...	...	10
Motor boats	...	...	...	...	...	a few
Total						21

*May 1915—(After capture of Amarah).*

Paddlers	...	...	...	...	...	11
Stern wheelers	...	...	...	...	...	3
Tugs	...	...	...	...	...	9
Launches	...	...	...	...	...	5
Barges	...	...	...	...	...	20-about to captured from Turks.
Motor boats	...	...	...	...	...	10
Total						58

*January 1916.*

Paddlers	...	...	...	...	...	11
Stern wheelers	...	...	...	...	...	3
Tugs	...	...	...	...	...	9
Launches	...	...	...	...	...	5
Barges	...	...	...	...	...	45
Motor boats	...	...	...	...	...	30
Total						103

*July 1st 1916.*

Paddlers (of Mejidieh type)	...	...	...	...	...	3
Paddlers of other type	...	...	...	...	...	22
Nile boats	...	...	...	...	...	5
Thames ferry boats	...	...	...	...	...	6
Stern wheelers	...	...	...	...	...	3
Tugs of Samana class and paddler	...	...	...	...	...	3
Tugs equal to Samana class	...	...	...	...	...	1
Other up river tugs	...	...	...	...	...	7
Hospital ships (Paddlers)	...	...	...	...	...	1
" " (Stern wheelers)	...	...	...	...	...	3



'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [39r] (77/134)

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Hospital barges ...	...	...	...	...	2
Port and deep sea tugs ...	...	...	...	...	9
Motor lighters ...	...	...	...	...	20
Motor boats ...	...	...	...	...	81
Steam launches ...	...	...	...	...	40
Barges, up river ...	...	...	...	...	73
Port Barges ...	...	...	...	...	35
Total					314

The river fleet is required, at present, solely in connection with military operations, and its functions may be sub-divided as follows :—

- (a) For the maintenance and transport of the army.
- (b) The requirements of the medical service.
- (c) The requirements of the Port of Basrah.
- (d) Miscellaneous Departmental requirements.

I will analyse these sub-heads *seriatim* :—

(a) *For the maintenance and transport of the army.*—It has been decided that Marine transport has to be provided for :

- (1) The daily requirements of 5 divisions in supplies, equipment, stores and gear, field force canteen, ordnance stores, mail, works and miscellaneous :
- (2) A possible increase of 50 per cent. over the above :
- (3) Transport for at least one division of all arms in addition to ordinary supply services.

We are told that 5 divisions require 725 tons of supplies per diem, which, allowing for a possible increase of 50 per cent, gives a total of 1,085 tons, or say as a maximum 1,200 tons per diem.

The fleet at present consists of vessels of all shapes and sizes and the Committee is directed to report on the nature of the craft required and the various description of vehicles (vessels?) recommended.

In deciding the class of vessel to be used on any river, four factors come into consideration :—

- (1) The speed of the current of the river.
- (2) The depth of the river.
- (3) The width of the river and the radius of the bends, and height of the banks.
- (4) The particular purpose for which the vessels are to be used, *i.e.*, passengers, cargo or mixed.

These factors have already been considered and the fleet on order has been reduced to practically 3 types, and the capacity of other vessels is measured by this standard.



'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [39v] (78/134)

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These Standard Types are:—

A steel paddle wheel steamer of the following dimensions,

Length between perpendiculars ... ..	220 feet.
Length over all, about ... ..	225 "
Breadth, moulded ... ..	30 "
Breadth, over sponsons ... ..	50 "
Depth, moulded, not less than ... ..	6 Feet 3 inches.
Draught in fresh water with steam up and loaded with 150 tons not to exceed ... ..	3 Feet 6 inches.
Speed when loaded and towing two barges of 3' 6" draught each, loaded with 250 tons dead weight ... ..	10 Knots.

This paddler is known as the "Mejidieh" type, because it is modelled on one of Messrs. Lynch Bros. steamers of that name.

(2) A steel twin screw tunnel tug. of the following dimensions:—

Length ... ..	81 feet.
Breadth, moulded ... ..	16 feet 6 inches.
Depth ... ..	5 feet.
Draught, in fresh water, completely equipped with steam up and loaded with 10 tons of fuel and stores, not to exceed ... ..	3 feet.
Speed, when loaded as above and towing two barges of 3 feet 6 inches draught, each loaded with 250 tons ... ..	not stated.

This tug is known as the "Samana" class, because it is modelled on one of the name belonging to Messrs. Lynch Brothers.

(3) A steel barge.—Dimensions,—

Length ... ..	170 feet.
Breadth ... ..	25 feet.
Depth, moulded ... ..	5 feet 9 inches.
Draught, in fresh water, fully equipped and loaded with 250 tons dead weight ... ..	3 feet 6 inches.

I am not a naval architect and have no particular remark to make on these types, except that I think the barges I have seen with square ends will prove very difficult to manage in the Narrows, and I do not think the architect can have understood that in this portion of the river, the steamers going round the sharp bends hug the bank, the inner barge actually being in close contact.

With a spoon or ship shaped nose the barges glide over irregularities, but with a square nose the barges will I think strike the bank a violent blow, when it meets a projection or irregularity, and that will be especially the case when passing the numerous irrigation ditches.

This naturally varies according to the distance of our Front from the Base.

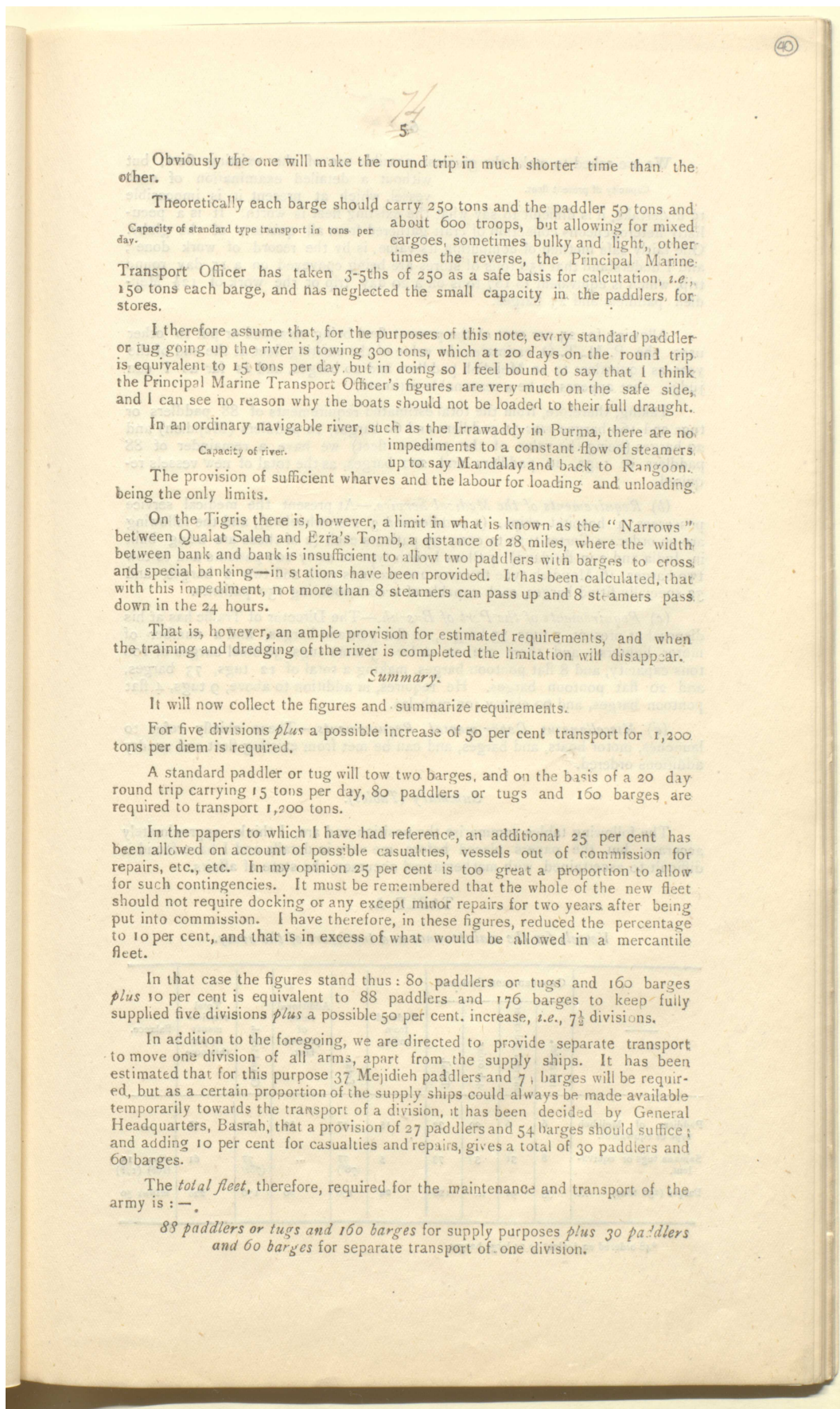
Duration of voyage. At present the round trip takes on an average 15 days, but it has been calculated that the round trip to Baghdad would take 20 days and in view of future eventualities, that has been taken as the standard.

I may point out that as the present round trip to Sheik Saad is only about half the distance to Baghdad, the round trip to the latter port should, under similar circumstances, take 30 days, but with abundance of labour and more reliable steamers, it is expected the round trip to Sheik Saad will be done in 10 days.

I would also remark that no account seems to have been taken of the difference of speed between Mejidieh paddlers of, I understand 1,200 H. P. towing two barges, and Samana tugs of 250 H. P. towing two barges.



'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [40r] (79/134)



Obviously the one will make the round trip in much shorter time than the other.

Theoretically each barge should carry 250 tons and the paddler 50 tons and about 600 troops, but allowing for mixed cargoes, sometimes bulky and light, other times the reverse, the Principal Marine Transport Officer has taken 3-5ths of 250 as a safe basis for calculation, i.e., 150 tons each barge, and has neglected the small capacity in the paddlers for stores.

I therefore assume that, for the purposes of this note, every standard paddler or tug going up the river is towing 300 tons, which at 20 days on the round trip is equivalent to 15 tons per day, but in doing so I feel bound to say that I think the Principal Marine Transport Officer's figures are very much on the safe side, and I can see no reason why the boats should not be loaded to their full draught.

In an ordinary navigable river, such as the Irrawaddy in Burma, there are no impediments to a constant flow of steamers up to say Mandalay and back to Rangoon.

The provision of sufficient wharves and the labour for loading and unloading being the only limits.

On the Tigris there is, however, a limit in what is known as the "Narrows" between Qualat Saleh and Ezra's Tomb, a distance of 28 miles, where the width between bank and bank is insufficient to allow two paddlers with barges to cross and special banking—in stations have been provided. It has been calculated, that with this impediment, not more than 8 steamers can pass up and 8 steamers pass down in the 24 hours.

That is, however, an ample provision for estimated requirements, and when the training and dredging of the river is completed the limitation will disappear.

*Summary.*

It will now collect the figures and summarize requirements.

For five divisions plus a possible increase of 50 per cent transport for 1,200 tons per diem is required.

A standard paddler or tug will tow two barges, and on the basis of a 20 day round trip carrying 15 tons per day, 80 paddlers or tugs and 160 barges are required to transport 1,200 tons.

In the papers to which I have had reference, an additional 25 per cent has been allowed on account of possible casualties, vessels out of commission for repairs, etc., etc. In my opinion 25 per cent is too great a proportion to allow for such contingencies. It must be remembered that the whole of the new fleet should not require docking or any except minor repairs for two years after being put into commission. I have therefore, in these figures, reduced the percentage to 10 per cent, and that is in excess of what would be allowed in a mercantile fleet.

In that case the figures stand thus: 80 paddlers or tugs and 160 barges plus 10 per cent is equivalent to 88 paddlers and 176 barges to keep fully supplied five divisions plus a possible 50 per cent. increase, i.e., 7½ divisions.

In addition to the foregoing, we are directed to provide separate transport to move one division of all arms, apart from the supply ships. It has been estimated that for this purpose 37 Mejdieh paddlers and 71 barges will be required, but as a certain proportion of the supply ships could always be made available temporarily towards the transport of a division, it has been decided by General Headquarters, Basrah, that a provision of 27 paddlers and 54 barges should suffice; and adding 10 per cent for casualties and repairs, gives a total of 30 paddlers and 60 barges.

The total fleet, therefore, required for the maintenance and transport of the army is:—

88 paddlers or tugs and 160 barges for supply purposes plus 30 paddlers and 60 barges for separate transport of one division.



'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [40v] (80/134)

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We are asked to make the greatest possible use of the existing fleet, but without a detailed examination of each vessel, which at present it is impossible to undertake, it is difficult to say what the existing fleet is worth. It is a peculiarly heterogeneous collection of craft gathered from all quarters of the globe. One fairly safe method of computing its value, is by the record of work done; and I understand that 250 tons of stores are being conveyed on a 15 day round trip, which is equivalent to 187 tons on a 20 day trip or the work of 12½ Mejidieh paddlers and 25 barges.

Allowing for 25 per cent of the present fleet being scrapped or put to other uses, the P. M. T. O. estimates the value of the existing fleet at the end of the year as equivalent to 10 Mejidieh paddlers and 20 barges, and as far as I can judge, that appears to be a reasonable estimate.

Taking, therefore, from the total estimated requirements of 88 paddlers or tugs and 160 barges plus 30 paddlers and 60 barges, 10 paddlers (Mejidieh) and 20 barges (being the value of the present fleet) we have a remainder of 88 paddlers or tugs, 20 paddlers and 200 barges, as the total of new vessels required.

(b) *Requirements of the Medical Service.*—At present the medical service possesses 4 hospital ships, (1 paddler and 3 sternwheelers), and the following are on order: 4 Carter type to carry 97 patients each (2 of these are being built in India and 2 in England), 4 Bloss Lynch type to carry 200 patients and to tow two barges, 16 Mejidieh type to carry 200 patients each and two 2 barges, and 32 specially fitted barges, each capable of accommodating 150 patients.

(c) *Requirements of the Port of Basrah.*—The Director of Traffic has at his disposal at present, 7 tugs, 35 barges, 12 flat pontoon barges, and a number of motor lighters; and there are on order 5 more tugs, 38 steel barges of 100 tons capacity, and 8 flat pontoon barges, making a total of 12 tugs, 73 barges, and 20 flat pontoon barges. He requires, in addition to above, 9 tugs, 4 flat pontoon barges, and 60 eighty ton mahelas.

(d) *Miscellaneous Departmental Requirements.*—These chiefly refer to launches, motor boats, and barges, and can be met from existing fleet and sundry additions ordered.

Summary (Tables).

The following tables summarise the position and are, I think, approximately accurate, but the papers placed before me vary in details and I have found it difficult to ascertain, with mathematical accuracy, the state of affairs.

TABLE A.

Vessels for the maintenance and transport of the army.

	ORDERED FROM ENGLAND.				Ordered from India.	Additional value of present fleet.	Grand total.	Total requirements as per this note.	Balance.	
	1st order.	2nd and 3rd order.	4th order.	Total.						
Paddlers of Mejidieh type or equivalent.	6	6	20	32	15	47	10	57	57	...
Samana tugs or equivalent.	8	31	31	73	5	77 (78?)	...	77 (78?)	61	plus 15 (16?) (17?)
Barges (250 tons)	...	35	91	126	24*	150	20	170	220	minus 50

\*48 ordered eq.ivalent to 24 large barges.



'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [41r] (81/134)

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TABLE B.

*For the Medical Service.*

	Present fleet.	Ordered from England.	Ordered from India.	Total.
Paddlers ... ..	1	20	...	21
Sternwheelers ... ..	3	2	2	7
Barges ... ..	2	32	6	40

TABLE C.

*For the Port of Basrah.*

	Present fleet.	Ordered from England.	Ordered from India.	Total.	Requirements.	Balance.	Remarks.
Tugs ... ..	7	5	...	12	21	minus 9	
Barges... ..	35	...	38	73	...	...	
Flat Pontoon Barges	12	...	8	20	24	minus 4	

TABLE D.

*Miscellaneous.*

	Present fleet.	Ordered from England.	Ordered from India.	Total.
Stern Wheelers ... ..	4	3	5	12
Motor boats ... ..	81	43	3	127
Motor lighters ... ..	20	...	...	20
Steam Launches ... ..	40	1	15	56



'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [41v] (82/134)

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TABLE E.

*Summary of total fleet when all are built and in commission.*

Paddlers of Mejdieh type	...	...	...	...	34
Paddlers of other types	...	...	...	...	37
Tugs of Samana Class or equivalent	..	...	...	...	85
Other up-river tugs	...	...	...	...	7
Nile boats	...	...	...	...	5
Thames Ferry Boats	...	...	...	...	6
Stern wheelers	...	...	...	...	15
Hospital ships	...	...	...	...	
"    "    Paddlers	...	...	...	...	} 21
"    "    Stern wheelers	...	...	...	...	
Hospital barges	...	...	...	...	40
Large barges for up river	...	...	...	...	170
Barges for stern wheelers	...	...	...	...	8
Any other barges for use up river	...	...	...	...	57
Port and deep sea tugs	...	...	...	...	16
Port barges	...	...	...	...	73
Motor lighters	...	...	...	...	20
"    boats	...	...	...	...	127
Steam launches	...	...	...	...	56
				Total	784

*Conclusion.*

The fleet, when complete, will contain about 800 units and be the greatest river fleet in the world, but I venture the opinion that it will take considerably longer than is estimated before it attains its full proportions.

In my judgment, unless measures are taken greatly to expedite the work in the shipbuilding yards at Home and much better arrangements than obtain at present are made to complete the re-erection or fitting out of the craft on arrival in India or Mesopotamia, the marine transport will not increase above the following ratio, as a maximum, and I believe that estimate a liberal one, as it assumes all the boats on order from India will arrive safely and that the second and third construction programmes in England will advance much faster than they are doing at present :—



'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [42r] (83/134)

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TABLE F.

	July 1st, 1916.		December 31st, 1916.		April 1st, 1917.		December 31st, 1917.	
	No. of vessels.	Tons of supplies on a 20 day trip.	No. of vessels.	Tons of supplies on a 20 day trip.	No. of vessels.	Tons of supplies on a 20 day trip.	No. of vessels.	Tons of supplies on a 20 day trip.
Paddlers and tugs ...	12½	} 187	55	} 825	80	} 1,200	134	} 1,700 plus the greater part of a division of all arms.
Barges ...	25		120		170		170	

The above figures are on the assumption of a round trip of 20 days for both paddlers and tugs and that the barges will only carry 150 tons instead of 250 tons.

As already stated, I believe both these assumptions require reconsideration.

The Committee accept the President's note as a general summary of the situation, and record the following views on certain specific points therein :—

*Standard Type of Vessels.*

The Committee note that the Mejidieh paddlers have not been provided with Samson posts, but they are informed these are necessary for towing purposes, and they recommend that Samson posts be provided on all paddlers under construction.

*In the matter of shape of barges,* there has already been considerable discussion and the concensus of expert opinion in Mesopotamia is, that barges, with square ends, will be a positive danger on the Tigris, especially during the navigation of the 28 miles of river which constitutes what is known as the Narrows.

The Committee is of opinion that the present is no time for experiments, as a serious accident in the Narrows might block the channel and have far-reaching and disastrous results.

They recommend that the square-ended barges be not used on the Tigris, that the barges of this type already in the country or on the seas, either in sections or in plates and angles, be shipped to Bombay and new fore ends fitted of the ordinary stem type and new after ends fitted of ordinary stern post type with one rudder, and that all barges under construction in Great Britain have this alteration effected before they are shipped. The barges, actually erected or in course of erection in Mesopotamia, can be used for work in the Port or up the river as far as Kurma.

