

Report  
OF THE  
INDUSTRIAL SURVEY COMMITTEE

Part II - Vol. I

(Govt. of the Central Provinces and Berar)

## IMPORTANT INFORMATION

### REPORT OF THE INDUSTRIAL SURVEY COMMITTEE

#### PART I—VOLUME 1

This volume discusses the considerations that underlie this survey and report in regard to the functions of the State, taxes and expenditure, capital and labour wealth, money and barter economics, etc. It reviews the work done by the Department of Industries since its establishment and makes certain recommendations for the reorganization of the department. It contains the results of a survey of 606 villages and the suggestions made to the Government to encourage about 30 village and cottage industries.

[ Pages 50—Price Re. 0-8-0 ]

#### PART I—VOLUME 2

This volume contains the survey reports of Wardha and Balaghat districts and notes on 24 village and cottage industries.

[ Pages 186—Price Re. 1 ]

#### PART II—VOLUME 1

This volume discusses the possibilities of exploiting Forest, Mineral and Power resources of the Province and recommends the reorganisation of the departments.

[ Pages 45—Price Re. 0-8-0 ]

#### PART II—VOLUME 2

*(Under preparation)*

This volume contains selected portions of the findings of the sub-committees and others on Forest Mineral and Power resources, and Transport, Taxation and Marketing.

All these Reports  
are printed on hand-made paper

**Corrigenda to the Report of the Industrial  
Survey Committee, Part II, Volume 1.**

In page 18,—

in line 3, *for* Re. 0-15-10, *read* Re. 0-5-10.

in line 4, *for* Rs. 91-10-0, *read* Rs. 9-1-10.

in line 8, *for* Re. 0-1-11, *read* Re. 0-11-11.

## TABLE OF CONTENTS

### Part II—Vol. 1

	PAGE		PAGE
CHAPTER I.—PROCEDURE ..	1	CHAPTER V.—POWER—	
CHAPTER II.—INTRODUCTORY—		Hydro-Electric projects ..	13
1. Forests ..	1	Thermal electric schemes ..	13
2. Minerals ..	2	Wood ..	14
3. Methods of Production ..	2	Charcoal ..	14
CHAPTER III.—FOREST RESOURCES—		Alcohol ..	14
1. Organization and Policy ..	3	Coal ..	15
2. Products—		CHAPTER VI.—TRANSPORT, MARKETS, ETC.	
Timber ..	4	Roads ..	15
Veneers and laminated boards ..	5	Means of transport—	
Making of Matches ..	5	(1) Bullock carts ..	16
Fence posts ..	6	(2) Lorries and buses ..	16
Sleepers ..	6	(3) Animal transport ..	17
Waste wood ..	6	(4) Waterways ..	17
Firewood ..	6	(5) Aerial ropeways ..	17
Charcoal ..	6	(6) Railways ..	17
Grazing and fodder ..	6	Taxes, market, etc. ..	18
Honey and bees wax ..	7	CHAPTER VII.—RECOMMENDATIONS AS	
Essential oils ..	7	TO THE ORGANIZATION—	
Gums, resins ..	7	Economic Council ..	19
Kattha-making ..	7	Economic Executive Board ..	19
Tendu leaves ..	7	Departments ..	19
Lac culture ..	8	I. Economic Council ..	21
Tanning materials ..	8	II. A List of a few Centralized Industries possible in this province. ..	22
Bones, horns, etc. ..	8	III. An Account of expenses of the survey made up to the 30th September 1939 ..	22
Medicinal herbs ..	8	IV. A List of subjects dealing with Forest, Mineral, Power resources, etc., of the province on which reports were submitted by the sub-committees and others ..	23
CHAPTER IV.—MINERALS—			
Manganese ..	9	NOTES	
Iron ore ..	9	Notes by—	
Tungsten ..	10	1. Dr. R. S. Thakur ..	24
Copper ..	10	2. Dr. A. N. Kappanna ..	24
Bauxite ..	10	3. Sjt. K. P. Sagreiya ..	25
Coal ..	10	4. The Chairman ..	32
Clay ..	10		
Stone ..	11		
Limestone ..	11		
Sand ..	11		
Soda ..	11		
Salt ..	12		
Barytes ..	12		
Semi-precious stones ..	12		
Graphite ..	12		
Soapstone ..	12		
Miscellaneous ..	12		

### INDEX

*Combined Index of Part I, Vol. 1, and  
Part II, Vol. 1.*

# REPORT

OF THE

## INDUSTRIAL SURVEY COMMITTEE

PART II—VOL. 1

### CHAPTER I.—PROCEDURE

In the second stage of our work, we were to study the Forest and Mineral Resources available in this province and submit our recommendations to the Government in regard to the general policy to be followed and the measures to be adopted to promote industrial development within the province.

In order to collect information and data we resolved ourselves, along with seven co-opted members into four sub-committees given below :—

#### *Forest Resources.*

- (1) Sjt. J. C. Kumarappa—*Convener*,
- (2) „ Chaturbhujbhai Jasani.
- (3) „ K. P. Sagreiya.
- (4) „ D. R. Paranjape, M.Sc., Demonstrator of Chemistry, College of Science, Nagpur (Co-opted).
- (5) „ M. T. Chobe, M.Sc. (Tech.), Industrial Chemist, Nagpur (Co-opted).

#### *Mineral Resources.*

- (1) Sjt. Walter Dutt—*Convener*.
- (2) „ K. P. Ghiara.
- (3) The Director of Industries.
- (4) Dr. R. S. Thakur.
- (5) Sjt. K. B. Joshi, B.Sc., Consulting Industrial Chemist, Bombay (Co-opted).

#### *Power Resources.*

- (1) Sjt. C. L. Gupta, B.Sc. (Agra), B.Sc. (Tech.) (Manch.), A.M.I.E., (India), Deputy Director of Industries to Government, Central Provinces and Berar—*Convener* (Co-opted).
- (2) „ V. V. Subhedar.
- (3) Dr. A. N. Kappanna.
- (4) Rai Sahib P. K. Sen, B.Sc. (Tech.) (Edin.), Inspector of Factories, Central Provinces and Berar (Co-opted).
- (5) Sjt. S. M. Gole, B.Sc., A.M.I.E.E., Electrical Adviser to Government, Central Provinces and Berar (Co-opted).

**NOTE.**—After the death of Sjt. C. L. Gupta, Rai Sahib P. K. Sen was elected convener of this sub-committee.

#### *Transport, Taxation, Marketing, etc.*

- (1) Sjt. J. C. Kumarappa—*Convener*.
- (2) „ R. N. Jha.
- (3) Smt. S. Ittyerah.
- (4) Sjt. F. R. Mahajani.
- (5) „ Nathmal Agrawal, B.A. (Hons.), LL.B., Commercial Agent to Government, Central Provinces and Berar (Co-opted).

These four sub-committees submitted their reports to the Survey Committee on the 2nd September 1939 and on the basis of their findings, this report is written.

### CHAPTER II.—INTRODUCTORY

In the first part of our report we have indicated the difference between the outlook of the individual and that of the State. This difference will come out in greater relief while we discuss the subject-matter of this part. While in the first part we were mainly concerned with village and cottage industries with the emphasis principally on the interests of the individuals, in the second part, we are dealing mainly with economic activities which require a long range view point, and so our decision will be affected, not necessarily by profit motives, but chiefly by consideration of service to the general public.

In the activities connected with the exploitation of land, the farmer looks forward to obtaining a return for his labours within three to six months or so, a horticulturist from three to seven years, but a forest may yield nothing for several decades. This difference in the time element necessitates fundamental modifications in the approach to the problems connected with them.

Again, there is a difference in kind between forest resources and mineral wealth, somewhat like that which exists between revenue and capital, or between a river with a perpetual flow and an exhaustible reservoir of water. These, again, call for a change in the treatment of the subject.

A great deal of the lack of co-relation that exists between the methods of exploiting the various sources of wealth is due to ignoring these differences.

**1. Forest.**—Forests serve several national purposes. They protect the soil from erosion, they aid in storing water, apart from the common uses as a source of timber, fodder and other minor produce. In a tropical country like ours, which depends largely on the monsoon for the welfare of a large proportion of its inhabitants, it becomes imperative that a natural wealth of this kind should be cared for and administered in the interests of the people.

