

Report of the special sub-Committee  
of the provincial Industries  
Committee, Bombay.

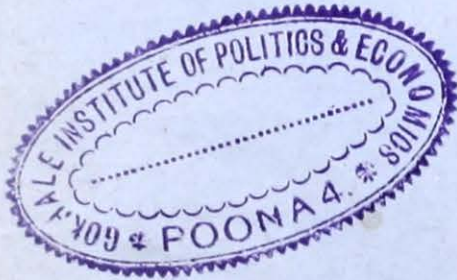


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Report of the Special Sub-Committee  
of the Provincial Industries  
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BOMBAY

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1947

**REPORT OF THE SPECIAL SUB-COMMITTEE OF THE PROVINCIAL  
INDUSTRIES COMMITTEE, BOMBAY**

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## CHAPTER I.

### INTRODUCTION.

*Appointment of the Sub-Committee.*—The Provincial Industries Committee appointed by the Government of Bombay decided at its first meeting held on the 19th July 1945, to appoint various Sub-Committees with a view to giving effect to the Terms of Reference for the Committee. One of the Sub-Committees was the Special Sub-Committee which was appointed for the purpose of suggesting suitable sites for the location of various industries after taking into consideration the availability of labour, water supply, electric power, raw materials, markets, etc. The Sub-Committee was authorised to co-opt as members, industrialists and experts, if and when necessary.

The Sub-Committee was to consist of the following :—

- (1) The Commissioner of Labour	...	...	Chairman.
- (2) A representative of employers	...	...	Member.
- (3) A representative of labour	...	...	Do.
- (4) A Factories Inspector	...	...	Do.
- (5) The Officer-in-charge, Commercial and Industrial Intelligence Section of the Department of Industries.			Do.
- (6) The Industrial Engineer of the Department of Industries.			Do.
- (7) The Industrial Chemist of the Department of Industries.			Do.

The Consulting Surveyor to the Government of Bombay and the Director of Public Health for the Government of Bombay or his nominee were subsequently added as members of the Sub-Committee.

Mr. J. C. Lancashire and Mr. N. V. Phadke, M.A., LL.B., were appointed as representatives of employers and labour, respectively, on the Sub-Committee.

The Public Health Engineer to Government and Mr. F. J. Hecht of Tata Hydro-Electric Agencies Ltd., were co-opted as members of the Sub-Committee.

The Special Sub-Committee, as finally constituted, consisted of the following members :—

1. S. V. Joshi, Esquire, B.A. (Cantab), J. P.	...	...	Chairman.
2. R. A. Collett, Esquire, O.B.E., M.Inst.C.E., F.R.San.I.			Member.
3. J. C. Lancashire, Esquire (Representative of Employers).			Do.
4. F. J. Hecht, Esquire ... .. Do.
5. N. V. Phadke, Esquire, M.A., LL.B. (Representative of Labour). Do.

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| 6.  | Major E. Benjamin, D.P.H.  | ...    | ... | Member.    |
| 7.  | N. G. Kewalramani, Esquire, B.Sc. (Eng.)<br>C.P.E., B.E., M.R.San.I. | Glas., |     | Do.        |
| 8.  | H. Khan, Esquire, F.S.I., A.I.A.A. (Lond.),<br>A.I.I.A. (Lond.).     |        |     | Do.        |
| 9.  | Dr. S. M. Dhume, D.Sc., Ph.D. (Lond.)                                |        | ... | Do.        |
| 10. | N. F. Mooraj, Esquire, Dip. F.H. (Lond.)                             |        | ... | Do.        |
| 11. | Dr. M. R. Mandlekar, D.I.C., Ph.D. (Lond.)                           |        | ... | Do.        |
|     | F. B. Baria, Esquire, B.A.   | ...    | ... | Secretary. |

Mr. J. C. Lancashire, who was granted leave of absence, resumed membership of the Sub-Committee. During his absence on leave, Mr. Bhagwandas C. Mehta was appointed as the representative of employers on the Sub-Committee.

Mr. R. A. Collett having proceeded on leave preparatory to retirement, Mr. S. E. Wadia, who has been appointed Public Health Engineer to Government, took his place on the Sub-Committee.

*Number of Meetings.*—The Special Sub-Committee held in all ten meetings.

*Scope of the Special Sub-Committee's work.*—At the first meeting a question was raised as to whether the Sub-Committee had to select sites for large scale industries only or sites were also to be recommended for cottage and small scale industries. The question was referred to the Secretary, Provincial Industries Committee, who stated in reply that it was not necessary for the Sub-Committee to suggest sites for the location of cottage and small scale industries. As regards large scale industries, the Sub-Committee was informed that it should suggest sites suitable for the location of new factories pertaining to the existing and new industries and that it was not necessary for the Sub-Committee to make suggestions for shifting the existing industries. The Sub-Committee has accordingly restricted itself to suggesting sites suitable for the location of such large scale industries as have been proposed for development in the reports of the Metals and Engineering Industries Sub-Committee, the Chemical Industries Sub-Committee, the Food and Forest Industries Sub-Committee, the Textile Industries Sub-Committee and the Miscellaneous Industries Sub-Committee.

*Constitution of Panels.*—The Special Sub-Committee formed three Panels to consider the proposals contained in the reports of the above Sub-Committees so far as the selection of sites for industries was concerned and to submit their suggestions to the Sub-Committee. The Panels consisted of the following members :—

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Mr. A. M. Kapadia (Co-opted as a member to serve on the Panel).

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Mr. Bhagwandas C. Mehta was appointed by the Sub-Committee as a member of the Textile Industries Panel to take the place of Mr. Lancashire, during his absence on leave.

The Panels commenced work as soon as possible after the receipt of reports of the five Sub-Committees and submitted their reports to the Special Sub-Committee. The suggestions made by the Panels have been carefully considered by the Sub-Committee in making its recommendations.

We desire to state that in making our recommendations we have confined ourselves primarily to those existing and new industries which the five Sub-Committees have proposed to develop on a large scale and for the location of which sites are required to be selected. In the case of certain industries, the Sub-Committees concerned have not recommended the establishment of new factories although they consider that there is scope for expansion of these industries. In such cases also we have suggested suitable sites for the location of the industries in case new factories are to be established.

We may mention that our recommendations for the location of various industries are based on such information as was available to us and that in some cases, e.g., iron and steel industry, production of electrolytic copper and manufacture of aluminium, dyestuffs and rayon, further investigation by experts may be necessary.

The question as to whether any new large scale factories should be permitted to be located in Bombay City was also discussed by the Sub-Committee. We have come to the conclusion that in view of the congestion already prevailing, no new sites should be suggested in Bombay City for the location of factories pertaining either to the existing or new large scale industries. In our recommendations in the succeeding chapters we have accordingly not proposed to locate any such factory within the limits of Bombay City.

■ We have seen the Preliminary Report of the Development of Suburbs and Town Planning Panel of the Bombay City and Suburbs Post-War Development Committee, which has been published. In that report recommendations have been made

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by the Panel for setting aside certain areas in the Greater Bombay region for heavy industries, light industries and noxious trades. Accordingly, wherever, in our opinion, an industry is required to be located as near as possible to Bombay City, we have in our report recommended its location in the Greater Bombay area. We thereby intend that such industry should be located in the area which may be set aside for that class of industry, under the plan which may finally be sanctioned for the development of the Greater Bombay area.

A note has been published for the information of the public giving details of the various electric projects contemplated to be undertaken by the Electric Grid Department. In our opinion the information contained in this note would be useful in connection with the selection of sites for industries, and we have, therefore, included the note in our report as an appendix.

*Arrangement of the Report.*—It will be seen from the chapters which follow that the industries pertaining to each of the five Sub-Committees have been dealt with by us in a separate chapter. A further chapter has been devoted to giving a summary of our recommendations in respect of the industries pertaining to these Sub-Committees.

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## CHAPTER II.

## METALS AND ENGINEERING INDUSTRIES.

In this Chapter we deal with the large scale metals and engineering industries which the Metals and Engineering Industries Sub-Committee has proposed to develop and for the location of which sites are to be selected.

## THE IRON AND STEEL INDUSTRY.

*Basic Iron and Steel Industry.*—The Metals and Engineering Industries Sub-Committee, which had before it a proposal to establish a small steel plant near Kalyan, has expressed its inability to give any expert opinion on the proposal, but has recommended that Government should, in view of the large demand for iron and steel in Western India and the desirability of working a basic iron and steel industry in the Province, appoint immediately a committee consisting of eminent steel producers and technical experts to go into the whole question. If conditions are reported to be favourable, the Sub-Committee strongly recommends the establishment of the industry in view of its importance to the Province. As regards its location the Sub-Committee thinks that Kalyan would be a suitable place. It is favourably located near the junction of two important railway lines through which the principal raw materials could be brought to the site. The nearness of the proposed site to Bombay harbour through which a major portion of the coke supplies is likely to be obtained is also in the Sub-Committee's opinion a very important factor in its favour.

The principal raw materials required for this industry are iron ore and coke, the sources of which have been indicated in the Metals and Engineering Industries Sub-Committee's report. Limestone would also be required to a certain extent. If, as we understand, the proposal is to first instal a plant to produce steel only by remelting scrap in open hearth steel furnaces fired with fuel oil, we agree that the Kalyan-Ambernath area would be suitable for the location of such a plant.

With regard to proposed production of special steel in electric furnaces for the manufacture of tools, etc., the primary condition is the availability of electric power at a cheap rate. Electric power is available at Kalyan and Ambernath from the Tata Hydro-Electric System. A factory for the production of special steel in electric furnaces could also, therefore, be located in the Kalyan-Ambernath area, provided that power from the Tata Hydro-Electric System could be made available at a reasonable rate. Another place which, in our opinion, may be suitable for this purpose would be Chiplun in Ratnagiri District, when the Koyna hydro-electric project is completed. The power station of the Koyna hydro-electric project is intended to be located near Chiplun, and it is understood that it would be possible to supply energy from the power station at a cheap rate. Ratnagiri District being one of the principal sources of supply of labour for industries located in Bombay City and the surrounding places, there should be no difficulty in procuring the necessary labour. One disadvantage, however, is that due to heavy rains during the monsoon, certain portions of the roads connecting Chiplun with Bombay and other places are not passable throughout the season, and if the Chiplun area is to be developed for industrial purposes, steps will have to be taken to make the roads fit for use throughout the year. It may also be necessary to provide suitable harbour facilities nearby to enable the free movement of raw materials and finished products by sea throughout the year.

*Steel Re-rolling Industry.*—The Metals and Engineering Industries Sub-Committee observes with regard to the future expansion of the Provincial re-rolling industry,

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*Steel Re-rolling Industry.*—The Metals and Engineering Industries Sub-Committee observes with regard to the future expansion of the Provincial re-rolling industry,

that although there is room for the establishment of new factories to meet the Provincial demand, it would be better to expand the capacity of the existing units rather than set up new mills, unless the new mills are sure of obtaining supplies of billets and are modern and efficient units.

In our opinion the most advantageous location for this industry would be in the Kalyan-Ambernath area near the iron and steel industry. If supplies of billets could be ensured at these places, Nadiad, Bhusawal and Hubli may also be suitable for the establishment of steel re-rolling mills.

#### ASSOCIATED INDUSTRIES.

(a) *Wire and wire products.*—In dealing with the wire and wire products industry, the Metals and Engineering Industries Sub-Committee has made no recommendation for the establishment of any new factory for this industry.

This is an industry associated with the iron and steel industry. It can draw its requirements from the steel re-rolling mills. The sites suggested by us for the steel re-rolling industry would, therefore, in our opinion, be also suitable for the manufacture of wire and wire products.

(b) *Bolts, nuts, rivets, etc.*—The Metals and Engineering Industries Sub-Committee states that it is understood that Guest, Keen and Williams, Ltd., who have set up a well organised factory at Bhandup are not likely to operate the factory and are likely to dismantle it. The Sub-Committee recommends that in order to establish this industry in the Bombay Province, for which there is an urgent need, Government should negotiate with this firm for the outright purchase of the factory, if it intends to dismantle it, for the ultimate purpose of handing it over to a public limited company. It urges that in any event Government should immediately take positive steps for the establishment of this industry in the Province.

This industry is also associated with the iron and steel industry and it can draw its raw materials from the steel re-rolling mills. The sites suggested by us for the steel re-rolling mills would, therefore, also be suitable for the manufacture of bolts, nuts, rivets, etc.

#### THE NON-FERROUS METALS INDUSTRY.

##### *Primary production (extraction of non-ferrous metal from the ore).*

(a) *Copper.*—In order to supplement the present scanty production, the Metals and Engineering Industries Sub-Committee recommends the installation of a smelter for producing electrolytic copper from imported ores and concentrates, pending an investigation into the availability of local ores in sufficient quantity and quality. The Sub-Committee observes that for economical working, the location of the smelter should be in close proximity to adequate supplies of water and electric power and that as the smelter would operate on imported ores in the beginning, its location near a port would be advantageous.

Apart from copper ore, adequate quantities of water and electric power are the chief requirements of the industry. We consider that the Kalyan-Ambernath area, which is situated at a short distance from the Bombay Port and has good road and railway connections, would be suitable for the location of a smelter for producing electrolytic copper, if the necessary amount of water and power could be made available at the place. Another place which may be suitable would be

that although there is room for the establishment of new factories to meet the Provincial demand, it would be better to expand the capacity of the existing units rather than set up new mills, unless the new mills are sure of obtaining supplies of billets and are modern and efficient units.

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#### THE NON-FERROUS METALS INDUSTRY.

##### *Primary production (extraction of non-ferrous metal from the ore).*

(a) *Copper.*—In order to supplement the present scanty production, the Metals and Engineering Industries Sub-Committee recommends the installation of a smelter for producing electrolytic copper from imported ores and concentrates, pending an investigation into the availability of local ores in sufficient quantity and quality. The Sub-Committee observes that for economical working, the location of the smelter should be in close proximity to adequate supplies of water and electric power and that as the smelter would operate on imported ores in the beginning, its location near a port would be advantageous.

Apart from copper ore, adequate quantities of water and electric power are the chief requirements of the industry. We consider that the Kalyan-Ambernath area, which is situated at a short distance from the Bombay Port and has good road and railway connections, would be suitable for the location of a smelter for producing electrolytic copper, if the necessary amount of water and power could be made available at the place. Another place which may be suitable would be



Chiplun when the Koyna hydro-electric project is completed. Water and power would be available in adequate quantities, but the transport of copper ore to the place may not be easy.

(b) *Manganese*.—The Metals and Engineering Industries Sub-Committee states that very large and rich deposits of manganese ore are scattered over many areas in India, particularly Bombay Province and the Central Provinces, and that the deposits in some areas are so abundant that only surface mining is necessary to mine the ore. The Sub-Committee recommends that active steps should be taken by Government to encourage the conversion of the ore into ferro-manganese, which is very widely required by Indian industries.

We understand that the manganese ore of the Bombay Province contains a large quantity of phosphorous and that it will require to be reduced by electrolytic process. A considerable amount of electric power would, therefore, be required. Manganese ore is available in this Province in the Panch Mahals District and Belgaum and Kanara Districts. If power in the required quantities could be made available in these districts, factories for the production of ferro-manganese could be located at suitable places in these districts. Failing this, the Kalyan-Ambernath area would be suitable for the location of the industry if, as we presume, the necessary amount of power will be available in that area. Another site which might be suitable would be a place near Chiplun, where ample electric power at a cheap rate would be available, when the Koyna hydro-electric project is completed under the Electric Grid Scheme.