*Duration of Voyage.*

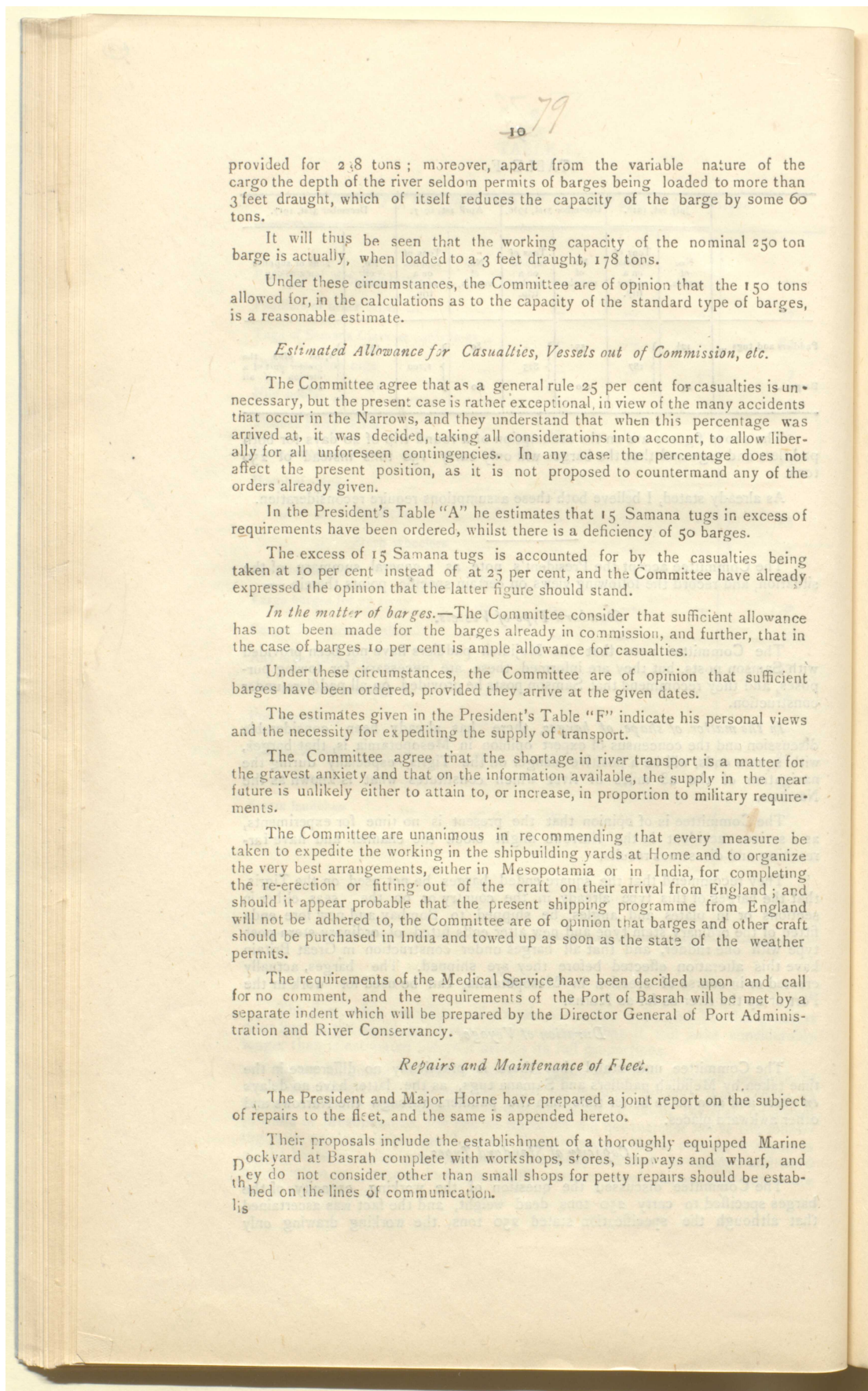
The Committee understand that there is practically no difference in the time taken by Mejidieh paddlers and Samana tugs, as the latter have no delays *en route* and also make better time than the paddlers through the Narrows and other awkward places.

*Capacity of Standard Types.*

The Committee discussed the question of the working capacity of the barges specified to carry 250 tons dead weight, and the fact was ascertained that although the specification stated 250 tons, the working drawing only



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provided for 238 tons; moreover, apart from the variable nature of the cargo the depth of the river seldom permits of barges being loaded to more than 3 feet draught, which of itself reduces the capacity of the barge by some 60 tons.

It will thus be seen that the working capacity of the nominal 250 ton barge is actually, when loaded to a 3 feet draught, 178 tons.

Under these circumstances, the Committee are of opinion that the 150 tons allowed for, in the calculations as to the capacity of the standard type of barges, is a reasonable estimate.

*Estimated Allowance for Casualties, Vessels out of Commission, etc.*

The Committee agree that as a general rule 25 per cent for casualties is unnecessary, but the present case is rather exceptional, in view of the many accidents that occur in the Narrows, and they understand that when this percentage was arrived at, it was decided, taking all considerations into account, to allow liberally for all unforeseen contingencies. In any case the percentage does not affect the present position, as it is not proposed to countermand any of the orders already given.

In the President's Table "A" he estimates that 15 Samana tugs in excess of requirements have been ordered, whilst there is a deficiency of 50 barges.

The excess of 15 Samana tugs is accounted for by the casualties being taken at 10 per cent instead of at 25 per cent, and the Committee have already expressed the opinion that the latter figure should stand.

*In the matter of barges.*—The Committee consider that sufficient allowance has not been made for the barges already in commission, and further, that in the case of barges 10 per cent is ample allowance for casualties.

Under these circumstances, the Committee are of opinion that sufficient barges have been ordered, provided they arrive at the given dates.

The estimates given in the President's Table "F" indicate his personal views and the necessity for expediting the supply of transport.

The Committee agree that the shortage in river transport is a matter for the gravest anxiety and that on the information available, the supply in the near future is unlikely either to attain to, or increase, in proportion to military requirements.

The Committee are unanimous in recommending that every measure be taken to expedite the working in the shipbuilding yards at Home and to organize the very best arrangements, either in Mesopotamia or in India, for completing the re-erection or fitting out of the craft on their arrival from England; and should it appear probable that the present shipping programme from England will not be adhered to, the Committee are of opinion that barges and other craft should be purchased in India and towed up as soon as the state of the weather permits.

The requirements of the Medical Service have been decided upon and call for no comment, and the requirements of the Port of Basrah will be met by a separate indent which will be prepared by the Director General of Port Administration and River Conservancy.

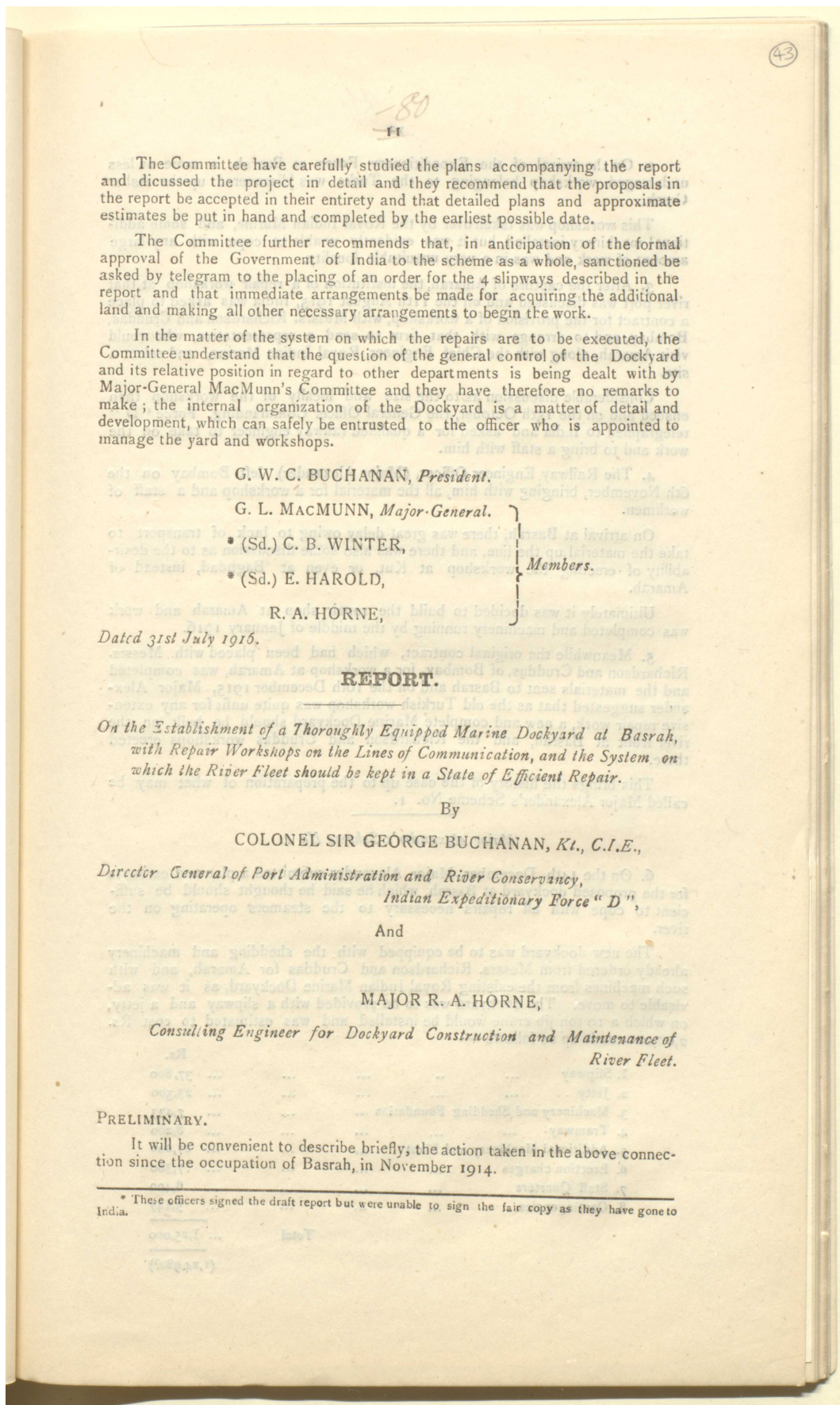
*Repairs and Maintenance of Fleet.*

The President and Major Horne have prepared a joint report on the subject of repairs to the fleet, and the same is appended hereto.

Their proposals include the establishment of a thoroughly equipped Marine Dockyard at Basrah complete with workshops, stores, slipways and wharf, and they do not consider other than small shops for petty repairs should be established on the lines of communication.



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43  
The Committee have carefully studied the plans accompanying the report and discussed the project in detail and they recommend that the proposals in the report be accepted in their entirety and that detailed plans and approximate estimates be put in hand and completed by the earliest possible date.

The Committee further recommends that, in anticipation of the formal approval of the Government of India to the scheme as a whole, sanctioned by telegram to the placing of an order for the 4 slipways described in the report and that immediate arrangements be made for acquiring the additional land and making all other necessary arrangements to begin the work.

In the matter of the system on which the repairs are to be executed, the Committee understand that the question of the general control of the Dockyard and its relative position in regard to other departments is being dealt with by Major-General MacMunn's Committee and they have therefore no remarks to make; the internal organization of the Dockyard is a matter of detail and development, which can safely be entrusted to the officer who is appointed to manage the yard and workshops.

G. W. C. BUCHANAN, *President.*

G. L. MACMUNN, *Major-General.*

\* (Sd.) C. B. WINTER,

\* (Sd.) E. HAROLD,

R. A. HORNE,

Members.

Dated 31st July 1916.

**REPORT.**

*On the Establishment of a Thoroughly Equipped Marine Dockyard at Basrah, with Repair Workshops on the Lines of Communication, and the System on which the River Fleet should be kept in a State of Efficient Repair.*

By

COLONEL SIR GEORGE BUCHANAN, *Kt., C.I.E.,*

*Director General of Port Administration and River Conservancy,  
Indian Expeditionary Force "D",*

And

MAJOR R. A. HORNE,

*Consulting Engineer for Dockyard Construction and Maintenance of  
River Fleet.*

**PRELIMINARY.**

It will be convenient to describe briefly, the action taken in the above connection since the occupation of Basrah, in November 1914.

\* These officers signed the draft report but were unable to sign the fair copy as they have gone to India.



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12 81  
2. On the arrival of the Expeditionary Force at Basrah, a more or less undamaged workshop belonging to the Turks was discovered up the Ashar Creek.

This workshop was taken over by the Royal Indian Marine, and some additional machinery installed, but it was evidently unable to cope with any large amount of work and was in a very unsuitable locality.

3. After the capture of Amarah, the institution of a repair workshop at that river port was discussed and on the 11th August 1915, India was asked to place a contract for the provision of a workshop, with Messrs. Richardson and Cruddas, Bombay, and to arrange with that firm to send a representative, who would visit Amarah, along with the Chief Engineer, Royal Indian Marine, and select a site.

Considerable discussion as to the size and locality of the workshop then ensued and on the 15th October, the General Officer Commanding, Force "D" telegraphed to India and asked for a qualified railway engineer to take on the work and to bring a staff with him.

4. The Railway Engineer Officer, (Major Alexander) left Bombay on the 6th November, bringing with him, all the material for a workshop and a staff of workmen.

On arrival at Basrah, there was great delay owing to lack of transport to take the material up the line, and there was also some discussion as to the desirability of erecting the workshop at Kut, or even at Baghdad, instead of Amarah.

Ultimately it was decided to build the repair shop at Amarah and work was completed and machinery running by the middle of January 1916.

5. Meanwhile the original contract, which had been placed with Messrs. Richardson and Cruddas, of Bombay, for a workshop at Amarah, was completed and the materials sent to Basrah and on the 10th December 1915, Major Alexander suggested that as the old Turkish workshop was quite unfit for any extensive repair work, a new and complete Marine Dockyard should be built on the river front at Basrah, and the Richardson and Cruddas workshops erected there.

This brings the history of the case up to the preparation of what may be called Major Alexander's Scheme No. 1.

*Major Alexander's Scheme No 1.*

6. On the 14th December, Major Alexander submitted a plan and estimate for the proposed dockyard at Basrah, which he said he thought should be sufficient to cope with all repairs necessary to the steamers operating on the river.

The new dockyard was to be equipped with the shedding and machinery already ordered from Messrs. Richardson and Cruddas for Amarah, and with such machines from the existing Royal Indian Marine Dockyard, as it was advisable to move. The dockyard was to be provided with a slipway and a jetty, on which a 10 ton jib crane would be installed and was estimated to cost Rs. 2,00,000 made up as follows :—

	Rs.
1. Slipway ... ..	37,800
2. Jetty ... ..	25,500
3. Machinery and Shedding Foundation ... ..	7,433
4. Tramway ... ..	8,200
5. Additional Machinery and Plant ... ..	27,200
6. Erection charges ... ..	7,300
7. Staff Quarters ... ..	6,400
8. Contingencies ... ..	5,147
Total	1,25,000
	(1,24,980)



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Add—

Richardson and Cruddas' contracts, including erection of shed- ding and Engine ... ..	63,303
Value of Machinery in existing dockyard ... ..	11,697
<b>Total ... ..</b>	<b>2,00,000</b>

7. On the 27th December, Major Alexander submitted a revised estimate in accordance with the orders of the Army Commander, who directed that the additional plant and machinery, over and above Richardson and Cruddas' contract, should be reduced to the lowest possible workable minimum and that such works as the slipway and jetties should be constructed in such a manner as to meet the absolute necessities of the campaign and to be as cheap as possible.

The revised estimate amounted to Rs. 1,61,000 as follows:—

	Rs.
1. Slipway ... ..	29,000
2. Jetty and crane ... ..	17,300
3. Foundation ... ..	7,433
4. Tramway ... ..	500
5. Machinery and Plant ... ..	15,400
6. Shedding ... ..	5,000
7. Staff Quarters and Latrines ... ..	6,500
8. Fencing and Contingencies ... ..	4,767
	86,000
Add Richardson and Cruddas contract ... ..	63,303
Value of existing Works ... ..	11,697
	1,61,000

8. The papers were sent to the Director General of Port Administration and River Conservancy, on the 13th January, for review and suggestions, and that Officer was informed, that the whole of the arrangements, cost of plant and machinery, construction of jetties and slipway had been carefully considered and sanctioned prior to his arrival in Mesopotamia and the original estimate reduced by Rs. 39,000; the hope was therefore expressed that he might find it possible to concur with what had been proposed and sanctioned as to counter order or upset any of the items already ordered, or to defer the work in hand would mean still further delay in the speedy establishment of an adequate repairing base for the river craft, used on the Tigris and Euphrates, the want of which had been one of the greatest difficulties, since the inception of Military Operations in this country.

9. In a memorandum, dated 1st February, 1916, the Director-General of Port Administration and River Conservancy observed that, as he understood the estimates had been sanctioned and the plant ordered, he did not consider himself called upon to do more than express general approval of the proposed workshop and tools, and he directed his attention to the proposals for a slipway and jetty.



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14 83  
With reference to the former, Major Alexander had explained that on working out the scheme in detail, he found there was not sufficient depth of site to build a slipway of adequate length. He had examined the plans and accepted the statement, that on the site pointed out, there was neither room for an end on or broadside slipway and as some means of docking the vessels was an absolute necessity, he agreed that whilst much preferring a slipway, a dock was under the circumstances the only alternative.

10. It was understood, the dock was to be a mud dock, without walls, as Major Alexander expressed himself satisfied no walls were required, the Director-General remarked that the floor of the dock required some consideration and he severely criticised the proposed entrance and gate, which he said were impracticable and could not be satisfactorily erected for 5 times the estimate.

He proposed a less ambitious scheme of entrance and remarked that the proposed dock would only be a make-shift, but should answer its purpose, also that he accepted no responsibility for any of the estimates.

The scheme for a dockyard was then sanctioned, except that a mud-dock, details of which were to be worked out was substituted for the slipway.

With reference to proposed jetty, Director-General expressed doubts as to the advisability of converting rails into piles.

*Major Alexander's Scheme, No. 2.*

11. On the 4th June, 1916, Major Alexander reported that he had discussed further extensions with the Chief Engineer, Royal Indian Marine, and other Officers and they were of opinion that in view of the proposed great additions to the Fleet, it would be necessary to further increase the staff and working accommodation in the Dockyard.

12. He remarked that owing to the great increase to the Fleet, he considered it very necessary to instal a slipway in addition to the dry dock, if the necessary funds and land were made available and he asked to have allotted, a piece of land, 680 feet long by 400 feet deep, south of existing boundary and which he understood the Supply and Transport were about to vacate, and also a strip of land, west of above, in order to give a sufficient depth for a slipway, Major Alexander estimated this strip at 300 feet by 150 feet, but it scales on the plan, 440 by 280 feet and involves the diversion of two roads.

13. The land about to be vacated by the Supply and Transport Major Alexander proposed to utilize for erection of Quarters for Petty Officers and workmen, and the erection of barges, but recognizing the value of land, with a river frontage, he proposed in the future, to reclaim a piece of land in the date groves and ultimately move the quarters to that locality.

He further proposed to shift the existing workmen's quarters and build a West Basin for repairs to launches; to purchase additional shedding and to instal a water supply.