In this province nearly 50 per cent, of the land is under forests. But a greater part of these forest areas are in private hands. This appears to us to be fundamentally wrong. As we have already pointed out, the exploitation of forests requires a long time view point, which cannot be expected of private individuals. Forests provide the primary material needed by most industries and,

therefore, the policy in regard to the forests must be controlled and administered by the State as a public service to benefit and encourage industries.

At the present time, the Forest Department does not control the bulk of forest areas in this province. And even, in such areas as are under the Forest Department, the administration is not planned with a view to the encouragement and the improvement of industries. There is hardly any co-ordination between this department and the Agriculture and Industries Departments. All of these work independently of each other without a definite comprehensive scheme or plan.

The present administration is organized more or less purely from the revenue yielding point of view. We feel, that if this department is to play its proper role in the economic life of this province, it should be run in conjunction with the other two sister departments, viz., Agriculture and Industries. This means that a complete detailed plan should be drawn up for some years ahead.

We have already indicated in Part I of this report, the place that the Industries Department should occupy. If the Industries Department fulfils its functions, it would be in possession of information as to what raw materials are needed, and when and where they are so required. For instance, if carpenters require a certain type of timber for cart-wheel-making, then it will be the duty of the Industries Department to see that the Forest Department supplies such timber, in a seasoned condition to the carpenters as required. The Forest Department, in its turn, will have to include in its working plan a consideration of such supplies needed by industries. We are aware that laying out such plans in advance would entail a considerable amount of difficulties. These are not insurmountable. Just as a farmer has to plan out his crop, weed his fields, and ward off pests and destructive forces, if he is to reap the benefit of his labour; similarly, the Forest Department has to look after its forests, plan and cultivate these areas with a view to supplying the needs of industry. Utilization of forests is in itself a very large department. We shall not enter into details at this stage but will deal with this in connection with industries that depend upon forest resources.

We found that the Forest Department was not able to supply us with any information in regard to malguzari forests and with regard to that of Government forests, it is not sufficiently detailed for our purpose. There are no suitable and sufficient forest statistics available.

It was with great difficulty that we could gather a little information. We must gratefully acknowledge the continued courtesy and the pains taken by officers of the department to help us in our work as much as possible with the scanty information that was available to them from their records. No businessman can hope to succeed if he is not able to keep close track of his raw materials and the resources. Neither can any province advance economically with haphazard methods. It may be necessary to increase the personnel of the Forest Department; but if it is necessary for the welfare of the people, it must be done.

2. Minerals.—Nature has endowed this province richly with minerals. Unlike forests there are a store of wealth which cannot be controlled by man. The store exists and will be exhausted when used while, in the case of forests, the supply can be planned, controlled and adjusted according to our requirements. In the case of minerals, therefore, there can be no planning in regard to supply other than a policy of conservation in the interests of the nation. The designation "the Conservator" will be more appropriate when used for the head of the Minerals Department. This difference in the two sources of wealth makes the difference in the approach to the problem. The mineral wealth of the province is a heritage that belongs to the people of the province. It should not be looked at merely from the view of proprietary rights but it should serve to give the people the right to be employed in the conversion of these minerals into consumable commodities. At the present time, our mineral resources are not being used in this way. Practically all of our minerals are being exported; this means that the people are being deprived of their right of being employed in the industries that will convert these raw materials into finished goods. This drain will entail unemployment and poverty in the province. A great many of the known reserves of these minerals have been leased out to outsiders who merely export these ores from our province. The Government by granting such concessions are adding to the unemployment problem in this province. Even in such cases where the Government feel called upon to give concessions, there should be conditions stipulated in all such leases that a lessee must sell the raw materials to local workers when required at reasonable rates. However, the Committee feel that the Government should not have any necessity to grant such contracts. This point may be kept in mind at the time of renewing the contracts. This is more or less of the same nature as the provision in the Gandhi-Irwin Pact in regard to the collection and manufacture of salt in the neighbourhood of villages. Some of the concessionaires have not been working their concessions for a long time. In such matters, no "dog-in-the-manger" policy should be allowed.

As in the case of forests, so also in the case of minerals the information available is very scanty. We would suggest that a detailed technical survey of minerals should be made in addition to the geological survey now available.

3. Methods of production.—In Part I of our Report, we were mainly concerned with decentralized methods of production in small units with little capital, and by the villagers themselves. But, where there are considerable risks to be undertaken, where elaborate equipment at a considerable cost is necessary and where it is possible to restrict or eliminate the profit motive, we had stated that centralized industries could be run either by the State or under its direct control. In this part, therefore, we are concerned with such industries as will require centralized methods of production to supply the raw materials needed by the village industries.

In such centralized industries our main object should be to pay the workers on the basis of a reasonable living wage. The selling prices should be fixed with reference to the cost of production which is based on a living wage and not governed by speculative influences. What the state is to the citizen, large scale industries should be to cottage industries. Just as land, as an investment in the hands of zamindars, is anti-social as against plots in the possession of cultivating ryots, so is centralized industry anti-social in the hands of private enterprisers. As it is the primary duty of the State to provide the citizen with such essential needs, as, water, light, transport, etc., regardless of profit and merely as a matter of service; in the same way the large scale industries should provide the basic needs of cottage industries; for instance, when the Forest Department has to supply timber to the village carpenter, it will fall to its lot to see that the timber is properly seasoned and graded. It will be no answer to say that it will make it expensive any more than the argument that if the State undertook to guarantee and to regulate the supply of pure milk, it would make it more expensive than adulterated and contaminated milk. The State will be failing in its primary duty if it allows private persons to enter into the field of production through large scale industries at this stage.

Often it is stated in favour of centralized industries, like the ones we shall be dealing with in this Part, that they enable us to utilize to the fullest extent by-products as in the case of distillation of coal. This is, no doubt, true but there is need for a note of warning. If we are not able to dispose of a certain by-product locally, we may be led into a situation where a market will have to be found. This is one of the prolific sources of war. In such cases where a ready market is not within our reach, it is better for us to leave that by-product alone. It may be a material waste but it will be a humanitarian gain.

If all the suggestions made herein are to be carried out, it would need a change in the organization and administration of many of the departments of the Government. We have already dealt with the need for co-ordination between the departments of Industries, Agriculture and Forest. We would add to this list the Educational Department as well. Our experience shows that this department hardly realizes its place in a properly conceived economic society. It seems to lay greater emphasis on the need of the boys and girls getting through their examinations than to fitting them out for life. The professors themselves have more contact with the libraries than with the laboratories of life in the sense that they know the existing knowledge without any relation to local conditions. In the course of our survey we had approached this department for help and we found that they had no intelligent appreciation of the importance of this survey nor did they understand the educative value which the survey would afford to their professors. This department also along with the other departments is

emphasizing the administrative side rather than the constructive side. Their goal needs a new orientation.

[I have taken strong exception to the Committee recording that the Education Department "had no intelligent appreciation of the importance of this survey nor did they understand the educative value which this survey would afford to their professors". This statement has no factual basis and is extremely unfair. I appreciate the courtesy of the Chairman in agreeing to insert any statement I may have to make on this point in the form of a foot-note, when the Committee decided by a majority to retain this statement in the Report.—A. N. KAPPANNA.]

### CHAPTER III.—FOREST RESOURCES

Of nearly 44,000 square miles of forest areas, about 25,000 square miles are under private ownership. Leaving natural resources of this kind in private hands is against public interest. This question should be carefully examined to see in what way these owners of private forests can be made to carry out the policy of the Government put into effect in the state forests. This will entail a scrutiny of the legal aspects of the case and, therefore, would be beyond our scope but we strongly recommend that this question be taken up for examination by the Government at a very early date. Even though the legal ownership vests in private individuals the responsibility of administering these forests in consonance with the general policy of the Government, must devolve on the Forest Department.

1. Organization and Policy.—Not only in regard to these private forests but also concerning the state forests, the information available is extremely scanty. There should be an officer placed in charge of a section dealing with the statistics and scientific information in regard to the contents of the forests. He should be more or less like a stock-keeper in a business concern.

There should be the cultural side of the forest which will in conjunction with the departments of Agriculture and Industries, lay out the working plans for the production and regular supply of resources that will be needed as raw materials for industries. Of course, as the planning will have to be done considerably in advance occasional adjustments may be needed to meet the situation from time to time. But this factor of uncertainty need not cause us to deviate from our main purpose. The Forest Department should form the foundation on which the country's economic activities should be based. The mineral resources may fail in time by exhaustion or by becoming uneconomic from the point of view of working costs, but the Forest Department, if properly organized, should provide for the economic activity of the nation in perpetuity.