*Secondary Production (Refining of non-ferrous scrap)*.—The Metals and Engineering Industries Sub-Committee states that large quantities of non-ferrous scrap accrue everywhere in the Province and recommends that Government should give certain assistance to the existing firms which are refining a variety of non-ferrous scrap for the production of white metals, phosphor-bronze ingots, gun metal ingots, solders, etc. No recommendation for the establishment of new factories has been made.

In our opinion factories for refining non-ferrous scrap should be located at places where sufficient scrap is available or can be easily transported. From this point of view, we consider that the Kalyan-Ambernath area, the vicinity of Ahmedabad or Nadiad, Poona or Nasik and Hubli would be suitable for the location of this industry.

*Non-ferrous semies manufacture*.—The Metals and Engineering Industries Sub-Committee recommends the installation in Bombay Province of two up-to-date rolling mills for a total production of 7,000 to 8,000 tons per annum of brass sheets and circles and about 4,000 tons per annum of copper sheets and circles.

After careful consideration, we have come to the conclusion that the vicinity of Ahmedabad or Nadiad and Nasik or Poona would be suitable for locating the proposed factories. We understand that there is already an industry at Nasik for the manufacture of brass and copper utensils and other items, but we consider that a site near Poona would be more suitable, as the requirements of the districts in the Southern Division could be met more easily from that centre.

We suggest that the suitability of the following areas in the vicinity of Poona may be examined for the location of such of the metals and engineering industries as have been recommended by us for establishment near Poona :—

- (1) The area lying to the south of Hadapsar along Saswad Road ;

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- (1) The area lying to the south of Hadapsar along Saswad Road ;

- (2) The Vadgaon-Chinchwad-Kirkee area lying between Bombay-Poona Road and Poona-Nasik Road ; and  
 (3) The Pimpri-Vaghera area.

#### THE ALUMINIUM INDUSTRY.

The Metals and Engineering Industries Sub-Committee recommends the establishment in the Bombay Province of (i) one aluminium reduction plant with a capacity of about 3,500 tons per annum and (ii) a rolling unit with a capacity of 3,500 tons per annum of all sorts of aluminium semies. The Sub-Committee further suggests that the location of this industry near the Koyna hydro-electric project would be very advantageous.

Two processes are involved in the production of aluminium metal, viz. (i) refining process for the conversion of bauxite into alumina and (ii) the reduction of alumina to aluminium metal. Both the processes are such as can be carried out independently of each other and can, therefore, be located, if necessary, at different places.

Bauxite is one of the principal raw materials required for the production of aluminium. It is understood that considerable deposits of a good quality of bauxite are available near Belgaum and in Thana and Kaira Districts. Deposits of bauxite in Thana District have been found on Tungar Hill, which is situated at about 30 miles from Bombay City, and these deposits are estimated to last for a very long period. No estimate of the deposits in Kaira and Belgaum Districts is available. Apart from bauxite, the other important raw material required in the refining process is caustic soda. Coal for steam and coke and furnace oil are also required.

For producing 3,500 tons of metallic aluminium about 14 to 15 thousand tons of bauxite would be required. Unless the reduction plant can also be located near the site of deposits, a very large quantity of bauxite will have to be transported to the site of the reduction plant if a composite unit is to be established. As a very large amount of power at a cheap rate is required for the reduction process, it may not be possible to locate the reduction plant near the site of bauxite deposits, and it seems to us desirable, therefore, that the two processes should be separated and carried out at different places independently of each other, the refining process being carried out at a site as near as possible to the bauxite deposits. Dr. Patel, who was Industrial Chemist to the Government of Bombay, has suggested in his Report on the possibility of Production of Aluminium in Bombay that a site near Kalyan would be suitable for locating a factory for the manufacture of aluminium from the bauxite deposits on Tungar Hill. We suggest that the possibility of establishing a bauxite refinery in the vicinity of Bassein, which will be much nearer the Tungar Hill deposits, may also be investigated as it will reduce the cost of transporting the bauxite to the refinery. The bauxite deposits in Belgaum District are located round about Belgaum and a site near Belgaum would, in our opinion, be suitable for locating a refinery. In the absence of information regarding the exact location of bauxite deposits in Kaira District, we are unable to suggest a suitable site for the location of a refinery in that District.

We will now deal with the location of reduction plant. As already stated, this part of the industry will require a very large supply of electric energy. It has been brought to our notice that in order to produce one ton of metallic aluminium, electric energy to the extent of about 25,000 KWh. would be needed. Electric energy will thus be a very important factor in determining the cost of production of aluminium

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metal. It is, therefore, essential that a very large supply of electric energy at a very cheap rate should be made available to the works producing metallic aluminium. In order to meet this principal requirement, we consider it imperative that the factory for the reduction of alumina to aluminium metal should be located at a suitable site as close as possible to a hydro-electric power station.

The Koyna hydro-electric scheme, when fully developed, will be capable of meeting a maximum demand of about 220,000 KW. It is presumed that it would be possible to supply electric energy from the Koyna hydro-electric power station at a sufficiently low rate.

We, therefore, agree with the recommendation of the Metals and Engineering Industries Sub-Committee that location near the Koyna hydro-electric project would be very advantageous and suggest that the plant for reduction of alumina to metal should be located near Chiplun in close proximity to the Koyna power station. As already pointed out by us, however, the Chiplun site has at present no adequate road facilities, nor has it any harbour or railway facilities; and the suitability of the site will depend on adequate transport facilities being provided.

We also suggest that the possibility of locating a reduction plant near the Kalinadi hydro-electric power station may be investigated when the Kalinadi project is completed, so that the alumina from the Belgaum refinery could be more advantageously utilised.

With regard to the rolling mill for the manufacture of aluminium semies recommended by the Metals and Engineering Industries Sub-Committee, we consider that the factories manufacturing non-ferrous semies can also advantageously undertake the manufacture of aluminium semies.

#### THE PRIME MOVERS INDUSTRY.

The Metals and Engineering Industries Sub-Committee observes that there is still some scope for an increase in the production of diesel oil engines and it considers that the industry should be organised on a large scale to secure economies of production. That Sub-Committee advises Government to undertake the manufacture in a State-managed factory of such types of prime movers as water, gas and steam turbines, steam engines, petrol engines, etc.

We understand that for the manufacture of prime movers skilled labour is required. In our opinion Poona, Nadiad and Hubli may be suitable for locating the industry. The Kalyan-Ambernath area would be suitable for locating factories manufacturing large machines.

#### THE MACHINE TOOLS INDUSTRY.

The Metals and Engineering Industries Sub-Committee observes that the Bombay Province enjoys a good share (nearly 40 per cent.) in the production of grade I machine tools in India. In the present state of the industry in the Province, that Sub-Committee does not view with favour any further expansion of industry by the establishment of new factories for the manufacture of such types of grade I machine tools as are already being manufactured in the Province.

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In our opinion new factories for this industry can suitably be located at places where skilled labour and facilities are available for good casting. We consider that Poona and Hubli may be suitable for the location of this industry.

## THE ELECTRICAL MACHINERY AND ACCESSORIES INDUSTRIES.

### *Electrical Machinery*

*Transformers and Electric Motors.*—The Metals and Engineering Industries Sub-Committee is of the opinion that there is a potential field for the manufacture of a standard range of transformers and a large field for the manufacture of small size electric motors. It considers that the best location for the industry would be in an area within daily reach of a city like Bombay, in order to avail of the skilled and semi-skilled male labour, and intelligent female labour which are essentially required for these industries.

As has been pointed out in the Metals and Engineering Industries Sub-Committee's report most of the raw materials required for the industry have to be imported. We are, therefore, of opinion that the Greater Bombay area and the Kalyan-Ambernath area, both of which are within easy reach of Bombay City, would be suitable for the location of the proposed industry. The other place where skilled and semi-skilled labour of the type required would be available is Poona, and it may also be found suitable for the location of this industry.

### *Electrical Accessories*

(a) *Dry Batteries and Cells.*—The Metals and Engineering Industries Sub-Committee considers that the contemplated large expansion in its production by the Estrella Batteries Ltd. would be sufficient, if achieved, to meet all the post-war demands for these products. That Sub-Committee, however, suggests that the question of the establishment of new factories for the production of dry cells may be further examined.

The use of dry batteries and cells is now spreading in the rural areas also and, in our opinion, it is advisable that new factories should be located at different centres in the Province, so as to meet the requirements of those places and the surrounding areas. There will thus be a saving in transport charges. Surat and Nadiad in the Northern Division, Poona and Dhulia in the Central Division and Belgaum and Dharwar or Hubli in the Southern Division, would, in our opinion, be suitable for the establishment of factories for the manufacture of dry batteries and cells.

(b) *Secondary Batteries.*—The Metals and Engineering Industries Sub-Committee is of opinion that if the post-war schemes of the two Provincial concerns, which manufacture secondary batteries, materialise, there will be no scope for any further expansion of this industry in the Province.

We are of opinion that the sites recommended by us for the location of factories for the manufacture of dry batteries and cells would also be suitable for the manufacture of secondary batteries.

(c) *Incandescent lamps (electrical).*—The Metals and Engineering Industries Sub-Committee considers that with the early establishment of the Electric Grid System, there would be room for the establishment of one or more factories, each producing about 1½ million to 3 million electric bulbs per annum.

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With the development of the Electric Grid System, rural areas will be electrified and electric bulbs would be required throughout the Province. It, therefore, appears desirable to us that this industry should be located at different places so that the requirements of surrounding areas could be met more easily. Surat and Nadiad in the Northern Division, Poona in the Central Division and Hubli and Belgaum in the Southern Division would, in our opinion, be suitable for the location of this industry.

(d) *Electric Fans.*—The Metals and Engineering Industries Sub-Committee observes that in its opinion there is scope for the establishment of one or more factories in the Province with a total production capacity of about 5,000 table fans per annum, as these are not manufactured in the Province.

In our opinion factories for the manufacture of electric motors, transformers, etc., in regard to the location of which we have already suggested suitable sites, can best undertake the manufacture of electric table fans. The question of recommending separate sites for the location of this industry, therefore, does not arise. If, however, this is not found possible, the Greater Bombay area, the Kalyan-Ambernath area and Surat would, in our opinion, be suitable for locating this industry.

#### THE COTTON TEXTILE MACHINERY INDUSTRY.

The Metals and Engineering Industries Sub-Committee recommends that two sets of plants for the manufacture of modern simpler types of cotton textile machinery should be immediately installed, one each at the main cotton textile manufacturing centres of Bombay and Ahmedabad.

We agree that the proposed factories should be located as near as possible to the cotton textile mills in Bombay and Ahmedabad. In view, however, of the congestion already prevailing in Bombay City and Ahmedabad, we are of opinion that such a factory should not be located in the city itself. We suggest that the proposed factories may be located in the Greater Bombay area or in the Kalyan-Ambernath area and in the suburbs of Ahmedabad. Other places which may be found suitable for the location of this industry would be Sholapur in the Central Division and Hubli in the Southern Division.

#### THE STEEL SAFES, CABINETS, ETC., MANUFACTURING INDUSTRY.

The Metals and Engineering Industries Sub-Committee, while suggesting certain measures for the improvement and expansion of the industry, has not proposed the establishment of any new factories.

Proximity to market and availability of suitable labour are important factors in the location of this industry. We are of opinion that the vicinity of Ahmedabad or Nadiad in the Northern Division and Hubli in the Southern Division would be suitable for the location of factories for the manufacture of steel safes, cabinets, etc.

#### THE BICYCLE INDUSTRY.

The Metals and Engineering Industries Sub-Committee considers that there is room for expansion of the industry in the Province.

As pointed out by the Metals and Engineering Industries Sub-Committee, the industry at present depends largely on imported raw materials. We are of opinion

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that new factories for this industry should be established near large towns where there will be ready market, and Ahmedabad and Poona may be suitable for the location of the industry.

#### THE RADIO INDUSTRY.

The Metals and Engineering Industries Sub-Committee considers that with the execution of the Electric Grid System and the post-war development plans of the All-India Radio, there would be a vast field for the radio industry in the Province. That Sub-Committee, therefore, recommends the early establishment of the radio industry in the Province. It also considers that the organisation of the industry should be on a mass production basis.

The industry requires a number of raw materials, several of which have to be imported. It also requires highly trained supervisory staff and skilled labour and we are, therefore, of opinion that it should be located as near Bombay City as possible. The Greater Bombay area would, in our opinion, be suitable for its location.

#### THE REFRIGERATION (ELECTRICAL) INDUSTRY.

The Metals and Engineering Industries Sub-Committee, which considers that the scope for the development of this industry is great, observes that the present state of the market makes it imperative for the industry to be located in large consuming cities, which are likely to set up the largest demand. The very close proximity of markets would help to decrease transport charges. It is also necessary to develop the industry as far as possible in an area well served by electricity. The Sub-Committee, therefore, recommends that Bombay Suburbs would be an ideal site for the location of the refrigeration industry in the Province.

We agree with the view expressed by the Metals and Engineering Industries Sub-Committee and suggest that the industry may be located at a suitable place in the Greater Bombay area or in the Kalyan-Ambernath area.

#### THE SCIENTIFIC AND SURGICAL INSTRUMENTS INDUSTRY.

The Metals and Engineering Industries Sub-Committee considers that the demand for scientific and surgical instruments will continue to be large, not only in the Bombay Province, but also in Sind, Madras, Central India, Central Provinces and the Indian States falling within the territories of these Provinces. That Sub-Committee is of opinion that Bombay City would be the best site for the development of this industry.

As has been pointed out by the Metals and Engineering Industries Sub-Committee, this is a specialised industry requiring technical knowledge and trained and skilled workmen. Due to the congestion which already exists in Bombay City, it may not be advisable to locate the industry in Bombay City, but it could be advantageously established, in our opinion, in the Greater Bombay area or in the Kalyan-Ambernath area. From point of view of labour and market, Poona and Surat may also be found suitable for the establishment of this industry.

#### THE AGRICULTURAL IMPLEMENTS INDUSTRY.

The Metals and Engineering Industries Sub-Committee recommends the establishment in the Province of one or more up-to-date modern factories specialised in the manufacture of improved iron ploughs.

that new factories for this industry should be established near large towns where there will be ready market, and Ahmedabad and Poona may be suitable for the location of the industry.

#### THE RADIO INDUSTRY.

The Metals and Engineering Industries Sub-Committee considers that with the execution of the Electric Grid System and the post-war development plans of the All-India Radio, there would be a vast field for the radio industry in the Province. That Sub-Committee, therefore, recommends the early establishment of the radio industry in the Province. It also considers that the organisation of the industry should be on a mass production basis.

The industry requires a number of raw materials, several of which have to be imported. It also requires highly trained supervisory staff and skilled labour and we are, therefore, of opinion that it should be located as near Bombay City as possible. The Greater Bombay area would, in our opinion, be suitable for its location.

#### THE REFRIGERATION (ELECTRICAL) INDUSTRY.

The Metals and Engineering Industries Sub-Committee, which considers that the scope for the development of this industry is great, observes that the present state of the market makes it imperative for the industry to be located in large consuming cities, which are likely to set up the largest demand. The very close proximity of markets would help to decrease transport charges. It is also necessary to develop the industry as far as possible in an area well served by electricity. The Sub-Committee, therefore, recommends that Bombay Suburbs would be an ideal site for the location of the refrigeration industry in the Province.