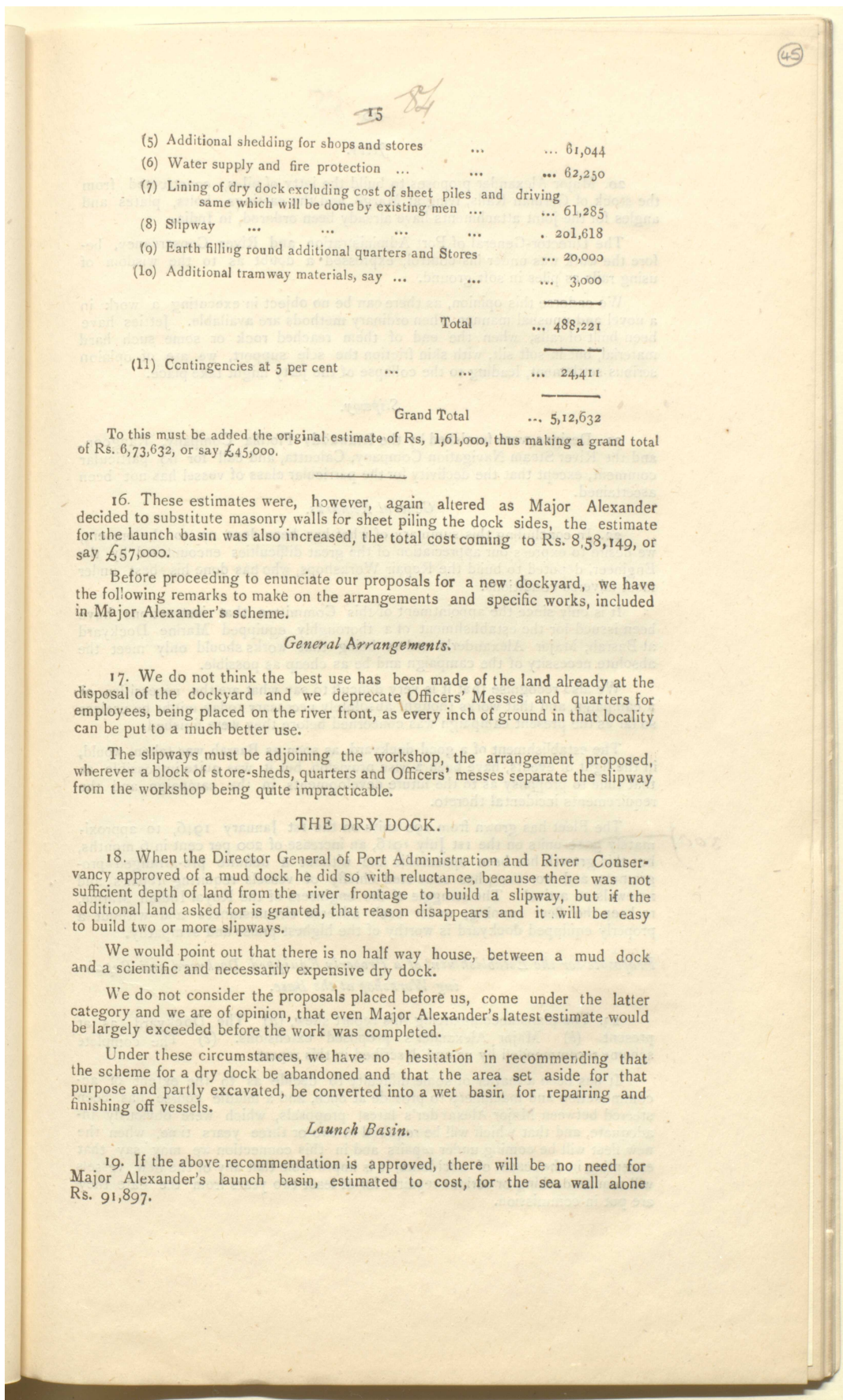
14. In the matter of the dry dock, Major Alexander remarked that as the whole aspect of the situation had changed from a more or less temporary Repair Workshop, to meet the absolute necessities of the campaign, to that of an efficient dockyard, employing a thousand men and dealing with the repairs to a vast number of river craft, he was of opinion that an unlined mud dock was no longer justified and he proposed to line the sides with iron sheet piles, build a reinforced concrete floor and close the entrance with a caisson.

15. Excluding the cost of the land, the additional expenditure necessary, Major Alexander estimated as follows:—

	Rs.
(1) Dismantling and re-erection of existing artisans' quarters ...	1,500
(2) Dismantling and re-erection of existing petty officers' and clerks' quarters ...	2,040
(3) Erection of additional artisans' quarters ...	7,500
(4) Launch Basin ...	67,984



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(5) Additional shedding for shops and stores	...	...	61,044
(6) Water supply and fire protection	...	...	62,250
(7) Lining of dry dock excluding cost of sheet piles and driving same which will be done by existing men	...	...	61,285
(8) Slipway	...	...	201,618
(9) Earth filling round additional quarters and Stores	...	...	20,000
(10) Additional tramway materials, say	...	...	3,000
		Total	488,221
(11) Contingencies at 5 per cent	...	...	24,411
		Grand Total	5,12,632

To this must be added the original estimate of Rs. 1,61,000, thus making a grand total of Rs. 6,73,632, or say £45,000.

16. These estimates were, however, again altered as Major Alexander decided to substitute masonry walls for sheet piling the dock sides, the estimate for the launch basin was also increased, the total cost coming to Rs. 8,58,149, or say £57,000.

Before proceeding to enunciate our proposals for a new dockyard, we have the following remarks to make on the arrangements and specific works, included in Major Alexander's scheme.

*General Arrangements.*

17. We do not think the best use has been made of the land already at the disposal of the dockyard and we deprecate Officers' Messes and quarters for employees, being placed on the river front, as every inch of ground in that locality can be put to a much better use.

The slipways must be adjoining the workshop, the arrangement proposed, wherever a block of store-sheds, quarters and Officers' messes separate the slipway from the workshop being quite impracticable.

*THE DRY DOCK.*

18. When the Director General of Port Administration and River Conservancy approved of a mud dock he did so with reluctance, because there was not sufficient depth of land from the river frontage to build a slipway, but if the additional land asked for is granted, that reason disappears and it will be easy to build two or more slipways.

We would point out that there is no half way house, between a mud dock and a scientific and necessarily expensive dry dock.

We do not consider the proposals placed before us, come under the latter category and we are of opinion, that even Major Alexander's latest estimate would be largely exceeded before the work was completed.

Under these circumstances, we have no hesitation in recommending that the scheme for a dry dock be abandoned and that the area set aside for that purpose and partly excavated, be converted into a wet basin, for repairing and finishing off vessels.

*Launch Basin.*

19. If the above recommendation is approved, there will be no need for Major Alexander's launch basin, estimated to cost, for the sea wall alone Rs. 91,897.



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*Jetty.*

20. Major Alexander proposes to build the jetty of piles, constructed from the stock of German Rails, lying at Margil, and the castings, bolts, plates and angles for the joint attachments have already been ordered, in India.

The Director-General of Port Administration and River Conservancy, before the work was under his control, expressed a doubt as to the wisdom of using rails as piles in soft ground.

We endorse this opinion, as there can be no object in executing a work in a novel and unusual manner, when ordinary methods are available. Jetties have been built of rails, when the end of them reached rock or some such hard material, but in soft silt, with skin friction the sole support, we are of opinion serious settlement, leading to the collapse of the jetty might take place.

*Shipway.*

21. Designs were furnished by the Irrawaddy Flotilla Company, Rangoon, and the River Steam Navigation Company, Calcutta, and call for no particular comment, except that the declivity for the particular class of vessel has not been ascertained.

*General Remarks.*

22. In concluding this summary of what has been done up to the present, we desire to express our appreciation of the great difficulties encountered by the Engineer, deputed to build the Repair Workshops, who has done his best under most adverse conditions.

It is only since the appointment of this Committee that instructions have been issued for the establishment of a thoroughly equipped Marine Dockyard at Basrah, Major Alexander's orders being that works should only meet the absolute necessity of the campaign and be as cheap as possible.

We also recognise that it is very difficult to say what are the necessities of a campaign, and that works thought absolutely necessary today might be useless so far as the present campaign was concerned before they were finished.

The establishment of a good dockyard, as soon as Basrah was taken, would, in the light of events, have been a wise provision, but it was quite impossible at that time to prophesy as to the future developments in the campaign and the requirements incidental thereto.

300) The Fleet has grown from 100 units on the 1st January 1916, to approximately 300 units on the 1st July 1916, an increase of 200 per cent in 6 months, but this growth has been spasmodic and without a definite pre-arranged programme, and moreover, has consisted chiefly of vessels requiring repairs and renewals on arrival. The struggle of the engineers of the Royal Indian Marine, to keep the fleet running, under such adverse circumstances and without a properly equipped dockyard is worthy of the highest praise and sympathy.

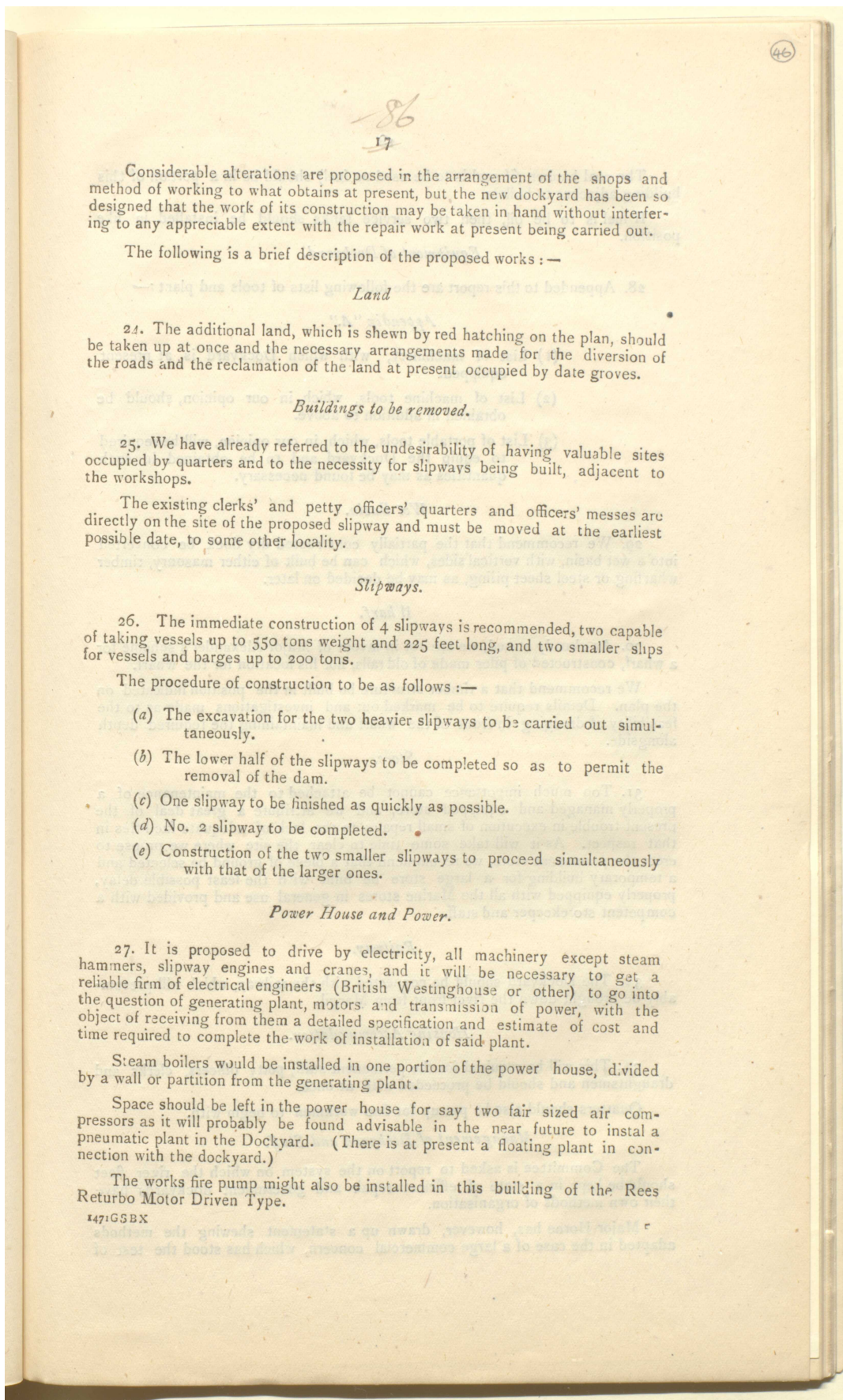
*Proposals for the Establishment of a Properly Equipped Dockyard and Repairing Workshop at the Base.*

23. The plans accompanying this report shew, (a) The Dockyard as at present. (b) Major Alexander's proposed extensions. (c) The complete scheme recommended by us and described in this report.

It has been a matter of some difficulty to decide as to the extent of accommodation and machinery to provide at once, and a middle course has been steered between Major Alexander's latest proposals, which were obviously inadequate, and that which will be required in two or three years time, when the new fleet will be coming under repairs and in this connection we may say that excepting in the case of accidents, it is improbable that any of the new vessels will require docking or serious repairs for at least two years from the date they are put in commission.

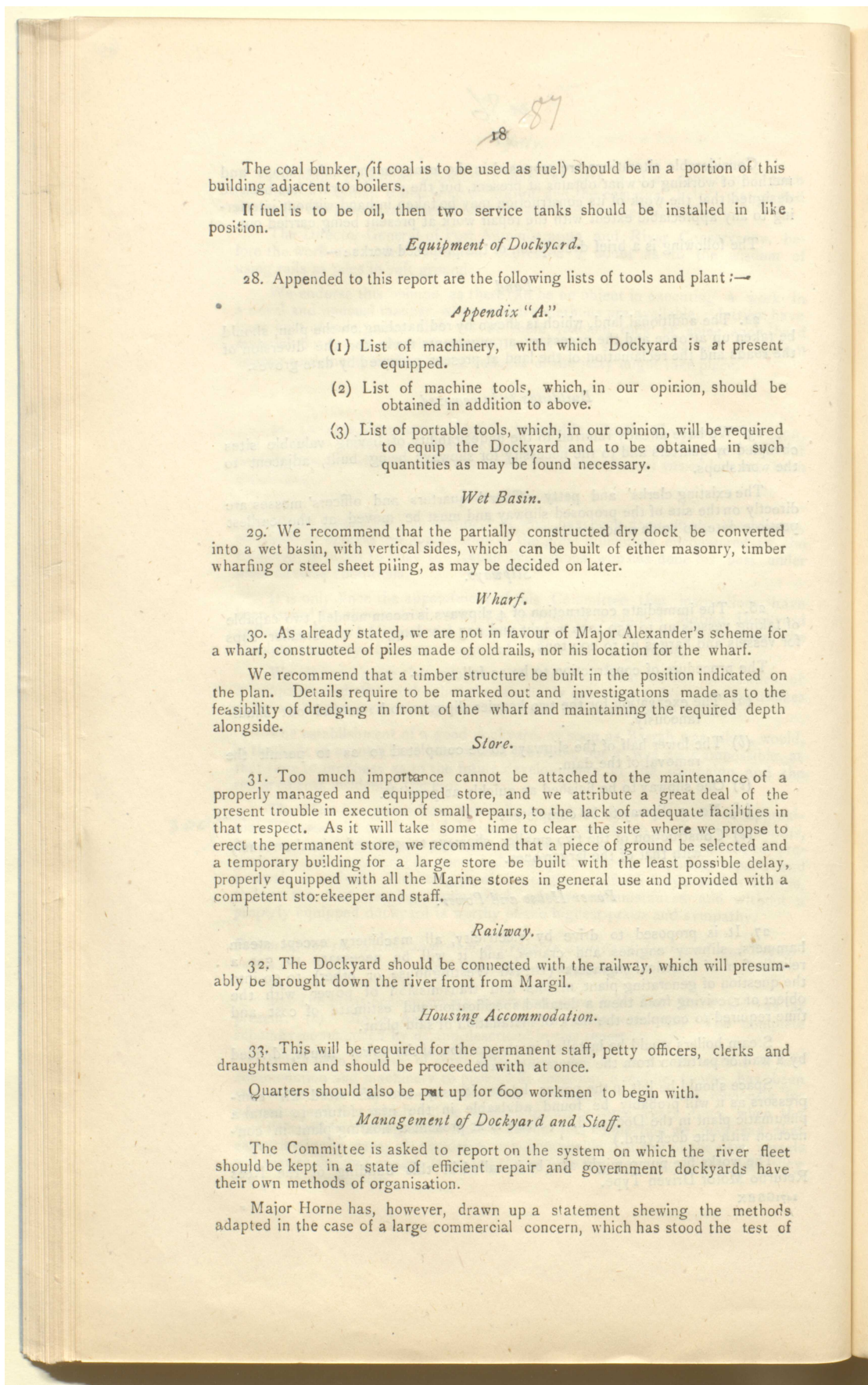


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-19

efficiency for many years. This is given in Appendix "B", to this report; we also append a statement of the existing staff at the Dockyard, Appendix "C", and we would observe that when the Dockyard is established on a more or less permanent basis, we think it would possibly add to efficiency, if a number of the Commissioned Officers were replaced by a few practical foremen, who are specialists in repair work.

*Repair shops on lines of communication.*

35. The Main Dockyard, whether for a military expedition or a commercial trading company must be at the base or sea port, unless there are overwhelming objections to the contrary and as little work as possible should be done at intermediate stations: the conveying of workshop appliances and men and materials up country by river steamers their own repairs being opposed to all principles of efficient administration.

Small shops for pretty repairs such as have been formed at Amarah and Nasiriyah, are all that are necessary.

There was at one time, a proposal to build a slipway at Amarah for vessels which, during the low water season, could not get down to Basrah, but such a scheme, does not commend itself to our judgment. Repairs to rudders, accidents to which were a fruitful source of trouble can, as a rule, be done without the docking of the vessel and for the rest a small repair shop is all that is necessary.

*Conclusion.*

36. The great difficulty in designing the new dockyard has been to decide how far to look forward.

The present urgent necessity of the military situation may have ceased before the new ships are built or before the new vessels on order have arrived, but obviously that cannot be taken into account. We have taken the situation as we find it and have certainly not erred on the side of extravagance, when it is borne in mind that the vessels in commission and on order constitute what is probably the largest river fleet the world has ever seen.

If the scheme outlined in this report is approved, we recommend that Major Alexander, the Officer in Charge of Repair Workshops, be instructed to work out the details and prepare an approximate estimate.

We say advisedly "approximate" because under present conditions in Mesopotamia and the fluctuation in price of plant and machinery at Home, it is not possible to prepare an estimate of the accuracy which would be required under ordinary circumstances.

The order for the slipways may, however, be placed at once.

GEO. C. BUCHANAN, Colonel,

Director General of Port Administration  
and River Conservancy.

R. A. HORNE, Major,

Consulting Engineer for Dockyard  
Construction and Maintenance of River Fleet.

BASRAH;

18th July 1916.



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APPENDIX "A".

List No. 1.—Machinery and plant with which dockyard is at present equipped, including plant for construction purposes.

Machine Shop.

Lathes.

Total length of bed.	Will take between centres.	Height of centre above bed.	GAP.		REMARKS.
			Depth.	Width.	
23'-10"	18'-0"	18"	9 1/4"	18 1/2"	Under removal from old to new dockyard.
16'-4"	11'-6"	13"	11"	16"	
12'-4"	8'-1 1/2"	10 1/2"	9"	17"	Under removal from old dockyard.
12'-0"	7'-11"	10"	9"	14"	
11'-5"	8'-0"	9 1/2"	6"	12"	Under removal from old dockyard.
8'-0"	4'-4"	9"	8 1/2"	13"	
8'-0"	4'-4"	9"	8"	13"	Turret Lathe
9'-0"	...	9"	No gap.		
12'-0"	7'-9"	8 1/2"	No gap.		8"
10'-0"	6'-6"	8"	8"	12"	
8'-0"	4'-3"	8"	8"	11"	8 1/2"
6'-0"	2'-9"	8"	6 1/2"	8 1/2"	
8'-0"	5'-0"	8"	6 1/2"	10"	8 1/2"
6'-0"	3'-4"	6 1/2"	5"	8 1/2"	
4'-6"	1'-8"	6"	6"	12"	

Drilling Machines.