Having a cultural section of the department would naturally mean that there should be attached to this a technical research section. Determination by scientifically conducted investigation, of vital facts, such as the discovery of the most valuable plants in the jungles and the soil and climate

they prefer, the friends and foes of the forest and the best manner of perpetuating the forests in a state more suited to the needs of the people is an urgent necessity which Government cannot justifiably neglect.

It has been brought to our notice that Government has appointed a special officer for silvicultural research but the committee are of opinion that sufficient attention has not been given to the matter and funds must be provided for adequate staff, research laboratories and a well equipped library in this department to carry out the work in a thorough manner. Money spent in this direction will yield a great return in the future besides which the information collected and development made in culture of useful plants such as those having medicinal value will be a permanent national wealth.

Lack of fuller silvicultural knowledge in this province has, the committee feels, been responsible for imperfect management. Research in this direction is well recognized to be a profitable capital investment. The Forest Department in fact ought to be one of the main constructive departments of Government. In Part I of our report, we have emphasised the importance of the Department of Industries. But there can be no Department of Industries without the Forest and the Agriculture Departments. Therefore, the need to re-organize the Forest Department with a new outlook and a broader policy is even greater.

At present, the policy of the Government is one of pure care-taking and revenue making. Therefore, the head of the Department is properly called a "Conservator of Forest". If this policy is to be followed by a department which ought to be the supplier of life to economic activity, it will spell ruination. That being so, neither profit nor balancing of budgets can be considerations which will determine policy in this all important department. Even if the department should prove to be a deficit department, if it fulfils the purpose for which it exists, it will be a source of profit to the nation. In a growing child, we do not look for the conservation of energy as we do in the case of a superannuated person. No father can consider the school fees paid for the child's education as a money-making investment. The expenditure incurred at this stage of growth is as capital expenses which will yield their profits in years to come. Of course, we do not mean to encourage wastage or maladministration. Observance of such economy should be taken for granted.

If the policy we have indicated above is adopted, the Forest Department may become one of the larger spending departments of the State, just as the Education Department is. This does not necessarily mean that it will always remain so. In the earlier stages, for a number of years, the expenditure may exceed the revenue; but as this department will be providing materials necessary for industries, once it has reached a stage where it will be in a position to supply these needs regularly, the department ought to become a source of revenue. But that may take several decades and in the meanwhile the finances necessary may have to be raised

either by loans or by converting the expenses into public debts, just as was done in the earlier stages of the development of railways in our country.

In planning out for the future, the forest areas will have to be opened up in such a way as to give easy access to every part of them. At present some of the forest villages have been so located as to provide an easy and ready supply of labour. This system is a good one, if administered properly, in which case, a number of small villages can be studded all over the forest areas, where a certain amount of industrial work in preparing the raw materials for the markets can also be introduced. However, the administration in these villages should be so designed as to safeguard the social and personal liberties of the people and to ensure that no undue advantage is taken of their helpless and isolated condition.

Many of the raw materials require elaborate processes involving heavy capital expenditure before they could be made available to the public. Here, therefore, we shall have to resort to centralized methods of production by units, which will be organized by the Department of Industries and run by it or under its direct control. Generally speaking, the Forest Department will stop where the raw materials are ready for the Department of Industries to deal with. If this organization is to be efficient we shall have to have a band of well-trained and experienced industrial chemists, engineers, and commercially minded men. These persons will be in charge of the various units for manufacturing and marketing their goods. The units will have the benefit of the advice and guidance of research sections. Assuming such an organization, we shall proceed to indicate in general terms some of the ways and means of how these units should function.

**2. Products.**—Timber for building purposes, firewood and grazing lands are associated in the popular mind with forests. But apart from these, a great many other products are also available which provide raw materials for innumerable industries and articles which are essential in many important processes in industries.

*Timber.*—Some of the principal woods available in the Central Provinces are the following:—

*Class I.*—Teak, bija, shisham, sal and tinsa.

*Class II.*—Saj, arjun, suriya, dhaman, rohan, bhirra, kusum, siwan, babul, khair, garari, lendia, haldu, dhaora, toon, mokha, am, imli, semal and anjan.

*Class III.*—All others.

Up to now, it has not been possible for the Forest Department to compute the quantity of cubic feet of timber of each class which can safely be supplied annually without depleting the forests. A proper census of trees might be taken and the results classified according to their kind, age and maturity. At present, without a proper working plan of *malguzari* along with Government forest we are unable to say what quantities of timber will be available immediately or at a future date. This is a very



unsatisfactory and dangerous state of affairs; it may lead ultimately to the depletion of the forests.

Trees are cut down, timber graded and sold to contractors who retail the logs to the public. By this method, the public is not assured of a supply of well seasoned timber. In Burma and Travancore, the timber gets seasoned in the process of transport to the markets by being floated down the rivers, but in our province, this method of seasoning timber is not feasible. So the department should consider ways and means of seasoning the timber before it leaves their charge. Some of our timber is beautifully grained but when converted into furniture it cracks and warps, thus causing a good deal of damage to private owners. The responsibility for seasoning must be that of this department. There are various methods of seasoning and there are many difficulties to overcome. These are not adequate reasons why the public should be supplied with unsatisfactory materials.

Most of the work done by the Forest Department is by manual labour but at Allapalli there is a power-driven saw-mill. There can be no objection to the Government using departmentally such power-driven mills as long as the machinery as well as the fuel are obtained locally. Unfortunately for the present, we are dependent on foreigners practically for all our machinery. This deplorable state should be remedied as soon as possible.

There can be portable sawing mills run on producer gas from charcoal. Such mills can be made at a comparatively low cost. If this is feasible, such power and saws would be available even in the interior. The possibilities of these need to be explored further.

Apart from the seasoning of timber, poles and posts, which have to be used in the building of huts should be treated against the attack of insects, white ants, borers and rot. Such treated poles can last 30 to 40 years, or even more. Therefore, they can easily supply all our requirements for electric and telegraph posts. Industrial countries such as the United States, Great Britain and Belgium, which manufacture steel poles for our use are themselves contented with the use of treated wood poles only at low costs. Therefore, in a province like ours, particularly with all the forest wealth, no steel poles should be tolerated.

For this treatment we have to obtain some cheap preservative. In other places, creosote has been used as a preservative, but this is comparatively a costly treatment as the creosoting pressure plant is rather expensive and has to be imported. A cheap agent with a simpler method of treatment is necessary. When charcoal is prepared by dry distillation of wood, one of the by-products is wood-tar, which has high preservative properties and this can therefore be used where preservation for a comparatively short time is needed; for longer periods, "Ascu" is more effective. The Forest Department should arrange to provide this treatment when it is asked for. However simple a method like this may be, our poor and ignorant villagers cannot be expected to apply it themselves. Unfortunately, in these days of exploitation of every available process, "Ascu" has

also been patented however persons can make and use it for their own purposes but not for selling. "Ascu" is prepared with one part of arsenic pentoxide, three parts of copper sulphate and one part of potassium dichromate.

The use of these preservatives not only enables us to utilise inferior woods to better purpose, but it also decreases the pressure on the forests because treated wood lasts longer. It also reduces the repair and replacement charges to the villagers.

*Veneers and Laminated Boards.*—Another method of economising the use of wood, without affecting the purpose it serves, is by resorting to the use of veneers, plywood and laminated boards. By using veneers, the beautiful grains that expensive and rare timber has, can be made use of to a much greater extent. So, the appearance of the surface of a piece of furniture may have the beauty that is to be found in the grains of expensive timbers at a fraction of the cost without affecting the strength. The methods of their manufacture require expensive machinery, and equipment and therefore, unless the department is prepared to undertake responsibility for these, the objective cannot be attained by hand-labour. It is estimated that slicing machinery and other necessary equipment will cost over Rs. 40,000 so that this industry cannot be launched upon by villagers. In the near future this department may have to undertake it.

Laminated wood and lamin-boards are designed to give uniform strength and distribute the stress and strain in all directions and at the same time increase the strength comparatively to its weight. Needless to say, that for all these purposes we need well seasoned wood. The manufacture of lamin-boards also, calls for expensive plant, costing about Rs. 50,000 which will place it beyond the realm of cottage industries.