We agree with the view expressed by the Metals and Engineering Industries Sub-Committee and suggest that the industry may be located at a suitable place in the Greater Bombay area or in the Kalyan-Ambarnath area.

#### THE SCIENTIFIC AND SURGICAL INSTRUMENTS INDUSTRY.

The Metals and Engineering Industries Sub-Committee considers that the demand for scientific and surgical instruments will continue to be large, not only in the Bombay Province, but also in Sind, Madras, Central India, Central Provinces and the Indian States falling within the territories of these Provinces. That Sub-Committee is of opinion that Bombay City would be the best site for the development of this industry.

As has been pointed out by the Metals and Engineering Industries Sub-Committee, this is a specialised industry requiring technical knowledge and trained and skilled workmen. Due to the congestion which already exists in Bombay City, it may not be advisable to locate the industry in Bombay City, but it could be advantageously established, in our opinion, in the Greater Bombay area or in the Kalyan-Ambarnath area. From point of view of labour and market, Poona and Surat may also be found suitable for the establishment of this industry.

#### THE AGRICULTURAL IMPLEMENTS INDUSTRY.

The Metals and Engineering Industries Sub-Committee recommends the establishment in the Province of one or more up-to-date modern factories specialised in the manufacture of improved iron ploughs.

This is an industry which is closely connected with agriculture and would, in our opinion, best be located at suitable places in the agricultural areas. Anand in the Northern Division, Poona in the Central Division and Hubli in the Southern Division may be found suitable for the location of such factories. The possibility of locating a factory at Bijapur may also be examined, as it may help to provide some employment to people in this famine area.

#### THE WAGON BUILDING INDUSTRY.

The Metals and Engineering Industries Sub-Committee suggests that the best and quickest method of building railway wagons in the Province would be to organise the manufacture of various components and structural engineering parts in the existing general and structural engineering factories, which should then be assembled in an entirely separate unit. This unit may be owned either by private enterprise or by Government. The Sub-Committee recommends Manmad junction as the best suitable location for such an assembling unit, served as it is by the broad gauge and meter gauge railway systems.

In our opinion the proposed industry is primarily a concern of the railway authorities. Most of the Indian railways are now State-owned and are managed by the Central Government. It seems, therefore, doubtful to us whether the Provincial Government can do anything in respect of the proposed industry. If, however, it is found possible to establish this industry, we agree with the Metals and Engineering Industries Sub-Committee, that Manmad junction, where there is a railway workshop, would be a suitable location for the proposed assembling unit. We consider that Dohad on the B. B. & C. I. Railway line would also be suitable for locating this industry.

#### THE STRUCTURAL ENGINEERING INDUSTRY.

The Metals and Engineering Industries Sub-Committee states that there are altogether five organised concerns all of which are located in Bombay City and which either specialise in or undertake structural engineering work as a side line. That body observes that this industry, which before the war was working at 50 per cent. of its capacity, would soon be in a position to work to a greater capacity. The establishment of a new factory for the industry has not been recommended.

From the point of view of nearness to raw materials and availability of trained labour, we consider that the Kalyan-Ambernath area, where we have suggested the location of other metallic and engineering industries, would be suitable for the location of this industry.

#### THE GENERAL ENGINEERING INDUSTRY.

*Iron Castings.*—The Metals and Engineering Industries Sub-Committee states that the most important centre for simple cast iron work is Bombay City, Ahmedabad coming next. There is also a good number of other medium-scale and large-scale workshops, which undertake general cast iron work as well, but only a few of them produce good quality reliable castings. That Sub-Committee has not, however, proposed the establishment of any new factories.

We consider that new factories for iron casting work should be located as near the market as possible. In our opinion the Greater Bombay area, the Kalyan—

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Ambernath area, Ahmedabad, Surat, Poona, Sholapur, Jalgaon, Dhulia and Hubli would be suitable for the location of the iron casting industry.

*Steel Castings.*—The Metals and Engineering Industries Sub-Committee states that the manufacture of steel castings is a highly technical proposition and that very few Indian firms have undertaken this work. The Sub-Committee considers that the production of steel castings in the Province is inconsiderable for any large scale industrial activity and that there is an immediate necessity for increasing it.

We have already recommended Kalyan-Ambernath area and Chiplun as suitable sites for the manufacture of steel. We consider that these sites, the latter one on the completion of the Koyna hydro-electric project, would also be suitable for the manufacture of steel castings.

*Forging and drop stamping.*—The Metals and Engineering Industries Sub-Committee states that the Bombay Province cannot be considered at present as well equipped for undertaking large scale forging work and recommends that the capacity of forging work undertaken in the Province should be increased.

Forging and stamping is required mainly in general engineering works, shipyards, etc., and we consider that suitable location for this industry would be near such works.

*Welding.*—The Metals and Engineering Industries Sub-Committee states that welding can either be done by oxy-acetylene flame or by electric current. Gas welding is practised more or less in all the workshops, as it involves little capital outlay. On the other hand, electric welding requires costly equipment and is generally practised by ship repairers and by ship building, structural engineering and general engineering firms.

In view of the observations made by the Metals and Engineering Industries Sub-Committee, we consider that this industry may be suitably located near large engineering work-shops, shipyards, etc.

#### THE MISCELLANEOUS PRODUCTS MANUFACTURING INDUSTRY.

*Metal cans and drums.*—The Metals and Engineering Industries Sub-Committee thinks that the development of the metal cans and drums industry in India is necessary. The Sub-Committee observes that for the present it does not visualise any profitable expansion in the industry manufacturing cans and containers for foods, beyond the output turned out by the existing firms.

Metal cans and drums are commonly used as containers for chemical products, paints, varnishes, oils, lubricants, liquid fuels, etc. The bulk of the concentrated demand for containers is in Bombay. We, therefore, consider that the industry can best be located in the Greater Bombay area or in the Kalyan-Ambernath area.

With regard to the manufacture of food cans, we think that it can conveniently be carried out near places where the canning of foodstuffs is undertaken.

*Metal cutting tools.*—The Metals and Engineering Industries Sub-Committee recommends the installation of a specialised plant for the manufacture on a large scale of all types of cutting tools, and particularly such tools as cutters, drills and reamers.

We have already recommended Kalyan-Ambernath area and Chiplun in Ratnagiri District as suitable sites for the manufacture of special steel in electric furnaces. The proposed metal cutting tools industry will have to draw its materials from the electric steel factory. We, therefore, recommend that the metal cutting tools

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*Clocks.*—The Metals and Engineering Industries Sub-Committee states that the manufacture of watches, clocks, etc, is a highly specialised work requiring special types of precision plant and equipment. The Sub-Committee is of opinion that there is scope for expansion of this industry in the Province.

As pointed out by the Metals and Engineering Industries Sub-Committee, considerable skill is required in the manufacture of clocks, as the work is of a precision nature. We are of opinion that Poona, Ahmedabad and Surat, where skilled labour would be available, would be suitable for the location of this industry.

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## CHAPTER III.

## CHEMICAL INDUSTRIES.

In this chapter we deal with the large scale chemical industries which the Chemical Industries Sub-Committee has proposed to develop and for the location of which sites are to be selected. As the chemical industries are among those which give rise to problems connected with the disposal of effluents or trade wastes, our recommendations are subject to the condition that it should be possible to make adequate arrangements, at the places suggested, for the disposal of effluents by means of drainage or in some other suitable manner.

## HEAVY CHEMICALS

## I. Sulphuric acid and allied products.

## (a) Sulphuric acid.

The Chemical Industries Sub-Committee has recommended that two plants for the manufacture of sulphuric acid may be put up, one at Bombay for the manufacture of 25 tons per day and the other at Ahmedabad for the production of 10 tons per day.

We understand that the chief raw material required for the manufacture of sulphuric acid is sulphur in the case of the contact process. For the chamber process very small quantities of nitre are required in addition. Sulphur is, however, not available in India and has to be imported, and this is an important consideration from the point of view of the location of a sulphuric acid plant. Another important factor to be considered is proximity to markets. Sulphuric acid is an essential chemical for several industries and the plant should be located as near as possible to the other industries requiring large quantities of this acid. The industry also requires a large quantity of water and it is estimated that a 10 ton plant would require about 75,000 gallons of water per day. Not much labour is required, the process being automatic. We recommend that one sulphuric acid plant may be installed in the vicinity of Bombay and the other round about Ahmedabad as suggested by the Chemical Industries Sub-Committee. As regards the former, we consider that a site in the Kalyan-Ambernath area, with good transport facilities both by road and rail, would be suitable for such a factory. As regards Ahmedabad, Barejadi or some other place near Ahmedabad where adequate water arrangements can be made and which may be recommended by the Ahmedabad Municipality, would, in our opinion, be suitable.

Owing to the dangerous nature of the effluents and fumes, the plant will have to be located away from inhabited areas. The owners of the factories should be held responsible for the treatment in a suitable manner of the effluents which would be discharged in large quantities. We also suggest that these factories should be required to take measures to ensure that fumes are not emitted in the air, as that will affect the atmosphere of the town.

## (b) Allied Products.

(i) *Nitric and Hydrochloric Acids : Ferric Alum : Epsom Salt : Copper Sulphate and Sodium Sulphate.*—The Chemical Industries Sub-Committee has made certain recommendations for the manufacture of these products.

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Industries for the manufacture of these chemicals can, in our opinion, be best located near the sites of the sulphuric acid plants, as the acid would be required in the production of these chemicals.

(ii) *Superphosphates*.—The Chemical Industries Sub-Committee recommends that 25,000 tons of superphosphates per annum may be produced in the Bombay Province from the bone meal.

There being no mineral phosphate deposits in the Bombay Province, superphosphates will have to be manufactured from bones alone. This means that the industry will have to be located at places where bones are available in large quantities or can be collected without difficulty. Sulphuric acid is required in considerable quantity in the manufacture of superphosphates. As the industry creates nuisance, it should be located well away from inhabited areas, but should at the same time be easily accessible by rail and road. There is already a bone mill at Diva in Thana District but, in our opinion, the place is not suitable for the installation of a superphosphates plant, as the mill is situated close to inhabited areas and has no space for expansion.

We think that a superphosphates plant can advantageously be put up near Anand in Kaira District or Godhra in the Panch Mahals District, where bones could be collected easily. As has been stated above, the industry creates nuisance, and the site selected in either of these two places will have to be away from residential areas. If a plant is to be put up at Anand, it should be located at least three to four miles away from the dairies. A suitable place for locating a plant to serve the agricultural areas in the Deccan would be in the Pimpri area near Chinchwad in the Poona District, about three miles away from the military dairy. An alternative site which may be found suitable would be a place near Hadapsar in the Poona District, about three miles away from the town. Belgaum would also be suitable for the location of a superphosphates plant.

## II. Alkali and chlorine products.

The chemicals included under this head are—caustic soda, chlorine (liquid compressed), bleaching powder, soda ash, sodium bicarbonate, calcium and sodium hypo-chlorites, sodium chlorate, potassium chlorate, caustic potash and potassium carbonate.

*Caustic Soda*.—The Chemical Industries Sub-Committee recommends that the caustic soda-chlorine industry may profitably be located at or near about Bombay and Ahmedabad and that the proposed factories at Bombay should produce 25 tons a day while those at Ahmedabad should manufacture 10 tons a day. The Sub-Committee remarks that the quantity of caustic soda to be produced by electrolytic process should be determined by the amount of chlorine required by the chlorine utilising factories and that the balance should be produced by causticisation.

Caustic soda can be produced by two processes, *viz.*, by causticisation and by electrolysis of common salt. For the causticisation process, soda ash and burnt lime are required. By this process, 0.75 ton of caustic soda will be produced for each ton of soda ash used. For the electrolytic process, common salt and electricity form the chief requirements. Nearly 1.7 tons of common salt will be used for each ton of caustic soda produced. We understand that a 10 ton causticisation plant would require about 25,000 gallons of water per day, while an electrolytic plant of a similar capacity would require about 40,000 gallons of water per day. Not much labour is required, as the process is automatic.

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With regard to the location of caustic soda-chlorine factories near Bombay, we are of the opinion that a suitable site for the factories would be the Kalyan-Ambernath area, where power from the Tata Hydro-Electric System could be obtained at a reasonable rate and common salt would also be available in case electrolytic process is to be adopted. The possibilities of a place near Chiplun in Ratnagiri District in the vicinity of the Koyna hydro-electric power station and Dandeli near the Kalinadi hydro-electric power station being found suitable for electrolytic caustic soda factories may also be investigated when those hydro-electric projects are completed. The advantage of these sites would be that a very large supply of power will be available at a moderate rate, but there may be difficulties about the transport of the raw materials and finished products to and from the factories.

We agree with the Chemical Industries Sub-Committee that factories for the manufacture of chlorinated products, including potassium chlorate, should be located near those producing caustic soda by electrolytic process. We also agree that caustic potash could with advantage be produced at the factories producing electrolytic caustic soda.

### III. Other heavy chemicals.

*Bichromates, Sodium Sulphide, Sodium Hydrosulphite, Sodium Sulphite, Potassium Chloride, Sodium Bisulphite, Sodium Thiosulphate, Sodium Silicate, etc.*—The Chemical Industries Sub-Committee has suggested the manufacture of most of these products in Bombay and its suburbs.

We are of opinion that a factory for the manufacture of these products should be located at a suitable place in the Kalyan-Ambernath area, in close proximity to the acid plants which we have proposed to locate in that area. The acid or sulphur dioxide from the acid factory which is useful in the production of these chemicals will be available at a cheap rate and transport charges for acid will be saved. Such a factory could also suitably be located in the Greater Bombay area.

### FINE CHEMICALS.

*Inorganic fine chemicals.*—The Chemical Industries Sub-Committee observes that inorganic fine chemicals would be generally consumed by industries such as textile, photographic and film production, foundries and workshops, leather manufacture, electro-plating, laboratory chemicals and analytical reagents.

We are of opinion that as a general rule it would be advantageous to manufacture most of these chemicals in association with heavy chemicals industries, since these are the purified chemicals generally obtained from the commercial quality.

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market of consumption. The Sub-Committee, therefore, suggests that factories for the manufacture of these chemicals may be located at or near Bombay and Ahmedabad.

We think that the industry for the manufacture of organic fine chemicals can advantageously be developed in association with the dyestuffs industry, referred to at page 20, which we have proposed to locate in the Kalyan-Ambernath area.

*Drugs and Pharmaceuticals.*—The Chemical Industries Sub-Committee observes that all the facilities required for the large scale manufacture of drugs and pharmaceuticals are available in Bombay and recommends that Bombay would be an ideal location for a factory for manufacturing these chemicals.

We are of the opinion that as recommended by us in the case of organic fine chemicals, the industry for the manufacture of drugs and pharmaceuticals should also be located in the Kalyan-Ambernath area near the dyestuffs industry, as a number of chemical products is obtained in the manufacture of dyestuffs intermediates. Another suitable site for drugs and pharmaceuticals industry would be a place in the Greater Bombay area.

*Textile Chemicals.*—In addition to heavy and fine chemicals, starch is required for the textile industry. The Chemical Industries Sub-Committee recommends that the starch industry should be fed by indigenously grown maize having a high percentage of starch.

