

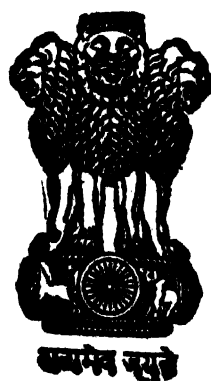
ESTIMATES COMMITTEE

1956-57

FORTY-SEVENTH REPORT

MINISTRY OF TRANSPORT

LIGHTHOUSES



LOK SABHA SECRETARIAT

NEW DELHI

February, 1957

C O R R I G E N D A

FORTY-SEVENTH REPORT OF THE ESTIMATES COMMITTEE ON THE MINISTRY OF TRANSPORT - LIGHTHOUSES.

Page 7, para 21, line 15. *read* 'Bhatkal' for 'Dhatakai'

Page 13, item 10, line 1: *read* 'Korlai' for 'Koreai'

Page 33, below Sacramanto Lighthouse. *read* 'Lascars 2' for 'Ladcars'.

Page 33, below Kap Lighthouse: *read* 'Lightkeepers 2' for 'Lightseepers 2'

Page 33, below Point Calimere Lighthouse: *read* 'Lascar 1' for 'Lascear'

Page 33, below Point Calimere Lighthouse: *read* 'Sweeper 1' for 'Seepers 2'

Page 33, below Manapad Lighthouse: *read* 'Lightkeepers 2' for 'Lightkweeper 1'

Page 33, below Manapad Lighthouse: *read* 'Sweeper 1' for 'Sweeper'

Page 33, below Manapad Lighthouse: *read* 'Lascars 2' for 'Lascar 1'

Page 33, Muttum Lighthouse: *add* 'Sweeper 1' *after* 'Lascar 1'

Page 33, below Quilon Lighthouse: *read* 'Lightkeepers 2' for 'Lightkeepers 3'

Page 33, below Quilon Lighthouse: *read* 'Lascar 1' for 'Laacarl'

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Page 35, line 14: read 'Lightbuoy' for 'Lighbuoy'

Page 36, line 18: read 'Aga' for 'Ag'

Page 43, below Appendix VII: read 'First' for 'Pist'

**Page 51, Serial No. 24, Column 3, line 13: read 'specialised' for 'specialise'
'specialise'**

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*Resigned with effect from the 20th November, 1956.

**Died on the 6th October, 1956.

***Ceased to be a member upon his election to Rajya Sabha on the 13th December, 1956.

26. Shri T. B. Vittal Rao.
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Shri R. P. Kaushik—*Under Secretary.*

INTRODUCTION

I, the Chairman, Estimates Committee, having been authorised by the Committee to submit the Report on their behalf, present this Forty-Seventh Report on the Ministry of Transport on the subject 'Lighthouses'.

2. The Committee wish to express their thanks to the Secretary and Officers of the Ministry of Transport for placing before them the material and information that they wanted in connection with the examination of the estimates.

BALVANTRAY G. MEHTA,

Chairman,

Estimates Committee.

NEW DELHI;

The 16th February, 1957.

LIGHTHOUSES

I. GENERAL ADMINISTRATION ETC.

A. Administrative set-up

1. The Lighthouse Department is headed by the Engineer-in-Chief who is in turn assisted by four District and four Regional Officers. Besides, there are three workshops under him where manufacture, repair and maintenance of various kinds of lighthouse equipment is undertaken.

2. Prior to the year 1929, the administration of 'Lighthouses' was the responsibility of the various maritime State Governments. The administration was centralised during that year consequent upon the passing of the Indian Lighthouse Act, 1927. For the purposes of this Act, Lighthouses are divided into 'general' and 'local' according to the utility of a particular lighthouse to navigation. The superintendence and management of 'general lighthouses' is vested in the Government of India, while the 'local lighthouses' are managed by local lighthouse authorities such as State Governments, Port Trusts etc. Under the provisions of the Act, the Government of India have, however, the power to issue directions to local lighthouse authorities in regard to the erection, maintenance and other matters relating to local lighthouses.

3. A statutory body—Central Advisory Committee for Lighthouses—has been appointed under the 1927 Act representing various interests, which advises the Government on matters connected with the improvement of lighthouses. It normally meets twice a year.

4. Before partition, India (excluding Indian States) had a coastline of approximately 3980 miles of which 560 miles went over to Pakistan. However, as a result of the federal financial integration, a further 920 miles of coastline, which formerly fell within the jurisdiction of erstwhile Princely States, and Andamans Islands has been added to the responsibility of the Central Lighthouse Department, bringing the total to 4340 miles. There are now, in all 166 lighthouses, 9 light vessels, 58 light buoys, 282 buoys, 190 beacons, 299 land marks and 713 other marks, making a total of 1717 aids to navigation strewn all along the entire coastline. Of these 120 lighthouses constitute the direct administrative responsibility of the Central Government. Consequent upon the classification of the subject of lighthouses as a Union responsibility in List I to the Seventh Schedule of the Constitution, it has been decided that all aids to navigation including those which were hitherto classified as 'local' should be brought on to a Central Register and gradually taken over by the Central Government.

5. At present the 'general' lighthouses in all States and 'local' lighthouses in ex-Part 'B', 'C' and 'D' States are the responsibility of the Centre. 'Local' lighthouses in ex-Part 'A' States are maintained by the local authorities such as the State Governments, Port Trusts etc. The Engineer-in-Chief, who is the head of the Lighthouse Department is responsible for the administration of the Indian Lighthouse Act and for the efficient administration and maintenance of all aids to marine navigation. He advises the Government of India on all administrative and technical matters and is also responsible for the execution of the capital works of the Department such as erection, repairs, alterations to existing stations and the approaches, radio beacons, radar, wireless aids, sound signals, lighthouse standards and contracts, etc. As chief inspector of Lighthouses in India, he is required to maintain an overall control on lighthouses which are administered by local authorities.

6. In addition to the administration of the Indian Lighthouses Act, control, supervision and maintenance of the central Lighthouses, the Engineer-in-Chief has to perform certain additional duties in respect of the following items:

(i) *Obstructions to Fairways Act*

The responsibility of administering the obstructions in the Fairways Act has also been placed on the Engineer-in-Chief, Lighthouse Department. This involves keeping the channels swept and clear from all obstructions. Fishing stakes in the channel leading to Bombay harbour have, for example, always presented a big problem to the authorities concerned.

(ii) *Aids to navigation in the Inland Waters*

The Central Government has set up an Indian Waterways Board and they are carrying out certain pilot surveys. The aids to navigation in the Inland Waterways have also to be taken up by the Lighthouse Department.

(iii) *Radio and Cable Board*

The Engineer-in-Chief, Lighthouse Department represents the Ministry of Transport on the Radio and Cable Board, for advising on all matters relating to electronics.

(iv) *Depth of Harbours*

The Engineer-in-Chief, Lighthouse Department is also a member of the Committee for studying depths of harbours.

(v) *International Liaison*

The Engineer-in-Chief has to maintain international liaison in matters of aids to navigation. An international conference on the subject takes place every five years. The last meeting was held in June, 1955.

7. The organisation chart of the office of the Engineer-in-Chief, Lighthouse Department as it stood on the 1st April, 1956 is given in Appendix I.

B. District Offices

8. For the purposes of administrative control the entire coastline of India including Andamans (about 4340 miles long) is divided into four lighthouse districts, namely (i) Saurashtra & Kutch, (ii) Bombay, (iii) Madras, and (iv) Calcutta. The present jurisdiction, number of lighthouses and other navigational aids under the control of each district are given below:

(i) *Saurashtra-Kutch District*

This district covers a coastline of 610 miles, along the ex-States of Kutch and Saurashtra and Okha Mandal, Dwarka and Kodinar Talukas of Amreli District in the ex-Bombay State, and has 43 lighthouses including 8 'general' lighthouses, 2 light-vessels, 18 light buoys, 29 buoys, 53 beacons and 163 other marks.

(ii) *Bombay District*

This district covers a coastline of 600 miles, along the ex-State of Bombay, excluding the areas included in the Saurashtra-Kutch District, and has 10 general lighthouses, 58 local Lighthouses, 2 light vessels, 7 light buoys, 68 buoys, 35 beacons and 229 other marks.

(iii) *Madras District*

This district covers a coastline of 1720 miles, along the ex-States of Travancore-Cochin, Madras and Andhra, and has 10 'general' lighthouses and 3 other lights directly administered by Central Lighthouse Department, 27 'local' lighthouses, 5 light buoys, 76 buoys, 82 beacons and 362 other marks.

(iv) *Calcutta District*

This district covers a coastline of 1330 miles, along the States of Orissa, West Bengal and Andamans and Nicobar Islands, and has 2 'general' lighthouses, 13 'local' lighthouses, 5 light vessels, 28 light buoys, 109 buoys, 20 beacons and 258 other marks.

9. The organisation chart of each of the 4 districts is given in Appendix II (A to D).

C. Workshops

10. There are two workshops, one at Madras and other at Bombay for the manufacture, repair and maintenance of various kinds of lighthouse equipment and spare parts. The workshop at Bombay was set up recently to relieve the pressure on the workshop at Madras and now caters to the needs of the lighthouses on the west coast of India. A small workshop has also been set up at Jamnagar to cater to the day-to-day requirements of the Saurashtra-Kutch District. The work done in the workshops at Madras and Bombay is given in Appendix III. The Committee suggest that there should be one workshop in each of the four districts so as to make each district self-sufficient in regard to the manufacture and maintenance of equipment.

11. It is understood that it has been tentatively decided to set up a Lighthouse Workshop and a Buoy-yard in Calcutta. The Committee consider this, a step in the right direction. Besides catering to the requirements of the reorganised Calcutta Lighthouse District, the proposed workshop would, in course of time, provide necessary assistance to the Calcutta Port Commissioners and the maritime State Governments of West Bengal, Orissa and Andhra in the manufacture and supply of spares for gas and petroleum vapour lights, which are at present imported, in addition to what they may require for the maintenance of the lights under their respective administrative charges. In the course of the next few years under the Second and the Third Five Year Plans, new and important lighthouses would be established in the Andaman and Nicobar Islands, the needs of which would also be catered for by the Calcutta Lighthouse Workshop. The Madras Workshop when relieved of the part of the work would be utilised to concentrate further on the manufacture of spares relating to the petroleum vapour and gas. The Calcutta Workshop would be a suitable place for manufacturing small optical equipment and associated parts and machinery for which help from the National Instruments Factory and the Glass and ceramic Laboratories of the Government of India—both at Calcutta would also be available. These two organisations would be able to assist in the manufacture of certain quantities of precision parts required at least in pre-finished stages so that specialised workshop capacity in the Lighthouse Workshop at Calcutta might be cut down to the minimum. The Committee suggest that the setting up of a Lighthouse Workshop at Calcutta should be expedited. They also suggest that early steps should be taken to expand the workshop at Jamnagar so as to bring it to the same standard as those at Madras and Bombay.

D. Regional Offices

12. Many of the Lighthouses, particularly those located in the former Princely States are not upto the necessary standard and require immediate improvement. The progress in this respect has been extremely slow. The Committee were surprised to learn that even a complete and authentic data about all the aids to navigation—

their exact location, the standard of equipment etc.—is not yet available with the Lighthouse Department. The Committee were informed that a programme of development, which includes the renovation of the existing lighthouses and modernisation of the various other aids to navigation has been drawn up and approved by the Planning Commission. For the purpose of the supervision of the works, the entire coastline of India is divided into four Regions with headquarters at Bombay, Jamnagar, Madras and Calcutta. Each Region is under the charge of a Resident Engineer who is assisted by an Assistant Engineer. The work of the Resident Engineers is co-ordinated at head-quarters. The Regional Offices were set up in 1954 with the minimum staff.

E. Administration of the Districts

13. As stated earlier, there are four lighthouse districts covering the coastline of India. When the lighthouses were centralised in 1929, only part-time officers functioned as Superintendents of lighthouses in the Districts. This position continued till 1953, when it was realised that it would not be possible any more to cope up with the expanded activities of the lighthouse Department in the Districts by part-time officers. Independent offices of the Superintendent of Lighthouses were, therefore, created in Madras in 1953, and in Calcutta in 1955. In Madras the Engineer, Lighthouse Department is holding charge of the office of the Superintendent of Lighthouses while in Calcutta, the Principal Officer, Mercantile Marine Department looks after the work. The Saurashtra-Kutch District is headed by a Deputy Superintendent and in Bombay the Collector of Customs is the *ex-officio* Superintendent of Lighthouses. Thus there is lack of uniformity in the actual administration, two districts, being manned by part-time Superintendents, one under the charge of a full time Superintendent and still another under a Deputy Superintendent. The representative of the Ministry informed the Committee that this lack of uniformity did affect the efficiency to some extent. The Committee were informed that steps to rationalise the pattern of administration were under consideration. The Committee suggest that early steps should be taken to see that each of the districts is manned by a full-time Superintendent.