*Making of Matches.*—One of the great drawbacks which is in the way of the development of this industry is the difficulty of getting satisfactory veneers for boxes and splints. Our forests have semal and salai trees in abundance and these are suitable for making boxes and splints. Most of the processes in the manufacture of matches can be carried out on a cottage basis. Therefore, the Forest Department should be able to place on the market properly cut veneers and splints. We had already suggested in connection with the making of plywood and laminated boards that this department should put up necessary plant for making veneers if the needed capital is forthcoming. If this plant is available, it will not be very difficult to supply the necessary raw material for the match industry. Even if this expensive plant is not available, a veneer peeling machine for match industry can be installed at a much lower cost of say, about Rs. 2,500.

The Industries Department should then arrange for the necessary paper for making the boxes. These should be distributed to villagers and the boxes taken back and paid for on piece-work basis. The tipping composition and the mixture for the striking surface can be prepared and packed in small containers and distributed again to the villagers

along with the boxes and splints to be treated. When these are ready, they can be packed, labelled and put on the market. The main difficulty in making this industry self-supporting in competition with highly organized foreign concerns, is the high excise duty. If the cottage produced matches are exempted from this duty just as cottage-made sugar is exempt from excise duty, this industry will give employment to a large number of people. For this industry, it is not essential to depend on elaborate automatic plants. If we do have large chemical industries in the province, it will be possible to extract the phosphorus that we need for the matches from the bones available within the province.

*Fence posts.*—Iron poles are gradually making inroads into this sphere, which had been a preserve of wooden posts until recently. If these poles can be put on the market after they have been treated with "Ascu", it would be a boon to villagers, who use millions of such poles. It is too much to expect the consumers to treat the wood themselves. It is claimed that posts impregnated with "Ascu" under a pressure of about 45 lb. per square inch in 6 per cent. concentration by weight, will last about 20 years. A plant for this, though expensive to private individuals, is cheap enough for the department. A portable plant capable of treating about 100 posts per day is estimated to cost about Rs. 500.

*Sleepers.*—Every year the railways use millions of wooden sleepers. Of late, there has been a tendency to use steel fish plates and bars for this purpose. What we have said in connection with wooden telegraph poles, etc., also applies equally to the use of wooden sleepers. The North Western Railway adopted a method of preserving the sleepers and this has saved them three lakhs of rupees per year.

*Waste Wood.*—Not much use is being made of cut pieces of wood and saw-dust. In some parts these are being actually burnt away.

Saw-dust, as also paddy husk, have been compressed into blocks with the aid of adhesives. If some such method can be used commercially, it may be possible for us to produce material out of which electric casing, compressed boards, etc., can be moulded. Saw-dust can also be useful in the preparation of moulding composition with lac. Again, another way of using such waste will be in the dry distillation of wood.

*Small dimension stock.*—We have advocated the Forest Department preparing the timber for the market. When this is done there will remain on its hand large quantities of small and irregular pieces left over after fashioning crooked and small sized stems, branch logs, slabs and edgings. Even now a fair amount of such pieces are available which are usually used as fuel. Wood plankings of small sizes can be cut from these without much skill and by village carpenters equipped with nothing more elaborate than a hand saw and an axe. These can supply ready cut pieces out of which wheel parts, charpoy legs and other parts of furniture made by turners, shoe lasts, toys, spools, shuttles, bobbins, spinning wheels, etc., can be made. From this timber waste a very large supply of high grade timber which would otherwise be too

expensive for making such small articles can be made available. This will also afford part-time employment for some agricultural labour as this work does not call for the capacity of a highly skilled carpenter.

*Firewood.*—Since, the major part of the forest area is under private ownership, this great natural wealth is being used without a rational plan. The result will be that the bulk of the forest will be depleted, by over-cutting and underculturing. One of the great needs of the villagers is a constant and readily available supply of firewood. We are considering the question of charcoal separately. There are a great many waste products from the forests which can be utilised for fuel. Quick maturing trees should be chosen which will flourish in our forests to provide an abundant supply of firewood.

*Charcoal.*—We have already referred to the generation of power by using producer gas. Such producers for motor-traffic now cost over Rs. 1,000. On the face of it this appears to be too expensive and the cost can probably be reduced by about 25 per cent. or more, according to the availability of the metal, etc., within the province. The preparation of charcoal itself, can be undertaken by the Forest Department, and if it desired to recover the volatile by-products, which are gas, pyroligneous acid and wood-tar, a cheap type of kiln costing about Rs. 300 may be built in brick and mortar. We may also get methyl alcohol, acetic acid, acetone, wood creosote, etc., but the process will be more expensive for these.

If the iron-ore available in this province, is to be converted into metal, large quantities of wood charcoal would be required for making pig-iron but it must be borne in mind that the production of pig-iron by charcoal furnaces must always be restricted so as to be compatible with forest resources and for this purpose licensing may have to be resorted to. In this case, a wood distillation plant may be erected in the vicinity of such iron-steel units and the volatile products can be utilized. It would be possible to obtain about 100 gallons of crude pyroligneous acid to a ton of wood and this acid contains 4 to 7½ per cent. of acetic acid, and about the same percentage of methyl alcohol and other tarry products. By-products like wood creosote have a large number of commercial uses such as in making insecticides, disinfectants and in timber preservation. (See also Chapter on Power.)

*Grazing and Fodder.*—Another incessant claim made on the resources of the forests is for grazing cattle. We have already pointed out that there is a paucity of good grazing lands in this province, and this is due largely to the excessive number of cattle, and to the deficiency of the area under fodder crops. It would be necessary to see if an excessive share of agricultural land has been given to money-crops instead of to fodder crops and reserves for grazing. When the farmers were offered tempting prices for money-crops, especially cotton, a large proportion of land was turned into fields for growing such crops. This was encouraged on the plea that it is good to put as much money as possible into the hands of the farmers, overlooking the fact that money is not the only thing to be desired. A farmer cannot feed his cattle

with money. He cannot send cotton to Bombay and import fodder from the Himalayas. Fodder has to be grown but forgetting this fact the farmers allowed themselves to be enticed away. Even if the number of cattle in this province is above what is required, if the cultivable land is rationally apportioned among the various crops according to the requirements of the province, we have no doubt that the cattle can be stall-fed satisfactorily. Every farmer who has cattle should be obliged to keep at least 10 per cent. of his land under fodder crops. It is improvident for villagers to depend on grazing as the chief source of food for the cattle and especially on free grazing lands of forests. In Wardha district, there is only .086 of an acre available for grazing per head of cattle excluding milch-cows, sheep and horses. The district gets an income of Rs. 28,000 per annum from the impounding of cattle. As the straying of cattle is the inevitable result of the scarcity of fodder supply, the authorities who have not taken care to see that man and beast get their food requirements, should be penalized rather than the victims of their neglect.

We are told that even the reserved forests have not yet attained their full bearing stage; therefore, it may cause irreparable damage, if indiscriminate grazing were allowed. On the other hand, we are informed that some parts of forests abound with grass which can be used as a fodder by ensiling it. These parts are inaccessible now, but we see no reason why they should not be opened up and exploited to yield the necessary fodder. The Forest Department itself should undertake silage operations, and sell the fodder at reasonable rates.

In this connection, we would like to suggest the paddock system of grazing, worked out by Sjt. K. P. Sagreiya as an additional method of solving this fodder question.

Even where grazing is allowed, it ought to be possible to restrict the number of cattle admitted to graze in a particular area. Of course, such restrictions will cause administrative difficulties, but to solve or to get over them, the proper way is not to raise a hurdle of grazing fees. If that is done, the richer man would get the advantage over the man without money. For such work in the interior of the forest, labour may be obtained as is done now by settling people in forest villages or *bankheti* settlements.

**Honey and beeswax.**—Honey as an article of food, is very rich nutritively. Unfortunately, the Forest Department is hardly aware of the possibilities of this commodity if we are to judge by the interest they have taken in it. Even such collections of honey as take place now, are purely predatory. Wild combs are taken after driving away the bees. These are squeezed for obtaining honey and wax. There is no scheme whatsoever, for developing this source of a very useful article of diet. The department should obtain the services of an able api-culturist, who would teach the villagers in and around the forests, scientific methods of tending bees. In regard to further details of this industry, reference may be made to Part I of our Report. The right to collect honey and wax from the Government forests ought not to be auctioned or sold to contractors, as their methods are destructive and harmful.

**Essential oils.**—The aromatic resources of the province, like many others, have not been systematically surveyed. It is, however, known that many odorous raw materials such as rusa grass, khuskhus root, kewda, gorakmundi, jasmin, lavender, wild roses, etc., are available. These will have to be carefully collected and then placed on the market.