The requirements of the textile-industry in respect of heavy and fine chemicals will be provided by the factories manufacturing these chemicals, in regard to the location of which we have already made recommendations.

With regard to the manufacture of starch from maize, we are informed that about 193,653 acres of land in the Bombay Province are under maize cultivation, the principal maize growing area being the Panch Mahals District in which about 125,608 acres are under maize cultivation. There is already one factory at Ahmedabad manufacturing starch from maize. We are afraid that the present production of maize in the Bombay Province is not in excess of the food requirements of the people, especially the poor classes. When, however, the food situation improves and if it is found that the maize produced is in excess of the food requirements of the people, the possibility of establishing a starch factory at Godhra or any other suitable place in the Panch Mahals District may be investigated. For a starch factory, plenty of fresh and clean water is necessary. If it is found possible to import large quantities of maize from other places in India, a starch factory could be put up in the Kalyan-Ambernath area.

#### DESTRUCTIVE DISTILLATION OF WOOD : COAL GAS AND COAL TAR PRODUCTS : DYESTUFFS : AND PETROLEUM REFINING.

*Destructive distillation of wood.*—The Chemical Industries Sub-Committee observes that hard wood is required for wood distillation and that this wood would be available in the North Kanara and Belgaum forests and the Dang forest in Gujarat. In view of the market for the products obtained from wood distillation, the Sub-Committee considers that at least one or two wood distillation factories should be installed in the Bombay Province. The Sub-Committee indicates North Kanara forest and the Dang forest near Billimora in Gujarat as possible sites for the location of wood distillation plants. The Food and Forest Industries Sub-Committee, which has also dealt with this industry, has, in addition, suggested the Panch Mahals and Thana Districts as possible sites for the industry.

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As regards the Dang Forest, it is situated in the Indian States, and before it is decided to locate a plant at a suitable place near that forest it would be necessary to ascertain whether a continuous supply of wood from the forest would be available.

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For the running of a coal gas plant, continuous large supplies of coal will be required, and it is doubtful whether, in view of the existing coal shortage, it will be possible to make them available to the new plants suggested at different places by the Sub-Committee. If, however, the coal situation improves and sufficient coal can be made available for the purpose, plants could be installed at these places. We suggest that, in addition to augmenting the supply of coal gas to Bombay City, plants for the manufacture of coal gas may be installed in the first instance at Ahmedabad and Poona, which would be important consuming centres for gas. Coke, an important by-product, would be readily used up by the workshops and other factories in these places.

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None of the ports on the Western sea coast of the Province has facilities for berthing tankers up to 35 feet draft. We understand, however, that at Pir Pau, the Bombay Port Trust has provided a sufficiently deep water pier to berth vessels up to 25 feet draft. If a suitable site can be selected in Trombay at some distance from Pir Pau for the location of the petroleum refinery, tankers up to 25 feet draft, carrying crude oil, can be berthed at this pier and the oil can by a suitable arrangement be pumped to the site of the refinery in the interior. As regards road facilities, there is the Sion-Trombay Road leading to Bombay City. There is also another road leading from Mahul to Ghatkopar. A railway line from Kurla runs to Chembur and other places.

We may mention that petroleum refining is considered to be a dangerous industry and as such the refinery will have to be located at a place away from inhabited areas as well as from other industries.

#### GLASS, POTTERY, CERAMICS AND REFRACTORIES.

##### *Glass Industry.*

*Glass Bangles.*—The Chemical Industries Sub-Committee observes that there are very few factories in the Province manufacturing glass bangles. The needs of the Province are largely met by the bangle manufacturers of Ferozabad in the United Provinces, which is a big centre of glass industry. The Sub-Committee, therefore, considers that there is a field for starting more bangle factories in Bombay Province.

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*Sheet Glass.*—In view of the enhanced building activity which is expected to take place in the Province and the rapid industrialisation of the Province, the Chemical Industries Sub-Committee anticipates that large quantities of sheet glass will be consumed. There is at present no factory in the Province producing sheet glass, and the Sub-Committee recommends that a factory producing at least 20 tons of sheet glass of various grades and thicknesses per day may be installed at a suitable place near Bombay. The Sub-Committee observes that good quality of sand required for the manufacture of large quantities of glass may be available on the North Kanara coast, from which it can easily be transported by coastal sea freight. With regard to soda ash, it suggests that it may be transported to Bombay by sea route from the Tata Chemical Factory at Mithapur (Okha Port).

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Owing to the difficulties involved in the transport of glass it seems desirable to locate the industry as near the principal market as possible. We suggest that the proposed sheet glass factory may be located either in the Greater Bombay area or in the Kalyan-Ambernath area. Sheet glass industry would require skilled labour, which will have to be trained.

#### *Pottery, Ceramics and Refractories Industries.*

The Chemical Industries Sub-Committee suggests that two types of ceramics factories may be put up in the Province. The first type consisting of large scale factories may be situated in big cities like Bombay and Ahmedabad. The other type consisting of smaller units (requiring a capital of not more than Rs. one lakh) may be put up in smaller towns where the facilities of raw materials and power supply are available. The Sub-Committee, however, considers that before recommending particular sites for larger factories, it is necessary to have a complete geological survey of the Province in respect of the availability of the various raw materials required for the industry.

We agree with the Chemical Industries Sub-Committee that a geological survey of the Province in respect of the various raw materials required for the industry should be carried out in order to fix suitable sites for the factories. We understand, however, that there are deposits of suitable clay near Khanapur in Belgaum District, and Khanapur may be suitable for the manufacture of pottery and ceramics, utilising locally available clay.

We think that in case a large scale factory (for white wares of high quality) using imported clay is to be installed, it could suitably be located in the Kalyan-Ambernath area.

*Bricks.*—The Chemical Industries Sub-Committee observes that most of the present production of bricks is located at Kalyan, which supplies the needs of building trade in Bombay. The quality of these bricks is such that these cannot be used without being plastered. If better qualities of clays are used, more durable types of bricks can be manufactured. The Sub-Committee recommends that plants with modern equipment may be put up for producing about 1 crore of bricks per annum.

We consider that Bassein and Kalyan in Thana District, Derol in Panch Mahals District and Khanapur in Belgaum District where, we understand, clay of the required quality would be available, would be suitable for the manufacture of bricks.

#### CEMENT AND CEMENT PRODUCTS.

The Chemical Industries Sub-Committee states that there is at present no cement factory situated within the British territory of the Province. Both the factories producing cement are situated within the limits of Indian States, one at Dwarka and other at Porbandar. The Sub-Committee estimates that in the next five years about 600,000 tons of cement per annum would be required including the requirements of industries like cement flooring tiles, asbestos cement products and Hume pipes. That Sub-Committee, therefore, considers that even if the Province is called upon to produce 400,000 tons of cement, there will still be scope for two more cement factories in the Province, each producing 100,000 tons per annum.

The materials required in the manufacture of high grade Portland cement are limestone, clay, gypsum and fuel. We understand that limestone and clay suitable for cement manufacture are available at some places in the Province, particularly at Sevalia in Kaira District. Gypsum is not available in sufficient quantity and may

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have to be imported. If a detailed survey discloses the availability of sufficient quantity of suitable limestone, Sevalia would, in our opinion, be a suitable place for the location of a cement factory.

With regard to other sites, we would suggest that a detailed geological survey of other areas (e.g., in Bijapur District) in regard to the availability of limestone of good quality and clay in sufficiently large quantities, may first be undertaken. In our opinion, Bagalkot area in Bijapur District may also be suitable for a cement factory, if good limestone deposits in large quantities are found there.

#### INEDIBLE OILS, SOAPS, PAINTS AND VARNISHES.

*Inedible oils.*—The Chemical Industries Sub-Committee observes that as oil from non-edible seeds is utilised mostly for industrial purposes, i.e., in the manufacture of paints, varnishes, etc., the extraction of oil by big mills situated in towns or cities where there is a ready market for the oils has a distinct advantage. Some inedible vegetable oils will be utilised to a very wide extent in certain important industries of the Province and these will have, therefore, to be produced in large quantities. The Sub-Committee thinks that vegetable oil factories having the most modern equipment for the extraction of oil should be considered as likely centres for production of inedible oils.

Linseed is grown in abundance in West Khandesh, Bijapur, Nasik, Ahmednagar, Sholapur, Belgaum, Dharwar, and Satara Districts. Castor oil seeds are chiefly grown in Ahmedabad, Surat, Panch Mahals, Kaira, Broach, West Khandesh and Dharwar Districts. In our opinion oil mills for the extraction of oil from these seeds could advantageously be located at suitable places in the districts named above. We may observe that so far as Kaira and Satara Districts are concerned, Nadiad and Karad would be suitable places for the extraction of oil from castor seeds and linseed, respectively.

*Soaps.*—The Chemical Industries Sub-Committee observes that the production of soap has been carried out on a fairly large scale in the Province, and that some of the most well known factories of India producing soap are located in Bombay. Oil industry having reached a high degree of concentration large amount of soap stock would be available for the soap industry. Soap stock is produced in the neutralisation and refining of oils at 'Vanaspati' factories. The Sub-Committee considers that the 'Vanaspati' factories in the Province can be made centres of the soap industry.

The chief raw materials required for soap manufacture are vegetable oils and caustic soda. Small quantities of cocoanut oil are required for some soaps. We are of opinion that soap factories can advantageously be located near 'Vanaspati' factories as well as near caustic soda factories.

*Paints and Varnishes.*—The Chemical Industries Sub-Committee observes that no serious attempts have so far been made in this Province for establishing a full-fledged paints and pigments industry, although there is quite a developed market and important raw materials are available in the country. Bombay and places near about are well suited, so far as the availability of technical personnel and skilled labour to work in the factories is concerned.

So far as we know, natural pigments are available in Ratnagiri and Kanara Districts, which may possibly provide the necessary raw materials for distempers and paint factories. Factories for the manufacture of pigments and paints may suitably be located in the Greater Bombay area or in the Kalyan-Ambarnath area, where we have proposed to locate the industry for the manufacture of bichromates,

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etc., which will be in a position to supply the chrome pigments. Factories for the manufacture of paints may also be located near the inedible oil mills, the natural pigment deposits or the market. Varnish factories may advantageously be located near the inedible oil mills. As in the process of boiling oils obnoxious gases are evolved, measures will have to be enforced for eliminating the nuisance.

#### ELECTRO-CHEMICAL INDUSTRIES.

*Aluminium Industry.*—This industry has already been dealt with by us in Chapter II of this report relating to the metals and engineering industries.

*Hydrogen Peroxide.*—Hydrogen peroxide is manufactured by electro-chemical process. The process does not require any special raw materials except small quantities of sulphuric acid. The main requirement is electrical power. The Chemical Industries Sub-Committee, therefore, suggests that it would be suitable to put up a plant for the manufacture of hydrogen peroxide in conjunction with other electro-chemical industries.

We consider that hydrogen peroxide can advantageously be manufactured near the sulphuric acid plants and electrolytic caustic soda plants, for the location of which sites have already been suggested by us.

#### PLASTICS INDUSTRY.

The Chemical Industries Sub-Committee observes that Bombay is the largest centre for the plastic moulding industry, and recommends that the manufacture of moulding powders may suitably be undertaken in Bombay City or Suburbs, as the chief requirements of this industry are organic chemicals, which are manufactured to a large extent in Bombay. Additional advantages would be the availability of trained labour and other industrial and business facilities in Bombay.

We consider that the plastic moulding industry should be located near the market. In our opinion, places near Bombay (Greater Bombay area and Kalyan-Ambernath area), Surat, Nadiad, Poona and Panvel would be suitable for the moulding industry. The industry for the manufacture of plastics powder should be located near the dyestuffs industry, for the location of which we have already suggested a site in the Kalyan-Ambernath area. Phenol-formaldehyde, etc., required for the plastics powder industry would be available from the dyestuffs factory.

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## CHAPTER IV.

## FOOD AND FOREST INDUSTRIES.

In this chapter we deal with the food and forest industries on large scale, which the Food and Forest Industries Sub-Committee has proposed to develop and for the location of which sites are to be recommended.

## FOOD INDUSTRIES.

*Canned Foodstuff.*

The Food and Forest Industries Sub-Committee recommends that about six factories may be started for canning fruits and vegetables, each factory having a daily output capacity of about 15 tons. The Sub-Committee adds that the proposed factories should be located in or near large industrial towns and that no factory should be more than 150 to 200 miles distant from the fruit and vegetable growing centres.

Apart from the necessity for clean atmosphere and surroundings, which are essential for food industries, other important factors to be considered in connection with the location of canning industries are easy availability of raw materials of the proper quality, abundant supply of pure water and good drainage. In our opinion the most suitable centres for the canning of fruits and vegetables are places in the Vicinity of Nasik, Poona, Ratnagiri and Bulsar. Nasik and Poona are suitable for the canning of vegetables, like tomatoes, beans, peas, etc., while at Ratnagiri and Bulsar, where the best types of mangoes are grown in large numbers, their canning may be undertaken with advantage. We further consider that places in the vicinity of Jalgaon, Rahuri and Poona, where oranges and other fruits are available in large quantities, would be suitable for the bottling of fruit juices. Kumta or Ankola in North Kanara District may also be suitable for the canning of mangoes and pine-apples.

## PROCESSED FOODSTUFF.

*(i) Biscuits.*

The Food and Forest Industries Sub-Committee considers that there is a scope in the immediate future for the establishment of two more biscuit factories in the Province, each with a capacity of two tons per day.

We consider that it would be advantageous to locate these factories in the vicinity of large centres of population where the demand is likely to be considerable. From this point of view the Greater Bombay area, Ahmedabad and Poona would, in our opinion, be suitable for the location of the proposed biscuit factories.

*(ii) Cereal Food.*

*Rice flakes and puffed rice.*—The Food and Forest Industries Sub-Committee considers that there is a scope for the expansion of this industry, if the product is standardized and well packed. The Sub-Committee suggests that in addition to the existing centres new centres may be opened in Gujarat at Ahmedabad and in Khandesh at Jalgaon.

In our opinion the proper location of factories for a large scale development of this industry would be in districts in which large areas of land are under rice cultivation. Nadiad, Bulsar, Bhiwandi, Panvel, Chiplun, Dharwar, Belgaum and Haliyal may be suitable for the location of this industry.

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*Wheat and corn flakes.*—The Food and Forest Industries Sub-Committee considers that, in addition to the existing two units at Poona, two new units may be established for the further expansion of this industry. It considers that Jalgaon or Bhusawal in East Khandesh District and the vicinity of Ahmedabad would be suitable for the location of these additional units.

We are of the opinion that one factory for this industry should be located in West Khandesh District in which a large area of land is under wheat cultivation. We consider that Dondaicha, which is a railway station on the Tapti Valley Railway and which is the principal market for wheat in the District would be a suitable place for the location of this industry. Niphad in Nasik District would also be suitable for this industry. Another factory may suitably be located at a place in the Greater Bombay area. It would serve the needs of Bombay City, which will be the principal consuming centre.

### (iii) *Sugar Confectionery.*

The Food and Forest Industries Sub-Committee thinks that there is a good scope for a systematic and planned development of the confectionery industry. That Sub-Committee observes that not more than six factories, each with a capacity not exceeding 5 tons a day, may be licensed in the Province.