Will drill holes from edge of work 21" under removal from old dockyard.

15 1/2"

12" under removal from old dockyard.

10 1/2"

10 1/2"

8" sensitive.

One wet Worcester Twist drill grinder (not yet landed).

Planing Machines.

One 27" deep 24" between posts length of table 6'-0".

One 20" deep 24" between posts length of table 4'-6" under removal.

Shaping Machines.

One 8 1/2" stroke under erection.

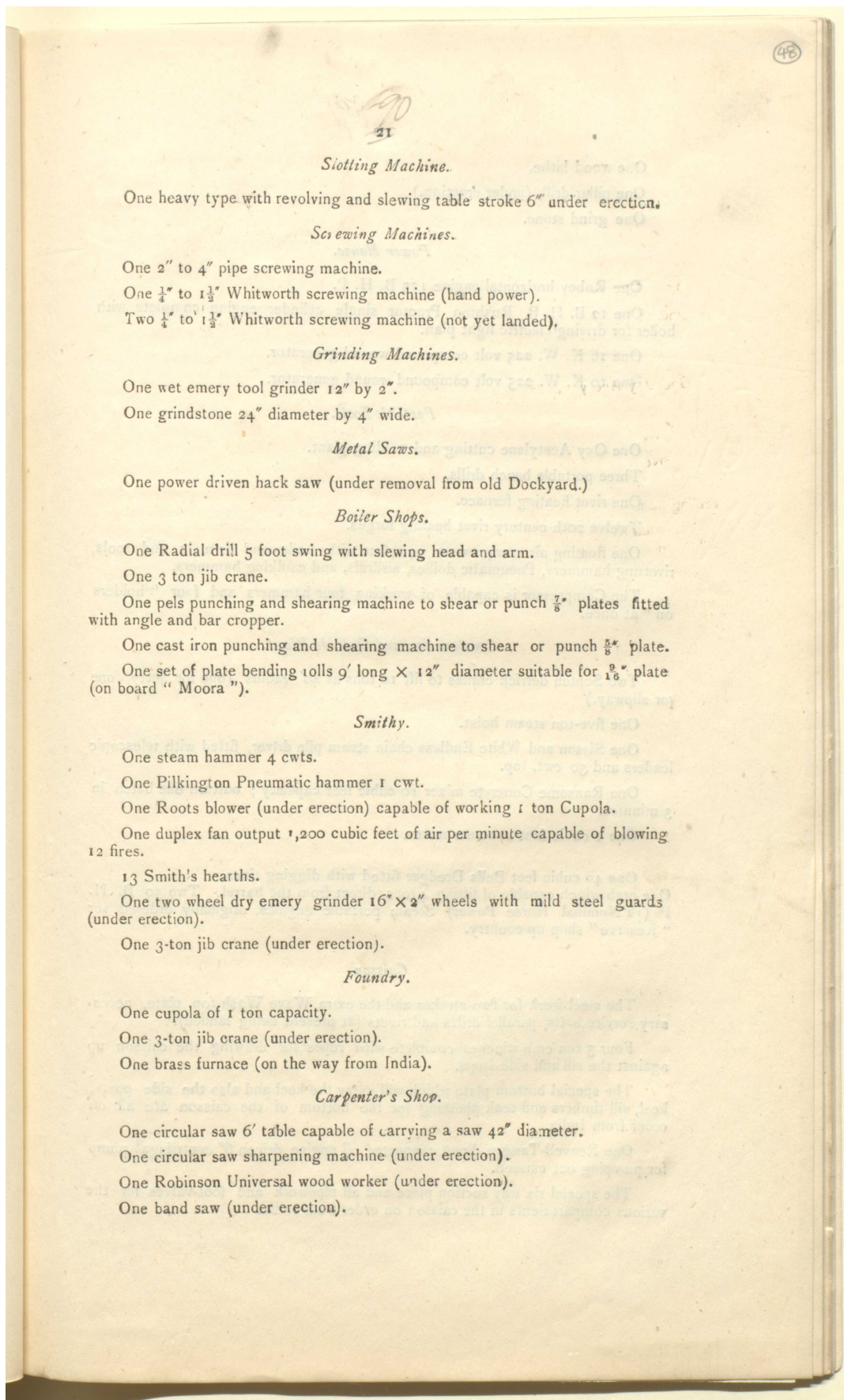
One 6" stroke under erection.

Milling Machine.

One universal milling machine 10" spindle complete with cutters.



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22 91  
One wood lathe.  
One pillar drill, (under erection.)  
One grind stone.

*Power House.*

One Robey horizontal engine 125 B. H. P.  
One 12 B. H. P. Rushton Proctor single cylinder engine complete with boiler for driving electric light plant.  
One 16 K. W. 225 volt compound wound generator.  
One 10 K. W. 225 volt compound wound generator.

*Portable Tools.*

One Oxy Acetylene cutting and welding plant.  
Three portable bench drills.  
One rivet heating furnace.  
Twelve 20th century rivet heating forges.  
One floating air compressors complete with boiler and air main and tools, rivetting hammers, Pneumatic dollies, airdrills, and caulking hammers.  
The Compressor is capable of working four hammers and four "holders on" at once.

*Construction and Outside Plant.*

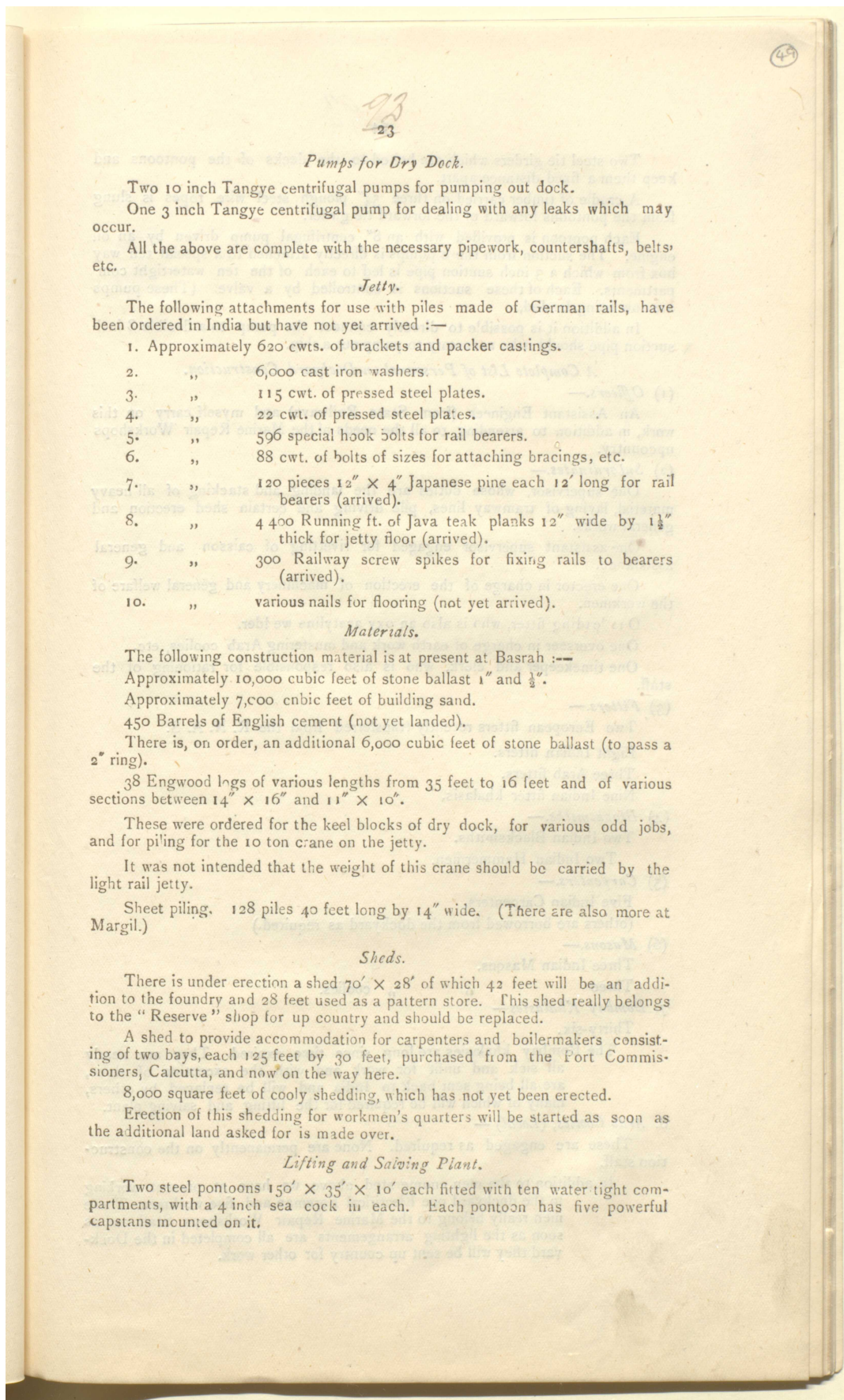
Two Scotch derrick cranes to lift 10 tons at 40' radius (one for jetty, one for slipway.)  
One five-ton steam hoist.  
One Sisson and White Endless chain steam pile driver, fitted with telescopic leaders and 30 cwt. top.  
One Ransome Concrete mixer 10 cubic feet capacity ; outturn one batch in 3 minutes.  
One 1 cubic foot concrete mixer.  
One 40 cubic feet Bells Dredger fitted with digging tines.  
One crab winch capable of lifting 4 tons, direct from the barrel. Two 30 B. H. P. (12 Nominal Horse Power) Steam portable engines, originally ordered for "Reserve" shop up country.

*Caisson.*

The steel work for two strakes and the extra Wave Wash top plate, necessary service bolts, parallel drifts and rivets (at present being landed).  
Four 5 ton crab winches complete with ropes for drawing the caisson up against the sill and side stops.  
The special bottom plate which will carry the keel and also the side posts, keel, sill timbers and teak planking for the bottom of the caisson are all on order from India.  
One Reavell-Tangye direct connected oil engine driven 6" centrifugal pump for pumping out caisson.  
The special six way suction piece and all pipework and foot-valves for the various compartments in the caisson on order from India.



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Two steel tie girders which are bolted to the decks of the pontoons and keep them a fixed distance apart.

A cradle of timber carried on three  $5\frac{3}{4}$ " plough steel wire ropes is slung from the pontoons forward of the forward tie girder.

Each pontoon is provided with an 8" centrifugal pump driven by an oil engine. The suction from the pumps is directly attached to a special ten way box from which a 3 inch suction pipe is led to each of the ten watertight compartments. Each of these suctions is controlled by a valve. (These pumps are now being landed,

In addition it is possible to directly connect the pump to a flexible 8 inch suction pipe should it be necessary to pump out a ship.

*A Complete List of Personnel in Dockyard Construction.*

(1) *Officers.*—

An Assistant Engineer (from State Railways) and myself carry on this work, in addition to attending to all the needs of the Marine Repair Workshops upcountry.

(2) *Subordinates.*—

One supervisor, whose duties are the landing and stacking of all heavy material, laying of tramway lines, pile driving and certain shed erection and general works.

One assistant supervisor engaged for rivetting of caisson and general assistance.

One erector in charge of the erection of machinery and general welfare of the workmen.

One leading fitter, who is also an oxy acetyline welder.

One overseer in charge of earth work and mustering Arab coolies, etc.

One timekeeper and clerk, who is also responsible for rationing of the staff.

(3) *Fitters.*—

Two European fitters recently transferred from the R. N. A. S.

Eight Indian fitters.

Three Arab fitters.

Nine Indian fitter khalasis.

(4) *Blacksmiths.*—

Two Indian Blacksmiths.

Two Indian Hammermen.

(5) *Carpenters.*—

Five Indian Carpenters.

(others are borrowed from the dockyard as required.)

(6) *Masons.*—

Three Indian Masons.

Three " " coolies.

7. *Bombay Khalasies.*—

Thirty-six.

The Bombay khalasies are long since time expired. They are nearly all sick and unfit for work and with the exception of three, are all being sent back to India and will be replaced by others, many of which will be required for the lifting and salving plant.

8. *Arab Coolies, (Local)* —

These are engaged as required. None are permanently on the construction staff.

In addition to the men enumerated above we have at present working in the dockyard one Electrical Foreman and five workmen. These men really belong to the Marine Repair Workshops Staff and as soon as the lighting arrangements are all completed in the Dockyard they will be sent up country for other work.



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APPENDIX "A".

LIST No. 2.—*Machine tools which should be obtained in addition to those in List No. 1.*

Number of machines required.	Machine shop.
Three ...	<p>Lathe, sliding, surfacing and screw-cutting, 8 ft. bed, 8 in. centre, variable speed gear.</p> <p>Extras.—Four jaw expanding chuck 16 in. for each lathe. Two improved steady rests.</p> <p>Makers, Lang &amp; Sons, Johnstone, Scotland, 1907 Catalogue, pages 18 and 19.</p>
Two ...	<p>Ditto... with 10 ft. bed ... ..</p>
Two ...	<p>Lathe, sliding, surfacing and screw-cutting, 10 ft. bed, 10 in. centre, with variable speed gear.</p> <p>Extras.—Four jaw expanding chuck, 20 in. for each lathe.</p> <p>One improved steady rest.</p> <p>Makers, Lang &amp; Sons, Johnstone, Scotland.</p> <p>1907 Catalogue, pages 26 and 27.</p>
Two ...	<p>Lathe, sliding, surfacing and screw-cutting, 10 ft. bed, 12 in. centre, with variable speed gear.</p> <p>Extras.—Four jaw expanding chuck 24 in. for each lathe.</p> <p>One improved steady rest.</p> <p>Makers, Lang &amp; Sons, Johnstone, Scotland.</p> <p>1907 Catalogue, pages 32 and 33.</p>
Two ...	<p>Lathe, hollow spindle, turret, to take 2 in. bar.</p> <p>Makers, Lang &amp; Sons, Johnstone, Scotland, or Alfred Herbert, Ltd., Coventry, England.</p>
One ...	<p>Lathe, hollow spindle, turret, to take 3½ in. bar.</p> <p>Makers, Lang &amp; Sons, Johnstone, Scotland, or Alfred Herbert, Ltd., Coventry, Scotland.</p>
One ...	<p>Radial Drilling Machine, 5 ft. tapping and boring up to 3 in. with geared speed box, half universal.</p> <p>Makers, Alfred Herbert, Ltd., Coventry, England.</p>
One ...	<p>Sensitive Drilling Machine, diameter of spindle (inside sleeve) centre on spindle to column 24 in.</p> <p>Makers, Alfred Herbert, Ltd., Coventry, England, Catalogue, section P, fig. 81.</p>
One ...	<p>Planing Machine, screw-driven, 10 ft. travel, to plane four feet width.</p> <p>Makers, Wm. Muir, &amp; Co., Ltd., Manchester.</p>



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Number of machines required.	Machine shop.
One ...	Horizontal Drilling, Boring, Tapping, and Studding Machine, to drill and bore holes up to 4 in. diametre. Extras.—Tools and accessories for tapping and studding, including spring chuck, Twist Drill, special Tap, screwing-in-chuck and ending chuck. Makers, Wm. Muir & Co., Ltd., Manchester.
One ...	Shaping Machine, Double Gear, with 14 in. stroke 6 ft. bed, to plane 3 ft. 9 ins. Extra.—One set tools. Makers, Wm. Muir & Co., Ltd., Manchester.
One ...	Vertical Drilling Machine, 2 ins. spindle, to admit 2 ft. 6 in., table 18 in. x 18 in. Makers, Wm. Muir & Co., Ltd., Manchester. Catalogue, section "D", page 4.
One ...	Slotting Machine, High Speed, 18 in. stroke, fitted with arrangement for radius slotting, also right angle tool holder and three tools, Table to incline Makers, Wm. Muir & Co., Ltd., Manchester. Catalogue, section "S", page 8.
One ...	Sharpening Machine, Universal, complete with additional parts. Makers, Lang & Sons, Johnstone, Scotland.
One ...	Centring, Counterboring and Facing Machine, capacity ¼" to 4". Double spindle. Makers, Lang & Sons, Johnstone, Scotland.
One ...	Sawing Machine, for cold iron, Steam power, complete with 16 in saw, pump and parallel vice, suitable for cutting steel tubes, bars, flats, angles, channels, etc. etc. Extras.—Two spare saws. Makers, Louden Bros., Ltd., 39 West Campbell St, Glasgow. Catalogue, No. 879.
One ...	Electric Overhead Travelling Crane, tons, to suit building from Royce or other good maker.
<i>Plater and Boiler Shop.</i>	
Two ...	Punching and Shearing Machine, for Belt Drive, to punch one inch holes through half inch plate, and shear half inch steel plate, with 28 inch punch gap and 18 inch shear gap. Crane for 16 ft. plate. Makers, Craig & Donald, Johnstone, Scotland.
One ...	Horizontal Punching, Double Angle-cutting and Beambending Machine to punch 1 inch hole through ¾ inch steel plate and bend 9 inch Bulb Beam and cut 5" x 6" x ⅝" angles fitted for independent Motor Drive. Makers, Craig & Donald, Johnstone, Scotland.



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Number of machines required.	Machine shop.
One ...	Vertical Drilling Machine, 2" spindle, to admit 2' 6" Table 18" x 18". Makers, Wm. Muir & Co., Ltd., Manchester. Catalogue, section "D", page 4.
One ...	Vertical Drilling Machine, standard type. Centre of spindle to column 14". Diameter of spindle 1-11/16 or 1-11-16 ins. Makers, Alfred Herbert Ltd., Coventry, England. Catalogue, section "P", page 13.
Two ...	Swing' Jib Countersink Radial Drill, belt drive, 2 1/2" spindle to cover 16' x 5' plates. Makers, Loudon Bros., Ltd., 39 West Campbell St., Glasgow.
One ...	Plate, Edge Planing Machine, Self acting, to plane 16' at each traverse, 10' deep. Belt driven. Makers, Loudon Bros, Ltd, 39 West Campbell St., Glasgow.
One ...	Plate, Flattening and Straightening Machine, to suit 6' plate up to 1/2" thick. Rolls 8" diameter. Belt driven. Makers, Loudon Bros., Ltd, 39 West Campbell St., Glasgow.
One ...	Double Ended Punching Machine, 3/4" size 2 1/4" gaps. Belt driven, with crane for 16' x 4' plates. Makers, Craig and Donald, Johnstone, Scotland.
One ...	Steam, Hammer, 7 1/2 cwts. Cylinder, 13" x 26" stroke, 3" steam and 4 1/2" exhaust pipe. Makers, John Birch & Co., Ltd., 2 Wall Buildings, London, E. C., Catalogue No. 436.
One ...	Steam, Hammer, 15 cwts, 16" Cylinder, 36" stroke, Steam pipe 4 1/2". Exhaust 7". Makers, As above, Catalogue No. 436.
One ...	Roots Blower, Motor driven, 10" Orifice, Volume of blast, 3,000 cubic ft. per minute. Motor drive. From, John Birch & Co., Ltd., 2 Wall Buildings, London, E. C. <i>Coppershop and Sheet Iron Workers Shop.</i>
One ...	Pipe, Bending Machine, Hydraulic, complete with hand pump to bend pipes up to 8" diameter. From, John Birch & Co, Ltd.
One ...	Pipe, Bending Machine, Screw to bend pipes up to 2" diameter, No. 3 Size. From John Birch & Co., Ltd.