Most of the essential oils can be manufactured on a cottage basis. Such cottage units should be encouraged or started; but where the preparation has to be done on a large scale, this department will content itself with supplying raw materials to the Industries Department.

**Rusa oil.**—Rusa oil has hardly any local demand. It is chiefly used for making "Otto of Roses", in soap-making and in scenting hair oils, etc. It is distilled from rusa or tikhari grass. In the Nimar, Melghat and Betul divisions this grass grows wild in adequate quantities. The Forest Department leases out annually the right to collect the grass. The distillation process is on the cottage basis and appears to be not economically adapted to large scale production. Therefore, as far as the Forest Department is concerned, its duty will end with the sale of rusa grass.

**Gums and resins.**—Various kinds of gums and resins are used widely in industry, in mucilages, sizing materials, paints, white washes, mortars, etc. These are available from different types of plants in the forests. But at present, they are being collected in crude form and placed in the market without any further refining or grading. The department should collect these, grade them and where necessary refine the produce before it reaches the market.

**Kattha industry.**—The khair tree is found scattered practically in all forests. Kattha is made on a cottage basis by boiling the heart wood and concentrating the extract from which the kattha crystallizes out, this being commonly used along with betel leaves. The mother liquor is a source of cutch (catechu tannin) which can be used for tanning purposes.

Here also, as it is a cottage industry, the Department will content itself with the sale of khair-wood.

**Tendu leaves.**—The abundance of tendu trees has introduced into this province one of the largest cottage industries prevalent, namely, the manufacture of bidi. The tree is found fairly well distributed in all Central Provinces forests but the chief localities are Bhandara, North Chanda, Jubbulpore, Bilaspur and Saugor divisions. The leaf of this tree forms the wrapper of bidis. Tobacco is mostly imported. The contractors obtain the right to collect the leaves and employ labour on piece-work basis.

We have already recommended to the Government that as the tobacco habit creates an inelastic demand it is not desirable to encourage such a habit among ill-nourished people, as it will ultimately lead to a large number of persons buying bidis to satisfy their craving for it at the cost of food and other necessities.

\* *Lac.*—This province holds a partial monopoly in this commodity, but at present, the methods of propagation, collection, preparation and marketing of lac, though done on a cottage basis, require proper organization and use of scientific principles. This is an important industry and is likely to assume still greater importance in the future. Therefore, the Forest Department should take care to see that lac which forms the raw material for many industries reaches the market well packed, in a graded and unadulterated condition. To this end, we should suggest that this department should undertake, according to a previously laid out plan, the production, collection and preparation under its own supervision, as there is hardly any method in the present mode of dealing with this important commodity.

Working on a cottage basis, the Forest Department would be able to supply seed lac, button lac and shellac in pure form.

The Industries Department will have to convert these into commercial products. The Lac Research Institute at Ranchi claims to have succeeded in preparing moulding powder using lac. If this has reached the commercial stage, it would be possible to produce all kinds of pressed ware, gramophone records, electric insulators, etc., for consumption in our province and for export.

Our forests can supply soft, light coloured and uniformly grained wood which can be worked upon with coloured lac sticks to produce artistic ware. French polish can be also made from lac. Concentrated solutions of lac can be used in the making of insulating materials. Of course, the common sealing wax is well known.

*Tanning materials.*—To convert raw hides into leather we need an abundant supply of tanning materials. This province exports large quantities of hides and skins and also over 10 lakhs of maunds of myrobalans. Apart from this, we possess other tanning materials such as, dhaora leaves and bark, cutch, babul bark, etc. If we undertake to tan all the hides available within the province, we shall be creating employment for thousands of people. If we have to export any surplus tanning material that can be done by exporting crushed myrobalans to other parts of the country or in the form of tanning extract to foreign countries.

The collection of myrobalans is not done by the department itself, but is given out to contractors. This method of dealing with it is not satisfactory inasmuch as properly graded goods are not placed on the market. Therefore, as in the other cases, the department should take upon itself the responsibility for the grading, etc., if it still wants to continue to give contracts for these collections.

*Bones, horns, etc.*—Certain quantities of bones are picked up in the forests and exported to foreign countries for various purposes by contractors. We see no reason why we should not use this source of wealth in our own country. Middlemen collect the bones and send them to Calcutta and other parts. Elsewhere, we have suggested that fertilizers should be made and supplied by a Government organization. Either the Forest Department, or the Agriculture Department

may convert these bones into bone-meal manure and supply to the farmers, not on a cash basis but in return for some produce raised by using such manure or for labour. Our land is getting impoverished in its calcium and phosphorus contents every day for lack of suitable manures.

Large quantities of horn are also to be found in the province. Antlers of deer and horns are mainly exported to England. Horns are valuable because they are elastic and so can be worked upon. Various articles such as combs, boxes, shoe-horns, shuttle-cocks, buttons, paper-cutters, handles for razors, knives, umbrellas and walking sticks, cigarette holders, snuff-boxes, pen-holders and other such articles of much utility are being made. Recently celluloid, bakelite and other synthetic plastics have been fast replacing horns for making these articles.

The department should organize the collection of horns and grade them. If the forest villagers can be taught the craft of working horns into useful articles, they may be able to follow this as a subsidiary occupation.

*Medicinal herbs.*—The Government has not been able to touch even the fringe of the problem of an adequate supply of medicines in spite of its large expenditure on this score. The Western system of treatment entails the use of imported medicines which are beyond the means of the villagers. Therefore, if we are to tackle this problem, the only possibility of doing so satisfactorily will be to find the sources of readily available drugs and medicines. Our forests abound in herbs and plants which have been used for centuries by our indigenous medical men. Unfortunately, owing to their decadence, middlemen have exploited the ignorance of the people and have palmed off spurious and decayed drugs as the genuine article. There is a great need of properly qualified and trained men to collect the herbs, etc., prepare standard medicines, and supply these to the people at cheap rates. This is another field of work in which the Forest Department can not only come to the aid of the people in distress, but also, render a much-needed service in which the existing efforts have been practically futile.

The Forest Department should include in its working plans such medicinal herbs and drugs as the Department of Industries in consultation with the Department of Medicine and Public Health may require for making the necessary preparations.

#### CHAPTER IV.—MINERALS

The minerals of any country form its treasure troves which, if parted with, cannot be replaced. This province is rich in mineral resources and a great duty is thrown on the Government to ensure their proper utilization in national interests. In granting concessions, they have to remember that they are dealing with the natural heritage of the people. The heritage consists of not merely the material resources but also of the chances of employment that the conversion of these raw materials into finished products will furnish. The fact that this aspect of the nature of mineral wealth, is not appreciated at present, is shown by the absence of any department of Government solely detailed out to safeguard these interests. Even where

there are departments, entrusted with a particular function, like the Department of Agriculture, Industries and Forest, they fall short of the conceptions which should guide their organization and policy. But when we come to minerals, there is not even an empty shell of a department with a special portfolio.

It is the practice at present to grant concessions in return for a paltry consideration in royalty or dead rent. The question as to whether the mines are being worked in a manner which will benefit the people is never considered. The granting of leases appears to be done with the same ease and indifference with which a never-do-well prodigal son disposes of his hereditary property to provide him the wherewithal to squander for his pleasure. There have been many concessions which have been taken by foreigners but not yet worked and such concessions have kept the available chances of employment from the people of the land. These are infringements on the unwritten property rights of the people.

In some measure, the subject matter of mines differs from that of forests. Most of the forest resources provide raw materials for cottage industries straight away. But in the case of minerals these have to be mined, quarried or collected and passed through certain processes before they can provide raw material for industries. As most of the processes involved in converting the natural product into an industrial raw material are elaborate and require a considerable amount of capital, these will form, what we may call basic or key industries which would supply materials for industries carried on by the people.

If these minerals are to be collected and processed for use in smaller industries, it necessarily follows that such key industries should not be handed over to purely private enterprise. Just as the Forest Department has to be run on the basis of service, so this all important resource should also be administered on behalf of the people by the State on the basis of service. This would involve either state management or a close control by the State. It seems to us that the best way of dealing with it would be to create a separate department correlating it with the Industries Department. This department, when it is not in a position directly to work the mines and quarries, should do so through organizations which will guarantee to carry out the policy of the Government.

A great deal more information than what can be gathered from the publications of the Geological Survey of India, etc., has to be obtained and classified, if we are to have full knowledge of the possibilities of the mineral resources.