We are of opinion that the additional factories suggested by the Food and Forest Industries Sub-Committee, could advantageously be located near the sugar factories, as sugar is the principal raw material. Sugar in liquid form (syrup) which is required for confectionery purposes, would be readily available from the sugar factories at a cheaper rate than sugar.

### VEGETABLE (EDIBLE) OILS; VEGETABLE GHEE, ETC.

(i) *Vegetable (edible) oils.*—The Food and Forest Industries Sub-Committee recommends the installation of expellers in small towns near railway stations or trunk roads for the extraction of oil to the utmost capacity. The Sub-Committee observes that the question of selection of sites for the location of new expellers will have to be investigated on the spot and that it will have to be studied side by side with the recommended development of the oil seed growing areas.

In the light of the existing figures in regard to the production of oil seeds (groundnuts) in different areas and the number of expellers in existence in various districts, we consider that the following places would be suitable for the installation of expellers:—

Satara-Karad area in Satara District ;  
Bijapur and Bagalkot in Bijapur District ; and  
Belgaum and Hukeri in Belgaum District.

(ii) *Vegetable Ghee Industry.*—The Food and Forest Industries Sub-Committee estimates that the capacity of the vegetable product industry will have to be increased from 100,000 tons to 200,000 tons per annum by 1960. After setting off against the proposed increase of 100,000 tons, the extra production of 43,500 tons for this Province sanctioned by the Government of India under their expansion scheme up to 1950, there will remain a balance of 56,500 tons per annum. That Sub-Committee suggests that for the manufacture of this balance, suitable sites may be selected in due course.

We understand that it is the intention of the Government of Bombay to undertake legislation to prohibit the manufacture of vegetable ghee in the Province. If so, it would not be necessary to consider the question of selecting suitable sites for the

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#### SUGAR AND POWER ALCOHOL.

##### (i) *Sugar Industry.*

The Food and Forest Industries Sub-Committee estimates that there will be a 50 per cent. increase in sugar consumption in Bombay Province in ten years. To limit the import of sugar to the desired extent, the Sub-Committee suggests that the existing sugar factories having a crushing capacity of between 300 and 800 tons per day should be allowed to expand up to 800 tons per day and that new factories should be started as per recommendations of the All India Central Sugar Panel when new irrigation projects are completed. The Sub-Committee further suggests that while carrying out surveys for new irrigation schemes, the Public Works Department should mark the location of possible sites for new factories. The location should be such that cane does not have to be hauled over long distances.

In view of the observations made by the Food and Forest Industries Sub-Committee, we do not consider it necessary at this stage to make any recommendation for sites for the location of new sugar factories.

##### (ii) *Power Alcohol.*

The Food and Forest Industries Sub-Committee recommends that a new central distillery should be established for utilising molasses derived as a by-product in the process of sugar manufacture, with a view to converting it into fermentation products, e.g., industrial alcohol, citric acid, acetic acid, etc. That Sub-Committee suggests that the proposed distillery may be situated at a central place like Poona, so that existing sugar factories may not be at a distance of more than 150 miles from the proposed distillery.

In our opinion, the proposed factory could more advantageously be located near Belapur Road in Ahmednagar District, so that molasses from the sugar factories at Belapur and other adjoining areas could be readily and cheaply transported to the proposed site for the factory. We are informed that this matter was fully investigated by the Industrial Chemist of the Department of Industries and the Superintendent, Government Distillery, Nasik, in the year 1942-43, as a result of which the Director of Industries suggested to Government that the power alcohol factory might be located at Belapur. Poona, in our opinion, would not be so suitable owing to the long distance involved in transporting molasses.

#### FOREST INDUSTRIES.

##### *Pulp and Paper Industry.*

(i) *Manufacture of pulp for paper mills and rayon factories.*—The Food and Forest Industries Sub-Committee observes that good quality of pulp, which is the principal raw material for paper manufacture, can be made from bamboos, which grow in large numbers in the North Kanara forest and the Dang forest in Gujarat.

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The Sub-Committee recommends that the manufacture of pulp from bamboos may be started in the Kanara forest with a production of at least 10,000 tons per annum, and suggests that a portion of this pulp may be reserved for the rayon industry and the balance distributed to the paper mills for the manufacture of paper. In making this recommendation, the Sub-Committee observes that the bamboo available in the Kanara forest would yield pulp to the extent of 50,000 tons per annum. Electricity from the Mysore Government's Jog Power Station will be available for the pulp mill and an abundant supply of water can be obtained from the Kalinadi and Gangavalli rivers. The Sub-Committee, therefore, considers that the Kanara forest is the best site for establishing pulp manufacture on a large scale. It also observes that the Dang forest in Gujarat will yield pulp well over 3,000 tons per annum.

We agree with the Food and Forest Industries Sub-Committee that factories for the manufacture of pulp from bamboos should be located at suitable places in the North Kanara forest which abounds in bamboos. We understand that enumeration has recently been made of the bamboos available in the tracts serving Dandeli and Bomanalli sites in the Kanara forests and that it has been found that sufficiently large quantities of air dry bamboos would be available every year from these tracts for the manufacture of pulp. There is a rail head at Dandeli, and it is situated near the Kalinadi river and ample fresh water is available there. No electric power is available at present but the place will be provided with electric energy when the Kalinadi hydro-electric project comes into operation. Bomanalli, which is 11 miles away from Dandeli, is also situated on the Kalinadi river. There will, therefore, be ample supply of fresh water. Electric power is not available at present, but it may be possible to generate it from the nearby Vincholi rapids, if it is not found feasible to supply Bomanalli with electric energy from the Kalinadi hydro-electric scheme. We, therefore, recommend Dandeli and Bomanalli in Kanara District as suitable sites for the manufacture of pulp from bamboos.

Other sites which may be found suitable for the manufacture of pulp from bamboos are Supa, Sidalgundi, Sunksal, Kadra and Gundbala in North Kanara District and Khanapur in Belgaum District. Bamboos are available at or near these places but without undertaking field enumeration, it is not possible to say whether bamboos in sufficiently large quantities would be available at these places. In the circumstances, we are not in a position to make any definite recommendation for the location of a pulp factory at any of these sites. As regards Dang forest, it is understood that the forest is situated in the Indian States. If it can be ensured that sufficiently large quantities of bamboos would be available regularly from the forest, it may be possible to locate a pulp factory at a suitable site in the British territory, as near as possible to the forest.

Large quantities of pulp will be required for the rayon manufacturing factories which it is proposed to establish in Bombay Province and for the location of which we have already made our recommendations in Chapter V of this report. The pulp required for the rayon industry has to be of very good quality containing a high percentage of alpha cellulose and a very low percentage of ash. We are not aware whether any investigations have so far been made to ascertain the suitability of Kanara forest bamboos for the type of pulp required for the manufacture of rayon. If investigations show that the pulp of the required standard can be manufactured, factories may be established at some of the places mentioned above where bamboos suitable for the manufacture of pulp for the rayon industry are available.

The Sub-Committee recommends that the manufacture of pulp from bamboos may be started in the Kanara forest with a production of at least 10,000 tons per annum, and suggests that a portion of this pulp may be reserved for the rayon industry and the balance distributed to the paper mills for the manufacture of paper. In making this recommendation, the Sub-Committee observes that the bamboo available in the Kanara forest would yield pulp to the extent of 50,000 tons per annum. Electricity from the Mysore Government's Jog Power Station will be available for the pulp mill and an abundant supply of water can be obtained from the Kalinadi and Gangavalli rivers. The Sub-Committee, therefore, considers that the Kanara forest is the best site for establishing pulp manufacture on a large scale. It also observes that the Dang forest in Gujarat will yield pulp well over 3,000 tons per annum.

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(ii) *Manufacture of straw-boards, etc., from grass.*—The Food and Forest Industries Sub-Committee recommends the establishment in West Khandesh District of a big board mill, manufacturing straw boards, mill boards, etc., from grass. The Sub-Committee observes that after making provision for local cattle grazing, grass would be available in this District to ensure a production of 10,000 tons of boards per annum.

We recommend that the proposed factory for the manufacture of straw-boards and other inferior quality of paper may be located at Nardhana in West Khandesh District. Nardhana is a railway station on the Tapti Valley Railway line running from Jalgaon to Surat. It is also situated on the Bombay-Agra Road. Electric power is not available at present, but would be available under the Electric Grid scheme when the Bhandardara scheme is completed.

Another suitable site for locating a factory for the manufacture of straw-boards, etc., would be the catchment area of the Tansa Lake, where grass grows in abundance. A site near Atgaon Station on the G. I. P. Railway line running between Kalyan and Kasara, may be suitable for the location of such a factory.

We suggest that a place in Ahmednagar District which is an important centre for the manufacture of sugar, would be suitable for the manufacture of wrapping papers and sound proof boards from bagasse.

#### WOOD DISTILLATION.

The development of wood distillation industry has also been suggested by the Chemical Industries Sub-Committee. We have dealt with the industry in Chapter III of this report relating to chemical industries.

#### WOOD WORKING : PLYWOOD AND ALLIED INDUSTRIES.

(i) *Saw Mills.*—The Food and Forest Industries Sub-Committee is of opinion that the demand for sawn timber is bound to soar in the next few years, as soon as the post-war housing schemes develop and the building construction by the general public starts afresh. The Sub-Committee, therefore, considers it necessary to put up new efficient and up-to-date saw mills at suitable centres and recommends that the Forest Department should make a survey of sites suitable for the establishment of saw mills. The Sub-Committee states that good quality timber can be obtained from the forests of Kanara District and considers this District as suitable for saw-milling and allied industries. It, however, points out that the District is lacking in proper transport facilities.

We are of opinion that large saw mills should be located near the Kanara and Thana forests. Anawar, Kirwatti, Kumta and Karwar in Kanara District and Kalyan, Sanjan, Manor and Savta Bunder in Thana District may be found suitable for the location of saw mills.

(ii) *Manufacture of bobbins and shuttles.*—The Food and Forest Industries Sub-Committee observes that there is a good scope for the manufacture of bobbins and shuttles if suitable wood is made available. The Sub-Committee suggests that factories for manufacturing the same may be installed at suitable places.

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We consider that Belgaum and Khanapur in Belgaum District and Dandeli and Yellapur in Kanara District would be suitable places for the manufacture of bobbins and shuttles. Sufficient supply of water and labour are available both at Belgaum and Khanapur. There is no electric power at Khanapur. Wood will be available from the forests of Belgaum and Kanara Districts. Dandeli and Yellapur are situated in the midst of wood producing tracts. There is a rail head at Dandeli, while Yellapur is situated at a distance of 46 miles from the Hubli railway station. By road, it is situated at a distance of 45 miles from Ankola port. Water is available at both the places, but there is no electricity at either place. Labour will have to be imported. The suitability of Ankola in Kanara District for this industry may also be examined.

In our opinion, another suitable site for the manufacture of bobbins is Navapur in West Khandesh District. It is situated on the Tapti Valley Railway. The necessary wood will be available from the surrounding forest. Water supply is also available at the place, but there is no electricity at present. Transport of raw materials will be by roads and of finished products by rail to markets.

(iii) *Manufacture of plywood.*—The Food and Forest Industries Sub-Committee states that there are two plywood factories in the Province but that neither of them is yet in full operation. The Sub-Committee observes that there are large forests in Kanara District from which sufficient timber can be obtained for the plywood industry for the next twenty years. It, therefore, recommends that one more factory for the manufacture of plywood may be established on the Kanara coast.

We consider that a place in the vicinity of Madangeri (near Tadari Port) in Kanara District, where timber from several valleys could be conveyed, may be found suitable for the location of a plywood factory.

#### WOODEN SHIPBUILDING INDUSTRY.

The Food and Forest Industries Sub-Committee recommends that steps should be taken to promote the shipbuilding industry in the Bombay Province.

We would observe that small country crafts can be built at several small ports on the Western coast of the Province. If particular places are to be considered, we suggest that until the question of the development of Bhatkal port is decided, the suitability of Karwar port for the shipbuilding industry may be considered. Timber required for the industry would be available at the place. Another suitable site for shipbuilding would, in our opinion, be Bulsar in Surat District, where this industry existed in the past.

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## CHAPTER V.

## TEXTILE INDUSTRIES.

In this chapter we deal with the large scale textile industries which the Textile Industries Sub-Committee has proposed to develop and for the location of which sites are to be selected.

## COTTON TEXTILE INDUSTRY.

(a) *Cotton Textile.*—The Textile Industries Sub-Committee estimates that the production of cloth in the Bombay Province will have to be increased by 530,500,000 yards. If this expansion is to take place in counts 40s and finer, it will require an expansion of one and a quarter million spindles and a corresponding number of looms, namely 30,000. The Sub-Committee considers that the Bombay Province is most suited, at least for many years to come, for the development of the fine counts industry. It also feels that additional 350,000 spindles should be installed in the Bombay Province to meet the yarn requirements of the handloom industry.

The Textile Industries Sub-Committee, while recommending the installation of new 1,600,000 spindles in all, has not given any indication of the number of new mills which would have to be established to give effect to its proposals. It, however, appears that in case the recommendations made by that Sub-Committee for the expansion of the industry are accepted, a number of new mills will have to be established in the Province. We understand that the Central Government do not propose, under their present post-war development plan which is an interim one, to allow any new mills to be established in the Province, as Bombay is considered to be a surplus Province in respect of the cotton textile industry. If, however, new cotton textile mills are to be established in the Province at a later date, suitable sites will have to be found for such mills. We have, therefore, considered it advisable to make suggestions in respect of suitable sites for new cotton mills.

In the first instance we would observe that, in view of the congestion already prevailing, no new cotton textile mills, if and when permitted, should be allowed to be erected within the city limits of Bombay and Ahmedabad. We may, however, observe that the Greater Bombay area would, in our opinion, be suitable for locating cotton textile mills (fine counts) and sewing thread industry. The vicinity of Ahmedabad would also be suitable for the sewing thread industry. In connection with the question of location of new textile mills in the mofussil, we are of opinion that they should be located either in cotton growing centres or, especially in the case of spinning mills, in centres where there is handloom industry. We suggest that the following places, in addition to those in various districts where cotton mills are located at present except the city limits of Bombay and Ahmedabad, may be considered for the possible establishment of new cotton textile mills:—

*East Khandesh District.*—

Jamner and Erandol (spinning or composite mills according to the requirements of these places).

*West Khandesh District.*—

Nandurbar and Dondaicha.

*Nasik District.*—

Malegaon (spinning mill only).

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Jamner and Erandol (spinning or composite mills according to the requirements of these places).

*West Khandesh District*.—

Nandurbar and Dondaicha.

*Nasik District*.—

Malegaon (spinning mill only).

*Satara District.—*

Karad.

*Ahmednagar District.—*

Rahuri (spinning mill only).

*Belgaum District.—*

Belgaum, Kudchi and Athni (spinning mills only).

*Dharwar District.—*

Ranebennur.

*Bijapur District.—*

Bagalkot (spinning mill only).

*Brouch District.—*

Ankleshwar.

The establishment of mills at these places will, however, depend on the availability of good supply of water. Electric power is not available at present at Jamner, Erandol, Dondaicha, Rahuri, Kudchi and Ankleshwar, although some of these places may be covered by the Electric Grid Scheme.