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Number of machines required.	Machine shop.
One ...	Plate Bending Rolls, suitable also for pipe work, to take 4' plate $\frac{1}{4}$ " thick, Top roller 6" diameter. Belt drive. From John Birch & Co., Ltd., London, E. C.
One ...	Rotary Slitting Shears, Hand Power, to cut plates up to 1-8" thick, 36" gap. One spare set of Shears. From, John Birch & Co., Ltd., 2 Wall Buildings, London, E. C.
<i>Foundry.</i>	
One ...	Cupola, 3 tons capacity. (Procure in India or U. K.)
<i>Foundry Ladles.</i>	
One ...	Double Hand Shank, 1 $\frac{1}{2}$ cwts.
One ...	Double Hand Shank, 3 cwts.
One ...	Crane Ladle, 10 cwts.
One ...	Crane, Ladle, Geared 2 tons. From, John Birch & Co., Ltd., 2 Wall Buildings, London, E. C.
One ...	Sand and Loam Grinding Mill, 6' diameter of pan at top. Belt drive by Motor. From John Birch & Co., London.
One ...	Electric Travelling Crane, 5 tons capacity, by Royce or other good maker, to suit Foundry Building.
<i>Saw Mill.</i>	
One ...	Circular Saw, Colonial Rack Bench, 26' table, outer table 15", inner table 7 $\frac{1}{2}$ ". One 54" saw to be supplied with Bench. From John Birch & Co., London.
<i>Electric Shop.</i>	
One ...	Lathe, 6" centre, sliding, surfacing and screw cutting, variable speed gear. Extras. 4 Jaw expanding chuck, improved steady rest, Makers, Lang & Sons, Johnstone, Scotland.
One ...	Bench Sensitive Drill, to drill holes to 9 16", 3" travel of spindle, spindle to table 14". From John Birch & Co., Ltd., London.
<i>General Store.</i>	
One ...	Weighbridge, to weigh up to three tons, with platform arranged to suit light railway gauge.



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APPENDIX "A".

List No. 3.

Portable tools which will be required and to be obtained as may be found necessary.

*Machine Shops.*

Bench Vices (various).  
Boring Bars.  
Lathe and Drill tools.  
Chisels.  
Hand Hammers.  
Rose Bits.  
Straight Edges (steel).  
Squares.  
Sledge Hammers and Plying Hammers.  
Ratchet Braces (different types).  
Spanners and Pliers (assorted).  
Screw Augers.  
Vee Blocks.  
Pulley Blocks.  
Taps and Dies.  
Adjustable Parallel Packing Blocks.  
Rimers.  
Whitworth Gauges.  
Valve Reseater and Facer.  
Steel Tools and Holders.  
Key Extractor.  
Testing Pump or Prover.  
Grindstones.  
Tap Wrenches.  
Combined Pipe Cutters and Wrenches.  
Chain Pipe Wrenches.  
Sleeves and Sockets for Morse Taper Shanks.

*Boiler and Platers' Shop.*

Hand Screwing Machine with Dies.  
Boiler Water space stay taps.  
Punching Bears, Duplex Lever.  
Wooden Mallets.  
Hydraulic Jack, 200 tons.  
20 Century Forges, quantity as required.  
Cast Iron Setting Blocks.  
Hammers (assorted).



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Chisels.  
Drills.  
Punches and Shear Blades.  
Ratchet Braces.  
Tube Expanders.  
Ratchet Wrenches.  
Rivettors Tools.  
Fullers sets, Drifts, Tongs.

*Smithy.*

Sets of Blacksmiths Tools (number as required).  
Engineers 1 lb. Hammers.  
Sledge Hammers, 5 lb. and upwards.  
Quarry Hammers, 5 lb. and upwards.  
Swage Blocks.  
Smiths Anvils.  
Weighing Machine.  
C. I. Blocks.  
Callipers.  
Dividers.

APPENDIX " A " (No. 3.)

Coppershop and sheet Iron Workers' shop.  
Bench Vices.  
Copper Soldering Bolts.  
Hand Hammers.  
Hand Saws.  
Steel Chisels.  
Plying Hammers.  
Tongs.  
Lead Pots.  
Ladles.  
Brazing Pots.  
Wrenches.  
Anvils.  
Tinsmiths Shears.  
Wooden Mallets.  
Coppersmiths Hearths.

*Foundry.*

Moulding Boxes and Plates.  
Hand Hammers.  
Sledge Hammers.  
Crow Bars.  
Mamorties.



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Iron Buckets.  
Crucibles, assorted.  
Crucible Tongs.  
Sling Chains.  
Dividers (small to large).  
Callipers (small to large).  
Weighing Machine, 1 ton.  
Sundry small Moulders tools.

*Shipwright Plant.*

Keel Blocks, say 1,000 in number.  
One set Launching Ways, 12" wide, 200 feet.  
Hand Barrows.  
Screw Jacks, up to 25 tons, Ball Bearing.  
Cross Cut Saws.  
Pitch Boilers.  
Pitch Ladles.  
Grindstone, where convenient, Belt Driven.  
Gangway planks.  
Gangway ladders.  
Pulley Blocks.

*Electric Shop.*

Standard Voltmeter.  
Galvanometer.  
Bench Vices.  
Magnet Tester.  
Bow Saw.  
Wire Bending Pliers.  
Side Cutting Pliers.  
Shears (wire).  
Hand Hammers.  
Small Hand Drilling Machine.  
Drilling Set.

**Appendix "B."**

Dockyard Management and Organisation of System of Repairs as Adopted in the case of a Mercantile Fleet of River Steamers.

*Staff.*

The composition of the European Staff should be approximately as follows:—

- (1) Dockyard Superintendent.
- (2) Assistant Dockyard Superintendent.
- (3) Chief Draughtsman.
- (4) Machine Shop; one Foreman.



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- (5) Outside Foreman Engineer ; one or more as may be found necessary as the volume of work increases.
- (6) Boilershop and Platers shop ; one Foreman.
- (7) Carpenters and Shipwrights ; one Foreman.
- (8) Blacksmiths, Coppersmiths, Tinsmiths and Sheet iron workers ; one Foreman.
- (9) Foundry ; one Foreman.
- (10) Electric Department ; one Foreman.
- (11) General Stores ; one Storekeeper.
- (12) General Office ; Head Accountant.
- (13) Timekeeper ; one.
- (14) Paint Shop ; one Foreman.

*Custody of Stocks*

*Timber.*—In the charge of the Foreman Carpenter.

*Steel plates, Angles and Steel girders.*—In the charge of the foreman of the platers and boiler shops.

*Iron and Steel Bars.*—Round and square of above 6 square inches in section. In the charge of the foreman blacksmith.

*Electric Requisites.*—In the charge of the foreman electrical engineer.

*Pig Iron, Coke, Sand, Scrap C. I., Scrap Brass.*—In the charge of the foreman moulder.

*Paints, Paint-oils, Tar, etc.*—In the charge of the foreman painter. The above-mentioned foreman shall take delivery of their respective stocks, check it as early as possible and give signed voucher to the head accountant together with any complaints *re* shortage, etc. The respective foremen are responsible for their own stock.

All other stock and stores to be in the custody of the Storekeeper, (General) who shall make a point of checking everything on taking delivery and give receipts or initialled invoices to the Head Accountant, together with complaints, if any, in writing, as to shortages, breakages, etc., etc.

*Outside. Departmental Clerks.*

It will be necessary for each department to have a native clerk to enter the "Time" and "Materials" against the respective jobs and also in the cases of the departments which keep their own stocks ; to receive, check, issue and keep account of stock.

The foreman of each department shall check all entries made by his clerk daily, and initial as being correct, thus making the foreman responsible for charges in his own department.

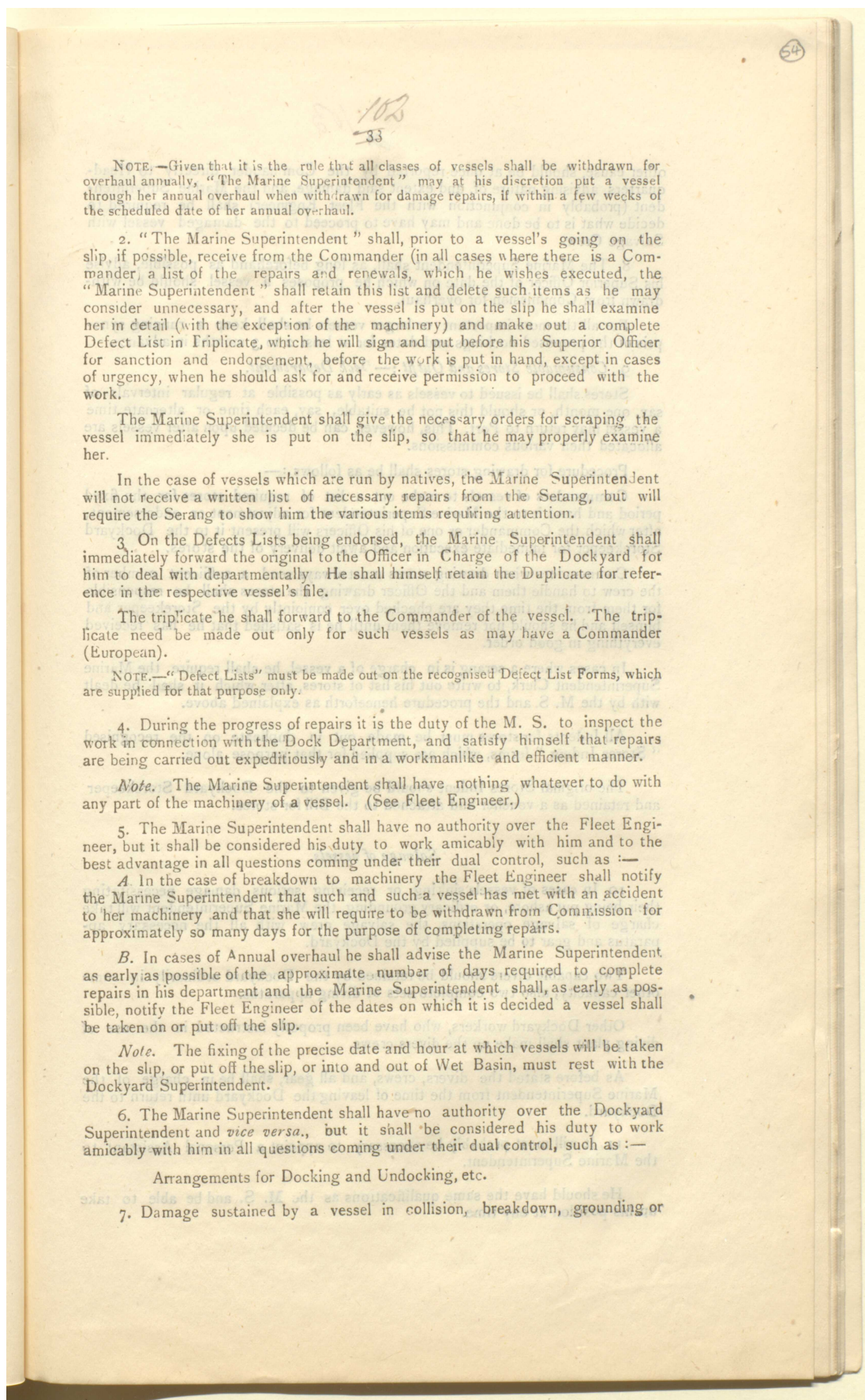
*Organisation and Administration.*

There is usually an officer appointed, who is designated the "Marine Superintendent," whose duties, in so far as the keeping of the Fleet in an efficient state of repair is concerned, are as follows :—

To make arrangements for the withdrawal of vessels of any description from commission for annual overhaul or for repairing damage by accident, breakdown, etc., to any part of the hull or machinery, (see later *re* damage to machinery.)



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other cause, should be at once reported by the Commander directly to Headquarters, advising nature of, and extent said damage, and the Marine Superintendent (probably in conjunction with the Fleet Engineer) shall be required to decide what is to be done and may have to proceed to the damaged vessel with Salvage Crew.

8. The Marine Superintendent shall, as long beforehand as possible, advise his Superior Officer of the date on which he proposes a vessel should be withdrawn from Commission for overhaul.

For all the more important or larger vessels he shall keep a running synopsis of the proposed dockings and dates for at least 2 to 3 months in advance.

9. *Consumable Stores and Outfit* :— *Deck Department.*

Stores shall be issued to vessels as early as possible at regular intervals of say, one month, or should this not be suitable, say, each time or alternate time a vessel may return to Port. This, however, can be decided upon after vessels are allocated their various commissions.

Procedure for drawing stores shall be as follows :—

Commanders of vessels to make out a list of required stores for the fixed period and hand it to the Marine Superintendent for adjustment or endorsement, after which the Commander or one of his Officers will present it to the Dockyard Storekeeper for immediate execution and await delivery of the stores.

Commanders when drawing stores must always send a sufficient number of the crew to handle them and the Officer drawing the stores shall be responsible for them from the time they are checked over conjointly by the Storekeeper and himself and he should not remove them until he is satisfied that he has received everything in good order.

In cases where a serang is in charge of a vessel, he shall require the Marine Superintendent Clerk, to write out his list of stores, after which it shall be dealt with by the M. S. and the procedure henceforth as explained above.

All Indents for stores must be made out in duplicate on the recognised "Stores Indent" forms, which are supplied for that purpose alone.

The original Stores Indent should be given to the Dockyard Storekeeper and retained as a voucher and attached to the Bill for stores.

*Salvage of vessels.*

10. In cases of vessels sinking or receiving serious damage necessitating their being put ashore, or ordinary grounding, the Marine Superintendent will take charge of salvage operations, the salvage crew with all the necessary apparatus and gear to be supplied by the Dockyard.

Two capable divers should be retained by the Dockyard ordinarily in some other capacity, also two complete sets of diving apparatus.

Other Dockyard workers, who have been properly instructed in the use of diving plant shall make up the divers crews.

As before stated the divers, crews, and all gear, shall be in charge of the Marine Superintendent from the time of leaving the Dockyard until return to the Dockyard.

11. It will most probably be necessary to appoint a Personal Assistant to the Marine Superintendent.

He should have the same qualifications as the M. S. and be able to take up his position at any time.



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*Fleet Engineer.*

The duties of the officer entitled the "Fleet Engineer" are as follows :—

1. He shall be required to receive from the Chief Engineer (in all cases where there is a Chief Engineer) prior to the vessels going on the slip, if possible, a list of the repairs and renewals, which the Chief Engineer wishes executed; which list he will retain deleting such items as he may consider unnecessary, and after examining all parts of the machinery himself, he shall make out a complete "Defect List" in triplicate which he will sign and put before his Superior Officer for sanction and endorsement before the work is put in hand, except in cases of urgency, when he should ask for and obtain permission to proceed with the work.

The Defect List being endorsed, the Fleet Engineer shall immediately forward the original to the Dockyard Superintendent, retain the duplicate for reference on steamer's file, and hand the triplicate to the Chief Engineer of the vessel.

In cases of vessels carrying only a native driver, the Fleet Engineer will not receive a written list of repairs required, but shall require the driver to point out all defects known to him, so that he may include them in this Defect List.

Defect Lists must be made out on the recognised "Defect List" forms, which are supplied for that purpose only.

2. It shall be the duty of the Fleet Engineer to inspect the work of repairs in connection with the machinery of vessels, during its progress and satisfy himself that it is being carried out expeditiously and in a workmanlike and efficient manner.

NOTE—The Fleet Engineer shall have nothing whatever to do with any part of a vessel, except her main and auxiliary machinery.

3. The Fleet Engineer shall have no authority over the Marine Superintendent, but it shall be considered his duty to work amicably with him in all questions coming under their dual control, such as; (*vide* A. and B. paragraph 5 of "Marine Superintendent's duties. ").

4. The Fleet Engineer shall have no authority over the Dockyard Superintendent, but it shall be considered his duty to work amicably with him in all questions coming under their dual control.

5. When a vessel is withdrawn for annual overhaul or ordinary damage repair, the Fleet Engineer shall as soon as possible advise the Marine Superintendent of the approximate time required to complete, and later of the actual completion of repairs.

*Consumable Stores and Outfit Engine Department.*

6. The procedure for drawing stores for this Department, shall be exactly similar to that for the Deck Department, except that the Fleet Engineer shall take the place of the Marine Superintendent, the Chief Engineer that of the Commander, a subordinate engineer that of an officer, and the driver that of the Serang.

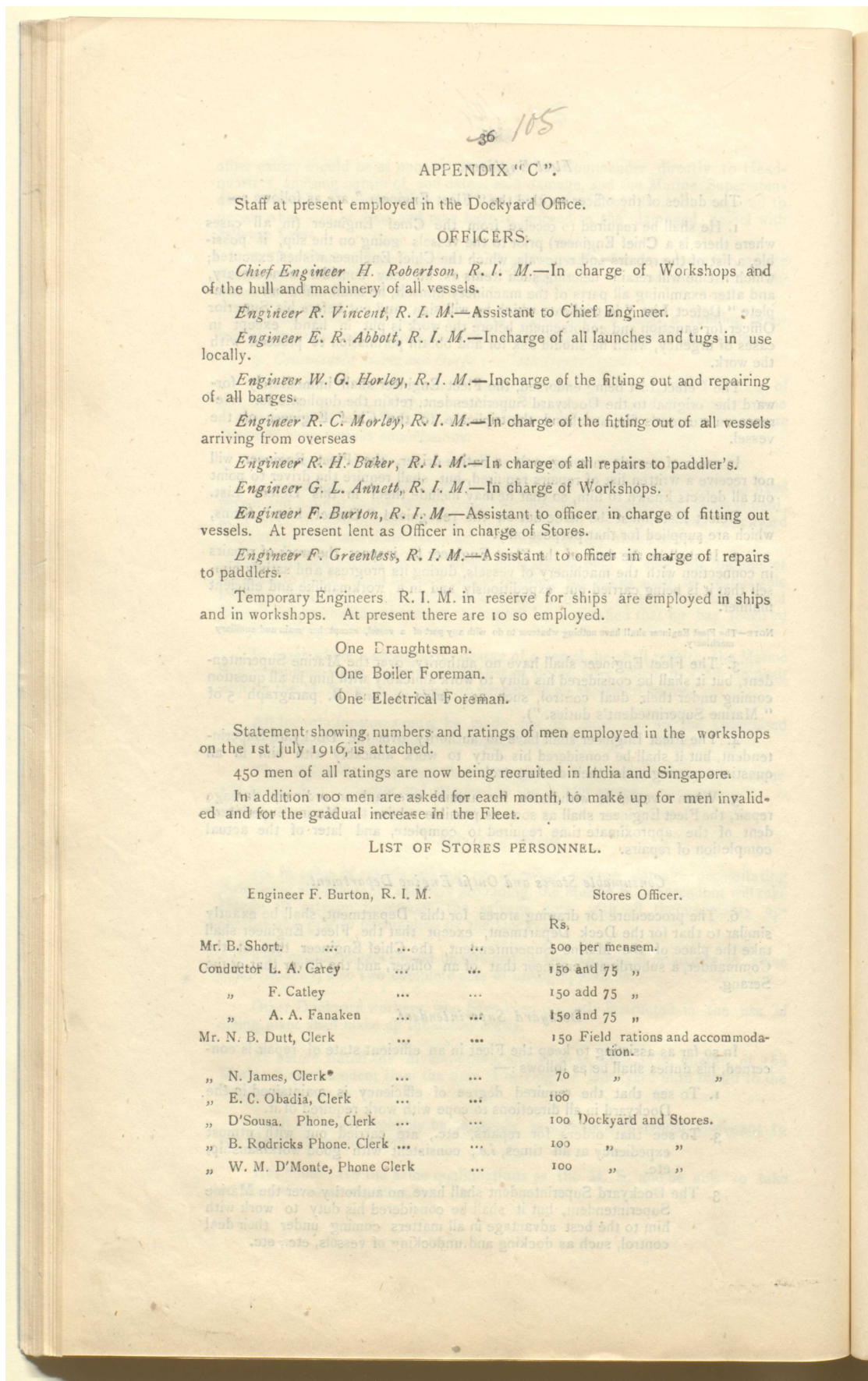
*Dockyard Superintendent.*

In so far as assisting to keep the Fleet in an efficient state of repair is concerned, his duties shall be as follows :—

1. To see that the required degree of efficiency is maintained in the Dockyard in all directions to cope with work required of it.
3. To see that orders for repairs, etc., are carried out with utmost expediency at all times, *i.e.*, consistent with good workmanship, etc.
3. The Dockyard Superintendent shall have no authority over the Marine Superintendent, but it shall be considered his duty to work with him to the best advantage in all matters coming under their dual control, such as docking and undocking of vessels, etc., etc.