**Manganese.**—The present era in the history of man is called the "Iron Age" rightly or wrongly. Most of the nations in the vanguard of material progress are the ones that have exploited the use of iron and steel to the fullest extent. Our Province is rich in raw materials for making high grade steel. Though we have coal enough to last us over a thousand years, yet much of it is not of good coking quality and hence, is not very helpful. As if to make up for this, we have been endowed with excellent manganiferrous ores and some of the finest manganese ore

deposits in the world. This marks the manganese ore as the most important of the mineral resources of the province. The ores found in different districts differ largely in their iron, silica and phosphorus content. The tendency seems to be towards a progressive increase in phosphorus content with depth, i.e., as the mines are worked, the quality of the ore obtained deteriorates. India supplies a considerable proportion of the manganese used in the world and we are exporting it in the crude form. If this state of affairs continues, when the time comes for our country to make use of this ore we shall find only low grade ores are left on our hands.

The Railways give special rates which encourage the export of crude ores. We have repeatedly pointed out how this policy is shortsighted and depletes the wealth of the province.

The chief deposits of manganese ores are in Balaghat, Nagpur, Bhandara and Chhindwara districts. The contribution of these mines to the total production in India is more than 60 per cent.

Manganese ore is mostly used in the production of iron and steel of great strength and hardness. Various compounds of manganese such as potassium and sodium permanganates, sulphate, chloride, etc., can be made from this, particularly from pyrolusite.

This is a case where our recommendation to Government to conserve our mineral wealth and not to encourage its export should be applied.

**Iron.**—In addition to manganese ores, this province has also a reserve of several hundred million tons of iron ore fairly widely distributed over the province and chiefly at Lohara in Chanda district, at Omarpani in the Narsinghpur district and in Dondi-Lohara Zamindari in Drug district. The quality of the ore is very good, as its analysis shows low percentages of phosphorus and sulphur.

Since time immemorial iron-smelting by small blast furnaces has been going on on a cottage unit basis, using charcoal. In Jubulpore district, 'kheri', a kind of steel, is smelted from manganiferrous iron ore. In the early years of the century there were over five hundred such furnaces working. Owing to many causes, chiefly shortage of charcoal, these have dwindled to about a hundred furnaces now.

The metal produced from manganiferrous iron ore is a good quality charcoal steel well adapted for making village tools and implements. This industry deserves encouragement. A long stride can be taken if the Forest Department could devise ways of supplying charcoal for this purpose. It would be a material loss if this industry were allowed to die out for lack of a little planning and organization. Iron smelting traditions exist, they need to be harnessed.

The one great obstacle in the way of developing an iron and steel industry in this province is the lack of a good quality coal. We are discussing the problem of power later. If that can be solved, this province can take

its former lead as an iron and steel producing province. If electric power at about 10 units per anna were available, the necessary furnaces could be constructed in suitable localities.

**Tungsten.**—This occurs in very small quantities in the Nagpur district as wolframite and as scheelite; the former containing in addition iron and manganese and the latter calcium. This ore is highly priced, being worth about Rs. 900 a ton. It is used in the making of high-speed tool steel and the filaments of incandescent electric lamps. Tungsten steel retains its temper even above a thousand degrees centigrade, while carbon steel loses it at half that temperature.

**Copper ores.**—India imports very large quantities of sheet brass from Germany, Japan and elsewhere. This forms the basic raw material not only for the ubiquitous brass vessels to be found in every Indian household, and for ornamental brassware, but also in bell-metal casting work. Formerly, in regard to this metal India used to be self-sufficient. We have copper ores in Imalaya near Slemabad in the Jubbulpore district and copper carbonates in Chilpighat in the Balaghat district and in Chicholi in the Drug district. It would be of great interest to this province if these sources are further investigated.

**Bauxite.**—Bauxite occurs in many localities in the Central Provinces. The best deposits discovered up to now are located in the Jubbulpore and Balaghat districts. The deposits in the latter district are somewhat inaccessible and have not, so far, been developed for commercial exploitation. On the other hand, the Jubbulpore deposits have been developed to a considerable extent—the best known of these are Dhangaon, Khujuri, Padarwara, Tikaria, Flag Staff Hill, Bargawan and Tikuri.

In other countries the main consumption of bauxite is in the manufacture of aluminium metal which is making steady progress in modern industry, in view of its being a light metal with excellent physical and chemical properties. Aluminium is also considered a vital national necessity because of its use in aeroplane construction and in the making of explosives (anomonal). In India, so far bauxite has not been converted into aluminium metal but a factory for this purpose is now under construction near Asansol.

Pure alumina (aluminium oxide) is made from bauxite by the Bayer process. This is the first stage in making aluminium metal. Bauxite is also the raw material for the manufacture of aluminium compounds such as sodium aluminate, aluminium hydroxide, aluminium chloride, aluminium sulphate and potash alum. Large quantities of these materials are used in the paper industry, water-purification, dyeing and many other industries.

Bauxite further finds use in the manufacture of refractory materials such as fire bricks and furnace linings. It is used for making artificial abrasives and also to produce a special kind of cement, known as "Ciment fondu", having the properties of quick setting and resistance to sea water.

The best locality for the manufacture of pure alumina, it would appear, is in the vicinity of Katni. There are at least five million tons of good quality bauxite readily available nearby and coal can be had at a low price from the Umaria collieries in the Rewa State. Provided a cheap source of electrical energy can be developed within the province, aluminium metal can be made from the pure alumina manufactured at a central factory. About 25 kilowatt hours of current are required for the production of one kilogram of aluminium metal. The smallest economic unit of production would be ten tons per day and for this purpose a supply of about 15,000 kilowatts would be needed. The cost of the energy should not exceed Rs. 60 per kilowatt year. The Aluminium Corporation of India, Ltd., who are constructing a factory near Asansol, estimate that using Bihar coal costing them Rs. 2 per ton at the pit's mouth, their cost of Thermal Electric energy will be Rs. 40 per kilowatt year.

The Committee is of the opinion that the production of pure alumina should not be deferred until the question of making aluminium metal is settled. Government should take up the manufacture of alumina immediately and give the production of aluminium metal their serious consideration as soon as a cheap source of power can be developed.

**Coal.**—Next in importance only to iron, coal ranks as the mineral on which modern civilization is based. Apart from its main use as a fuel, it is also the source of a great many important by-products from which many articles of present day commerce are manufactured.

This province contains very large deposits of coal but these have not been completely surveyed. As far as is known, most of the mines do not produce high grade coal of a coking variety. The Coal Grading Board has classified our coal into the second and third grade. A very limited amount of first grade coal is found in some areas.

The two large tracts exploited at present are in the Pench Valley and in the Wardha Valley. The larger portion of the coal fields are not being worked mainly due to lack of communications.

The coal raised is mostly used by the Railways and industrial undertakings in the province and in adjacent places. The coal is not graded but is commonly known, and judged as regards its quality, after the place from which it is raised. A royalty is paid to Government on per ton of coal raised. The Government should carry out a fuller survey to see if seams of better grade coal can be found.

**Clay.**—The pottery industry where worked on a cottage scale as well as the brick and tile-making industries, are in a very decadent condition in this province owing to the ignorance of the potters about the qualities of the clay used by them and on account of the advent of cheap metallic vessels. There are no satisfactory analyses of clays available in this province. Samples of clay from every village where these industries are carried on, should be obtained and properly analysed and the necessary correctives for



making satisfactory mixtures should be suggested. This is a very important industry, as it affects not merely the economic life of those engaged in the industry, but also the health and well-being of the general populace. The necessary investigations can be carried out by the industrial chemists attached to the Industries Department. It will not be practicable to depend on professors, engaged in teaching, for such important industrial work.

In this province in addition to common clay we have fire-clay and china-clay.

We are importing large quantities of china and porcelain wares for domestic use as well as for commercial uses such as electric insulators, etc. All these can be manufactured mostly by hand excepting where specialized kilns for firing at high temperatures are necessary. Such kilns must be provided by the Government in addition to technical advice and guidance. Insulators, etc., require expensive apparatus for testing their soundness.

For high class work, even the preparation of clay becomes too high a technical operation for the country potter to undertake. In such cases, the department ought to prepare the necessary clay mixtures and distribute them to the workers. There are only a few pottery works in the province and they have not been able to produce goods of sufficiently high grade and quality, excepting in stone-ware, to oust all imports. As this province contains very good raw materials for this industry, we should aim at being not merely self-sufficient in this matter, but also in a position to supply the needs of other provinces.