14. The Committee note that though the post of the Superintendent for Calcutta had been sanctioned in 1955, the post has not been filled up as yet. The main difficulty in this connection is stated to be that the Union Public Service Commission has not been able to recruit suitable officers for the post of Superintendents. The qualifications prescribed for the post of Superintendent are:—

- (i) Academic Qualification: A Degree in Civil Engineering from a recognised University.
- (ii) Training and Experience: Considerable practical experience preferably in Maritime Engineering, Docks,

Harbour and other structural works with submerged foundations in a responsible position. Preferably working experience in Mechanical and Electrical Engineering including Lighthouse Engineering.

In view of the difficulty experienced in recruiting men with practical experience the condition that one should have put in 10 years experience has been relaxed and reduced to five years. The Committee suggest that the feasibility of recruiting candidates with suitable educational qualifications, and then giving intensive training in India and abroad might be examined to over-come the shortage.

F. The present Lighthouse Districts

15. The jurisdiction of the lighthouse districts has already been given earlier. The Districts were created in 1927. The Superintendent of Lighthouses, Calcutta looks after only two lighthouses though he has to look after a coastline of 1330 miles. Although the Superintendent of Lighthouses is directly responsible for the maintenance of only two 'general' lights at present, he is required to make periodical inspections of other lightstations in the District as well. Prior to 1955, the lighthouse at Table Island, which lies on the Coco Group of islands, was also under the charge of the Superintendent of Lighthouses, Calcutta. The administration and maintenance of this island lighthouse involved a lot of work. The Superintendent of Lighthouses, Calcutta is also entrusted with the work of completing all pension cases of the staff of the former Rangoon District 'general' lighthouses, which were transferred to the Burma Government in 1950. This itself has been a heavy item of work as most of the old relevant records were destroyed by the Japanese during their occupation of Burma in the last war. All the same, the Committee feel that seven years is too long a period to keep the pension cases of retired employees pending. They recommend that such residual cases should be closed without causing undue hardship to the parties concerned, by taking *ad hoc* 'decisions', if necessary.

16. The lighthouses and other aids to navigation included in the Saurashtra-Kutch District remained in charge of the Saurashtra Government upto 1952 on an agency basis. They were, however, taken over by the Centre in December, 1952. An officer of the State cadre was appointed and the District was organised under a Deputy Superintendent. The then scale of pay was also not comparable with the Central Government scale. An Assistant Executive Engineer, an Assistant Engineer and Mechanics were appointed and at the beginning Mechanics from Madras were deputed to rehabilitate the lighthouses in the district.

17. The Committee understand that a number of lighthouses in this district are in a bad state and some of them are not even showing the characteristics that are advertised. The Committee suggest that vigorous steps should be taken to rectify these defects. The Com-

mittee were glad to learn that one new lighthouse of a very high candle-power has been completed in Okha and several lighthouses in the Gulf of Cambay have also been improved.

18. The Committee were given to understand that it is proposed to head the Saurashtra and Kutch Lighthouse District by a Superintendent instead of by a Deputy Superintendent. The Committee suggest that this step should be taken without any further delay.

19. The Committee understand that the existing lighthouses in the Andaman and Nicobar Islands are being administered by the Chief Commissioner, on behalf of the Centre. But all the repair and maintenance work is carried out from India as the Chief Commissioner has no organisation to deal with these things. The new lighthouses proposed to be constructed in the area would be the responsibility of the Central Lighthouse Department. The details of the new lighthouses which are proposed to be constructed in Andaman and Nicobar Islands during the Second Plan period are given in Appendix IV.

20. In view of the fact that the Chief Commissioner of Andaman and Nicobar Islands has no organisation to deal with the repair and maintenance work, the Committee suggest that the feasibility of taking over all the Lighthouses in this area by the Superintendent, Lighthouses, Calcutta, should be examined. If necessary, a technical officer of the rank of an Assistant Superintendent might be posted in the Andamans for proper on the spot supervision and control.

G. Control of Lighthouses in Ex-States

21. After the World War II was over it was considered necessary to take stock of the existing conditions in respect of the Lighthouse Service in India and the general review revealed that some of the local Lighthouses were not being maintained to the same standard as 'general' Lighthouses. The local authorities did not have any qualified or experienced staff to advise them on matters relating to defective lights, improvements to the existing lights, installation of new lights, specification of characteristics, ranges, etc. It was accordingly decided that the Central Government should be responsible for ensuring efficient maintenance and administration of all aids to navigation. In pursuance of this decision a start has already been made in effecting the transfer of control of local lighthouses in ex-Part 'A' States by declaring the more important lights among them, which are of benefit to general navigation as 'general'—for instance, Deogarh, Tolleshwar, Ghogha and Bhatakhal (ex-Bombay State) Kilton Island (Madras State) and Puri (Orissa State), which are now administered directly by the Central Lighthouse Department. All lighthouses in ex-Part 'B' States have already been taken over by the Central Lighthouse Department under the Federal Financial Integration Agreement and the Lighthouses of the ex-Parts 'C' and 'D' States are also administered by the Centre. As a further step, all aids to navigation are

being brought under a central register. The slow progress in taking over the local lighthouses by the Lighthouse Department has been attributed to:—

- (i) examination of the question of financial commitments involved in the proposal; and
- (ii) review of the staff position, *i.e.*
 - (a) personnel at present available on the lighthouses *vis-a-vis* the staff necessary to man them after centralisation, and
 - (b) additional staff required in the District Offices and at Headquarters for the administration and maintenance of the local lights proposed to be taken over by the Lighthouse Department. It has not so far been possible for Union Public Service Commission to recruit suitable officers for the posts of Superintendent of Lighthouses to replace the existing part time officers who hold the posts in an *ex-officio* capacity.

22. The Committee understand that upto October, 1956, 3 lighthouses, about 18 buoys and 229 other aids to navigation had been taken over by the Central Lighthouse Department and nearly 140 Lighthouses and 1,237 other aids to navigations are still to be taken over by the Centre. It is expected that in two years' time the process of transfer would be completed.

23. The representative of the Ministry during the course of his evidence before the Committee explained, that the general financial examination of transfer of lighthouses in the ex-part 'A' States to Centre was started during the First Five Year Plan period and the preliminary work had been finished recently. He further added that a matter of primary importance was the preparation of a Central Register showing all the Lighthouses. The work was started in 1952 and the register had been prepared and completed. The work in this connection could not be completed earlier due to lack of complete details, though the concerned State Governments and local authorities were able to furnish some details. Moreover, as the lighthouses were administered by various authorities from time to time the records were not readily available. He also added that it was likely that the list of lighthouses prepared might have certain gaps still due to lack of information regarding some lighthouses.

24. While the Committee appreciate the difficulties in getting full information in respect of all the lighthouses on the coast-line of India, they feel that the work of enumeration and the furnishing of details could have been completed earlier. The Committee hope that every effort will be made to get information in respect of all the lighthouses and other aids so that there is no gap left. In this connection the Committee also suggest that a brochure may be published by the lighthouse Department giving up-to-date information in respect of all

Lighthouses and other aids and this brochure should be made available for sale to the interested parties, such as shipping companies, owners of sailing vessels etc. This brochure should be periodically brought up-to-date. In this connection the Committee appreciate the efforts made in preparing a documentary film on Lighthouses by the Films Division of Government of India which was released on the 27th January, 1956.

25. As the subject of lighthouses is a Union responsibility in terms of the Constitution, the Committee are of the opinion that more expeditious action is necessary by the Central Lighthouse Department to take over the remaining lighthouses, etc.

H. Inspection of Lighthouses

26. The Superintendent or his Deputy inspect the various lighthouses under their charge as often as necessary but not less than once in a year. The Engineer-in-Chief and the other officers at headquarters viz. Inspectors and Engineers, Lighthouse Department, Electrical Engineer, Professional Assistant to the Engineer-in-Chief and other Engineers pay visits to the Lighthouses from time to time as required, depending on the needs of the situation and guidance required.

27. The Committee were given to understand that the question of inspection is again a matter of past relic, and that when the Districts were held by administrative Officers, inspection from the headquarters had to be arranged. The Committee were further informed that now the Superintendents themselves are the technical officers and, therefore, inspection will not be necessary as a matter of routine. Specialist officers at headquarters, however, will continue to inspect plans etc. as and when required.

28. The Committee suggest that as soon as all the Lighthouses etc. are taken over by the Centre, a proper schedule of inspections should be laid down at various levels and rigidly followed.

II. FIVE YEAR PLANS

A. First Five Year Plan

29. The development works undertaken during the First Five Year Plan were estimated to cost Rs. 200 lakhs out of which Rs. 44.11 lakhs were spent. The department was not able to achieve the desired targets of the development programme during the plan period partly due to non-availability of suitable technical personnel for carrying out several works of a specialised nature and partly due to delay in the procurement of the requisite equipment and machinery from abroad which hampered the progress of projects. This has been dealt with in detail in subsequent paragraphs.

B. Reasons for shortfall in the First Five Year Plan

(a) *Non-availability of technical personnel*

30. Several senior posts in the Department still continue to remain unfilled as the UPSC have not been able to recommend suitable candidates inspite of their repeated efforts. There has also been appreciable difficulty in getting the right type of men in the subordinate categories of the technical staff and quite a number of persons who were selected resigned soon after joining the Department with a view to improving their prospects elsewhere.

31. Though it is generally accepted that there is an overall paucity of technical personnel in the country due to the increased demands caused by the tempo of the various development schemes, the Lighthouse Department is experiencing certain special handicaps in recruiting suitable personnel, which may be broadly attributed to the following factors:

- (i) The standards of personnel required for the implementation of various lighthouse projects have necessarily to be above the average type;
- (ii) Service conditions in this Department are exacting and sometimes hazardous. The technical work calls for alertness of the mind and study of latest developments on intricate subjects;
- (iii) Persons of the requisite calibre do not find compatible financial benefits as the prescribed scales of pay are inadequate.

32. With a view to attracting suitable candidates, both for the senior posts and the technical subordinates, higher initial pay up to the maximum of scales is being offered to suitable and qualified persons. The U.P.S.C. have also recommended revision of the scales of pay attached to certain senior posts. To meet emergencies, the ser-

vices of superannuated officers are also being utilized, and there are at present three such officers employed in this Department, one as Engineer Lighthouse Department and two as Resident Engineers. Advantage has also been taken of the United Nations Technical Assistance Administration (U.N.T.A.A.), which has so far provided two experts from its funds. These experts would install at the sites the specialised equipments such as optics, radio beacons, fog signals, etc. which have been and are being imported from abroad. A special engineer, who is an expert in sub-marine construction works, has been recruited from Sweden for the construction of a lighthouse on the Lushington Shoals. Indian Officers and/or technicians are attached with the foreign experts for training, and this would ensure a fairly reasonable cadre of trained officers in the Department in due course.

33. As regards the implementation of the projects included in the Second Five Year Plan, the Committee were informed that the question of personnel is being examined, and that necessary steps are being taken to secure the requisite personnel. The Committee consider it rather unfortunate that even though more than six months of the Second Plan have passed, the Department has not yet formulated a clear cut scheme for securing the technical personnel required during the Second Plan. The Committee suggest that such a scheme should be formulated without any further delay.

(b) Difficulties in procurement of lighthouse equipment

34. In accordance with the general policy of the Government all stores costing more than Rs. 2,000 are required to be procured through the Central Purchase Organisation, viz., Director General of Supplies and Disposals in India, Director General, India Stores Department, London and Indian Supply Mission, Washington. The Department has, therefore, been placing indents with these organisations for the improvement and development of lighthouses, as envisaged in the Five Year Plans. As, however, the progress of the various schemes undertaken by this Department was being hampered due to the non-availability in time of the stores indented through the D.G.S. & D., the Central Advisory Committee for lighthouses, at its meeting held in October, 1955, urged the need for quicker action in respect of procurement of equipment required by this Department and also desired that the Government should relax the rigidity of the rules for purchase in respect of specialised lighthouse equipment and authorise the Lighthouse Department to make direct purchases. Accordingly, the question of making direct purchases was examined, but it was felt that there were certain advantages of using the agency of Central Purchase Organisation and it was, therefore, considered desirable to give further trial to this mode of procuring stores which was being followed by various other Departments of the Government of India, State Governments etc. However, to cut down some of the delays, it has been arranged that the officers of this department should make personal contacts with the Director General of Supplies

and Disposals periodically. As a result, it is reported that delays are now being reduced as far as practicable by meetings, personal contacts, correspondence, etc. between the officers of the D.G.S. & D. and the Ministries of Transport and Works, Housing and Supply and the Lighthouse Department. The Committee suggest that in order to reduce the delays in procurement of stores, the Engineer-in-Chief, Lighthouse Department, may be authorised to make direct purchases upto Rs. 5000 instead of upto Rs. 2000 at present.

35. The Ministry has stated that another issue that arises in this context is the complicated question of inspection of the lighthouse equipment designed to their specifications. Most of the equipment is obtained from Europe, and being of specialised nature, calls for specialised inspection for which inspection staff of the Director General, India Stores Department, London, is not adequate. The Committee understand that one or two instances had occurred in the past where the equipment obtained in foreign countries, after being inspected by the I.S.D. London, had to be returned after being received in India, as it was found not to be of the requisite specifications. The Committee consider it unfortunate that such things should have occurred. They, are, however, glad to learn that it has since been decided that officers of the lighthouse Department should be deputed at suitable intervals to inspect the specialised equipment ordered from abroad. The Ministry, explained that this procedure avoided delay and consequent dislocation in the programme of work. It was much easier to rectify defects noticed as a result of inspection at the Production Centres. The General stores and non-specialised equipment would, however, continue to be procured by the Central Purchase Organisation in the usual manner.