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APPENDIX "C".

Staff at present employed in the Dockyard Office.

OFFICERS.

Chief Engineer *H. Robertson, R. I. M.*—In charge of Workshops and of the hull and machinery of all vessels.

Engineer *R. Vincent, R. I. M.*—Assistant to Chief Engineer.

Engineer *E. R. Abbott, R. I. M.*—Incharge of all launches and tugs in use locally.

Engineer *W. G. Horley, R. I. M.*—Incharge of the fitting out and repairing of all barges.

Engineer *R. C. Morley, R. I. M.*—In charge of the fitting-out of all vessels arriving from overseas

Engineer *R. H. Baker, R. I. M.*—In charge of all repairs to paddlers.

Engineer *G. L. Annett, R. I. M.*—In charge of Workshops.

Engineer *F. Burton, R. I. M.*—Assistant to officer in charge of fitting out vessels. At present lent as Officer in charge of Stores.

Engineer *F. Greenless, R. I. M.*—Assistant to officer in charge of repairs to paddlers.

Temporary Engineers. R. I. M. in reserve for ships are employed in ships and in workshops. At present there are 10 so employed.

One Draughtsman.

One Boiler Foreman.

One Electrical Foreman.

Statement showing numbers and ratings of men employed in the workshops on the 1st July 1916, is attached.

450 men of all ratings are now being recruited in India and Singapore.

In addition 100 men are asked for each month, to make up for men invalid and for the gradual increase in the Fleet.

LIST OF STORES PERSONNEL.

	Engineer F. Burton, R. I. M.	Stores Officer.
		Rs.
Mr. E. Short.	...	500 per mensem.
Conductor L. A. Carey	...	150 and 75 "
" F. Catley	...	150 add 75 "
" A. A. Fanaken	...	150 and 75 "
Mr. N. B. Dutt, Clerk	...	150 Field rations and accommodation.
" N. James, Clerk*	...	70 "
" E. C. Obadia, Clerk	...	100 "
" D'Sousa. Phone, Clerk	...	100 Dockyard and Stores.
" B. Rodricks Phone. Clerk	...	100 "
" W. M. D'Monte, Phone Clerk	...	100 "



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APPENDIX "C."

Statement of Artificers.

Total of men on books.	Indian and Chinese.	Local.	Total.	ABSENT.			PRESENT.		
				Indian and Chinese.	Local.	Total.	Indian and Chinese.	Local.	Total.
Carpenters ...	126	28	154	35	10	45	91	18	109
Riveters ...	25	...	25	11	...	11	14	...	14
Turners ...	12	6	18	5	2	7	7	4	11
Copper Smiths ...	4	2	6	2	...	2	2	2	4
Moulders ...	2	2	4	...	...	...	2	2	4
Assistant Moulders ...	...	2	2	...	...	...	...	2	2
Drivers ...	1	...	1	...	...	...	1	...	1
M. Men ...	10	...	10	1	...	1	9	...	9
Fitters ...	40	21	61	6	6	12	31	15	49
Assistant Fitters ...	9	...	9	1	...	1	8	...	8
B. Makers ...	11	47	58	4	9	13	7	38	45
W. Men ...	5	...	5	2	...	2	3	...	3
Black Smiths ...	7	12	19	3	4	7	4	8	12
Assistant B. S ...	6	14	20	...	...	...	6	14	20
Painter ...	1	...	1	...	...	...	1	...	1
Cooks ...	14	...	14	...	...	...	14	...	14
Drillers ...	...	1	1	...	...	...	...	1	1
Stoker ...	...	1	1	...	1	...	...	1	1
Tindal ...	...	1	1	...	...	...	...	1	1
Total ...	273	137	410	70	31	101	203	106	309

48 Casualties since last report of 29th June 1916.

Military Men	...	26
Coolies	...	120
Total	...	455

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Memorandum No. 1745-1-Q., dated the 14th August 1916  
(Received in the War Section, 31st August 1916.)

Serial No. 23.

From—The General Officer Commanding, Indian Expeditionary Force "D,"  
To—The Chief of the General Staff, Army Headquarters, Simla.

With reference to your telegram No. 55771 of 24th May 1916, and my telegram No. 1614-13-Q. of 12th June 1916, the Committee under the Presidency of Major-General G. F. MacMunn, Inspector-General of Communications, appointed to consider the organisation and provision of personnel for the river fleet in Mesopotamia, existing and future, and the best system on which the traffic up and down river should be worked, so as to get the best results out of the vessels composing the fleet, having completed their sittings, I beg to forward herewith a copy of their report for your information, in accordance with request contained in your above quoted telegram.

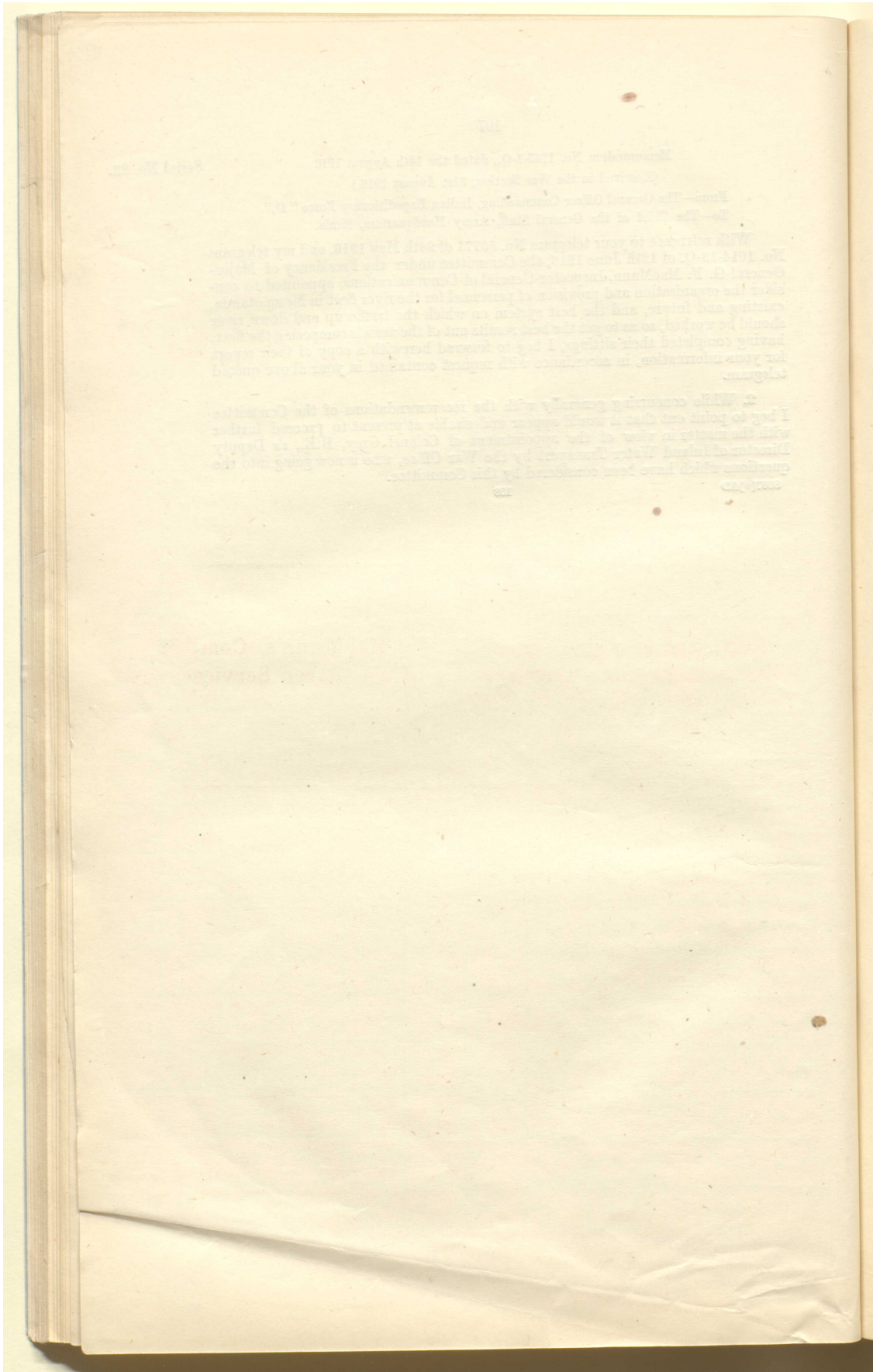
2. While concurring generally with the recommendations of the Committee I beg to point out that it would appear undesirable at present to proceed further with the matter in view of the appointment of Colonel Grey, R.E., as Deputy Director of Inland Water Transport by the War Office, who is now going into the questions which have been considered by this Committee.

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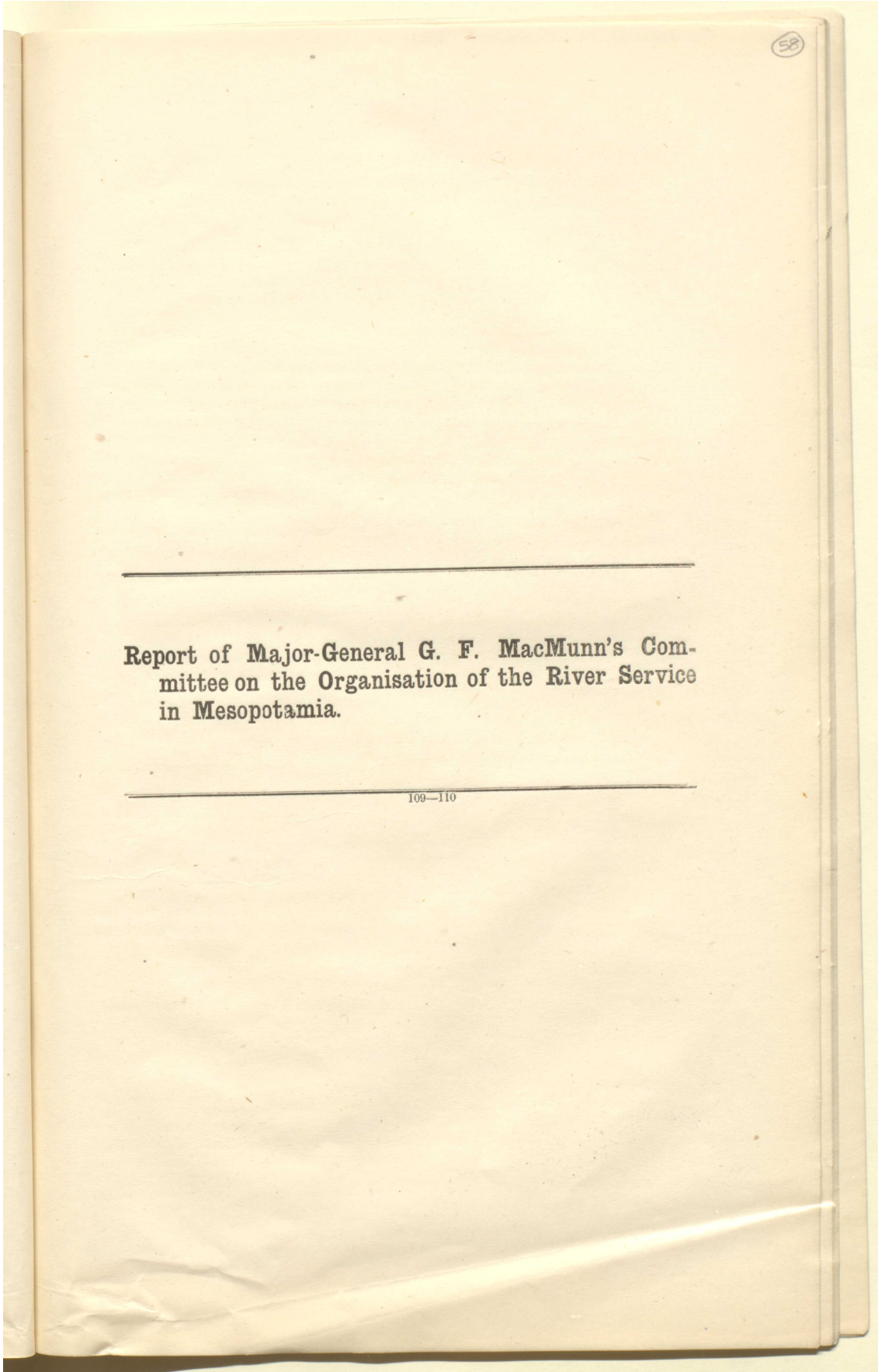


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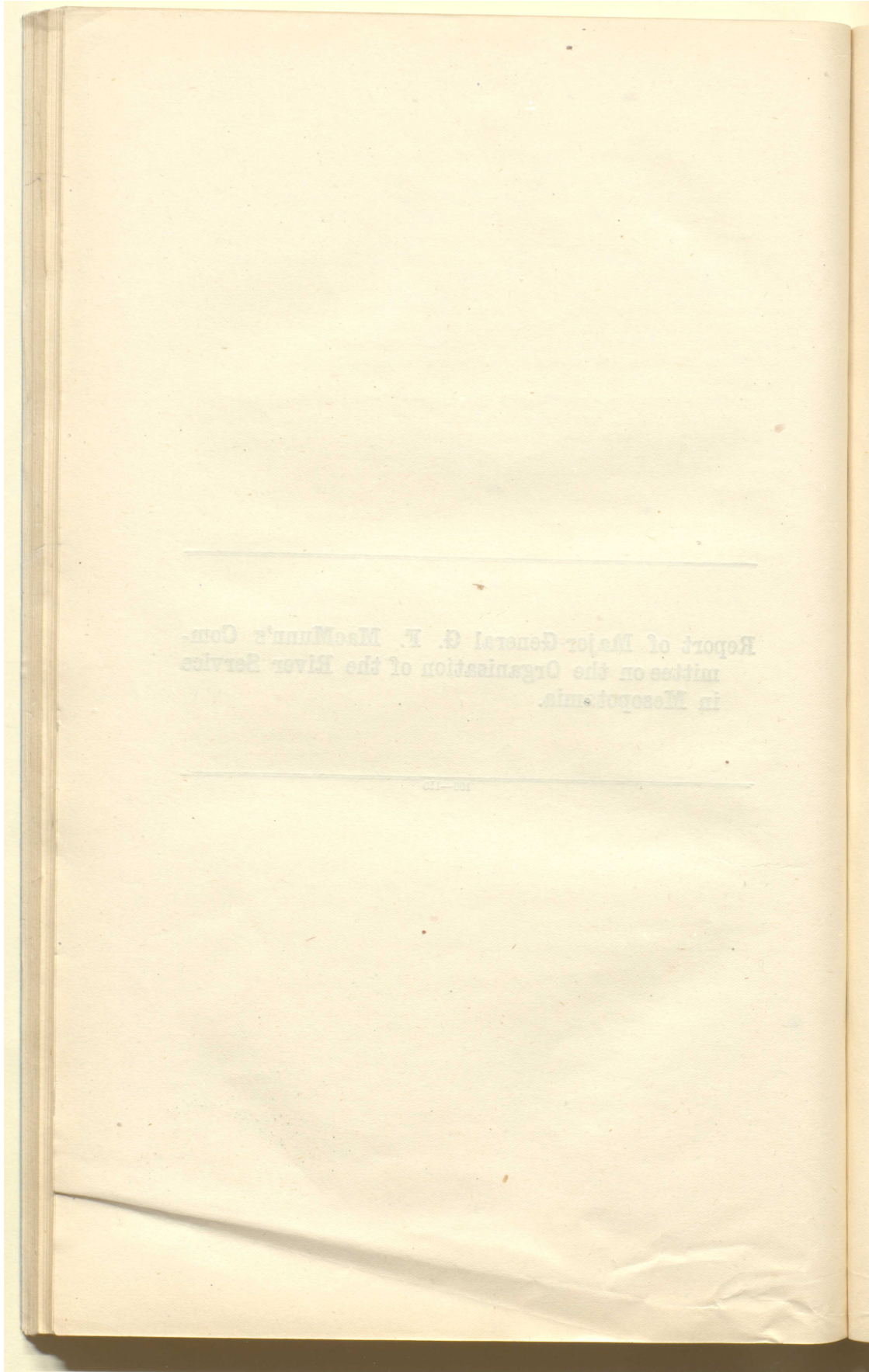


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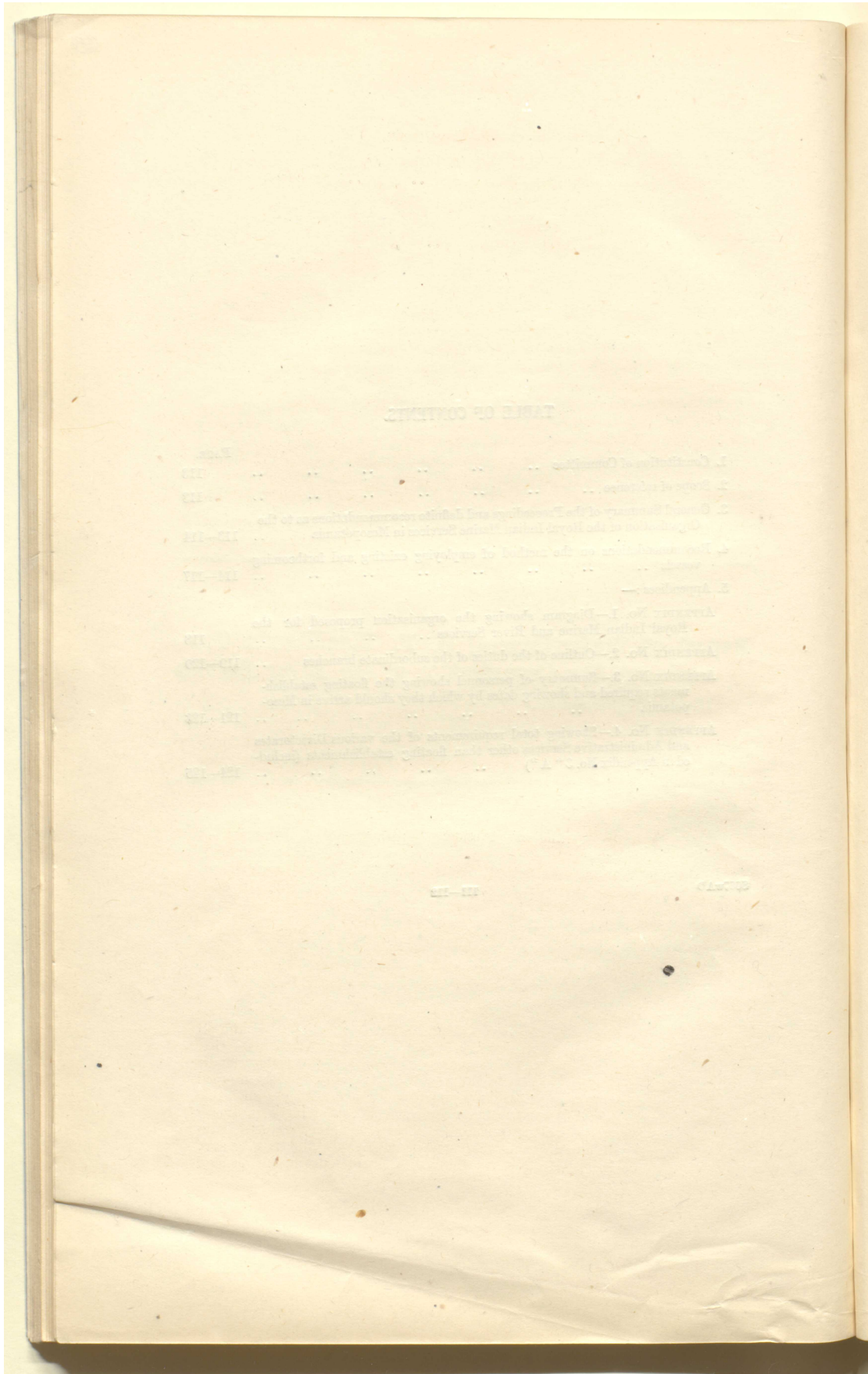
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CONSTITUTION OF THE COMMITTEE.