**Building stones.**—The geological formations of this province yield excellent stones which can be used for building, ornamental work, etc. Unfortunately, hardly any statistical data are available. These stones have not been properly studied. A considerable amount of investigation has to be done, if we are to use them to the best advantage.

**Limestone.**—Our province is the second largest producer of limestone in India. Apart from its use as a building material, lime prepared therefrom is used in various processes in industries, such as glass-making, leather tanning, etc. It can also be used in making bleaching powder, in the making of calcium carbide in electrical furnaces in combination with coke and carbon and we are all familiar with the use of slaked lime with "Pan" and in white washing.

**Marble.**—This occurs in several places but the best known locality is Jubbulpore. The marble is, however, not of good quality and on account of its contents of pyrites it weathers badly soon, developing a pock-marked appearance.

**Sandstone.**—Sandstone occurs in Chanda, Nagpur, Nimar, Hoshangabad, Betul, Amraoti, Jubbulpore, and, in small quantities, in other parts of the province. The Vindhya formation yields different coloured stones which are good for building purposes. A type of quartzite suitable for glass-making occurs in a fairly pure condition at

Krishnapore. In Hoshangabad, there are flags of sandstone suitable for roofing purposes.

Apart from its use as a building material, sandstone has been used wherever resistance to weather is a consideration, as in the case of railing posts, roofing, foot-path pavings and so on.

**Laterite.**—Laterite in the purer form is the bauxite ore which we have already considered as a mineral forming an important source of aluminium.

**Basalt.**—Basalt, a black hard stone, is found largely in Berar and in some parts of the Central Provinces. These are excellent for building purposes and road-metalling. They are also used for carving out images.

**Sand.**—In the case of sand as in the case of all other items of national wealth, very little systematically collected and classified information is available.

From what little we have gathered from the users, we learn that excellent sand is to be found in many parts of the province. This sand has a high silica content and is used in making glass in foundry moulds and in filtering water supplies. There are a few glass-making concerns in Gondia, Nagpur and Jubbulpore. But the possibilities of this industry in this province are very much greater. In making glass this province is in an advantageous position, as it contains almost all raw materials needed, namely, sand, soda and limestone.

**Salt and soda.**—Both salt and soda have a wide range of uses in all kinds of industries. And so, their availability demands the close attention of the Government. Common salt is a monopoly of the Central Government, but it is allowed to be manufactured by village lagers for their own use under the Gandhi-Irwin Pact. The Provincial Government will have to consider its position in regard to the salt resources of this province.

As regards soda, for all practical purposes, the Imperial Chemical Industries (India), Ltd., has a monopoly. And this monopoly can be and ought to be broken if local sources of supply are available.

At this stage, we may mention that a good deal of vegetable waste that is burnt away in the forests to clear up the unnecessary growth, yields ashes, akin to pearl-ash rich in potassium carbonate. The top-parts of sugarcane plant and bamboo and the plantain tree waste can be converted into pearl-ash; certain plants such as aghada, adhatoda-vessica, are good sources. These are matters which both the Forest Department and the Agriculture Department should consider. Potassium carbonate when converted into caustic potash is used in the manufacture of certain types of soaps.

**Sajji-matti.** occurs in the efflorescence found in reh-lands in this province, mainly, in some parts of Wardha, Saugor, Bhandara and Hoshangabad districts. In former times, the extraction of sodium carbonate and other salts from *sajji-matti* was a vast industry in our country in which thousands of people were employed. The salts so recovered were used in washing, dyeing, soap-making, glass manufacture, etc. Apart from,

reh-lands, considerable quantities were obtained also from the Lonar Lake in Buldana district. At the present time the sodium carbonate and caustic soda used are practically all imported. Our province should produce as much of it as possible locally. To this end, we have already suggested that the Forest Department and Agriculture Department should do their share of work. The Government should investigate the potentialities of Lonar Lake by finding out the sources of the salt. Borings may be made in the bottom of the lake to ascertain the quantities of salt, if any, available in the mud of the bed. And also, an investigation should be undertaken in regard to the methods of extraction, calcination, and other processes connected with the recovery of the salts and in regard to facilities of transport. In Lonar Lake, the supply appears to occur sporadically, and not in a dependable regularity from year to year. Therefore, methods of extraction involving large capital expenditure may not be advisable. Perhaps processes may be devised such as will require very little capital and which can employ labour available locally during the season in which agricultural labour is unemployed. If this can be done, this industry will fit in to the rural conditions in the locality. We understand the Government has recently given a concession in regard to Lonar Lake for 10 years to a private concern. It may be possible, in the general interest of the province, to induce the concessionaire to allow the Government to do the necessary research in this regard.

A certain amount of common salt can be obtained from the Lonar Lake. A long time ago, large quantities were extracted from about 400 wells sunk in the Poorna river valley, within a compass of 10 by 50 miles. It may be advisable to have a proper survey made in this locality to find out the possibilities and the capacity of this source. The water from these wells is said to be not only saltish, but also bitter to taste. This suggests that in addition to common salt, magnesium sulphate or sodium sulphate may be present. The analysis of the efflorescence in Western Chanda shows as high a percentage of common salt as 88.23 and as regards Epsom-salt content it was 13.94 per cent. in some cases. These are valuable products and their availability should be investigated.

**Barytes.**—Barytes is commonly used as an inert carrier in the manufacture of white paints and as a basic material for many coloured ones. We have suggested that the manufacture of paints of various kinds should be encouraged as many raw materials for that industry are to be found in this province.

Barytes occurs at Wun and in the Jubbulpore District, but we have no information in regard to the quantity available and its quality. This has to be investigated further by the Government.

**Ochres.**—Red and yellow ochres are useful pigment materials. Red ochre is found in Jubbulpore, Balaghat, Betul and Drug districts and yellow ochre in Chanda and Nagpur districts. These yield durable pigments and, therefore, will be valuable in

building up a paint industry in this province. There are only a few at Katni and elsewhere exploiting this raw material. Further survey ought to be made as regards their occurrence, quantities available and their value as pigments.

**Semi-precious stones.**—Various kinds of semi-precious stones such as, agate, carnelian, jasper, garnet, etc., are found all over the province. These are used mostly in artistic wares. Agate is often used in scientific instruments. The Department of Industries may include a course in its schools of handicrafts in working those stones.

**Graphite.**—India imports about 800 tons of graphite in powder and crucible form. In this province, graphite occurs at Gauthana and Chilkhal in Betul district. But the extractions have been below 50 tons per year and practically all of it is exported from this province. The quality of this mineral available in Betul is not known. This should be investigated. Graphite is used largely for making crucibles, lead pencils and as a lubricant. Until we know the quality of the graphite available it will not be possible to offer any suggestion as regards its utilization. If large quantities of a good quality are available, a number of useful things such as pencils, crucibles, lubricants, and graphite powder electrical goods can be manufactured.

**Steatite.**—Steatite, commonly known as soap-stone, the coarser and harder variety being called pot-stone, is found in large quantities in Jubbulpore, Bhandara, Chanda and Yeotmal districts. The material when quarried is generally sent away to Bombay and from there to foreign countries. Steatite from India is not readily acceptable in the London market, largely due to the fact that the different varieties have not been properly graded and that the grinding operations are carried out carelessly. These matters should form part of the responsibility of the Industries Department. Soap-stone is largely used in our country for making images, decorative panels, etc., for building purposes, for carving out pots and dishes, and in the manufacture of small fancy articles. Commercially, it is used as a filler in manufacturing paper, textiles, rubber goods, soaps and paints. In foreign countries it is used in powder form in toilet preparations. It is also used in making slate pencils, tips of gas burners and other similar articles. The mine-owners experience great difficulty in de-watering their quarries, and in the transport of raw material and quarried soap-stone because of the mines being situated in remote places unconnected by road or rail.

**Miscellaneous minerals.**—Apart from these main minerals there are also available small quantities of gold, silver, lead, fuller's earth, corundum, mica, quartz, felspar and asbestos. The information in regard to these is very scanty and at present not much use is being made of them within the province.

There are also a few mineral springs in different parts of the province where no arrangements have been made to prevent pollution of their water for drinking. In



other parts of the country, mineral spring waters are bottled and exported. If the curative properties of our spring waters are examined, some such use may be made of these also.

**Finance.**—The Government gets in dead rent, concession fees and royalty less than Rs. 4½ lakhs per year from these resources. As long as this province is not working these minerals into processed goods, it may not be advisable to extract these minerals in any large quantities. Every effort should however be made to utilise as much of the minerals as are taken out in the province, in industries located in the province.