C. Some Important Works

36. The programme for development of aids to navigation included in the First Five Year Plan is given in Appendix V. The position in respect of some of the important works undertaken is indicated below:

1. *Bhatkal*.—work completed. Equipment has already been received.
2. *Uttan*.—Equipment has already been received. Buildings are under construction.
3. *Mangrol*.—already completed.
4. *False Point*.—Equipment has already been received. Arrangements are being made to install the same.
5. *Dolphin's Nose*.—Equipment has already been received. Buildings are nearing completion.
6. *Okha*.—Buildings have been completed. Equipment has also been received and installed. The new light would start functioning as soon as electric connection is given by the local power supply authorities.

7. *Deogarh*.—An indent for the equipment has been placed with the D.G.S. & D. Construction of buildings has been entrusted to a building contractor.
8. *Perotan*.—Buildings have been completed. Equipment is lying ready with the manufacturers awaiting shipment.
9. *Tolkeshwar*.—Tenders for the Civil Engineering works are being scrutinised. Orders for equipment have been placed.
10. *Koreai Fort*.—Buildings have been completed. Equipment is lying ready with the manufacturers in France awaiting shipment.
11. *Pentakotta*.—Building is nearing completion. Equipment is lying ready with the manufacturers in France awaiting shipment.
12. *Vakalapudi*.—Civil Engineering works have been completed. The suppliers of the equipment are expected to deliver the same shortly.
13. *Kandla Buoyage Scheme*.—17 out of 38 light-buoys provided in the scheme have already been laid in position. The remaining buoys are being fabricated and also the lighting equipment therefor is being procured.
14. *Piram*.—Estimates are under preparation.

37. In addition, equipment for Puri Lighthouse has also been received and the Civil Engineering works at this station are being carried out departmentally. Orders for the supply of equipment required for the improvement of the following other light houses included in the Plan have also been placed:—

- (i) Perotan beacon
- (ii) Jaffarabad Beacon
- (iii) Khanderi Island (new radio beacon and radar)
- (iv) Bhatkal (Power Supply and fog signal)
- (v) Alleppey
- (vi) Saugor Island (Radar)
- (vii) False Point (Radio Beacon)
- (viii) Uttan Point (Power Supply Equipment).

Arrangements are being made to procure equipment for the under-mentioned lighthouses:—

- (a) Jakhau
- (b) Mandvi
- (c) Jaffarabad
- (d) Jegri
- (e) Methiveli
- (f) Tarapore

- (g) Rajapur Bay
- (h) Kiltan Island
- (i) Kilthottam
- (j) Okha (Radio Beacon)
- (k) Diu-Head (Radio Beacon)
- (l) Dolphin's Nose (Radio Beacon)

Tenders for the civil engineering works at Mandvi, Jaffarabad, Diu-Head, False Point and Rajapur Bay have been received and these works would be entrusted to building contractors shortly.

38. The statement showing achievement in the First Plan and targets laid down in the Second Plan is also given below:—

	1st Plan Achievement	2nd Plan Target
(a) Construction of lighthouse towers, buildings and jetties.	30	100 Nos.
(b) Purchase and installation of optical equipment, apparatus and machinery.	30	100 units
(c) M.F. and V.H.F. Radio Stations.	2	15 Nos.
(d) Decca Navigator Stations	..	12 Nos.
(e) Harbour radar and ship borne radar.	..	15 Nos.
(f) Sound Signal	..	50 Nos.
(g) Generation & Supply of Electric Power.	1	75 Units
(h) Lightships	..	10 Nos.
(i) Ships, tenders, life-boat, launches etc.	3	35 Nos.
(j) Buoys and other floating aids	22	150 Nos.
(k) Beaconage	5	..
(l) Construction of roads, culverts, etc.
(m) Water supply and sanitation.

D. Number of Lighthouses

39. The number of aids to navigation operating in the Indian Seas at present is 1717, comprising of 166 lighthouses, 9 light vessels, 58 light-buoys, 282 buoys, 190 beacons, 299 land marks and 713 other marks. A map of India showing the lighthouses along the coastline of the country is given at Appendix VI.

40. The number of lighthouses erected during the First Five Year Plan was 35 at a total cost of Rs. 16,66,550. A statement showing the location of these lighthouses is given as Appendix VII.

41. The Committee hope that both the physical and monetary targets laid down in the Second Five Year Plan will be achieved unlike in the First Five Year Plan by keeping a strict watch on the progress of works and initiating remedial measures at the earliest possible opportunity.

E. Lighthouse at Landfall Island

42. It is proposed to construct a lighthouse at Landfall Island during the Second Five Year Plan period. The project is estimated to cost Rs. 10 lakhs and it is likely to take 3 to 4 years from the date plans and estimates have been approved to complete the same.

43. Consequent on the transfer of Table Island to the Burma Government in 1954, it was felt that that Government might not be in a position to take the desired interest in maintaining the lighthouse at Table Island upto the required standard. Since this lighthouse was of primary importance to Indian ships trading between Calcutta and Far East (including Penang and Singapore) Calcutta and Andaman Islands and Madras and Rangoon, it was considered desirable to explore the possibility of constructing another lighthouse at a suitable site in the Indian territory, which would provide the necessary assistance to Indian Shipping. Landfall Island is considered to be a suitable site for the proposed new lighthouse and has been selected for the purpose. Before, however, detailed plans and estimates for the construction of a lighthouse at Landfall Island are finalised, it is necessary to survey the channel between the Little Coco Island and the Landfall Island to ascertain whether the channel in question is safe for navigation. The Lighthouse Tender M.S. 'Pradeep' would carry out the requisite survey early. Reconnoitering survey has already been carried out and it has been found that the high hill on the island as shown on the Admiralty Chart and on which it was proposed to construct the lighthouse does not actually exist.

F. Lighthouse at Lushington Shoals

44. It may be stated that the Lushington Shoals, which constitute a great danger to navigation in the mouth of Gulf of Kutch, have not been marked so far, except by small buoys which drift away from their positions very often and cannot, therefore, be relied upon. An expert Committee met in Bombay in November, 1949 and *inter alia* recommended that these shoals should be marked with a powerful light as soon as possible. These recommendations were considered by the Central Advisory Committee for Lighthouses at its meeting held in 1950, which strongly supported the proposal. The fact that a million tons of shipping was expected to proceed to and from Kandla within the next few years gave added importance to the marking of the shoals. The recommendations of the Committee were accepted by the Government of India and plans, specifications and designs for the building of a lighthouse were prepared on the assumption that a lighthouse could be built there.

45. The proposed lighthouse would be built on a sub-marine site, where the depth of water is 40 ft. and waves rise to a height of 50 ft. on occasions. It would be a sort of man-made island structure of cement and concrete founded on sea bed. The tower would rise 150 ft. above the sea water level and would be complete with lighting, wireless and fog signalling equipment, together with living quarters for six men and storage accommodation for oil, water and provisions. The light will be visible from a distance of 20 miles and the effective beam intensity will be 3 million candles. Arrangements would also be made for hoisting and lowering boats. According to the rough estimate drawn up, the project is estimated to cost about Rs. 50 lakhs.

46. It was considered that any structure built at the site would be subject to wave action in all its complexities and for its designs only theoretical and empirical methods could be adopted. Recourse had, therefore, to be taken to model studies to work out and verify the various loads on the lighthouse structure that would actually influence stability, the magnitude of uplift pressures and the risk of erosion of the foundations by wave and tidal action. The question of getting the model studies done in India was exhaustively considered in consultation with the Poona Hydraulic Research Station but it was found that as similar work had not been done in this country before, a good deal of time and money would have to be expended, on experimental work for further information and data to get reliable results. As, however, a similar problem had already been tackled in 1949-50 by Sweden where the necessary model studies were carried out by Prof. Hellstorm, it was considered advantageous to entrust the model studies for the Lushington Shoal lighthouse to the Swedish Expert. The Central Water and Power Commission who were consulted in the matter, concurred with the above view. Accordingly, model studies were entrusted to Prof. Hellstorm. It was initially estimated that these model studies would cost Rs. 90,000 but actually the total cost has been somewhat higher. The model studies for the construction of lighthouse at Lushington Shoals have been completed by Prof. Hellstorm and his final report is awaited. A copy of the interim report has, however, been received from him.

47. A special Engineer, who would be incharge of the actual construction of the lighthouse tower at Lushington Shoals, has also been recruited from Sweden, as, like Prof. Hellstorm, he too was associated with the project of construction of a similar lighthouse in Swedish waters. The Special Engineer, who has been engaged for a period of two years in the first instance, has already carried out necessary preliminary investigations at site. It is expected to take about 3 years from the date the plans and estimates are finally approved to build the lighthouse at Lushington Shoals.

III. FINANCIAL POSITION

A. Current rates of levy of light dues in India.

48. The current rates at which light dues are levied in India are indicated below:—

Sailing Ships	o 1 o	per ton.
Other Ships	o 4 o	per ton.

Only a single levy is made in 30 days regardless of the number of visits to the ports.

The revenues derived from the levy of light dues in India during each of the years 1950-51 to 1955-56 are given below:—

Year	Sailing Ships	Other Ships
	Rs.	Rs.
1950-51	12,997	10,37,517
1951-52	15,956	13,08,457
1952-53	16,875	13,70,986
1953-54	20,103	23,10,759
1954-55	36,018	27,14,951
1955-56	36,794	34,80,828

49. The rates of light dues charged by the Governments of Great Britain, U.S.A., Canada, Australia and Pakistan are given below, as a matter of interest.

(1) Great Britain	Rate equivalent in Indian currency	Rs. As. Ps.			
		Rs.	As.	Ps.	
(a) Home trade sailing ships	4·6d. per ton per voyage	o	4	1	approximately per ton per voyage.
(b) Foreign going sailing ships.	10·35d. per ton per voyage.	o	9	2	Do.
(c) Home trade steamers	6·9d. per ton per voyage.	o	6	2	Do.
(d) Foreign going steamers	12·65d. per ton per voyage.	o	11	3	Do.
(e) Visiting pleasure Yachts	4·6d. per ton in respect of any visit of 30 days or less.	o	4	1	approximately per ton.
(f) Home and Irish Republican Tugs & Pleasure Yachts.	4·6 sh. per ton annually.	3	1	1	per ton annually.

(ii) U. S. A.

Rate equivalent in
Indian currency
Rs. As. Ps.

- (a) For ships coming from Canada, Mexico the Caribbean & North Coast of South America. 2 cents per net ton 0 1 6½ approximately per ton
- (b) For ships coming from countries & places other than those mentioned at (a) above. 6 cents per net ton 0 4 7 approximately per ton.

(iii) Canada

Nil

The expenditure on Lighthouse service is financed as normal part of transport departmental appropriation through Federal taxes.

(iv) Australia

6d. per ton on net tonnage of ship. 0 4 3 per net ton every three months.

(v) Pakistan

- (a) On ships arriving and departing. 1 anna per ton 0 1 0 per ton.
- (b) Sailing Ships 6 pies per ton 0 0 6 per ton.

B. Receipts and Expenditure.

50. A comparative statement of the receipts and expenditure of the Lighthouse Deptt. in each of the years 1950-51 to 1955-56 is given below:—

Year	Receipts	Expenditure (Revenue)	Surplus(+) Deficit(—)
1950-51	11,33,000	8,18,580	+ 3,14,420
1951-52	17,68,000	6,65,998	+ 11,02,002
1952-53	16,09,000	7,20,841	+ 8,88,159
1953-54	22,57,000	10,92,725	+ 11,64,275
1954-55	27,78,000	9,89,549	+ 17,88,451
1955-56	36,60,000	14,88,100	+ 21,71,900

51. The Lighthouse Department is run on commercial basis. Its revenues are derived from the levy of light dues. Customs, Central Excise Departments etc. are paid the charges for doing lighthouse work as the administration of lighthouses and lightships is intended to be self-supporting.

52. The surpluses of the Department are put in the General Reserve Fund of the Department from which the capital works of the Department are financed. The amount to the credit of the

General Reserve Fund on the 31st March, 1956 was Rs. 95.47 lakhs and a further sum of Rs. 75:00 lakhs is estimated to be added to this fund during the Second Plan period.

53. Originally funds to the tune of Rs. 80 lakhs were expected to be available from the Reserve Fund for the Second Plan, leaving a minimum balance of Rs. 30 lakhs to be retained in the Reserve Fund. On account of a shortfall of expenditure in the First Plan, the funds actually available for the Second Plan would now be Rs. 140 lakhs (*i.e.* Rs. 95 lakhs plus Rs. 75 lakhs minus Rs. 30 lakhs).