Major-General G. F. MacMunn, C.B., D.S.O. Inspector  
General of Communications .. .. . *President.*

Lieutenant-Colonel C. B. Winter,  
Assistant Quartermaster-General,  
General Headquarters. .. .. .

Commander A. Bingham, R. I. M. .. .. .

Major R. A. Horne, on deputation from the Government of  
India .. .. .

Captain J. C. Macrae, D.A.Q.M.G.,  
Line of Communications .. .. . *Secretary.*

} *Members.*

SCOPE OF REFERENCE.

1. The Committee will consider and report upon the following :—
  - (a) The manner in which the river fleet in Mesopotamia, existing and future, should be organised and provided with personnel. The services of the personnel already employed being utilised to the fullest extent.
  - (b) The system upon which the traffic up and down the river should be worked so as to get the best results out of the vessels composing the Fleet.
2. The Committee will bear in mind that it is essential from a military point of view that the service of the Army should be maintained without a break and their recommendations should be framed accordingly.
3. The Committee is empowered to summon any witnesses they may desire to examine and call for any information they require, and visit any localities which they may wish to inspect.

REPORT OF THE COMMITTEE.

The Committee consider their Report can be best presented in the form, one, of a summary of their proceedings, secondly, definite proposals and recommendations.

1.—SUMMARY OF PROCEEDINGS :—

- (i) Prior to their meeting the President directed that a summary of certain main points, on which information would be required, should be submitted to the Principal Marine Transport Officer, so that his representatives at the meeting might appear with certain information.
- (ii) The Committee assembled for the first time on 12th July 1916, and examined a diagram showing in outline the main duties and departments, which it was necessary to carry out and maintain on the river for the adequate provision of a river service.
- (iii) After discussing the general principles of organisation it was obvious that the Head of the Marine Service could not himself deal with more than a certain number of subordinates, and that according to the general recognised principles of organisation it was desirable that the various functions should be grouped into suitable main groupings, under the charge of a responsible officer. This officer would have authority to control in the ordinary daily exercise of their officers the various branches and subdivisions allotted to his charge, and would only find it necessary to refer to the Head of the Service, reporting to him the general



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progress and well-being of affairs, or to take his orders in difficulties and matters which he could not himself control. The Committee consider it a difficulty in the existing organisation that this general grouping did not already exist, though they recognise that since a Deputy Principal Marine Transport Officer and an Assistant Principal Marine Transport Officer has been added to the Principal Marine Transport Officer's staff some partial devolution of authority has been organised with the result of an acceleration of business and the relief of the Principal Marine Transport Officer from the burden of a mass of detail.

2. It seems to the Committee that the following points call for careful consideration :—

- (i) To what extent Principal Marine Transport Officer, as now constituted, could or could not control under one authority the whole of the enlarged service, including eventually one of the largest river fleets known in the world, and a very considerable dockyard.
- (ii) The best way of arranging the various big branches under the Principal Marine Transport Officer, in which it is proposed the military parallel of Directorates shall be followed, a principle already recognised by the existence of Directors of Land and Sea Transport.
- (iii) The question of the Principal Marine Transport Officer's actual Headquarters Staff must be considered, and the present Deputy and Assistant being more suitably employed as actual Directors, rather than as Principal Staff Officers, the difference being clearly recognised between a Director of a responsible head of a branch, with definite duties as distinct from a Staff Officer, who is merely the mouthpiece for uttering the orders of a higher authority.
- (iv) The necessity of providing each Director with sufficient Assistant Directors to allow him to divide his department into sub-departments under his control, and especially in this connection to see that the Director of River Transport should have enough assistants to enable him to manage the increasing fleet.
- (v) The adequate provision and control of personnel, which includes :—
  - (a) Timely provision for personnel to provide for the needs of the increasing fleet, and also the replacements of casualties.
  - (b) Proper arrangements for record of all individuals on the rolls, their appointment, clothing and rationing.
  - (c) The control of shore camps or barracks of establishment waiting to join the ships.

The Committee were of opinion that the whole of these latter services should be controlled by a Director of Personal Services, shown in the diagrams, whose duties and subordinate departments are also explained hereafter.

- (vi) The Committee recognise that at present all these cited services have been more or less adequately provided for so far as the existing fleet in concerned and circumstances have permitted.

RECOMMENDATIONS OF THE COMMITTEE.

1. Before outlining their definite recommendations the Committee place on record that they have carefully considered the question of the control of the Dockyard. In view of the fact that the Royal Indian Marine is one of the existing services of the Government, with its own disciplinary act and its own *esprit de corps*, and the fact that the officers of the Dockyard, both executive and engineer, must chiefly be drawn from the Royal Indian Marine, and that probably any additions of the officer grade, either permanently or temporarily commissioned officers, will be from that body, they recommend that the Dockyard shall be under the Principal Marine Transport Officer as the final authority, subject to the General



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Officer Commanding, the Forces in Mesopotamia, rather than to be an entirely separate institution. They recognise that this does, to a considerable extent, add to the already large responsibilities of the Principal Marine Transport Officer, but they consider that as he must necessarily be the officer to control the discipline, and that without him it is difficult to produce any authority who could reconcile differences between the dockyard and the needs of the fleet, the advantages of this arrangement outweigh the disadvantages.

(ii) In making the above recommendation, however, they are convinced that there should be attached to the Headquarters of the Principal Marine Transport Officer, a Chief Inspecting Engineer, who should provide the independent inspection already referred to. This officer should be quite distinct from the technical portion of the dockyard with full authority to inspect, interfere, and advise, on behalf of the Principal Marine Transport Officer, but entirely separate from the Dockyard personnel. He would also be charged with the general supervision of the engineer officers of the up river steamers, the inspection of these steamers for defects, and the criticism of the work to be turned out by the dockyard in repairing craft.

2. In view of the foregoing they make the following definite recommendations for the main organisation :—

(i) PRINCIPAL MARINE TRANSPORT OFFICER.

In command of all Royal Indian Marine services on the river, that is to say, the river fleet, the Dockyard, and so far as discipline and the supervision of personnel goes of such craft as are provided for the use of the Port Conservancy or other services.

His duties therefore include the command, the administration, and the inspection by tour of his services.

The staff of his Headquarters will consist of—

(a) Two personal assistants (officers of the Royal Indian Marine), to be increased if necessary as the fleet increases.

(b) A Chief Inspecting Engineer, with two assistants (*i.e.*, engineer officers as inspecting engineers), charged with the inspection of engineer services of all the river craft, and the surveillance of the Superintendent of the Dockyard.

(c) The senior of the Directors described below will be the Deputy Principal Marine Transport Officer, that is to say, the next senior officer of the Service, and in addition to his duties of Director will be expected to understudy the duties of the Principal Marine Transport Officer.

(ii) The main sub-divisions of the Marine Service in Mesopotamia will be as follows :—

(a) THE DIRECTOR OF RIVER TRANSPORT.

This officer will control the fleet of river steamers and barges, in accordance with the requirements of the Force.

(b) THE DIRECTOR OF PERSONAL SERVICES.

This officer will control the supply of personnel and will be responsible for their care and maintenance, and the general management of the Marine lines on shore, other than the Dockyard.

(c) THE DIRECTOR OF PORT SERVICES.

This officer will control the following branches :—

(i) Accounts Department.

(ii) Marine repair workshops up river (which are quite distinct from main Dockyard).

(iii) Various Marine duties at Basrah not included in other Directorates.



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(d) DIRECTOR OF SEA TRANSPORT.

This officer will have general control of the arrival and departure of ocean-going ships, and will conduct all correspondence with the Marine authorities in India.

(e) SUPERINTENDENT OF THE DOCKYARD.

To be a senior and experienced engineer officer, assisted by an executive Staff Officer, directly under the superior control of the Principal Marine Transport Officer, and the supervision of the Chief Inspecting Engineer.

3. The diagram (Appendix No. 1) shows in graphic form the organisation, detailed in the preceding paragraph, with the subordinate branches resulting therefrom, while Appendix No. 2 gives the outline of the duties of the subordinate branches.

4. The Committee wish especially to dwell on the importance to provide fully for the Directors and other assistants, without which the large fleet now preparing cannot be efficiently controlled. So far as Directors are concerned the Deputy Principal Marine Transport Officer and the Assistant Principal Marine Transport Officer can be most suitably employed as Director of Personal Services and the Director of Port Services, respectively. In the case of the rest of the supervising staff required, as distinct from officers of vessels, the Committee recognise that it is probable that sufficient permanent officers of the Royal Indian Marine may not be forthcoming, but feel sure that among the various officers temporarily commissioned there will be found several of administrative capacity, whose places in the ships can be taken by new arrivals, or if not that the Director, Royal Indian Marine, and the India Office should have no difficulty in bringing in from outside, as the Army and Navy have so largely done in the present campaign, sufficient temporarily commissioned officers to fill whatever vacancies are necessary.

5. The Committee further wish to place on record that as the fleet increases certain of the Directorates, notably those of the Personal Services and River Transport, will require to expand their sections by the increase of their sub-divisions corresponding with the increase of the fleet and personnel to be controlled.

1. (i) The Committee now turn to the second part of their Reference, *i.e.*, the best method of utilising the existing and forthcoming craft. The Director of River Transport and the Inspector General of Communications have already had considerable experience on this matter, and their practice for some time past now has been to group the fleet on such portions of the river as may best suit its capacities.

(ii) The Tigris, the Euphrates and the Shatt-al-Arab are all rivers of widely differing characteristics, while the Tigris itself differs considerably in character on various parts of its course.

(iii) As regards the Tigris alone, speaking generally, the most satisfactory working when the power of the steamers will admit of it, is the through course from Basrah to the fighting front. This, however, is limited to the fact that all paddle boats, when traversing the "Narrows" must tow barges on either side to protect their paddles. The following is the practice:—

- (a) Paddle, twin-screw, and single-screw vessels that are capable of doing so work on the through trip.
- (b) Weaker boats that cannot tow barges work on the reaches above Amarah.
- (c) To save tonnage, certain small sea-going boats also work up to Qurnah on the Shatt-al-Arab to feed the native craft service on the Euphrates and Tigris. For the convenience of oil fueling the Naval motor lighters work from Basrah or Qurnah to Amarah only.
- (d) To avoid an unduly long round trip, native craft on the Tigris work to Amarah, there making deposits of reserves of stores, which are transferred by surplus steamers to the Tigris front.
- (e) Owing to the shallowness of the water on the Euphrates, and pending the eventual dredging of the Hammar Lake, the major portion of



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all the work on this line is done by native craft, known as lake bellums, which ply between Qurnah and the Euphrates front. A few small sternwheelers carrying details are the only steamers on this line, except during a short period of the highest flood, when occasional steamers from the Tigris have gone up this line. When the Hammar Lake is dredged, it is intended to have a regular through service from Basrah to the Euphrates front.

(iv) The Committee are of opinion that the methods heretofore in practice are the best suited to the most economical utilisation of the native craft, and recommend they should be followed in the future. The Committee have been informed of the arrangements that are being made for storing oil fuel on the river, and they are assured that these arrangements are adequate and feasible, provided the number of tanks already under order are duly erected and the barges under order arrive in good time to maintain them.

Signed at Basrah.

G. F. MACMUNN, *Major-General,*

*President.*

*4th August 1916.*

\* A. BINGHAM, *Commander, R.I.M.*

\* Except that I dissent from para. 1 (ii) of (recommendations) for reasons given in paper A attached.

*Members.*

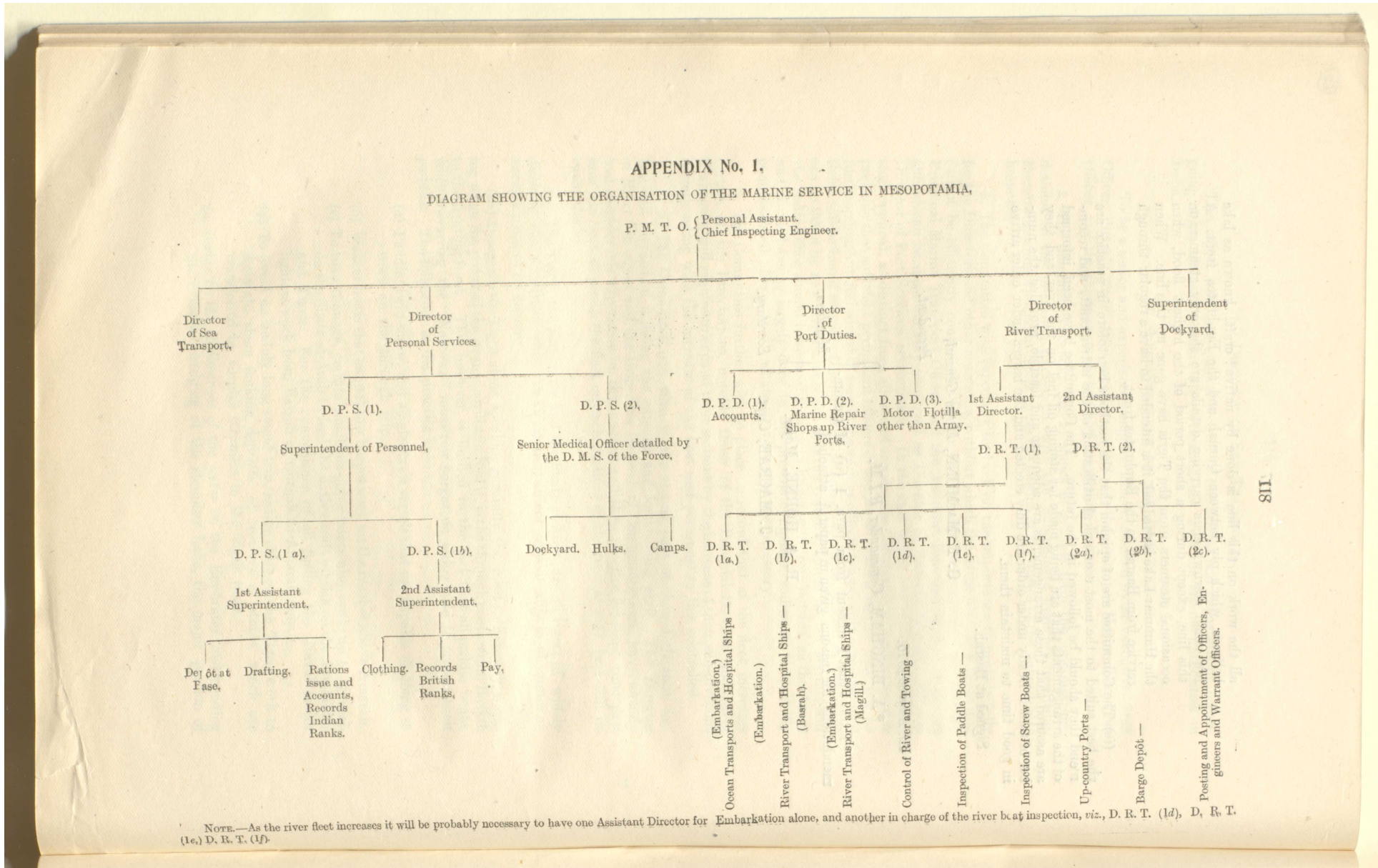
R. A. HORNE, *Major.*

J. MACRAE, *Capt.*

*Secretary.*



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APPENDIX NO. 2.

OUTLINE OF DUTIES OF THE SUBORDINATE BRANCHES.

1. DIRECTOR OF SEA TRANSPORT.

This Directorate has practically no subordinate branches.

2. DIRECTOR OF PERSONAL SERVICES.

This Directorate has the following branches :—

(i) D. P. S. (1). SUPERINTENDENT OF PERSONNEL.

Is responsible for maintaining the supply of all men for river craft in Mesopotamia, including adequate reserves. Will forward necessary demands to India, make arrangements for reception, maintenance and records. Draft men into ships as required, also rations, clothing, payment, and generally act as if it was a Base Depôt itself. The sub-branches under this officer are—

(I) D. P. S. (1a) 1st. Assistant Superintendent.

(a) Having charge of the Depôt at the Base, consisting of a commandant with two assistants (an executive and engineer officer) and four gunners, who will be responsible for the general control of the Base Depôt.

(b) Drafting and Records Section, consisting of three officers, and one clerk per 1,000 men. This Section keeps complete records of all ratings, and sends necessary orders to the Depôt Commandant for men for ships.

(c) Rations Department. Divided into accounts branch (which will do all accounting) consisting of head clerk, and one clerk per 1,000 men, and Issue Department, which will manage the ration stores, issuing to all ships' companies and units, consisting of head clerk and ten assistants.

(II) D. P. S. (1b) 2nd. Assistant Superintendent.

(a) This sub-branch deals with clothing, records, and pay, in charge of one officer as assistant superintendent, with the following departments :—

Clothing Stores, clothing accounts and issue, consisting of head clerk and one clerk per 1,000 men.

(b) Records, British ranks and clerks. Will keep a record of the arrival of all officers, warrant officers and clerks, deal with next-of-kin and their estate should they die in the country, and all questions of the whereabouts of all ranks concerned, and last pay certificate on leaving.

(c) Pay branch, under a paymaster with one clerk per 1,000 men. To pay all Marine ratings below warrant officer and keep their accounts.

(ii) D. P. S. (2). SENIOR MEDICAL OFFICER.

Will be a military officer with necessary assistants, detailed by the Director, Medical Services of the Force, under whom will be three separate medical charges, *i.e.*, Dockyard, Hulks, and Camps.

3. DIRECTOR OF PORT DUTIES.

This Directorate is divided into three sections as follows :—

(i) D. P. D. (1) ACCOUNTS.