(b) *Finishing, Dyeing and Printing Industry.*—The Textile Industries Sub-Committee is of the opinion that as the standard of living improves in the country, the demand for bleached, dyed and printed varieties of cloth will increase and it is, therefore, most important that this side of the industry should also be developed so as to keep pace with the growing demands. The Sub-Committee recommends that special sites for this industry, which requires large and cheap supply of water, should be reserved in the localities where water is available in abundance and that such sites should have adequate road and rail facilities. It also considers it advisable that the sites which may be selected should not be far from the sources of supplies of grey cloth, heavy chemicals and dyes and should be so situated that the distribution of the finished cloth can be achieved as economically as possible.

In view of the observations made by the Textile Industries Sub-Committee, we are of opinion that the Finishing, Dyeing and Printing industry should principally be located at places as near as possible to the existing two main centres of the cotton textile industry, namely, Bombay and Ahmedabad. We, therefore, recommend that the proposed industry may be located at a suitable place either in the Greater Bombay area or in the Kalyan-Ambernath area. With regard to Ahmedabad, we think that Barejadi or some other place away from the town, which may be recommended by the Ahmedabad Municipality, would be suitable for the industry.

In view of the large number of small weaving factories at the place, Surat, in our opinion, would also be suitable for the development of this industry. The chemicals required for the industry will, however, have to be obtained from Bombay.

*Satara District.*—

Karad.

*Ahmednagar District.*—

Rahuri (spinning mill only).

*Belgaum District.*—

Belgaum, Kudchi and Athni (spinning mills only).

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### RAYON INDUSTRY.

The Textile Industries Sub-Committee recommends the installation in the Bombay Province of three factories for the manufacture of rayon, each producing between five to ten tons per day. With regard to the location of the proposed three factories, that Sub-Committee suggests investigation into the suitability of sites situated in the areas named below:—

Surat (Bank of Tapti River); Kalyan area; Patalganga river area; Kundalika river area; a site near the Koyna hydro-electric project; and a site near the Kalinadi hydro-electric project, using Karwar as a port.

The principal raw materials required for the manufacture of rayon are pulp of a high quality and chemicals. The industry also requires constant fresh and abundant supply of soft water and large quantities of cheap power. Disposal of the effluents is also a factor of considerable importance from the point of view of location. Taking into consideration all the factors, we are of opinion that the Kalyan and Patalganga river areas would be suitable for the location of rayon industry. We, however, understand that power is not available at sites in the immediate vicinity of the Patalganga River and that it may be cheaper to carry water from the river to Panvel where power is available, than to carry power to the riverside. We, therefore, consider that the neighbourhood of Panvel would be more suitable for the location of the industry than the immediate vicinity of the river. If, however, it is considered desirable to locate the industry as near as possible to the river, a place near the tidal waters area, *e.g.* Kharpada, may be suitable. We are doubtful whether Surat and the Kundalika river area would be suitable. The possibility of Chiplun and the Kalinadi area for locating this industry should be investigated when the Koyna and Kalinadi hydro-electric projects, respectively, are completed.

### WOOLLEN INDUSTRY.

The Textile Industries Sub-Committee is of the opinion that in view of the necessity of importing finer varieties of wool from abroad, the expansion of the woollen industry should take place in the vicinity of Bombay City.

If it is found possible to develop the woollen industry as suggested, we consider that the Kalyan-Ambernath area would be suitable for its location.

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## CHAPTER VI.

## MISCELLANEOUS INDUSTRIES.

In this chapter we deal with the leather and leather goods, glue and gelatine and rubber goods industries on large scale, which the Miscellaneous Industries Sub-Committee has proposed to develop and for the location of which sites are to be selected.

## LEATHER AND LEATHER GOODS INDUSTRIES.

(1) *Vegetable Tanning.*

*Pit tanning.*—The Miscellaneous Industries Sub-Committee recommends that seven new tanneries for pit tanning, each producing 100 buffalo hides a day, may be established in the next five years. The sites for pit tanning suggested by the Sub-Committee are Ahmedabad and Godhra in the Northern Division, Nandurbar, Ahmednagar or Nasik, Sholapur and Satara in the Central Division, and Belgaum or Hubli in the Southern Division.

Before dealing with the question of sites, we desire to point out that tanneries come under the category of noxious trades and strict control is, therefore, necessary over their location. Care will have to be taken to see that they are situated as far away as possible from residential areas, that hygienic conditions are maintained in the factories and that the disposal of trade waste is properly regulated. The effluents must be suitably treated and should not be allowed to pass into nallas untreated.

At the outset we may observe that the number of buffalo hides produced in Bombay Province in the years 1943-44 and 1944-45 was estimated at 217,891 and 218,896 pieces, respectively, while the annual requirements of the proposed seven new tanneries, including those of the existing tanneries, would be about 300,000 buffalo hides. We are, therefore, doubtful whether it would be possible for all the seven new tanneries to obtain sufficient number of raw hides in this Province to enable them to tan 100 buffalo hides each per day.

We have given careful consideration to the question of selection of sites for tanneries and are of the opinion that places near Ahmedabad and Godhra in the Northern Division, Poona, Satara, Sholapur, Malegaon and Nandurbar in the Central Division and Belgaum in the Southern Division would be suitable for the location of tanneries. All these tanneries should be located fairly away from residential areas. We are not in favour of establishing a tannery at Nasik, as in our opinion, Malegaon, which we have recommended instead, is more suitable. We understand that hides and skins in large numbers are available at Malegaon. Labour, water supply, market and good transport facilities by roads are also available at this place. We do not consider it advisable to locate another tannery at Ahmednagar, as there are already two large tanneries at the place and we understand that raw hides and skins have to be imported from outside the District, as those that are available in the District are not found sufficient to meet their requirements. Moreover the water supply at Ahmednagar is also deficient.

(2) *Chrome Tanning.*

The Miscellaneous Industries Sub-Committee has stated that at present there are only three chrome tanneries in the Province, producing 300 pieces a day. To meet the estimated requirements (1,300 hides a day) the Sub-Committee observes that it may be possible in the next five years to establish five additional chrome tanneries, each producing 200 pieces per day.

## CHAPTER VI.

## MISCELLANEOUS INDUSTRIES.

In this chapter we deal with the leather and leather goods, glue and gelatine and rubber goods industries on large scale, which the Miscellaneous Industries Sub-Committee has proposed to develop and for the location of which sites are to be selected.

## LEATHER AND LEATHER GOODS INDUSTRIES.

(1) *Vegetable Tanning.*

*Pit tanning.*—The Miscellaneous Industries Sub-Committee recommends that seven new tanneries for pit tanning, each producing 100 buffalo hides a day, may be established in the next five years. The sites for pit tanning suggested by the Sub-Committee are Ahmedabad and Godhra in the Northern Division, Nandurbar, Ahmednagar or Nasik, Sholapur and Satara in the Central Division, and Belgaum or Hubli in the Southern Division.

Before dealing with the question of sites, we desire to point out that tanneries come under the category of noxious trades and strict control is, therefore, necessary over their location. Care will have to be taken to see that they are situated as far away as possible from residential areas, that hygienic conditions are maintained in the factories and that the disposal of trade waste is properly regulated. The effluents must be suitably treated and should not be allowed to pass into nallas untreated.

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We consider that the places suggested for vegetable (pit) tanneries, particularly Ahmedabad, Sholapur and Belgaum as well as the Greater Bombay area would also be suitable for the location of chrome tanning factories.

(3) *Miscellaneous Tanning.*

(i) *Glace Kid, Chrome-suede, etc.*—The Miscellaneous Industries Sub-Committee considers that in the next five years it should be possible to establish eight tanneries each producing 500 pieces per day of glace kid and chrome-suede.

The sites recommended by us for chrome tanning would also be suitable in our opinion for the location of glace kid and chrome-suede tanning factories.

(ii) *Oil Tanning.*—The Miscellaneous Industries Sub-Committee states that the requirements of this Province in regard to chamois leather are at present met by imports from Madras, Calcutta and overseas. The Sub-Committee points out that the raw materials required for this type of tanning, viz. heavy goat skins and fish oil, are available in the Province, and suggests that the manufacture of this leather should be encouraged in the Province.

We consider that oil tanning factories may be located in the vicinity of chrome tanneries.

(iii) *Specially dressed leathers.*—The Miscellaneous Industries Sub-Committee observes that dressed leather (namely, case hides, moroccos, roller skins, etc.) which is produced in Bombay City by hand process is not sufficient to meet the local requirements. The Sub-Committee, therefore, recommends that four machine-operated finishing factories, one in Bombay City and one each in the three divisions should be installed, each with an output of 500 skins and 50 hides per day.

We recommend that the machine operated factory suggested for Bombay City may be located in the Greater Bombay area. -Of the proposed three other factories, we suggest that one may be located in the vicinity of Ahmedabad in the Northern Division, the other may be established at Nasik in the Central Division, while the third one may be set up at Belgaum in the Southern Division.

FINISHED LEATHER GOODS.

(i) *Industrial Leather Goods.*—The Miscellaneous Industries Sub-Committee considers that industrial leather goods are in great demand and that with the improvement in quality and an effective approach to the purchasers, this industry has a fair chance of development. Pickers, belting, picking bands, buffers, laces and strapping, washers, roller skins and gloves are classed as industrial leather goods. These goods are manufactured from raw hides, pressed buffalo hides or sheep skins.

In our opinion this industry can suitably be established at places where tanneries are situated. From the point of view of the availability of raw materials, labour, market, transport facilities, etc, we consider that the vicinity of Ahmedabad, Nadiad, Godhra and Broach in the Northern Division, Poona, Karad, Sholapur, Malegaon and Nandurbar in the Central Division and Hubli and Belgaum in the Southern Division would be suitable for the location of this industry.

(ii) *Footwear (Western Type).*—The Miscellaneous Industries Sub-Committee suggests that two mechanised shoe factories may be established in the Province in the first five years, one at Ahmedabad and the other at Poona, each producing 800 machine made pairs of shoes per day, and that six similar factories be started in the following five years, near convenient industrial centres.

We consider that the places suggested for vegetable (pit) tanneries, particularly Ahmedabad, Sholapur and Belgaum as well as the Greater Bombay area would also be suitable for the location of chrome tanning factories.

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We agree with the Sub-Committee that of the proposed two factories, one may be located near Ahmedabad and the other near Poona. It is understood that the factories require to be located at places where humidity is much less. The climatic conditions in Ahmedabad and Poona are, therefore, suitable for the proposed factories. Leather required by the proposed factory at Ahmedabad can be readily obtained from the tanneries located near that place. The Poona factory can meet its leather requirements from the tanneries in Poona and the adjoining places. We are of opinion that if a dehumidifying plant could be installed, such a factory could also be established in the Greater Bombay area. We also consider that places near Nasik and Belgaum would be suitable for locating additional mechanised shoe factories, if and when required.

(iii) *Traveller's requisites and fancy leather goods.*—The Miscellaneous Industries Sub-Committee states that this industry is a cottage industry localised in Bombay City and observes that its entire production is hand-made, using sewing machines for stitching small and fancy articles. Articles like suit cases, attache cases, medicinal cases, wallets, purses, brief cases, hand bags, kit bags, etc., fall under this head.

In case the goods falling under this head are to be manufactured on a large scale, we consider that the vicinity of Ahmedabad and Surat in the Northern Division, Poona, Nasik, Ahmednagar, Sholapur, Satara or Karad and Dhulia in the Central Division and Hubli and Belgaum in the Southern Division would be suitable for the location of this industry.

#### *Gut Manufacture.*

Guts which are manufactured from the intestines of slaughtered animals, are generally used for gutting rackets, casings for sausages, etc. and for surgical requirements. The Miscellaneous Industries Sub-Committee has not made any recommendation for the expansion of the industry.

We consider that factories for the manufacture of guts and casings for sausages should be located near big slaughter houses. Places near Ahmedabad, Poona, Ahmednagar, Sholapur, Bijapur and Belgaum would be suitable for this industry. The Greater Bombay area would also be suitable for the location of a factory for the manufacture of guts.

#### OIL AND LEATHER CLOTH INDUSTRY.

The Miscellaneous Industries Sub-Committee states that there is one factory in Bombay Province producing oil and leather cloth, e.g. rexine, oil cloth, book-binding cloth, etc. The raw materials required are cotton cloth, canvas, linen, colours and chemicals for preparing paste and varnish. The Sub-Committee has not suggested the establishment of a new factory.

In our opinion a large scale oil and leather cloth factory can suitably be located in the Kalyan-Ambernath area.

#### GLUE AND GELATINE INDUSTRIES.

The Miscellaneous Industries Sub-Committee considers that there is a scope at present for establishing one fairly large glue factory in the Province. That body thinks that places like Deolali and Poona, which have low rainfall and the temperatures in summer are not very high, would be more suitable for locating a glue factory.

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In its opinion, a suburb of Bombay, in close proximity to main tanneries, would also be suitable for a glue factory, if dehumidifying plants are installed, as Bombay would furnish the major quantity of the raw material and would also be the largest market for the finished product. Glue industry is a subsidiary of the tanning industry. Waste fleshings, hide-cuttings and picker-cuttings, which are of no use for being made into leather, and worn out pickers discarded by the textile mills are used for the manufacture of glue. This product can also be prepared from fish and bones. Glue is considered to be an important industry, as it is used practically in every important industry, such as, the textile industry, wood and furniture industry, paper, straw-board and printing industry, and match, paint, varnish and chemical industries.

We consider that suitable sites for the manufacture of glue would be places in the vicinity of tanning centres, where the required raw materials are already available. Glue manufacture can be undertaken at every tanning centre. In our opinion, the vicinity of Ahmedabad, Poona, Malegaon, Ahmednagar and Satara or Karad would be suitable for glue manufacture.

Gelatine is a refined variety of glue. Its manufacture, though analogous to that of glue, requires considerable skill and care. Factories for the manufacture of gelatine can also be established at suitable places near Poona, Malegaon and Ahmednagar.

If the manufacture of glue and gelatine is to be undertaken near Bombay City, it can be done at a suitable place in the Greater Bombay area.

#### RUBBER GOODS INDUSTRIES.

The Miscellaneous Industries Sub-Committee observes that the rubber industry in India possesses natural advantages for its development and expansion in the form of abundant supply of raw materials, cheap power, labour and good market. Most of the raw materials, except sulphur, carbon black and accelerators, are available in the country. Sufficient quantities of raw rubber are available from South India, Burma and Malaya. The Sub-Committee states that Bombay Province, situated on the west coast and with its vast hinterland fed by railways and other transport facilities, enjoys an excellent position for the development of rubber industry.

The Miscellaneous Industries Sub-Committee has classified the rubber industry under the following heads :—

- (i) Tyres and tubes.
- (ii) Rubber footwear.
- (iii) Extruded and moulded rubber goods.
- (iv) Mechanical rubber goods.
- (v) Proofed rubber goods.
- (vi) Latex rubber goods.

The Sub-Committee, while recommending certain measures for the development of most of the rubber industries mentioned above, has not made suggestions for the establishment of new factories for any of these industries. We understand that the rubber industries mostly require semi-skilled labour and that it can be easily trained. Continuous flow of water will be required for cooling purposes. An average factory, other than that manufacturing tyres and tubes, would require

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about 2,000 to 3,000 gallons of water per day of 8 hours. We also understand that the effluent emitted from the rubber factories is not harmful and that its disposal can be arranged suitably.

*Tyres and tubes.*—The Miscellaneous Industries Sub-Committee states that in view of the huge production and powerful organisation of the existing foreign owned tyre and tube factories, there seems very little chance of any new Indian owned concern to enter this field.