54. The Committee hope that the planned expenditure of Rs. 400 lakhs will materialise and bring about the improvements urgently needed and that there will be no shortfall in expenditure during the Second Plan.

IV. STAFF MATTERS

A. Recruitment of Staff

55. The recruitment of the staff for lighthouses is made on a regional basis through the Regional Employment Exchanges. The selected candidates for the posts of lightkeepers are, however, imparted essential technical training in the Lighthouse Workshops before they are posted at light-stations. As the recruitment is made by the respective Superintendents of Lighthouses of the area concerned, and requisitions for candidates are placed on the Employment Exchange of the District concerned, it is not possible to confine the recruitment only to the area near to the location of the lighthouses. Moreover, recruitment of a person from within such a confined area would serve no useful purpose, as the lighthouse staff are liable to be transferred from one station to another in the same Lighthouse District, and if need be to a Lighthouse in a different District.

B. Promotion

56. The qualification prescribed for the posts of lightkeepers and head lightkeepers in the Lighthouse Department is only Matriculation, with no technical knowledge. After recruitment, the candidates are given training in the Lighthouse Workshops to enable them to hold the posts of lightkeepers. The lightkeepers are eligible for promotion to the post of head lightkeepers on seniority-cum-fitness basis, and on an average two lightkeepers are promoted as head lightkeepers in a year.

57. It was reported by the Ministry that as senior posts in the Department require qualifications which are not ordinarily possessed by lightkeepers and head lightkeepers, the question of these categories of personnel being eligible for promotion to such senior posts does not arise. The lot of the lightkeepers and the head lightkeepers is a hard one, as they have often to pass their life in out-of-the-way and secluded places. They do not even have any future prospects of promotion. The Committee, therefore suggest that suitable avenues of promotion for this category of staff should be opened up. A certain percentage of the next higher technical posts in the department should be ear-marked for them. Suitable technical literature should be circulated among them and periodical refresher courses arranged. Those amongst them who show special interest and initiative should be selected for specialised intensive training (in India and/or abroad) to make them properly equipped for the higher technical posts. This method has two advantages. It will open up suitable avenues of promotion for this category of staff, and it will also assist in overcoming the shortage of technical staff in the Department.

C. Leave Reserve

58. Normally, a major lighthouse is manned by three lightkeepers who, apart from their normal duty of keeping watch throughout the night, are required to attend to various clerical and other routine duties, such as cleaning of optical instruments, lanterns etc., for nearly four hours during the day time. Whenever a lightkeeper is allowed short casual leave, his work is distributed between the remaining two lightkeepers, but this arrangement is not possible if the period of absence is long, when it becomes necessary to post a substitute to the station. The substitute should necessarily be a trained person as the duties of a lightkeeper are technical, onerous and responsible. Most of the lighthouses are situated in out-of-the-way places or on islands, and only a person accustomed to life at remote and lonely places is suited for the lightkeeper's post. It is, therefore, necessary to keep in reserve a complement of a few lightkeepers, fully trained, in each Lighthouse District, to serve as 'leave reserve' for being posted to light-stations as and when required.

59. A leave reserve of 3 to 4% of the strength is provided to allow the lighthouse personnel to proceed on leave without impairing the efficiency of the light-stations. At present this arrangement exists only in the Madras District. The Committee recommend that the question of providing adequate leave reserve to ensure that there is no hardship in getting leave when required should be carefully examined and provision of suitable leave reserve in other districts should be made without further delay. The Committee also suggest that the lightkeepers and head lightkeepers should be encouraged to take leave periodically to relieve the monotony of the job.

60. The Committee were told by the Ministry that when the staff against leave reserve are not actually required to be posted to the light-stations, they are employed in the District Offices where the strength of the staff is kept slightly lower. They are utilised for buying stores, packing them etc. Thus, the man-power is not wasted.

The Committee suggest that the feasibility of interchanging the leave reserve staff periodically with the regular staff should be examined.

D. Medical Facilities

61. The Committee were informed that the lighthouse staff and their families enjoy the same concessions in respect of free medical aid, as is admissible to other civil employees of the Government. As, however, lighthouses are situated in remote localities and prompt medical aid is not possible, medical chests containing essential medicines and first aid materials are generally provided at the station for use in an emergency. Elementary medical books are also provided at the stations for guidance. In case of serious illness, however, the patient is rushed to the nearest hospital, and if necessary and feasible, outside medical aid is also brought to the light-station. The Committee suggest that the feasibility of introducing a brief training in first aid and general rules of health during the refresher courses for the lightkeepers might be examined.

E. Educational Facilities

62. Class III and Class IV Lighthouse personnel are entitled to an education allowance of Rs. 15 p.m. and Rs. 10 p.m. respectively for each school going child below the age of 18 years, subject to a maximum of three children, provided that no suitable school is available within a distance of 3 miles of the light-station and the child has to be sent away for education. The Committee suggest that the question of giving suitable scholarships to children of low-paid employees of the department and arranging hostel accommodation for them should be sympathetically considered.

F. Training in India and abroad

63. The Committee were informed that while the question of sending engineer officers of the Department abroad for training purposes was under active consideration, it had not so far been possible to do so on account of the shortage of technical officers in the Department. One senior lighthouse mechanic from the Madras Lighthouse Workshop was, however, sent to the U.S.A. in 1954 for a year's training under the auspices of the Technical Co-operation Mission. The question of deputing more officers for training abroad was being reviewed from time to time and the Engineer-in-Chief, Lighthouse Department during his deputation to Europe in 1954 explored the possibility of training the Indian Engineers in the United Kingdom, France and Italy. The shortage of trained technical personnel is standing in the way of sending suitable employees for further technical training abroad and absence of such specialised training is aggravating the shortage of available trained personnel. The vicious circle has got to be broken, and the sooner it is done the better. The Committee also suggest that the feasibility of utilising the services of the senior lighthouse mechanic who was sent to the U.S.A. in 1954 for imparting an intensive course of advanced technical training to other mechanics in the department should be examined carefully.

64. In this connection, the Committee were glad to learn that the lighthouse department has recently secured the services of two installation engineers under the auspices of the United Nations Technical Assistance Board and the services of one Swedish Civil Engineer have been obtained on contract for the construction of a lighthouse on a sub-marine site at Lushington Shoal in the Gulf of Kutch. These three foreign experts would, besides assisting the Department in execution of the development plan, train Indian personnel in the installation and maintenance of specialised lighthouse equipment, and also in the special work relating to the construction of lighthouses on sub-marine sites. An English officer has also been recruited for commanding M.S. 'Pradeep' on a contract basis for 2 years from 25th April, 1955. The Committee were informed by the Ministry that the training that the officers of the Lighthouse Department receive in India is the best they can get anywhere in the world except in cases of specialised training in certain branches.

65. This training and refresher course, the Committee note, is in respect of maintenance aspect. In respect of development work, construction work and specialised work of maintenance nothing substantial has been done and the reason advanced by the Department for this was the comparatively smaller number of people required for the purpose.

66. A number of technical officers will be required for the Lighthouse Department during and at the close of the Second Five Year Plan and there is no provision either in the Universities or in Technical Institutes etc. to train youngmen for the specialised requirements of the Lighthouse Department. A well integrated scheme of training in India and abroad to overcome the shortage of trained personnel appears to be urgently necessary. During the First Plan, a number of posts in the Lighthouse Department remained vacant for want of suitably trained staff. The Committee, regard this an unsatisfactory feature and hope that it would not persist during the Second Five Year Plan period.

V. RESEARCH AND DEVELOPMENT

67. Much of research and development on optics, electrification of lighthouses, radio, electronics and other branches of science connected with lighthouse engineering are being carried out by the Lighthouse Department. There is a certain amount of handicap due to restricted facilities which, the Committee were informed, are being expanded. The Department is now self-sufficient in respect of spares for the various petroleum burners and acetylene gas flashing apparatus that the Department employs and which used to be imported from abroad. Acetylene flashers used in this country are all of British or Swedish manufacture, but the Department has now developed an acetylene flasher which shows great promise and has undergone and passed successfully several trials. The cost of the flashers manufactured by the Department as against the imported ones is given below:—

	Lighthouse Department's manufacture (Rs.)	Imported to India (Rs.)
K 130 single flashing	500	1400
K 130 Double flashing	600	1750

The Committee recommend that henceforth, only the indigenously manufactured flashers should be utilised by the Lighthouse Department, and their imports from abroad completely stopped.

68. So far as the burner equipment is concerned it is stated that the Department has now been able to manufacture a very large number of spares and is almost independent of foreign imports. The Department has also, after a lot of research, developed a new kind of electric flasher and has also developed a new kind of electric light source of 5 KW capacity which, after long experimentation, has proved successful and is now being utilised for service. With this development it would be possible to utilise the existing old optics which otherwise would have had to be scrapped and it is estimated that during the Second Five Year Plan a saving of about Rs. 30–50 lakhs in capital expenditure would be made. The new type of flasher used in conjunction with 5 KW electric source developed on optical apparatus as old as 70 years can be utilised to produce out of it an equipment from which a beam candle power of 5 to 10 times the existing candle power can be reasonably assured. The standards for visibility of light sources under the various conditions in India where visibility of the same light source is at one time 15 miles and at another not even half a mile, are very important problems, on a satisfactory solution of which depends the economic investment of capital on such optical machinery for lighthouses. No data is available on emissivity

of sound signals and their reception. Research work in this direction by the Department is also now in progress in consultation with an eminent scientist, Dr. Wright of the United Kingdom.

69. A statement showing the comparative cost of equipment manufactured at the lighthouse workshops and their imported cost is given at Appendix VIII.

70. For conducting research in Lighthouse Engineering, where the problems encountered are of a highly specialised nature and are not generally confined to any single field of technology, an intensive and thorough background in various aspects of fundamental sciences and engineering (Civil, mechanical, electrical, wireless, radar, nautical and marine) is an essential pre-requisite. It is also an accepted fact that solutions to most of these problems cannot be based solely on the basis of experiments conducted in a laboratory, where it would not be easy to simulate the various modes of ambient conditions prevailing around lighthouses in the ocean. The Central Hydrological Research Station (at Khadakvasla) which were approached by the Department some time back for conducting model studies in connection with the construction of a lighthouse on a sub-marine shoal site, expressed their inability to undertake that work, and after prolonged discussions it was decided to entrust the studies to Prof. Hellstrom at Stockholm with the concurrence of the Ministry of Irrigation and Power. Efforts are, however, being continued to obtain the assistance of scientific and other institutions whenever feasible. Recently, a special grade of leather employed in the diaphragms of Acetylene light Flashers has been successfully developed for the first time in India in co-operation with the Leather Technological Institute (Madras). For these materials this department is no longer dependent on the import of diaphragms from abroad. Attempts are being made to manufacture beacon lanterns (for which this country is solely dependent on imports from Europe) as well as pressed lenses and drum optics in collaboration with the Central Glass and Ceramics Research Institute (Calcutta). In addition, the Department is directly engaged in solving several fundamental problems of a special nature which require close and intensive research such as the determination of Atmospheric Transmission Factor, intensity of illumination from lighthouse optics, etc.

71. The Committee are glad to note the progress made in the field of research by the lighthouse department. They suggest that recognition in the form of rewards, certificates of merit etc. should be given to those workers who make practical contribution in this field. At the same time the Committee also suggest that the research work in this field should be intensified further with the object of making the lighthouse department independent of imported equipment. The Committee also suggest that the feasibility of establishing a proper laboratory with up-to-date research equipment and a nucleus full time staff to study specialised problems encountered by the Department should be carefully examined.

VI. MISCELLANEOUS

A. International meeting held in June, 1955 regarding matters of Aids to Navigations

72. The International Conference of Lighthouses and other aids to navigation is generally held once every five years to exchange views amongst the several Lighthouse Authorities regarding the latest techniques of development and progress on lighthouses and other navigational aids. As the Conference has no statutory powers to enforce its recommendations on the member countries, it is not customary to pass any formal resolutions at such meetings but to arrive at recommendatory conclusions and it is an accepted convention that recommendations made at these Conferences are to be implemented by all the member-countries.

73. At the International Conference held in June, 1955 at Hague, a large number of questions were discussed on the basis of papers presented by various countries including India. Broadly these were:—

- (a) Intensity of International lights.
- (b) Visibility and International Code.
- (c) Floating equipment construction—Lightvessels, tenders, working ships, buoys.
- (d) Gas, power supplies and transmission.
- (e) Light and Light-sources and optical apparatus.
- (f) Principles of lighting and reflecting material.
- (g) Co-ordination of maritime signalling characteristics of neighbouring countries.
- (h) Co-ordination between maritime light characteristics and aerial light characteristics located near the sea.
- (i) Secondary aids to radar navigation in centimetric waves.
- (j) Radio beacons.
- (k) Radio aids.
- (l) Radar, Consol, Loran, Decca.
- (m) Radio range beacons, Radio Telephones.
- (n) Automatic and remote control of navigational aids.
- (o) Diaphones, sirens, oscillators.
- (p) General measurement of sound propagation etc.