This Branch will be responsible for the payment of all officers, warrant officers, clerks and all ratings not paid by the Superintendent of Personnel, Superintendent of Dockyard, of the Superintendent of the Motor Flotilla (the three latter branches will indent on the "Accounts Money" for money required, but will be responsible to the

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F. C. M. A. for their accounts). The Accounts Branch will pay all bills that are in order and duly supported, and has permission to deal direct with the F. C. M. A.

(ii) D. P. D. (2). SUPERINTENDENT OF MARINE REPAIR WORKSHOPS.

This officer controls the Marine repair workshops at up river stations, either existing or to be formed hereafter. He draws money direct from grants from India, and arranges all his own labour.

(iii) D. P. D. (3). SUPERINTENDENT OF MOTOR FLOTILLA.

This officer is in charge of the Motor Flotilla and also a small repair yard attached to it. He has under him a superintending engineer and an officer in charge of all Indian Marine ratings. Pending the possible establishment of the Army Motor Boat Flotilla he has under him such military boats and military ratings as may be ordered.

4. DIRECTOR OF RIVER TRANSPORT.

This directorate is organised as follows, into two sections under Assistant Directors :—

(i) D. R. T. (1). 1ST ASSISTANT DIRECTOR.

Deals with the embarkation and disembarkation from all craft in the river, and the inspection of all river on arrival at Basrah. This section is divided into six sub-sections :—

D. R. T. (1a). Arranges embarkation and disembarkation from ocean ships of all kinds.

D. R. T. (1b). Arranges embarkation and disembarkation from river ships at Basrah.

D. R. T. (1c). Arranges embarkation and disembarkation from river ships at Magill.

D. R. T. (1d). Controls the river and tugs, *i.e.*, sees that native craft and steamers do not block the fairway. Assists vessels in difficulties, and tows vessels to safety that are drifting owing to strong winds, and controls all tugs not under the Director of Traffic (Port Administration).

D. R. T. (1e). Inspector of Paddlers. The officer of this sub-section will inspect all paddle steamers as they come in, see that their defects are made good, and that they are provided with stores and rations, and kept clean and efficient, also hear reports and complaints from officers and crew, as well as maintained discipline.

D. R. T. (1f). Inspector of Screw Vessels, and Sternwheelers. Similar duties to D. R. T. (1e).

(ii) D. R. T. (2). 2ND ASSISTANT DIRECTOR.

This section deals with the Marine Transport establishments in up-river ports, manages the Barge Depot at Basrah, and controls the general posting of European ranks and ratings to river boats, and has three sub-sections.

D. R. T. (2a). River Port Section. This sub-section attends to all wants and complaints and correspondence connected with the Marine Transport Officers of the up-river ports, and sees that all stores, fuel, and personnel required are forwarded.

D. R. T. (2b). Barge Depot. This sub-section deals with the upkeep, cleaning and fitting out all barges, and the general maintenance and discipline of the barge crews.

D. R. T. (2c). Postings. The officer in charge of this sub-section to keep personal records of all officers, engineers, and warrant officers in the river fleet, arrange their postings, and generally attend to their interests and records.



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APPENDIX No. 3.

*Summary of Floating Establishments required.*

The Table "A" has been made out on the consideration that the following vessels will be ready for their crews and allowances for casualties at the following scale:—

Officers, Engineers and Gunners at 20 per cent.

Other ratings at 33½ per cent.

	From.
During August—	
P. 52, P. 53, P. 54 .. .. .	England.
4 Samana Tugs .. .. .	Abbadan.
4 "L" Class Launches .. .. .	India.
During September—	
P. 55 .. .. .	England.
3 Thames paddlers .. .. .	England.
52 Barges .. .. .	England.
2 Stern-wheelers .. .. .	} Abbadan and Lynch Brothers.
9 large Barges .. .. .	
7 small Barges .. .. .	
23 Barges .. .. .	India.
2 Oil Barges .. .. .	India.
5 "L" Class Launches .. .. .	India.
4 Tugs, large .. .. .	India.
2 Hospital Motor Ships .. .. .	India.
During October—	
2 Motor Hospital Ships .. .. .	England.
14 Samana Tugs .. .. .	England.
4 Samana Tugs .. .. .	Abbadan.
6 large Barges .. .. .	Abbadan.
14 large Paddlers .. .. .	India.
1 small paddler .. .. .	India.
6 Stern-wheelers .. .. .	India.
During November—	
6 large Tugs .. .. .	England.
During December—	
6 "P" Class Mejidieh .. .. .	England.
4 Hospital Ships .. .. .	England.

*Note.*—If craft are behind hand drafts will be lessened by that number.

India has been asked to send all her craft fully manned with officers, engineers gunners and crew for service in Mesopotamia.

England has been asked to send all her craft manned with officers, engineers and gunners for service in Mesopotamia.



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APPENDIX No. 3—TABLE "A."

FLOATING ESTABLISHMENT.

Diagram showing personnel required for existing fleet and to meet eventual increase.

1	2	3	4	5	6	7	8	9
Rank.	Totals present.	Number already demanded.	NUMBER REQUIRED IN ADDITION TO COLUMN 3.					Total of columns 3—8.
			By 1st October.	By 1st November.	By 1st December.	By 1st January.	To complete fleet.	
Officers .. .. .	84	25	20	66	7	24	119	261
Engineers .. .. .	72	..	14	45	7	12	124	202
Gunners .. .. .	54	15	14	26	..	12	17	84
Syrangs and Tindals of Lascars	171	75	33	38	12	27	246	431
Seacunnis and Lascars ..	1,972	1,066	460	490	50	250	2,194	4,510
Syrangs and Tindals of Stokers	75	47	12	10	6	12	69	156
Stokers .. .. .	1,001	696	350	370	50	250	1,593	3,309
Engine Drivers .. .. .	157	106	52	65	12	27	110	372
Carpenters .. .. .	19	35	6	10	..	10	13	74
Leadsmen .. .. .	12	10	..	10	2	10	9	42
Cooks .. .. .	99	58	20	41	6	35	18	178
Servants .. .. .	140	172	60	70	6	17	22	357
Ships Stewards .. .. .	18	14	6	8	..	10	8	46
Monthly casualties approximate	..	..	(350)	(450)	(450)	(450)	..	..



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APPENDIX No. 3—TABLE "B."

Diagram showing personnel required on Shore Staff at present and in future.

1	2	3	4	5
Rank or Rating.	Present total.	Numbers* already demanded.	Total Establishment under scheme.	REMARKS.
Commanders .. .. .	3	2	7	* Increase asked for in Principal Marine Transport Officer's letter No. 2414-100-A., dated 27th July 1916, to Inspector General of Communication.
Officers .. .. .	16	24	51	
Engineers .. .. .	13	10	27	This increase will last until end of year, when full numbers will be demanded.
Gunners .. .. .	Nil.	17	40	
Head clerks .. .. .	6	10	21	Workmen from the Dockyard are indented for by Chief Engineer of Dockyard, there is a large indent on hand and it has been arranged that 100 workmen monthly be sent to Basrah to fill casualties and gradually increase the staff of workmen.
Clerks .. .. .	60	62	181	
Store Conductors .. .. .	4	4	8	
Typists .. .. .	9	6	16	
Messengers .. .. .	Nil.	53	57	
<i>Stores—</i>				
Cassubs .. .. .	4	2	16	
Tindals .. .. .	2	2	8	
Store Coolies .. .. .	Nil.	80	80	
<i>Dockyard—</i>				
Assistant Plater Foreman .. .. .	Nil.	1	1	
„ Carpenter „ .. .. .	..	1	1	
Blacksmith .. .. .	..	1	1	
M. Shop .. .. .	..	1	1	
Timekeepers .. .. .	2	4	6	
<i>Barge Department—</i>				
Lascar Ratings .. .. .	Nil.	43	43	
Stoker .. .. .	..	11	11	
Fitters .. .. .	6	8	1	
Carpenters .. .. .	Nil.	8	20	



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APPENDIX No. 4.

Diagram showing total requirements of the various Directorates and Administrative Services of the Marine and River Services other than floating establishments.

Directorate or Service.	Commanders.	Officers and Engineers.	Gunners and Warrant Officers	Superintending Clerks.	Clerks and typists.	Messengers.	Merchants, etc., etc.	Store keepers.	Store Conductors.	Store Tindals.	Cassanbs.	Carpenters.	Tinsmiths.	Coopers.	Store coolies.	Tindal of lascars.	Lascars.	Draftsmen.	Foremen.	Time keeper, etc.	Wiremen.	Sailmakers.	Coolie labourers.	Coal Conductors.	Motor boat drivers.	Syrang of lascars.	Sukkanies.	Bhandarries.	Tupasses.	Total.					
P. M. T. O. .. .. .	2	1	..	1	17	7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	28						
D. of S. T. .. .. .	1	1	..	..	7	7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	17						
D. of P. S. .. .. .	1	6	1	4	67	11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	91						
D. of P. D. .. .. .	1	†1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31						
Accounts .. .. .	..	2	..	..	22	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31						
Marine R. Sps. .. ..	..	..	..	..	27	..	290	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	333						
Motor F'illa .. .. .	..	2	2	..	5	4	28	1	..	..	..	10	..	..	..	..	200	..	..	..	..	..	..	150	3	175	8	6	600						
D. of R. T. .. .. .	1	27	1	20	11	11	18	..	..	..	..	20	..	..	..	2	46	..	..	..	..	..	..	..	..	1	..	..	163						
Superintendent of Dockyard ..	1	†1	†20	5	56	11	980	2	8	8	16	302	2	2	80	§1	10§	1	9	6	30	40	200	2	..	..	..	..	1,813						
																..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2,075			
																..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	(2,076 ?)

\*Military Coding Officer.  
†Paymaster.  
‡Includes two civil Engineers.  
§Stokers.  
||Cooks.  
¶Includes one Chief Engineer.

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MINUTE OF DISSENT BY COMMANDER BINGHAM, R.I.M.

RECOMMENDATION OF COMMITTEE.

Paragraph 2.

I do not agree with the views laid down and consider that a Chief Inspecting Engineer, with duties as suggested, is not necessary.

I am of opinion that the Chief Inspecting Engineer should have supreme control of the Dockyard and all its branches.

He should be assisted by —

- (1)—*Staff Officer of Dockyard*,—a Senior Lieutenant, R.I.M. who will look after the executive control, discipline, police, sanitary arrangements and the mooring of vessels at the yard.
- (2)—*Senior Engineer of Dockyard*,—who will be in charge of all repair shops and repairs to vessels; he will have under him the Officers in charge of —
  - (a) Launches.
  - (b) Fitting out vessels arriving from overseas.
  - (c) Repairs to River Craft in commission.
  - (d) Workshops.

It is not the practice in the Royal Indian Marine Yards in India, nor, I am informed, in the Royal Naval Yards at Home, to have an Inspecting-Engineer with duties as proposed in the report.

It is necessary to have an Inspecting Engineer where the work is let out to a contractor. For example, if a contractor builds a ship for Government, it is, I agree, necessary for an Inspecting Engineer to watch the interests of Government as it is to the interests of the contractor to get the work done as cheaply as possible and for the Government to get as much for their money as they can.

The case of the Royal Indian Marine Yard at Basrah is different. It is to the interests of all concerned that the work done should only be of a first class character and done as quickly as possible.

The Engineers of the ships watch the work being done and can bring to the notice of the Dockyard Engineer in charge of that job, any mistakes that they consider are being made, and, if not satisfied, can appeal the Chief Inspecting Engineer.

BASRAH ; } A. BINGHAM,  
The 2nd August 1916. } Commander, Royal Indian Marine.

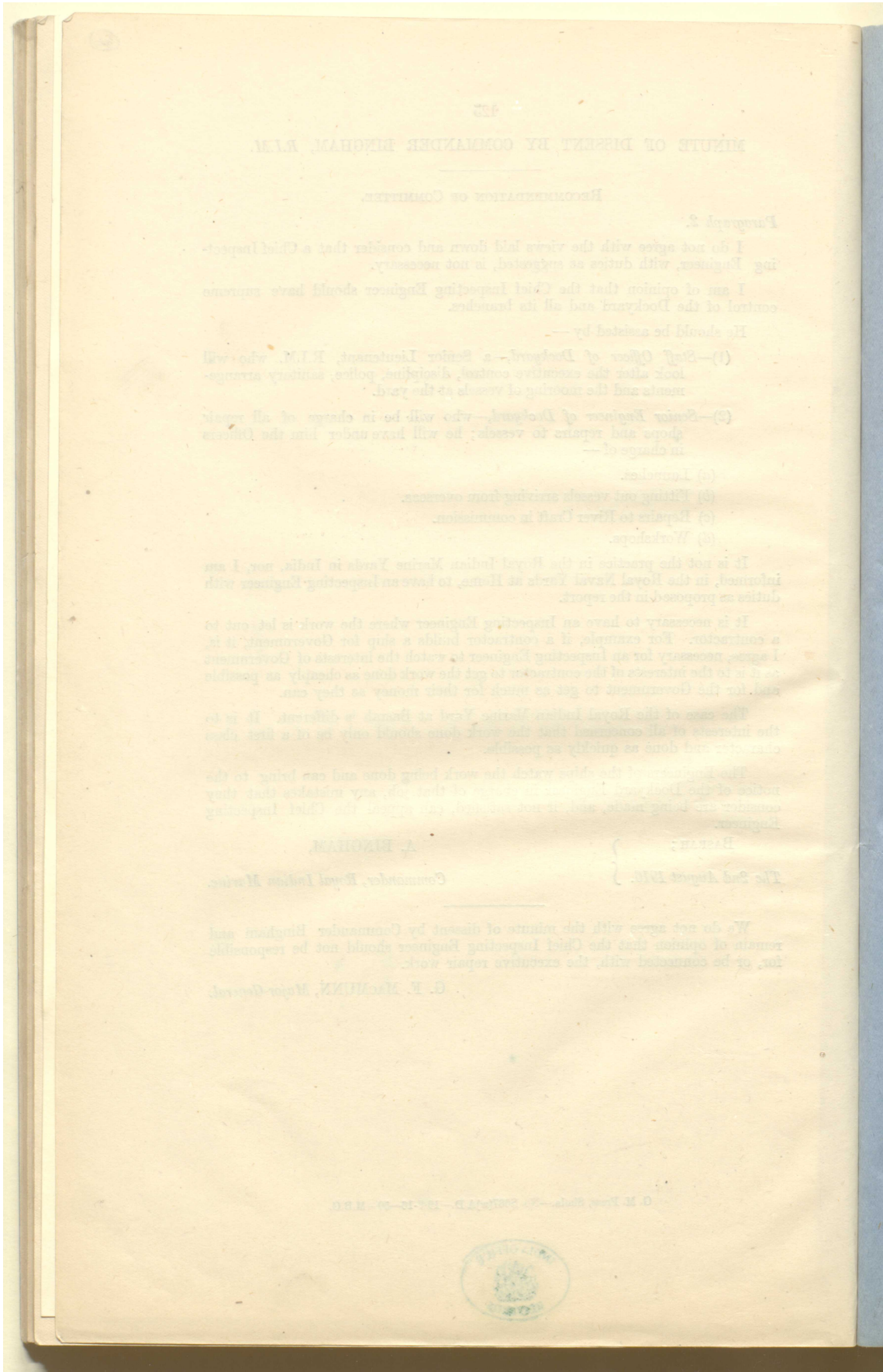
We do not agree with the minute of dissent by Commander Bingham and remain of opinion that the Chief Inspecting Engineer should not be responsible for, or be connected with, the executive repair work.

G. F. MACMUNN, Major-General.



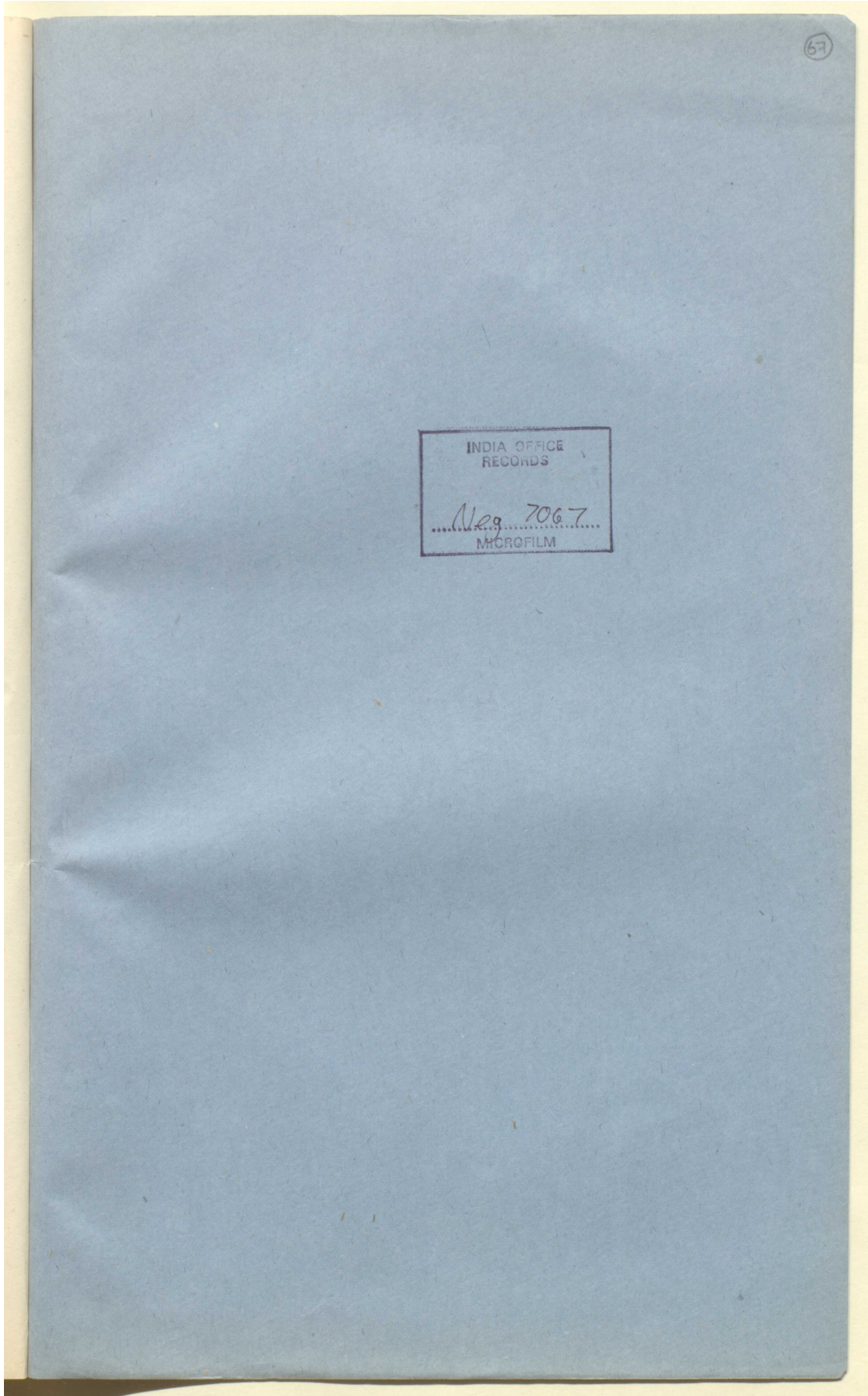


'Summary of correspondence relative to the administration of the Port of Basrah and measures for the control of the shipping traffic in Mesopotamia.' [66v] (132/134)





'Summary of correspondence relative to the administration of the Port of Basrah  
and measures for the control of the shipping traffic in Mesopotamia.' [back-i]  
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**'Summary of correspondence relative to the administration of the Port of Basrah  
and measures for the control of the shipping traffic in Mesopotamia.' [back]  
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