We consider that if it is found possible to establish a factory for the manufacture of bicycle tyres and tubes, the Greater Bombay area, the Kalyan-Ambernath area or Poona would be suitable for its location.

*Rubber footwear ; extruded and moulded rubber goods ; mechanical rubber goods ; proofed rubber goods.*—The Miscellaneous Industries Sub-Committee has not recommended the establishment of any new factories.

We consider, however, that the Greater Bombay area, the Kalyan-Ambernath area, and the vicinity of Ahmedabad, Poona and Sholapur would be suitable for the location of factories for these rubber industries.

*Latex rubber goods.*—No sites for the location of factories producing these goods are suggested, as we are of opinion that the industry can best be developed at present on a cottage industry basis.

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## CHAPTER VII.

## SUMMARY OF RECOMMENDATIONS.

## METALS AND ENGINEERING INDUSTRIES.

If, as it is understood, the proposal in regard to the basic iron and steel industry is to first instal a plant to produce steel only by re-melting scrap in open hearth steel furnaces, the Kalyan-Ambernath area would be suitable for the location of such a plant.

A factory for the production of special steel in electric furnaces can suitably be located in the Kalyan-Ambernath area provided that power from the Tata Hydro-Electric System could be made available at a reasonable rate. Another suitable site for this industry would be Chiplun in Ratnagiri District when the Koyna hydro-electric project is completed.

The most advantageous location for the steel re-rolling industry would be in the Kalyan-Ambernath area, near the iron and steel industry. If supplies of billets could be ensured at these places, Nadiad, Bhusawal and Hubli may also be suitable for the location of this industry.

The sites suggested for the steel re-rolling industry would also be suitable for the manufacture of wire and wire products, as well as bolts, nuts, rivets, etc.

The Kalyan-Ambernath area would be suitable for the location of a smelter for the production of electrolytic copper, if the necessary amount of water and power could be made available at the place. Another suitable site would be Chiplun, when the Koyna hydro-electric project is completed.

Factories for the production of ferro-manganese could be located at suitable places in the Panch Mahals District and Belgaum and Kanara Districts, if power in the required quantities could be made available in these Districts. Failing this, the Kalyan-Ambernath area would be suitable for the location of the industry, if, as is presumed, the necessary amount of power will be available in that area. Another site which might be suitable would be a place near Chiplun, when the Koyna hydro-electric project is completed.

The Kalyan-Ambernath area, the vicinity of Ahmedabad or Nadiad, Poona or Nasik and Hubli would be suitable for the location of factories for refining non-ferrous scrap.

The vicinity of Ahmedabad or Nadiad, and Nasik or Poona would be suitable for the location of the proposed rolling mills for the production of brass and copper sheets and circles. Poona would be more suitable than Nasik.

A site near Belgaum, round about which bauxite deposits are located, would be suitable for establishing a refinery to convert bauxite into alumina. Kalyan is suggested as a suitable place for locating a plant for the Tungar Hill bauxite deposits. But the possibility of establishing a refinery in the vicinity of Bassein, which will be much nearer these deposits, may also be investigated.

The plant for the reduction of alumina to metal should be located near Chiplun in close proximity to the Koyna hydro-electric power station. The possibility of locating a reduction plant near the Kalinadi hydro-electric power station may be investigated, when the Kalinadi project is completed.

Factories manufacturing non-ferrous semies can also advantageously undertake the manufacture of aluminium semies.

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Factories manufacturing non-ferrous semies can also advantageously undertake the manufacture of aluminium semies.

Poona, Nadiad and Hubli may be suitable for locating the prime movers industry. The Kalyan-Ambernath area would be suitable for locating factories manufacturing large machines.

Poona and Hubli may be suitable for the location of the machine tools industry.

The Greater Bombay area and the Kalyan-Ambernath area would be suitable for the location of the industry for the manufacture of transformers and electric motors. Poona may also be found suitable for the location of this industry.

Surat and Nadiad in the Northern Division, Poona and Dhulia in the Central Division, and Belgaum and Dharwar or Hubli in the Southern Division would be suitable for the establishment of factories for the manufacture of dry batteries and cells.

The sites recommended for the location of factories for the manufacture of dry batteries and cells would also be suitable for the manufacture of secondary batteries.

Surat and Nadiad in the Northern Division, Poona in the Central Division and Hubli and Belgaum in the Southern Division would be suitable for the location of the incandescent lamps (electric) industry.

The manufacture of electric table fans can best be undertaken by factories manufacturing electric motors, transformers, etc. If this is not found possible, the Greater Bombay area, the Kalyan-Ambernath area and Surat would be suitable for locating this industry.

The proposed factories for the manufacture of modern simpler types of cotton textile machinery may be located in the Greater Bombay area or in the Kalyan-Ambernath area and in the suburbs of Ahmedabad. Other places suitable for the location of this industry would be Sholapur in the Central Division and Hubli in the Southern Division.

The vicinity of Ahmedabad or Nadiad in the Northern Division and Hubli in the Southern Division would be suitable for the location of factories for the manufacture of steel safes, cabinets, etc.

Ahmedabad and Poona may be suitable for the location of the industry for the manufacture of bicycles.

The Greater Bombay area would be suitable for the location of the industry for the manufacture of radios.

The refrigeration (electrical) industry may be located at a suitable place in the Greater Bombay area or in the Kalyan-Ambernath area.

The industry for the manufacture of scientific and surgical instruments could be advantageously established in the Greater Bombay area or in the Kalyan-Ambernath area. Poona and Surat may also be found suitable for the establishment of this industry.

Anand in the Northern Division, Poona in the Central Division, and Hubli in the Southern Division may be found suitable for the location of factories for the manufacture of agricultural implements. The possibility of locating a factory at Bijapur may also be examined.

If it is found possible to establish the wagon building industry, Manmad junction would be a suitable location for the proposed assembling unit. Dohad on the B. B. & C. I. Railway line would also be suitable for locating this industry.

The Kalyan-Ambernath area would be suitable for the location of the structural engineering industry.

Poona, Nadiad and Hubli may be suitable for locating the prime movers industry. The Kalyan-Ambernath area would be suitable for locating factories manufacturing large machines.

Poona and Hubli may be suitable for the location of the machine tools industry.

The Greater Bombay area and the Kalyan-Ambernath area would be suitable for the location of the industry for the manufacture of transformers and electric motors. Poona may also be found suitable for the location of this industry.

Surat and Nadiad in the Northern Division, Poona and Dhulia in the Central Division, and Belgaum and Dharwar or Hubli in the Southern Division would be suitable for the establishment of factories for the manufacture of dry batteries and cells.

The sites recommended for the location of factories for the manufacture of dry batteries and cells would also be suitable for the manufacture of secondary batteries.

Surat and Nadiad in the Northern Division, Poona in the Central Division and Hubli and Belgaum in the Southern Division would be suitable for the location of the incandescent lamps (electric) industry.

The manufacture of electric table fans can best be undertaken by factories manufacturing electric motors, transformers, etc. If this is not found possible, the Greater Bombay area, the Kalyan-Ambernath area and Surat would be suitable for locating this industry.

The proposed factories for the manufacture of modern simpler types of cotton textile machinery may be located in the Greater Bombay area or in the Kalyan-Ambernath area and in the suburbs of Ahmedabad. Other places suitable for the location of this industry would be Sholapur in the Central Division and Hubli in the Southern Division.

The vicinity of Ahmedabad or Nadiad in the Northern Division and Hubli in the Southern Division would be suitable for the location of factories for the manufacture of steel safes, cabinets, etc.

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The Greater Bombay area, the Kalyan-Ambernath area, Ahmedabad, Surat, Poona, Sholapur, Jalgaon, Dhulia and Hubli would be suitable for the location of the iron casting industry.

The Kalyan-Ambernath area and Chiplun, the latter one on the completion of the Koyna hydro-electric project, would be suitable for the manufacture of steel castings.

Forging and drop stamping industry may suitably be located near general engineering works, shipyards, etc.

Welding industry may be suitably located near large engineering workshops, shipyards, etc.

The industry for the manufacture of metal cans and drums can best be located in the Greater Bombay area or in the Kalyan-Ambernath area. The manufacture of food cans can conveniently be carried out near places where the canning of foodstuffs is undertaken.

The metal cutting tools industry should be located either in the Kalyan Ambernath area or near Chiplun in the vicinity of the proposed electric steel factory on the completion of the Koyna hydro-electric project.

Poona, Ahmedabad and Surat would be suitable for the location of the industry for the manufacture of clocks.

#### CHEMICAL INDUSTRIES.

The Kalyan-Ambernath area and Barejadi or some other place near Ahmedabad would be suitable for the location of the proposed sulphuric acid plants.

Industries for the manufacture of nitric and hydrochloric acids, ferric alum, epsom salt, etc., may best be located near the sites of the sulphuric acid plants.

Anand in Kaira District or Godhra in the Panch Mahals District would be suitable for the location of a plant for the manufacture of superphosphates. Pimpri area near Chinchwad or a place near Hadapsar, both in Poona District, would be suitable for a superphosphates plant to serve agricultural areas in the Deccan. Belgaum would also be suitable for the location of a superphosphates plant.

A caustic soda plant may be located at Barejadi or some other suitable place near Ahmedabad. For the location of the industry near Bombay City, the Kalyan-Ambernath area would be suitable. The possibilities of a place near Chiplun in the vicinity of the Koyna hydro-electric power station and Dandeli near the Kalinadi hydro-electric power station, being found suitable for electrolytic caustic soda factories may also be investigated when those hydro-electric projects are completed.

Factories for the manufacture of chlorinated products, including potassium chlorate, should be located near those producing caustic soda by electrolytic process. Caustic potash could be produced at the factories producing electrolytic caustic soda.

A factory for the manufacture of other heavy chemicals (*e.g.*, bichromates, etc.) should be located at a suitable place in the Kalyan-Ambernath area, in close proximity to the acid plants. Such a factory could also suitably be located in the Greater Bombay area.

It would be advantageous, as a general rule, to manufacture most of the inorganic fine chemicals in association with the heavy chemicals industries.

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It would be advantageous, as a general rule, to manufacture most of the inorganic fine chemicals in association with the heavy chemicals industries.

The industry for the manufacture of organic fine chemicals can advantageously be developed in association with the dyestuffs industry proposed to be located in the Kalyan-Ambernath area.

The industry for the manufacture of drugs and pharmaceuticals should also be located in the Kalyan-Ambernath area. Another suitable site for this industry would be a place in the Greater Bombay area.

When the present food situation improves and if it is found that the maize produced is in excess of the food requirements of the people, the possibility of establishing a starch factory at Godhra or any other suitable place in the Panch Mahals District may be investigated. If it is found possible to import large quantities of maize from other places in India, a starch factory could be put up in the Kalyan-Ambernath area.

Bomanalli, Yellapur, Sirsi, Kadra and Shirgunji in Kanara District, Navapur in West Khandesh District, Kalyan, Vasind and Dahanu Road in Thana District, Khandia, Chabunpur and Chanchalav in the Panch Mahals District, Khopoli, Nagothana and Roha in Kolaba District and Londa in Belgaum District, would be suitable for locating wood distillation plants. A plant could also be located at a suitable place near the Dang forest (which is situated in the Indian States) after ascertaining whether a continuous supply of wood from the forest would be available.

If the coal situation improves and sufficient coal can be made available, it is suggested that, in addition to augmenting the supply of coal gas to Bombay City, plants for the manufacture of coal gas may be put up in the first instance at Ahmedabad and Poona.

The dyestuffs industry should be located at a suitable place in the Kalyan-Ambernath area in the vicinity of the heavy chemicals industry (*e.g.*, sulphuric acid, caustic soda, etc.)

A suitable site may be selected in Trombay at some distance from Pir Pau for the location of the petroleum refinery.

It would be advantageous to locate large scale factories for the manufacture of glass bangles at places near glass factories.

The proposed sheet glass factory may be located either in the Greater Bombay area or in the Kalyan-Ambernath area.

A geological survey of the Province in respect of the various raw materials required for the pottery, ceramics, etc., industry should be carried out in order to determine suitable sites for the factories. Khanapur in Belgaum District may be suitable for the manufacture of pottery and ceramics, utilising locally available clay. In case a large scale factory (for white wares of high quality) using imported clay is to be installed, it could suitably be located in the Kalyan-Ambernath area.

Bassein and Kalyan in Thana District, Derol in the Panch Mahals District and Khanapur in Belgaum District would be suitable for the manufacture of bricks.

Sevalia in Kaira District would be a suitable site for the location of a cement factory. A detailed geological survey of other areas (*e.g.*, in Bijapur District) in regard to the availability of limestone of good quality and clay in sufficiently large quantities may first be undertaken. Bagalkot area in Bijapur District may also be suitable for a cement factory, if good limestone deposits in large quantities are found there.

Mills for the extraction of linseed oil could advantageously be located at suitable places in West Khandesh, Bijapur, Nasik, Ahmednagar, Sholapur, Belgaum, Dharwar

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Mills for the extraction of linseed oil could advantageously be located at suitable places in West Khandesh, Bijapur, Nasik, Ahmednagar, Sholapur, Belgaum, Dharwar

and Satara Districts, while those for the extraction of castor oil could be located at suitable places in Ahmedabad, Surat, Panch Mahals, Kaira, Broach, West Khandesh and Dharwar Districts. Nadiad and Karad would be suitable places for the extraction of oil from castor seeds and linseed, respectively.

Soap factories can advantageously be located near "Vanaspati" factories as well as near caustic soda factories.

Factories for the manufacture of pigments and paints may suitably be located in the Greater Bombay area or in the Kalyan-Ambernath area. Factories for the manufacture of paints may also be located near the inedible oil mills, the natural pigment deposits or the market, while the varnish factories may advantageously be located near the inedible oil mills.

Hydrogen peroxide can advantageously be manufactured near the sulphuric acid plants and electrolytic caustic soda plants.

Places near Bombay (Greater Bombay area and Kalyan-Ambernath area), Surat, Nadiad, Poona and Panvel would be suitable for the location of the plastic moulding industry. The industry for the manufacture of plastics powder should be located near the dyestuffs industry.

#### FOOD AND FOREST INDUSTRIES.

##### *Food Industries.*

Nasik and Poona are suitable for the canning of vegetables, while at Ratnagiri and Bulsar canning of mangoes may be undertaken with advantage. Places in the vicinity of Jalgaon, Rahuri and Poona would be suitable for the bottling of fruit juices. Kumta or Ankola in Kanara District may also be suitable for the canning of mangoes and pine-apples.

The Greater Bombay area, Ahmedabad and Poona would be suitable for the location of biscuit factories.

Nadiad, Bulsar, Bhiwandi, Panvel, Chiplun, Dharwar, Belgaum and Haliyal may be suitable for the location of factories for the manufacture of rice flakes and puffed rice.

The Greater Bombay area, Dondaicha in West Khandesh District and Niphad in Nasik District would be suitable for the location of factories for the manufacture of wheat and corn flakes.

Factories for the manufacture of sugar confectionery could advantageously be located near the sugar factories.

For the location of expellers for the extraction of oil (edible), Satara-Karad area in Satara District, Bijapur and Bagalkot in Bijapur District and Belgaum and Hukeri in Belgaum District, would be suitable.

If new vegetable ghee factories are to be permitted, these could best be located near the oil extraction centres in East Khandesh, Satara, Dharwar and Belgaum Districts.