74. The Committee are glad to learn that the proposal to adopt the new electric flasher invented in India and the new electric source developed by Indian Lighthouse Department was accepted by this

Conference. The Committee were given to understand that the British firm which developed the source according to the Indian design had received many orders from other countries. The Committee suggest that the feasibility of the new electric flasher being manufactured by an Indian firm should be explored.

75. India was also represented on the special sub-Committee which went into the question of determining the apparent intensity of illumination from lighthouses and her representative's proposals for defining the standards of measurement of light intensity were accepted and incorporated in the recommendations adopted by the General Conference.

76. The Conference also agreed on the necessity of consultations within the country and between neighbouring countries regarding co-ordination of maritime light characteristics and aeronautical light characteristics and decided to circulate the resolution to all the countries for further consideration and co-ordination.

B. Problem of fishing stakes in Bombay Harbour

77. In 1950-51 it was observed that fishing operations were carried out by fishermen by placing fishing stakes at sea between 7 to 10 fathoms line between Kennery Island and Boria Pagoda in Bombay Harbour. These stakes were placed in an irregular manner which made it difficult for coastal shipping to navigate with safety in the locality at night time. The fishing stakes remained unlighted at night and ships would frequently collide with them. Such collisions are very dangerous to shipping and may also result in considerable loss to the fishermen due to the destruction of their stakes, nets, poles, etc. Fishermen would sometimes leave in the sea some of the broken stakes, which are not visible above the surface of water, thus endangering the coastal craft plying in the area. The hull and other machinery of these vessels would be seriously damaged when they struck against the broken stakes and sometimes the accidents would result in the total loss of the vessels.

78. In order to facilitate navigation in the Bombay Harbour, as a first step, arrangements were made to sweep the channel and ensure that the fishermen did not place any more fishing stakes there. Proposals were also drawn up for the construction of a new lighthouse at Korlai Fort and to provide a channel 18 to 19 miles long and 1 mile wide, which would be kept clear of fishing stakes and marked by lighted buoys. As regards the new lighthouse, its tower has already been built. The lighting equipment, which is being imported from Europe would be delivered shortly and it is hoped to exhibit the new light early. So far as the provision of a channel is concerned, necessary estimates for the work are already under consideration of the Ministry.

C. Unattended beacons etc..

79. The unattended beacons, lighthouses etc. are located at such positions where it is not feasible to provide residential accommodation for the keepers. Moreover, accessibility of the sites and living conditions are so difficult at some of the stations on account of their geographical situation, that it is not possible for anyone to stay there. Accordingly, these stations have necessarily to be left unattended. However, such beacons, etc. are provided with automatic devices—the lighting equipment is fitted with a sun-valve, which automatically switches 'on' the light at sun-set and switches it 'off' at sun-rise. These light stations are periodically visited for checking up the equipment, renewal of gas or for otherwise ensuring their satisfactory working.

BALVANTRAY G. MEHTA,

Chairman,

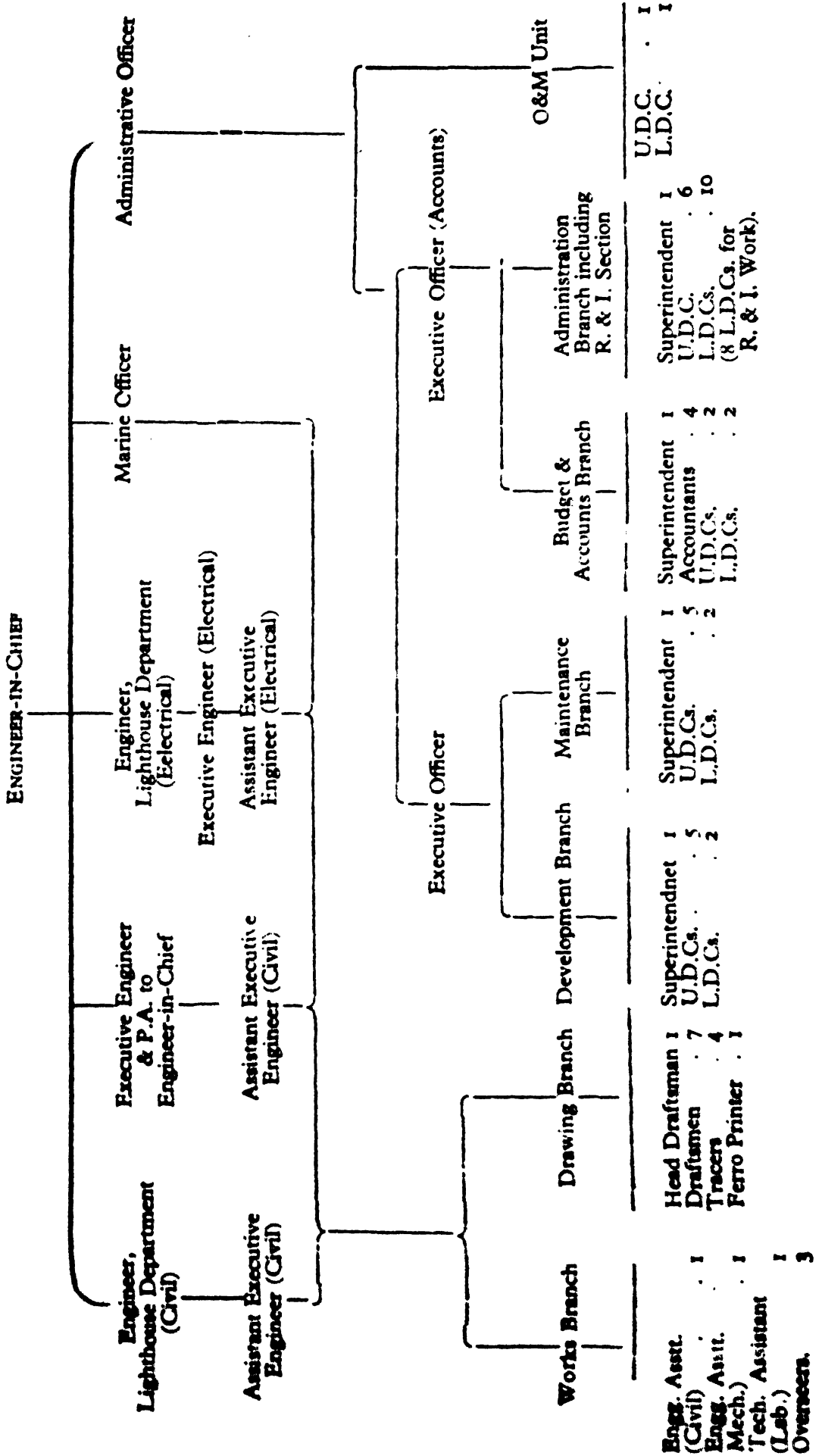
Estimates Committee.

NEW DELHI;

The 16th February, 1957..

APPENDIX I

Organisation Chart of the Office of the Engineer-in-Chief, Lighthouse Department (Ministry of Transport), as on the 31st March 1956



APPENDIX II-A

Office of the Deputy Superintendent of Lighthouses, Saurashtra and Kutch District, Jamnagar
DEPUTY SUPERINTENDENT OF LIGHTHOUSES

Regional Office	Office Establishment	Lighthouse Working Establishment	Tending Establishment of M. L. "JAMVIJA Y"	
Resident Engineer 1	Head Clerk 1		Driver 1	(1)
Assistant Engineer 1	Storekeeper-c/m-Accountant 1		Tindal 1	(2)
U. D. C. 1	U. D. C. 1		Oilmen 2	(3)
L. D. C. 2	L. D. C. 1		Khalasi 1	(4)
Overseers 1	Overseer 1			(5)
Draftsman 1	Peon 2			(6)
Peon & Khalasis 2	Watchman 1			(7)
				(8)
				(9)
Ottal Light-house (General)				
'A' Grade Light-keeper 1				
Lascars 2				
Samivani Light-house				
'B' Grade Light-keeper 1				
Lascars 2				
Dwarka Light-house (general)				
Head Light-keeper 1				
"A" Grade Light-keeper 1				
"B" Grade Light-keeper 1				
Lightman 1				
Diu Head Light-house (General)				
Head Light-keeper 1				
"A" Grade Light-keeper 1				
"B" Grade Light-keeper 1				
Lascars 2				
Sweeper 1				
Porbander Red Light				
Lascar 1				
Porbander Lighthouse				
Lascar 1				
Navibunder Lighthouse				
Lascar 1				
Veraval Lighthouse				
Khalasi 1				
Bhidia Beacon				
Lascar 1				

APPENDIX II-B

Office of the Superintendents of Lighthouses, Bombay Circle

Superintendent of Lighthouses (Part-time) 1 Deputy Superintendent of Lighthouses (Part-time) 1

Lighthouse Establishment
(1)

Piram Lighthouse	Arvala Lighthouse	Jaigad Lighthouse	Rajapur Bay Lighthouse	Vengurla Light-house	Oyster Rocks Lighthouse	Bharthal Light-house
Lightkeeper 'B' Grade 1	Lightkeepers 'B' Grade 1	Head Light-keeper 1	Lightkeeper 'B' Grade 1	Head Light keeper 1	Head Light-keeper 1	Tindal 1
Lascars 2	Lascars 2	Lightkeepers : 'A' Grade 1	Lascars 2	Lightkeepers : 'A' Grade 1	Lightkeepers 'B' Grade 2	Lascars 2
		'B' Grade 1		'B' Grade 1	Lascars 3	
		Lascars 4		Lascars 4	Sweeper 1	
		Sweeper 1		Sweeper 1		
		Waterman 1				

Motor Boat Establishment
(4)

Office Establishment	M.S. "PRADEEP" Light-house Tender Establishment (3)	Piram Motor Boat Establishment	Vengurla Motor Boat Establishment	Oyster Rocks Motor Boat Establishment
Accountant 1	Master 1	Boat Keeper 1	Master 1	Master 1
U. D. C. 1	Chief Engineer 1	Lascars 2	Driver 1	Driver 1
L. D. Ct. 2	Chief Officer 1		Quarter Master 1	Quarter Master 1
Peon 1	2nd Officer 1		Leading Seaman 1	Seamen 3
	Carpenter 1		Scaman 3	Bhandari 1
	Purser 1		Bhandari 1	Greaser 1
	Deck Sarang 1		Greaser 1	
	Deck Tindal 1			
	Sea Cunnies 3			
	Lascars 5			
	Bhandari 1			
	Topas 1			
	2nd Engineer 1			
	3rd Engineer 1			
	4th Engineer 1			
	Greasers 2			
	Cleaners 2			
	Stewards 2			
	Cabin Cook 1			

APPENDIX II-D

Offices of the Superintendents of Lighthouses, Calcutta

SUPERINTENDENT OF LIGHTHOUSES

Regional Office	False Point Lighthouse	Puri Lighthouse
Resident Engineer	1	1
Assistant Engineer	1	1
U.D.C.	1	1
L.D.C.	1	1
Draftsman	1	1
Overseers	2	3
Peon & Khalasies	2	3
	Lightkeeper	Lightkeeper
	Motor Boat Driver	Watchers
	Class IV Staff	
	Watchers	5
	Boat Majhi	1
	Boat Dandies	5
	Garden Cooli	1
	Dispensary Cooli	1
	Sweeper	1

Lighthouse Workshops, Bombay, Madras and Jannagar

SUPERINTENDENT OF WORKSHOPS

Mechanic-in-Charge Lighthouse Workshop, Bombay	Engineer Supervisor Lighthouse Workshop, Madras	Lighthouse Workshop, Jannagar
Storekeeper- am -Accountant	Head Clerk	Mechanic
1	1	10
1	Accounts Clerk	Junior Mechanic
1	Storekeeper	2
	L.D.Cs.	2
		Mechanic Tradesman
		1
		1

APPENDIX III

Work done in the Lighthouse Workshop, Bombay.

Improvements to the light and tower etc; were carried out at Chanka Island in the Saurashtra District.

A new electric flashing light was installed at Ross Island in the Andaman group of islands.

The First Stage of the Kandla Buoyage Scheme was taken up and completed, after assembling the buoys and fitting lighting equipment etc; thereon.

V.H.F./R.T. equipments were fitted at Vengurla Rocks lighthouse, Vengurla Port Light and on the launch intended to be stationed in the waters around Vengurla.

The Second Stage of the Kandla Buoyage Scheme consisting of 8 buoys was taken up and completed.

The Ranwara Shoal lighbuoy was overhauled, refitted, and laid at her station.

The Perigee Lightvessel was refitted with an overhauled lantern and apparatus, and placed back in position.

Experiments were carried out with Indian made Auto-form mantles with a view to ascertain their adaptability for our light-stations, as mantles at present are being imported.

Flashers and other lighting apparatus from the Saurashtra, Kutch and Bombay Districts repaired in the workshops. Maintenance and repairs were also carried out by the staff at various lightstations in these districts.

The work of erection of new lighting equipment at Bhatkal lighthouse (new) is in hand.

Assistance to Madras Workshop Party in installing new equipment at Mangrol Lighthouse.

Assistance to Madras Workshop party in installing new equipment at Okha lighthouse.

Electrification of Dwarka Lighthouse tower, stores, quarters, etc.

Work done in the Lighthouse Workshop, Madras

Installation of an Anchorage light at the Madras Harbour.

New Stations that are being erected:—

- (1) Pentakota.
- (2) Dolphin's Nose.

Electrification of:—

- (a) Madras Lighthouse.
- (b) Mangrol Lighthouse.
- (c) Okha Lighthouse.

The electrification of the following stations is on hand and is expected to be completed very soon.

- (a) Puri Lighthouse.
- (b) False Point Lighthouse.
- (c) Quilon Lighthouse.
- (d) Dwarka Lighthouse.

A flashing mechanism has been satisfactorily completed and it is proposed to manufacture a number of similar type flashers.

Drawings and estimates for the preparation of 140/m/m, 200/m/m & 300 m/m Aga type lanterns have been completed. The preparation of these lanterns will be taken up very soon. This will effect considerable saving in Foreign Exchange as such lanterns were being obtained from abroad so far.

Almost all the spare parts required for the chance and Ag type light installations are now manufactured, in the Madras workshop and are available for supply from stock.

Efforts are being made to minimise as far as possible the number of spares still to be imported and thus slowly create a position of self sufficiency in the department.

APPENDIX IV

New lighthouses proposed to be constructed in Andamans and Nicobar Islands

The following new lighthouses are proposed to be constructed on the coast of the Andamans and Nicobar Islands during the 2nd Five Year Plan period:—

1. *Keating Point (Car Nicobar).*—It is proposed to construct a new lighthouse with a range of 18 miles at the approximate position Lat. 9 degree 15' N., and Long. 92 degree 46' E. The Character of the light would be single flashing white every 10 seconds. It would also be necessary to build residential quarters for the staff at the new light-station. Necessary plans and estimates for the project would be prepared after surveying the area. The project is estimated to cost Rs. 10 lakhs (approximately) and it would take 4-5 years to complete it.

Ross Island.—It is proposed to construct a new lighthouse with a range of 20 miles at the approximate position Lat. 11 degree 41' N and 92 degree 47' E. The character of the light would be triple flashing (white) every 30 seconds. An estimate of Rs. 2,48,000 for the purchase and installation of optical equipment was prepared by this Department and also sanctioned by Government but further action to execute the project has been shelved for the time being on the advice of the Chief Commissioner, Andamans, who has informed that due to cracks and subsistence of soil observed at the island, it would be necessary to carry out a geological survey of the area. The feasibility of constructing a new lighthouse at this Island would be determined on receipt of a further report from the Chief Commissioner, Andamans.

3. *South Sentinel Island.*—The proposed new lighthouse would have a range of 18 miles, approximate position Lat. 10 degree 59' N. and Long. 92 degree 14' E. The character of the light would be flashing (white), every 10 seconds. It would also be necessary to build residential quarters for the staff at the lightstation. Necessary plans and estimates for the project would be prepared after surveying the area. The project is estimated to cost Rs. 10 lakhs (approx.) and it would take 4-5 years to complete it.

4. *North Cinque Island.*—The proposed new lighthouse would have a range of 12 miles (approximate position Lat. 11 degree 20' N. and Long. 92 degree 44' E). The character of the light would be flashing (white), every five seconds. It would be necessary to build residential quarters for the staff at the new lightstation. Necessary plans and estimates for the project would be prepared after surveying the area. The project is estimated to cost Rs. 10 lakhs approximately, and it would take 4-5 years to complete it.

5. *Land Fall Island.*—It is proposed to install a light with a range of 20 miles at the approximate position Lat. 13 degree 41' N., and Long. 93 degree 02' E. Residential quarters would also be built at

the new lightstation for the staff. Necessary plans and estimates for the project would be prepared after surveying the area. The project would cost Rs. 10 lakhs approximately and it would take 4-5 years to complete it.

6. *Outram Island*.—It is proposed to instal a new lighthouse with a range of 18 miles at the approximate position Lat. 12 degree 19' N. and Long. 93 degree 05' E. The character of the light would be double flashing (white), every 20 seconds. It would also be necessary to build residential quarters for the staff at the new lightstation. Necessary plans and estimates for the project would be prepared after surveying the area. The project is likely to cost Rs. 10 lakhs approximately, and it would take 4-5 years to complete it.

7. *Nancowry*.—It is proposed to construct a new lighthouse with a range of 15 miles at the approximate position Lat. 7 degree 55' 30" N. and Long. 93 degree 34' 00" E. It would also be necessary to build residential quarters for the staff at the lightstation. Necessary plans and estimates for the project would be prepared after surveying the area. The project would cost Rs. 5 lakhs approximately and it would take 4-5 years to complete it.

8. *Sir Hugh Rose Island*.—It is proposed to construct a new lighthouse in approximate position Lat. 11 degree 46' 40" N., and Long 93 degree 5' 30" E. Character of the light would be flashing white, every 10 seconds. Visibility—15 miles. It would also be necessary to build residential quarters for the staff at the new lightstation. Necessary plans and estimates for the project would be prepared after surveying the area. It is estimated that the project would cost Rs. 10 lakhs (approx.) and it would take 2-3 years to complete it.

9. *Great Nicobar Island*.—It is proposed to install a new lighthouse at Parsons Point, in approximate position Lat. 6 degree 45' 28" N., and Long. 93 degree 49' 45" E. Character Group flashing (3) every 10 seconds. Visibility—15 miles. It would be necessary to build residential quarters also at the new lightstation. Necessary plans and estimates for the project would be prepared after surveying the area. The project is estimated to cost Rs. 10 lakhs approximately and it would take 3-4 years to complete it.

10. *Little Andamans*.—It is proposed to construct a new lighthouse off Bumila creek in approximate position Lat. 10 degree 53' 30" N. and Long. 92 degree 31' 30" E. with a characteristic group flashing (3) every 15 seconds and a visibility of 10 miles. It would also be necessary to build residential quarters for the staff at the lightstation. Necessary plans and estimates for the project would be prepared after surveying the area. The project is estimated to cost Rs. 5 lakhs (approx.) and it would take 3-4 years to complete it.

APPENDIX V

Programme for development of Aids to Navigation included in the Five Year Plan

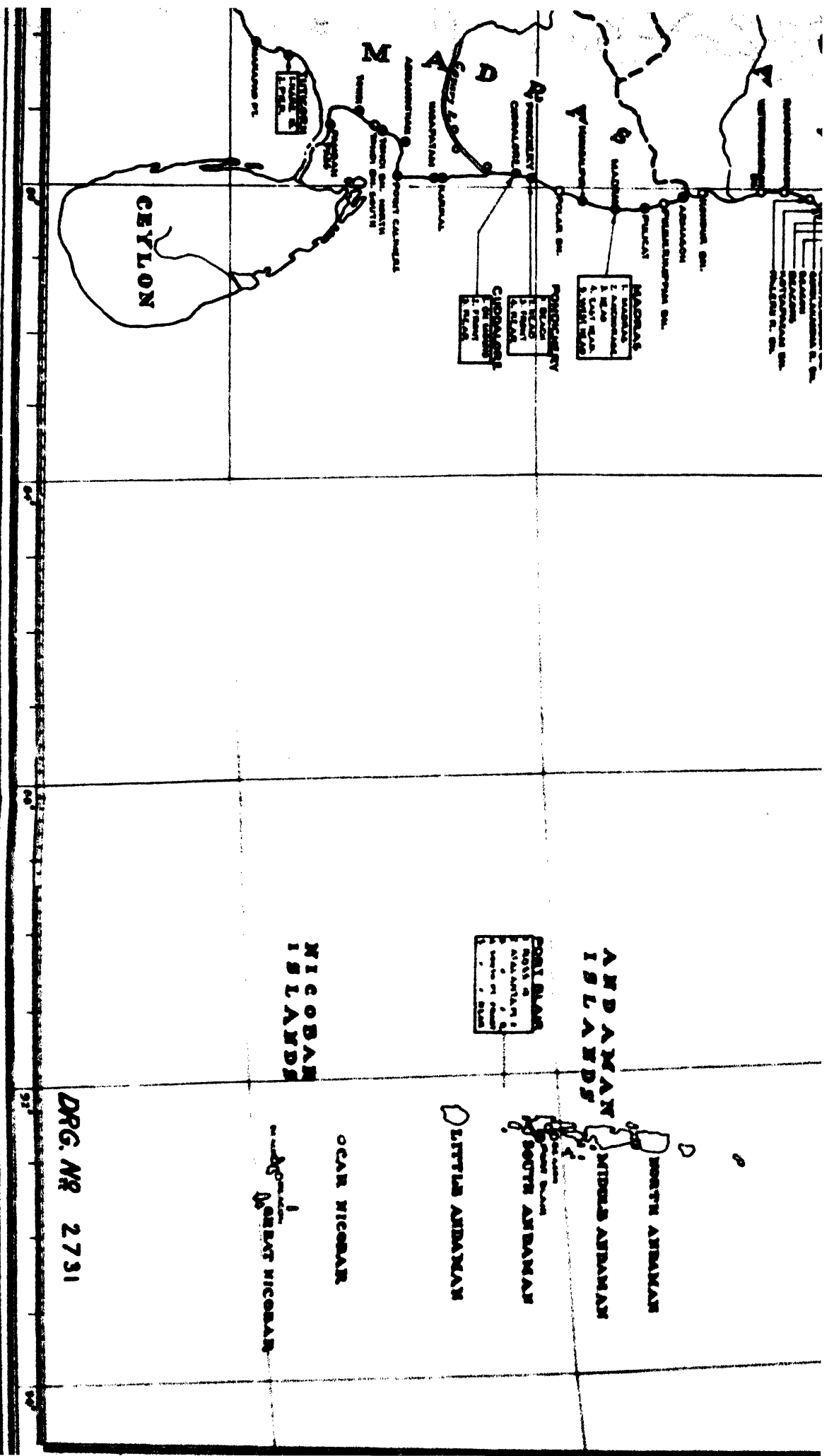
S. No.	Name of lighthouse	Total estimated cost (Rs. in lakhs)
1	2	3
1.	Bhatkal	5.50
2.	Uttan	5.00
3.	Mangrol	1.00
4.	False Point	2.30
5.	Dolphin's Nose	6.20
6.	Okha	4.50
7.	Deogarh	3.00
8.	Tolkeshwar	3.50
9.	Perotan	4.25
10.	Korlai Fort	2.00
11.	Pentakotta	1.75
12.	Vakalapudi	1.00
13.	Kandla Buoyage	14.50
14.	Piram	2.00
15.	Chanks West	1.50
16.	Puri	4.00
17.	Jakhau	7.00
18.	Navinal	2.50
19.	Lushington Shoals	52.00
20.	Chachi	5.50
21.	Mandvi	3.50
22.	Dwarka	5.00
23.	Veraval	2.50
24.	Diu Head	5.25
25.	Jaffarabad	5.00
26.	Chanch Point	4.00
27.	Jegri	3.50
28.	Methiveli	3.00
29.	Gogha	2.75
30.	Bronch Point	3.00
31.	Mallaca Banks	20.00
32.	Daman	2.00
33.	Tarapore	5.00
34.	Tapti	1.00
35.	Khanderi Island	2.00
36.	Nanoli (Rajapuri Point)	3.50
37.	Ratnagiri	3.25
38.	Rajapur Bay	4.00
39.	Malvan	3.50

1	2	3
40.	Vengurla Rocks	2.00
41.	Vengurla	2.50
42.	Point Calimere	2.00
43.	Nagapatnam	2.00
44.	Devi Point	4.75
45.	Gopalpur	4.00
46.	Dhamra River	3.00
47.	Shrott Island	4.25
48.	Saugar Island	4.00
49.	Mouth of Hooghly	14.00
50.	Lighthouse Tender and Boat	110.00
51.	Decca Chain (East Coast, West Coast and Andamans)	120.00
52.	Radio and Sound signals	49.00
53.	Great Nicobar	10.00
54.	Car Nicobar (Keating Point)	10.00
55.	Sir Hugh Rose Island	10.00
56.	Minicoy Island	5.00
57.	Little Andamans	5.00
58.	Ross Island	4.00
59.	Pigeon Island	6.00
60.	Landfall Island	10.00
61.	Outram Island	10.00
62.	South Sentinel Island	10.00
63.	North Cinque Island	10.00
64.	Improvement of Buoyage System in Indian Waters	30.00
65.	Kao Rocks	5.00
66.	Kiltan Island	5.00
67.	Androth Island	5.00
68.	Nancowry	5.00
69.	Pulicat	5.00
70.	Improvement of Arnala Lighthouse	2.50
71.	Armagaon	3.00
72.	Bhimlipatnam	4.00
73.	Vizag. (North and South)	5.00
74.	Lightvessels	40.00
75.	Improvement of Communications with land and ships	10.00
76.	Hooghly Right bank	6.00
77.	Other miscellaneous improvements to lighthouses and lightships including beacons and minor lights	10.00
78.	Buoyage system at the approaches to Bombay Harbour	5.00
79.	Improvement of Hare Island lighthouse	2.00
80.	Improvement of Manapad lighthouse	2.00
81.	Improvement of Koilthottam lighthouse	3.00
82.	Cape Comorin lighthouse	3.00
83.	Seeka Khari lighthouse	3.00
TOTAL		775.75