The proposed power alcohol factory could be advantageously located near Belapur Road in Ahmednagar District.

##### *Forest Industries.*

Dandeli and Bomanalli in Kanara District would be suitable for the manufacture of pulp from bamboos.

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##### *Forest Industries.*

Dandeli and Bomanalli in Kanara District would be suitable for the manufacture of pulp from bamboos.

The proposed factory for the manufacture of straw-boards and other inferior quality of paper from grass may be located at Nardhana in West Khandesh District. A site near Atgaon Station on the G. I. P. Railway line running between Kalyan and Kasara, in the vicinity of the catchment area of the Tansa Lake, may also be suitable for the location of such a factory.

A place in Ahmednagar District would be suitable for the manufacture of wrapping papers and sound proof boards from bagasse.

Alnawar, Kirwatti, Kumta and Karwar in Kanara District and Kalyan, Sanjan, Manor and Savta Bunder in Thana District may be found suitable for the location of large saw mills.

Belgaum and Khanapur in Belgaum District and Dandeli and Yellapur in Kanara District would be suitable places for the manufacture of bobbins and shuttles. The suitability of Ankola in Kanara District for this industry may also be examined. Navapur in West Khandesh District would be another suitable site for the manufacture of bobbins.

A place in the vicinity of Madangeri (near Tadari port) in Kanara District may be found suitable for the location of a plywood factory.

Until the question of the development of Bhatkal port is decided, the suitability of Karwar port for the shipbuilding industry may be considered. Another suitable site for the industry would be Bulsar in Surat District.

#### TEXTILE INDUSTRIES.

The following places, in addition to those in various Districts where cotton mills are located at present, except the city limits of Bombay and Ahmedabad, may be considered for the possible establishment of new cotton textile mills:—

Jamner and Erandol in East Khandesh District (spinning or composite mills); Nandurbar and Dondaicha in West Khandesh District; Malegaon in Nasik District (spinning mill only); Karad in Satara District; Rahuri in Ahmednagar District (spinning mill only); Belgaum, Kudchi and Athni in Belgaum District (spinning mills only); Ranebennur in Dharwar District; Bagalkot in Bijapur District (spinning mill only); and Ankleshwar in Broach District.

The Greater Bombay area would be suitable for locating cotton textile mills (fine counts) and sewing thread industry. The vicinity of Ahmedabad would also be suitable for the sewing thread industry.

The finishing, dyeing and printing industry may be located either in the Greater Bombay area or in the Kalyan-Ambernath area. Barejadi or some other place away from the town would be suitable for locating this industry at Ahmedabad. Surat would also be suitable for the development of this industry.

The Kalyan area and the neighbourhood of Panvel would be suitable for the location of rayon industry. It can also be located near the Patalganga river at a place near the tidal waters area, e.g., Kharpada. The possibility of Chiplun and Kalinadi area for locating this industry should be investigated when the Koyna and Kalinadi hydro-electric projects, respectively, are completed.

If it is found possible to develop the woollen industry, the Kalyan-Ambernath area may be suitable for its location.

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## LEATHER AND LEATHER GOODS, GLUE AND GELATINE AND RUBBER GOODS INDUSTRIES.

### *Leather and Leather Goods Industries.*

Ahmedabad and Godhra in the Northern Division, Poona, Satara, Sholapur, Malegaon and Nandurbar in the Central Division and Belgaum in the Southern Division would be suitable for the location of factories for vegetable tanning (pit tanning).

Places suggested for vegetable (pit) tanneries, particularly Ahmedabad, Sholapur and Belgaum as well as the Greater Bombay area would also be suitable for the location of chrome tanning factories, and glace kid and chrome-suede tanning factories.

Oil tanning factories may be located in the vicinity of chrome tanneries.

The Greater Bombay area, the vicinity of Ahmedabad in the Northern Division, Nasik in the Central Division and Belgaum in the Southern Division would be suitable for the location of factories for the production of specially dressed leathers.

The vicinity of Ahmedabad, Nadiad, Godhra and Broach in the Northern Division, Poona, Karad, Sholapur, Malegaon and Nandurbar in the Central Division and Hubli and Belgaum in the Southern Division would be suitable for the location of the industry for the manufacture of industrial leather goods.

The proposed mechanised factories for the manufacture of footwear (western type) may be located near Ahmedabad and Poona. If a dehumidifying plant could be installed, such a factory could also be established in the Greater Bombay area. Nasik and Belgaum would be suitable for locating additional mechanised shoe factories, if and when required.

The vicinity of Ahmedabad and Surat in the Northern Division, Poona, Nasik, Ahmednagar, Sholapur, Satara or Karad and Dhulia in the Central Division and Hubli and Belgaum in the Southern Division would be suitable for the location of the industry for the manufacture of traveller's requisites and fancy leather goods, if these goods are to be manufactured on a large scale.

Places near Ahmedabad, Poona, Ahmednagar, Sholapur, Bijapur and Belgaum and the Greater Bombay area would be suitable for the location of factories for the manufacture of guts.

A large scale oil and leather cloth factory can suitably be located in the Kalyan-Ambernath area.

### *Glue and Gelatine Industries.*

The vicinity of Ahmedabad, Poona, Malegaon, Ahmednagar and Satara or Karad would be suitable for glue manufacture. Factories for the manufacture of gelatine can also be established at suitable places near Poona, Malegaon and Ahmednagar. The Greater Bombay area would also be suitable for the manufacture of glue and gelatine, if this industry is to be undertaken near Bombay City.

### *Rubber Goods Industries.*

If it is found possible to establish a factory for the manufacture of bicycle tyres and tubes, the Greater Bombay area, the Kalyan-Ambernath area or Poona would be suitable for its location.

The Greater Bombay area, the Kalyan-Ambernath area and the vicinity of Ahmedabad, Poona and Sholapur would be suitable for the location of factories for the manufacture of rubber goods, e.g., rubber footwear; extruded and moulded rubber goods; mechanical rubber goods; and proofed rubber goods.

## LEATHER AND LEATHER GOODS, GLUE AND GELATINE AND RUBBER GOODS INDUSTRIES.

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A large scale oil and leather cloth factory can suitably be located in the Kalyan-Ambernath area.

### *Glue and Gelatine Industries.*

The vicinity of Ahmedabad, Poona, Malegaon, Ahmednagar and Satara or Karad would be suitable for glue manufacture. Factories for the manufacture of gelatine can also be established at suitable places near Poona, Malegaon and Ahmednagar. The Greater Bombay area would also be suitable for the manufacture of glue and gelatine, if this industry is to be undertaken near Bombay City.

### *Rubber Goods Industries.*

If it is found possible to establish a factory for the manufacture of bicycle tyres and tubes, the Greater Bombay area, the Kalyan-Ambernath area or Poona would be suitable for its location.

The Greater Bombay area, the Kalyan-Ambernath area and the vicinity of Ahmedabad, Poona and Sholapur would be suitable for the location of factories for the manufacture of rubber goods, e.g., rubber footwear; extruded and moulded rubber goods; mechanical rubber goods; and proofed rubber goods.

## CHAPTER VIII.

## CONCLUSION.

As mentioned in the Introductory Chapter of this report, the work of the Special Sub-Committee related to finding suitable sites for such of the large scale industries dealt with in the reports of the various Sub-Committees as were proposed for development by those bodies and for the location of which sites had to be recommended. We have endeavoured to examine, as far as possible, the suitability of sites for various industries from the point of view of availability of raw materials, labour, water-supply, electric power, market, and transport facilities, and we have recommended such sites as are, in our opinion, suitable for the location of the industries concerned. We may, however, observe that the sites suggested by us indicate only approximate locations and that when factories are actually to be erected, exact locations in the areas recommended by us will have to be settled by the industrialists in consultation with experts and the local authorities.

We wish to thank all the officials and non-officials who assisted us with their advice in course of our deliberations. Their special knowledge was found useful in making some of the recommendations contained in this report.

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## APPENDIX.

(Vide penultimate paragraph in Chapter I of the Report.).

## BOMBAY ELECTRIC GRID.

In the Province of Bombay, there are at present 68 licenses in operation. In the case of three of these, the licensees have hydro-electric stations, their installed plant capacity being 231,000 kW. These three licensees serve by bulk supply Bombay City, the Bombay Suburban District, Poona, and about six other townships. Almost all the remaining 56 licensees generate their own electric energy. Of these, one has an installed capacity of 37,500 kW, another 3,624 kW and the remaining having relatively small power houses. Most of the licensees operate in urban areas.

2. The objects with which the Government of Bombay have set up the Electric Grid Department are: (1) to rationalise the generation of electricity by generating it at a few selected stations having natural advantages; (2) to make available progressively large amounts of electricity at low rates; and (3) to bring the energy within reach of a progressively increasing number of the urban and rural population.

3. The objects are to be achieved by the establishment of an Electric Grid System in regions which lend themselves to such development economically under Quasi-State control. An Electric Grid System means a net work or system of wires over which electric power is transmitted from interconnected generating stations to receiving centres and then distributed to ultimate consumers. New Power Stations—both hydro-electric and thermal—will be established. These and the existing efficient generating stations of licensees, wherever practicable, will be inter-connected by the Grid lines. Inefficient generating stations will be closed down and the licensees concerned supplied bulk power. Wherever possible, rural areas within the Grid regions will be supplied electricity from the System.

4. It is also intended to establish small Diesel Stations in isolated townships, which have some cottage industries and which cannot, within reasonable time, be served from the Grid.

5. To promote rapid development of the use of electricity by agriculturists and cottage and small scale industrialists specially in rural areas, it is proposed to assist them financially in acquiring electrical machinery and equipment on hire purchase terms.

6. Largely, at the initiative of the Government of Bombay, the Government of India introduced in the Central Legislature a Bill entitled "Electricity (Supply) Bill, 1946" during the Budget Session of 1946. When this measure is passed, the Government of Bombay proposes to set up the Bombay Electricity Board, which will be, under the provisions of the Act, charged with the work of the rationalisation and development of Electric Supply in the Province.

7. Meanwhile, a Special Grid Department has been organised and the development programme under execution at present consists of: (1) North Gujarat Grid Scheme; (2) South Gujarat Grid Scheme; and (3) Rural electrification and small town schemes based on small Diesel Stations:—

(1) *The North Gujarat Grid Scheme.*—Two 15,000 kW steam turbo sets are being installed by the Ahmedabad Electricity Company Ltd. to supplement the existing steam station of 37,500 kW, thus making a total installed capacity of 67,500 kW at this place with facilities for further extension in the future. The general plan of development contemplated is that bulk power from the Company will be received in a Government owned Receiving Station, located near the Company's power station premises, from where it will be transmitted in the south to Baroda and in the north to Kalol. It is proposed to construct a 66 kV H. T. line up to Baroda with main sub-stations at Barejadi, Nadiad, Anand and Baroda and a 33 kV line up to Kalol. From Barejadi, Nadiad and Anand sub-stations, an extensive 11 kV system will be put up to cover the territory within a radius of about 20 miles from each station.

The Baroda State Government has agreed to co-operate by taking supply in bulk at Baroda and Kalol for distribution within the State territory.

According to the present programme, Grid power will be available at Mehmedabad, Kaira, Mattar, Nadiad, Umreth, Anand and Borsad early in 1948. Extensions around those centres will then be undertaken as and when required.

(2) *South Gujarat Grid Scheme.*—It has been decided to establish a new steam station in the Surat region comprising, initially, two numbers of 7,500 kW turbo sets. It is proposed to construct an E. H. T. line from Surat to Bulsar with main sub-stations at Navsari, Billimora and Bulsar. The Government of Baroda will take bulk power at Navsari and Billimora for distribution within the Baroda State territory. From these sub-stations, 11 kV system will be put up to cover the territory within a radius of about 20 miles from each centre.

According to the present programme, Grid power is expected to be available in this region by the end of 1948. Extensions from the main sub-stations will be undertaken thereafter as and when required. The line extension to the North of Surat will be undertaken if and when sufficient load is available in that area to justify capital expenditure on the line.

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(3) *Rural electrification and small town schemes.*—The schemes so far sanctioned by the Government consist of:—(a) Electrification of the towns of Ratnagiri, Malvan, Vengurla, Chiplun, (b) electrification of certain villages in the Satara taluka based upon power being taken from the existing power house of the Satara Electric Supply Co. Ltd., and (c) electrification of certain villages in the Bulsar taluka, based on bulk electricity being taken from the existing power house of the Bulsar licensee. Later on, when power becomes available from the Government's own station in Surat, power will be supplied from that Station.

Neither of these can at present supply any large industrial load, but when the Bulsar station will be linked up with the new Surat Steam Station, there will be scope for supplying power for industrial use.

Extension of such schemes to other talukas is also being examined.

8. The Government of Bombay has made an agreement with the Government of Mysore for purchase of power from their hydro-electric station at Jog up to a maximum of 3,750 kW. This power can be obtained sometime in 1947. Investigations are in progress to determine the most advantageous method of utilizing power available at Jog in the southern part of the Province.

9. The salient features of hydro electric projects which are likely to be undertaken by the Government within the next 10 years are as follows:—

(1) *Koyna Hydro Project.*—A preliminary investigation of this project has just been started. The generating station will probably be located about 15 miles from Chiplun on the road to Karad. The scheme when fully developed is capable of meeting a maximum demand of the order of 200,000 kW, after reserving a part of the storage for irrigation. Initially about 18,000 kW could be developed economically for supply to the districts of Poona, Satara, Sholapur, Bijapur and Ratnagiri, as required. Electro chemical industries and other similar loads could be established near the power station site with advantage and the plant progressively increased. If the scheme is undertaken, it is expected that supply of power may be commenced in about 8 years' time.

(2) *Kalinadi Hydro Project.*—A proposal for undertaking preliminary investigations of this project, as soon as possible, is under consideration. The Generating Station if the scheme is undertaken, will probably be located about 60 miles to the South-West of Hubli near the junction of Nagjhiri Nala, and Kalinadi in Kanara District. The scheme, when fully developed, is capable of meeting a maximum demand of the order of 80,000 kW. Initially 20,000 kW may be developed for supply to the Districts of Dharwar, Belgaum and Kanara, as required. If the scheme is undertaken, power may be available in about nine years' time.

(3) *Bhatga Hydro-electric Project.*—A demand of about 10,000 kW can be met from this source, provided the Power Station is linked up either with Koyna when and if developed or Tata system at Poona. Consideration of this scheme will be taken up after 2 seasons' work has been put in on the proposed new irrigation dam at Vir, which will provide a balancing and supplementary reservoir.

(4) *Bhandardara-Randha Electric Scheme.*—A demand of 16,000 kW can be met from this source. In addition to this, a further 7,500 kW can be obtained during the monsoon. This power can be firm up by the establishment of a steam station of the installed capacity of 15,000 kW in this area. The scheme was sanctioned by the Government of Bombay in 1945, but its execution had to be postponed as under the present conditions, development of this source of power cannot be undertaken economically. The question of its execution will be reviewed in due course.

10. The Government of Bombay has also under consideration the possibility of developing Narbada and Tapti River Schemes on multi-purpose basis and if it is found feasible to develop them, an appreciable block of Electric Power will be available from these sources.

11. In the Post-War Reconstruction programme, a sum of Rs. 8.46 crores has been allotted for the development of electric supply in the Province during the first 5-year period.

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