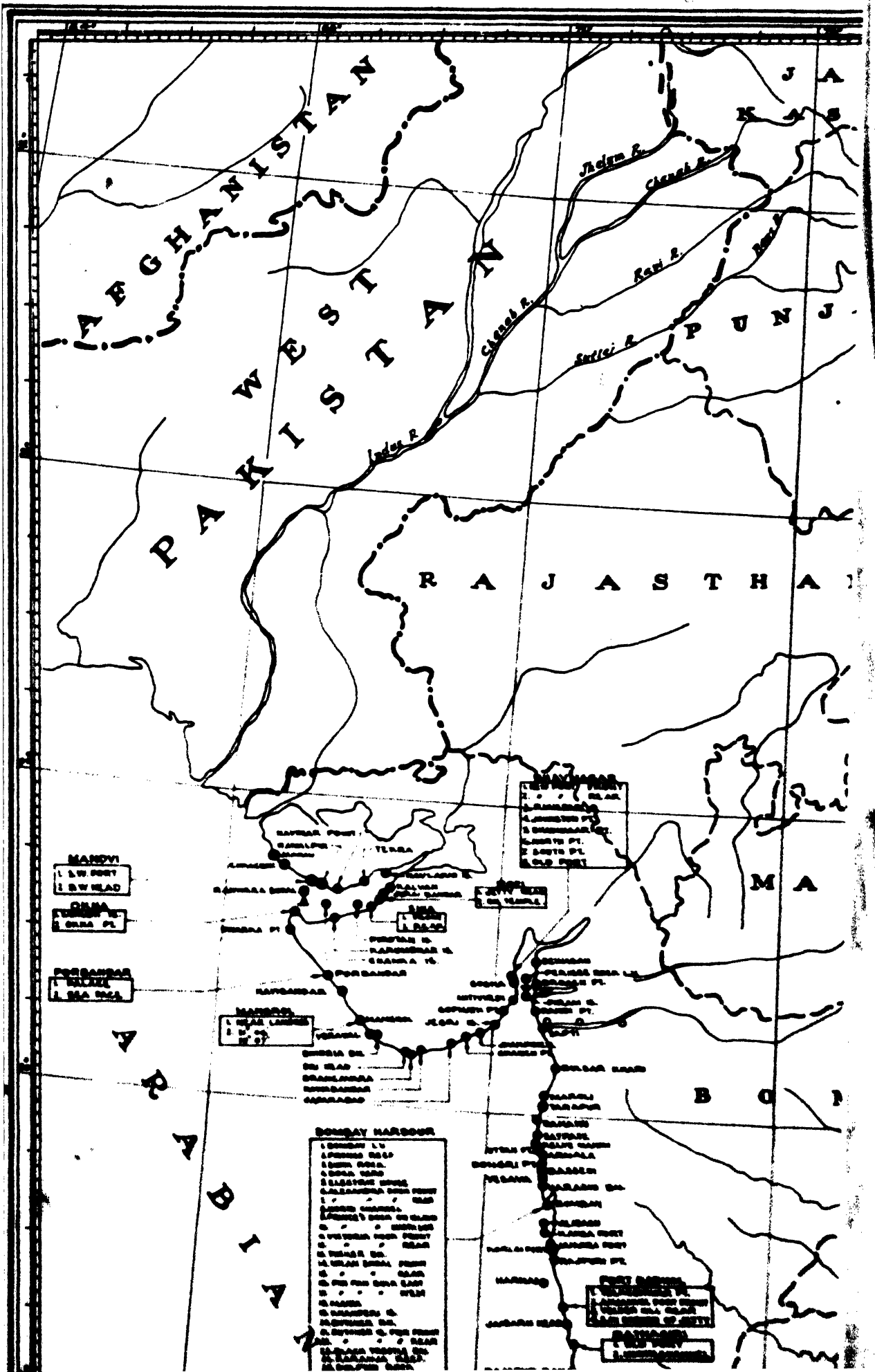
MAP OF
INDIA

SHOWING
THE LIGHTHOUSES
ALONG THE COAST OF INDIA

MILES 0 40 80 120 160 200 240 280
Scale: - 1 Inch to 80 Miles



DRG. NR 2731



AFGHANISTAN

PAKISTAN

INDIA

RAJASTHAN

MAHARASHTRA

BENGAL

ANDHRA PRADESH

MADHYA PRADESH

GUJARAT

KARNATAKA

TAMIL NADU

BOMBAY HARBOR
 1. BOMBAY L.V. DOCK
 2. BOMBAY S.W. DOCK
 3. BOMBAY S.E. DOCK
 4. BOMBAY S.W. DOCK
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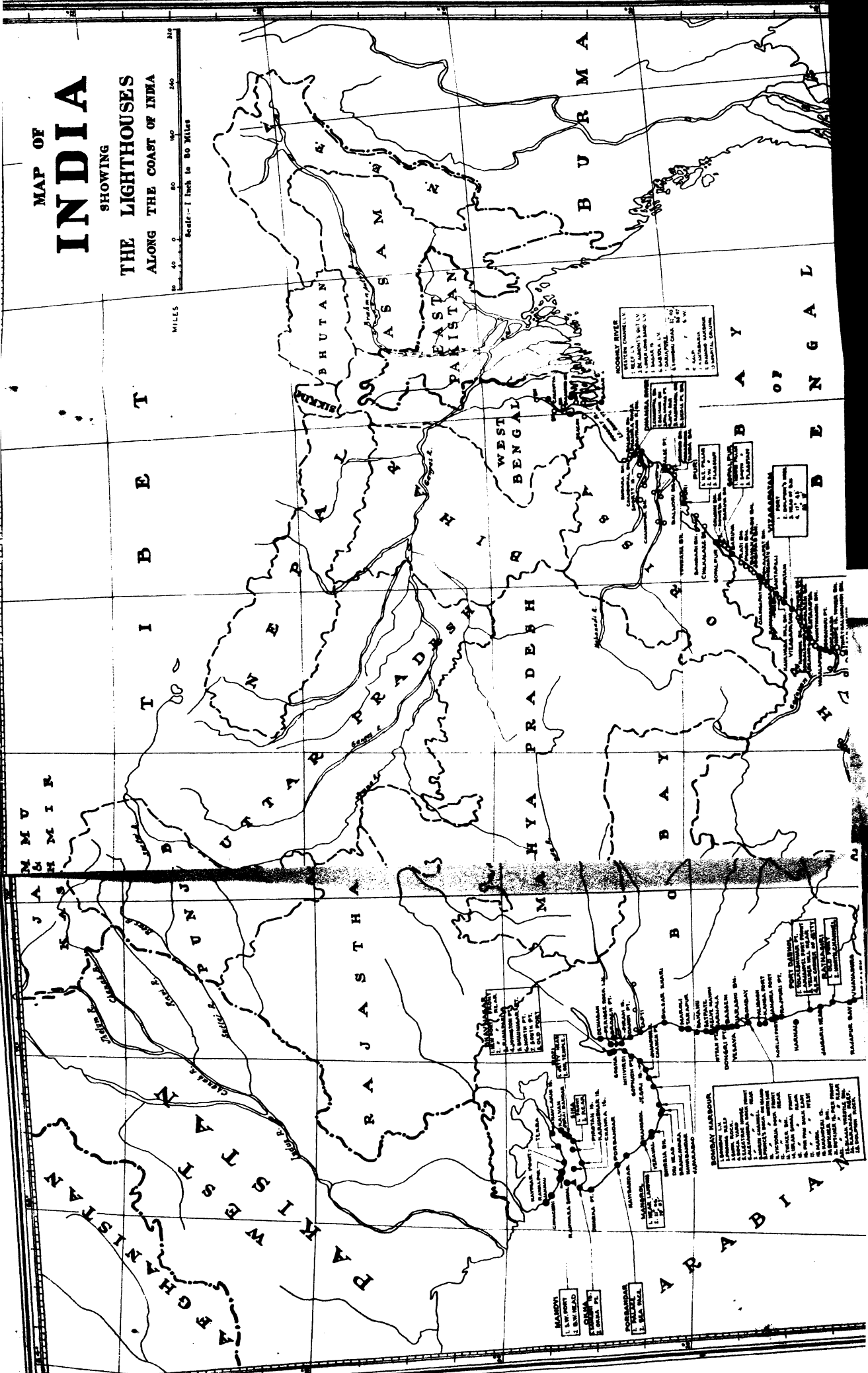
MADRAS PORT
 1. MADRAS L.V. DOCK
 2. MADRAS S.W. DOCK
 3. MADRAS S.E. DOCK
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COCHIN PORT
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 2. COCHIN S.W. DOCK
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 18. COCHIN S.W. DOCK
 19. COCHIN S.E. DOCK
 20. COCHIN S.W. DOCK

MAP OF INDIA

SHOWING THE LIGHTHOUSES ALONG THE COAST OF INDIA

MILES
0 40 80 120 160 200 240 280
Scale—1 inch to 80 Miles



FOOTNOTES
 1. Lighted 1st night
 2. Lighted 2nd night
 3. Lighted 3rd night
 4. Lighted 4th night
 5. Lighted 5th night
 6. Lighted 6th night
 7. Lighted 7th night
 8. Lighted 8th night
 9. Lighted 9th night
 10. Lighted 10th night

LEGEND
 F. Flashing light
 F.V. Flashing variable light
 F.C. Flashing colored light
 F.S. Flashing solar light
 F.L. Flashing lighthouse
 F.P. Flashing post
 F.T. Flashing tower
 F.B. Flashing buoy
 F.R. Flashing rock
 F.S. Flashing solar light
 F.L. Flashing lighthouse
 F.P. Flashing post
 F.T. Flashing tower
 F.B. Flashing buoy
 F.R. Flashing rock

LEGEND
 1. Lighted 1st night
 2. Lighted 2nd night
 3. Lighted 3rd night
 4. Lighted 4th night
 5. Lighted 5th night
 6. Lighted 6th night
 7. Lighted 7th night
 8. Lighted 8th night
 9. Lighted 9th night
 10. Lighted 10th night

LEGEND
 1. Lighted 1st night
 2. Lighted 2nd night
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 4. Lighted 4th night
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LEGEND
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LEGEND
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 6. Lighted 6th night
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 8. Lighted 8th night
 9. Lighted 9th night
 10. Lighted 10th night

LEGEND
 1. Lighted 1st night
 2. Lighted 2nd night
 3. Lighted 3rd night
 4. Lighted 4th night
 5. Lighted 5th night
 6. Lighted 6th night
 7. Lighted 7th night
 8. Lighted 8th night
 9. Lighted 9th night
 10. Lighted 10th night

APPENDIX VII

Location of Lighthouses erected during the First Five Year Plan

S. No.	Name of Light	Position
1.	Mangrol Lighthouse	21° 06' 30" N. 70° 05' 10" E.
2.	Rajpara Light	20° 47' 24" N. 71° 12' 00" E.
3.	Simar Light	20° 45' 44" N. 71° 09' 00" E.
4.	Korlai Fort Tower	18° 32' 15" N. 72° 54' 24" E.
5.	Okha Tower	22° 28' 40" N. 69° 05' 08" E.
6.	Bhatkal	13° 58' 00" N. 74° 32' 00" E.
7.	"Sanmardeno" Wreck Floating Light	21° 51' 00" N. 71° 25' 03" E.
8.	Kandla Approach Channel Floating Light	22° 52' 18" N. 70° 08' 19" E.
9.	Do	24° 54' 23" N. 70° 11' 20" E.
10.	Do	22° 54' 36" N. 70° 12' 36" E.
11.	Do	22° 54' 45" N. 70° 13' 07" E.
12.	Do	22° 55' 06" N. 70° 14' 29" E.
13.	Do	22° 55' 45" N. 70° 14' 29" E.
14.	Do	22° 56' 25" N. 70° 14' 40" E.
15.	Do	22° 57' 00" N. 70° 14' 35" E.
16.	Do	22° 51' 32" N. 70° 08' 36" E.
17.	Do	22° . . . 02" N. 70° 10' 08" E.
18.	Do	22° 53' . . . 9" N. 70° 11' 42" E.
19.	Do	18° 53' 7" N. 70° 13' 18" E.
20.	Do	22° 54' 19" N. 70° 14' 35" E.

S. No.	Name of Light	Position
21.	Kandla Approach Channel Floating Light	22° 54' 48" N. 70° 15' 09" E.
22.	Do.	22° 55' 42" N. 70° 15' 08" E.
23.	Do.	22° 56' 31" N. 70° 15' 06" E.
24.	Do.	22° 57' 40" N. 70° 14' 15" E.
25.	Perotan Island Tower	22° 36' 00" N. 69° 57' 00" E.
26.	Lushington Shoal Marker Buoy	22° 46' 48" N. 63° 46' 37" E.
27.	" Inchkeith " Wreck Marking Buoy	11° 55' 06" N. 92° 51' 19" E.
28.	Koilthottam Light	8° 59' 45" N. 76° 32' 15" E.
29.	Chanka West	22° 33' 00" N. 69° 24' 00" E.
30.	Dolphin's Nose	17° 41' 00" N. 83° 18' 00" E.
31.	Jaffarabad (Chuman Bhatti)	20° 52' 00" N. 71° 23' 00" E.
32.	Mangrol Red Light (Shamashan Khadi)	21° 06' 00" N. 76° 07' 00" E.
33.	Floating Light Outer Tuna Sar	22° 50' 42" N. 70° 07' 04" E.
34.	Floating Light Ranwara Shoal	22° 40' 12" N. 69° 21' 00" E.
35.	Buoy Marking Sacramento Shoals	16° 32' 00" N. 82° 21' 00" E.

APPENDIX VIII

Statement showing the comparative Cost of Equipment manufactured at the light-house workshops and their imported Cost:

Item	Manufactured cost at the workshop	Approximate imported cost
	Rs.	Rs.
1. Bunsen Broach drills 35 m/m	0 9 0	3 0 0
2. Burner cone 35 m/m	5 0 0	22 8 0
3. Bunsen tube 35 m/m	5 1 0	22 0 0
4. Gauze cap 35 m/m	0 12 0	2 0 0
5. Mantle carrier	4 4 0	18 0 0
6. Mixing chamber 35 m/m	14 9 0	22 0 0
7. Vapouriser nipple 35 m/m	0 13 0	2 10 0
8. Vapouriser ripple socket 35 m/m	2 8 0	6 0 0
9. Vapouriser plug socket 35 m/m	3 13 0	5 0 0
10. Vapouriser staybrite steel 35 m/m	31 3 0	67 8 0
11. Spirit lamp 35 m/m	7 0 0	13 0 0
12. Pricker 35 m/m	0 2 0	0 9 0
13. Nipple height gauge 35 m/m	1 8 0	9 6 0
14. Mantle height gauge 35 m/m	4 8 0	5 0 0
15. Hood asbestos 35 m/m	2 0 0	8 10 0
16. Burner 35 m/m	120 0 0	500 0 0
17. Bunsen tube 55 m/m	5 12 0	20 0 0
18. Burner cone 55 m/m	13 11 0	22 0 0
19. Gauze cap 55 m/m	1 8 0	2 8 0
20. Hoods Asbestos 55 m/m	2 1 0	10 0 0
21. Keep ring 55 m/m	0 15 0	2 8 0
22. Mantle carrier 55 m/m	5 5 0	20 0 0
23. Mixing chamber 55 m/m	13 5 0	30 0 0
24. Perforated plate 55 m/m	0 7 0	1 8 0
25. Vapouriser staybrite steel 55 m/m	31 6 0	67 8 0
26. Spirit lamp 55 m/m	7 14 0	18 12 0
27. Pricker 55 m/m	0 3 0	0 9 0
28. Nipple height gauge 55 m/m	1 12 0	9 6 0
29. Mantle height 55 m/m	4 8 0	6 4 0
30. Bunsen broach drill 55 m/m	0 11 0	2 2 0
31. Burner 55 m/m	200 0 0	750 0 0
32. Bunsen tube 85 m/m	11 4 0	52 8 0
33. Burner cone 85 m/m	19 14 0	26 4 0
34. Keep ring 85 m/m	0 14 0	2 8 0

Item	Manufactured cost at the workshop	Approximate imported cost
	Rs.	Rs.
35. Mantle carrier 85 m/m	8 2 0	26 8 0
36. Vapouriser staybrite steel 85 m/m	59 4 0	105 0 0
37. Gauze cap 85 m/m	2 15 0	3 4 0
38. Pricker 85 m/m	0 3 6	0 9 0
39. Nipple height guage 85 m/m	2 2 0	10 0 0
40. Hood asbestos 85 m/m	2 1 0	10 10 0
41. Bunsen broach drill 85 m/m	0 11 0	3 2 0
42. Burner 85 m/m	340 0 0	1,020 0 0
43. Micrometer valve	45 0 0	87 8 0
44. Air Pump	34 8 0	60 0 0
45. Couplings for oil pipes complete	3 0 0	4 12 0
46. Container head	63 13 0	165 0 0
47. Piston rings	5 3 0	7 8 0
48. Vapouriser plugs	0 9 0	1 13 0
49. Vapouriser tube brush	0 8 0	0 12 0
50. Vapouriser tube scrapers	1 7 0	5 5 0
51. Union F. 10	2 12 0	4 8 0
52. Union F. 40	0 13 0	1 8 0
53. Union F. 60	0 9 0	1 0 0
54. Stop valves V.T. 390	30 11 0	45 0 0
55. Coupling 3-way	16 12 0	25 0 0
56. Coupling 6-way	27 3 0	60 0 0
57. Ratchet wheel for multiple flasher	15 0 0	36 12 0
58. Leaf spring for auxiliary valve	0 10 0	2 0 0
59. Stroke stop for auxiliary valve	4 8 0	10 4 0
60. Ratchet pawl for auxiliary valve	5 0 0	9 0 0
61. Ratchet spring for auxiliary valve	0 7 0	1 0 0
62. Collar for auxiliary valve spindle	1 0 0	2 2 0
63. Nuts for auxiliary valve spindle	0 10 0	1 11 0
64. Auxiliary valve spindle	2 0 0	3 8 0
65. Perforated plate for auxiliary valve	2 0 0	5 0 0
66. Adjusting plate with washers for auxiliary valves	5 0 0	12 0 0
67. Flasher diaphragm plates (upper)	1 8 0	3 9 0
68. Flasher diaphragm plates (lower)	1 8 0	3 9 0
69. Washer for Auxiliary valve diaphragms (5/8" dia)	0 4 0	0 8 3
70. Diaphragm for auxiliary valve (1 1/4" dia)	0 6 0	2 0 0
71. Diaphragms for K-80 regulator (4 1/2" dia)	0 6 0	2 12 0
72. Diaphragms for K. 130 flasher and regulator (5 3/4" dia)	0 13 0	4 2 0
73. Diaphragms for K. 80 flasher (3 1/2" dia)	0 3 0	1 13 0
74. 100 litre cluster burner	109 0 0	170 0 0
75. 15 to 30 litre burner head	34 0 0	50 0 0

Item	Manufactured cost at the workshop	Approximate imported cost
	Rs.	Rs.
76. Flasher single	520 0 0	1,400 0 0
77. Flasher double	575 0 0	1,750 0 0
78. Flasher triple	575 0 0	2,050 0 0
79. F. 10 Unions & Spigots (per gross)	405 0 0	900 0 0
80. Leather diaphragms	0 6 0	2 12 0
81. Electric flasher (Shri Lahiri's invention and subsequently patented) 1 K.W.	1000 0 0	3,000 0 0
82. Electric flasher (Shri Lahiri's invention and subsequently patented) 3 K.W.	1200 0 0	4,800 0 0
83. Electric flasher (Shri Lahiri's invention and subsequently patented) 5 K.W.	1500 0 0	6,900 0 0

APPENDIX IX

Statement showing the Summary of Conclusions/Recommendations

Serial No.	Reference to Para No.	Summary of Conclusions/ Recommendations
1	2	3
1	10	The Committee suggest that there should be one workshop in each of the four lighthouse districts so as to make each district self-sufficient in regard to the manufacture and maintenance of equipment.
2	11	The Committee suggest that the setting up of a lighthouse workshop at Calcutta should be expedited and early steps should be taken to expand the workshop at Jamnagar so as to bring it to the same standard as those at Madras and Bombay.
3	13	The Committee suggest that early steps should be taken to see that each lighthouse district—Saurashtra-Kutch, Bombay, Madras and Calcutta—is manned by a full-time superintendent.
4	14	The Committee suggest that the feasibility of recruiting candidates with suitable educational qualifications and then giving them intensive training in India and abroad might be examined to overcome the shortage in regard to posts of superintendents of lighthouses.
5	15	The Committee consider that seven years is too long a period to keep the pension cases of retired employees pending as in the case of the staff of the former Rangoon district 'general' lighthouses which were transferred to the Burma Government in 1950. They recommend that such residual cases should be closed without causing undue hardship to the parties concerned, by taking <i>ad hoc</i> decisions, if necessary.
6	17	The Committee suggest that vigorous steps should be taken to rectify the defects in the lighthouses and other aids, in the Saurashtra-Kutch district.
7	18	The Committee suggest that steps should be taken to appoint a superintendent for the Saurashtra-Kutch district, without any further delay.

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- 8 20 In view of the fact that the Chief Commissioner of Andamans and Nicobar Islands has no organisation to deal with the repair and maintenance work, the Committee suggest that feasibility of taking over all the Lighthouses in this area by the Superintendent, Lighthouses, Calcutta, should carefully be examined. If necessary, a technical officer of the rank of an Assistant Superintendent might be posted in the Andamans for proper on the spot supervision and control.
- 9 24 The Committee hope that every effort will be made to get information in respect of all the lighthouses and other navigational aids on the coastline of India so that no gaps are left. In this connection the Committee also suggest that a brochure may be published by the Lighthouse Department giving up-to-date information in respect of all lighthouses and other aids and this brochure should be made available for sale to the interested parties, such as shipping companies, owners of sailing vessels etc. This brochure should be periodically brought up-to-date. In this connection the Committee appreciate the efforts made in preparing a documentary film on Lighthouses by the Films Division of the Government of India which was released on 27th January, 1956.
- 10 25 As the subject of Lighthouses is a Union responsibility in terms of the Constitution, the Committee are of the opinion that more expeditious action is necessary by the Central Lighthouse Department to take over the remaining lighthouses, etc.
- 11 28 The Committee suggest that as soon as all the Lighthouses etc. are taken over by the Centre, a proper schedule of inspections should be laid down at various levels and rigidly followed.
- 12 33 The Committee consider it rather unfortunate that even though more than six months of the Second Plan have passed, the Department has not yet formulated a clear cut scheme for securing the technical personnel required during the Second Plan. The Committee suggest that such a scheme should be formulated without any further delay.
- 13 34 The Committee suggest that in order to reduce the delays in procurement of stores, the Engineer-in-Chief, Lighthouse Department, may be authorised to make direct purchases up to Rs. 5,000 instead of upto Rs. 2,000 as at present.

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14	41	The Committee hope that both the physical and monetary targets laid down in the Second Five Year Plan will be achieved unlike in the First Five Year Plan by keeping a strict watch on the progress of works and initiating remedial measures at the earliest possible opportunity.
15	54	The Committee hope that the planned expenditure of Rs. 400 lakhs will materialise and bring about the improvements urgently needed and that there will be no shortfall in expenditure during the Second Plan.
16	57	The Committee suggest that there should be suitable avenues of promotion for the light-keepers and head-light-keepers. A certain percentage of the next higher technical posts in the Department should be earmarked for them. Suitable technical literature should be circulated among them and periodical refresher courses arranged. Those amongst them who show special interest and initiative should be selected for specialised intensive training (in India and/or abroad) to make them properly equipped for the higher technical posts. This method has two advantages. It will open up suitable avenues of promotion for this category of staff and it will also assist in overcoming the shortage of technical staff in the Department.
17	59	The Committee recommend that the question of providing adequate leave reserve to ensure that there is no hardship in getting leave when required should be carefully examined and provision of suitable leave reserve in all the districts should be made without further delay. The Committee also suggest that the light-keepers and head light-keepers should be encouraged to take leave periodically to relieve the monotony of their job.
18	60	The Committee Suggest that the feasibility of interchanging the leave reserve staff periodically with the regular staff should be examined.
19	61	The Committee suggest that the feasibility of introducing a brief training in the first aid and general rules of health during the refresher course for the light-keepers might be examined.
20	62	The Committee suggest that the question of giving suitable scholarships to children of low paid employees of the department and arranging hostel accommodation for them should be sympathetically considered.

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| 21 | 63 | The Committee suggest that the feasibility of utilising services of the senior lighthouse mechanic who was sent to the U.S.A. in 1954 for imparting an intensive course of advanced technical training to other mechanics in the department should be examined carefully. |
| 22 | 66 | The Committee consider that a well integrated scheme of training in India and abroad to overcome the shortage of trained personnel in the lighthouse department is urgently necessary. During the First Plan, a number of posts in the Lighthouse Department remained vacant for want of suitably trained staff. The Committee regard this an unsatisfactory feature and hope that it would not persist during the Second Five Year Plan period. |
| 23 | 67 | The Committee recommend that hence-forth only the indigenously manufactured flashers should be utilised by the Lighthouse Department and their imports from abroad completely stopped. |
| 24 | 71 | The Committee are glad to note the progress made in the field of research by the lighthouse department. They suggest that recognition in the form of rewards, certificates of merit etc. should be given to those workers who make practical contribution in this field. At the same time the Committee also suggest that the research work in this field should be intensified further with the object of making the Lighthouse Department independent of imported equipment. The Committee also suggest that the feasibility of establishing a proper laboratory with upto date research equipment and a nucleus of full-time staff to study specialise problems encountered by the Department should be carefully examined. |
| 25 | 74 | The Committee suggest that the feasibility of the new electric flasher, invented by the Lighthouse Department being manufactured by an Indian firm should be explored. |