## CHAPTER V.—POWER

Power is one of the important items of cost in all manufactured articles. Manufactures can flourish where cheap power is available. An adequate supply of power, therefore, forms one of the principal items that conduce towards the industrial development of a country. This being a basic requirement, it will not be very satisfactory to depend on outside sources of power. If we wish to control the development of industries, we must first obtain control over the motive power. We need power to quarry, mine or to gather our raw materials, we need power to transport these to the place of manufacture, we need power to manufacture the raw materials into consumable goods and we need power again to convey these articles to the markets. Therefore, the duty of supplying cheap power falls to the State.

Power can be obtained by taking it from Nature's store, as in the case of coal. This is a predatory method of enjoying the bounty of Nature. From coal we may also generate electricity and transmit it to places where power is necessary.

By his ingenuity man may be able to produce a source of supply of power by his own effort. He may plant trees, plan and regulate their growth so as to obtain a regular supply and then convert the wood into power. Under this heading we may bring in wood, charcoal, and hydro-electric schemes. In the last case, man regulates and directs the storage and flow of water to generate electricity. This mode of obtaining power is superior to the predatory method in that the supply can be controlled by man.

As far as this province is concerned, it is fortunate in having large supplies of coal and large areas under forests. But, being the centre of the country geographically, it is a water-shed, and, therefore, is the source of many rivers. This factor reduces the quantity of water available at any one point. Therefore, it may be difficult and hence expensive to install hydro-electric stations, unless such a scheme is coupled with some electro-chemical industries consuming large quantities of electricity, such as the production of aluminium from bauxite as already suggested.

**Hydro-electric projects.**—This province has had several surveys to examine the possibility of developing electric power by the development of hydro-electric projects, or installation of thermal stations. Mention may be made here of the reports of Mr. Batchelor, I.C.S., Mr. Mears, the Tata Company and Sir William Stampe. But none of these is

conclusive. The Pench-river schemes appear to hold good possibilities of generating electric power at different points on this river. The calculations of Sir William Stampe work out the capital cost at Rs. 881 per kilowatt at Dotla Doh, and Rs. 1,205 per kilowatt at Sillewani Ghat. But he himself confesses that he "makes no pretence of accuracy or finality". These are rather high figures. Mr. Batchelor's scheme may cost about Rs. 600 per kilowatt, and the Tata Hydro-electric Company's scheme was estimated to cost about Rs. 750 per kilowatt. These may be compared with the cost of such schemes in the Punjab and at Pykara, at which places it works out to Rs. 800 per kilowatt. Sir William Stampe's final opinion is that there is no prospect of an expensive hydro-electric scheme being successful in competition with steam at the present time. His proposal is to start thermal power-stations to form a grid and the question of hydro-electric generation should be considered, when the load rises above a certain limit.

In view of these widely conflicting opinions, although the Government may not be able to launch these schemes immediately, they should seek the advice of some experts who can take a detached view and who have had experience in this line in other parts of the country. Of the surveys done so far, Sir William Stampe himself has not been able to carry out his work to his own satisfaction as he was ill at the time of his visit here. His inspections were more of the maps than of the sites and, therefore, we may not place too much reliance on his report. At the same time, the schemes with the exception of Tata's do not bear the stamp of experts, with local experience. The Tata scheme and estimates are based on prices that were current about 17 years ago, and even at the present time, it will be very difficult to calculate the cost of a large scheme of this nature with the disturbed state of the commercial market at present. However, when the time comes, which possibly is not now or in the near future, we suggest that the Government should take the necessary steps to obtain a fresh estimate.

**Thermal stations.**—Hydro-electric schemes can generate electricity at cheap rates provided there is a sufficiently heavy load but the capital investment involved is very much greater than in the case of a thermal station. Therefore, it has been suggested that while we are developing a demand for power, we may use thermal stations at comparatively lower capital charges and form a grid by having several units in different places in the province. In this province, we have coal supplies available but the calculations that we have seen so far offer us no ground to hope that by this means we shall be able to supply power sufficiently cheap to encourage electro-chemical industries. But we feel, the possibilities will have to be explored more thoroughly before a definite conclusion can be reached.

There are several thermal plants in the province, but unfortunately the existing costs of production, in the words of Sir William Stampe, "are not such as to encourage either the development of large or the fostering of the small industries". He goes on to say

that the rates of supply are indeed prohibitive from the point of view of cottage and minor industries".

**Management.**—Sir William Stampe is definitely of opinion that a syndicate managed grid system would be best. He feels that it will not be possible for the Government to obtain the necessary men to run such projects efficiently. He doubts that even if such men were available whether "they would work efficiently without highly trained overhead supervision". He goes on to add insult to injury by saying "I have not yet seen in any province in India, a proper organization for the development of industries on modern lines. Is it likely that the Central Provinces would be the first to be able to produce such an organization?" We are surprised at this defeatist mentality of the late Chief Engineer of the United Provinces. We do not share these fears.

Apart from this, as we have already said, power supply is a public utility service in which the profit motive should not enter. After having made out a case for Company management, Sir William goes on to contradict himself when he says, "it is well known to those who have had experience of the operation of electric supply companies by managing agents in India and elsewhere, that the managing agents are sometimes interested commercially in the sale of coal through their own collieries. In such cases their function as managing agents of electricity supply companies are apt to conflict with their functions as coal salesman." If this be the case, this argument ought to knock the bottom out of his special pleadings for company management, because it would be very difficult indeed to find businessmen who are not interested financially or otherwise in other enterprises too. Perhaps, we may have to go in for "the highly trained overhead supervision" which he dreads so much. We are definitely of opinion that it will be disastrous to introduce profit considerations in such public utility concerns.

Whatever may be the cost of production, the Government should undertake to supply power, when it is in a position to do so, at varying rates which are sufficiently low to be remunerative for such industries as are of national interest. In any case even where such supply companies work under the direct control of the state, provision should be made in the terms of the contract reserving to the Government power to regulate the rates.

**Wood.**—The universal power generator available to the masses is wood. As we have already pointed out, this province is rich in its forests. Still, owing to various extraneous circumstances people have to resort to using cow-dung cakes as fuel, thus depriving land of valuable manure. The Forest Department should plan to produce sufficient supply of firewood so as to be able to meet the fuel requirements of the villagers.

**Charcoal.**—As a fuel, which will generate gas free from tar and other impurities, charcoal is superior to coal. Under "Transport" we have suggested the use of producer gas as a fuel for motor vehicles. For the generation of this gas, it would be necessary for us to have a fairly reliable and an adequate supply of graded charcoal. The forests of

this province are widely scattered and, therefore, if adequate supplies of wood are available at various places of the province, these need not be far from the forests from which the wood is obtained. Charcoal-making itself will provide occupation to a very large number of people.

The present method of preparing charcoal from wood is very crude and wasteful, but it requires little or no effort. The people who produce charcoal are generally so poor that it is much more economical from their point of view to produce charcoal in their own way. If the Forest Department is to be organized as a public utility concern, they ought to keep in stock certain types of portable kilns of a suitable type for the use of charcoal-makers unless the department itself undertakes to produce charcoal, employing these people on daily wages. The Forest Research Institute, Dehra Dun, has devised an improved type of kiln, "Frikiln", which is claimed to be highly efficient. It can be taken to pieces and transported from place to place. But the only drawback is that it costs about Rs. 500. With the use of this device the cost of making charcoal is said to be four annas eight pies per maund and its average production of charcoal per month is claimed to be 9,770 lb. using 34,730 lb. of oven dry wood (2,250 cubic feet when stacked).

There are other devices which, while producing charcoal by wood distillation, also produce gas and wood-tar as by-products. These are necessarily done by more elaborate processes. Wood alcohol, if it is obtained cheaply enough, can be used for power purposes, as a solvent in making polishes and varnishes and for making formaldehyde which is used with phenol in the making of bakelite. Charcoal can also be of great value in our province, which produces good manganese iron ores, in converting these into valuable steel.

**Alcohol.**—As petrol is an imported product and our aim is to find, as far as possible, local fuel, we have to examine the possibility of substituting or reducing the consumption of imported articles. Later we are dealing with the possibilities of producer gas from charcoal with the aid of generators which could be used on motor vehicles.

Another source of power is alcohol. It is an expensive commodity to be used as fuel. When compared, however, with the petrol prices, inclusive of the Government duty, it may be cheaper to form a mixture of alcohol and petrol for internal combustion engines. The chief of the common sources from which alcohol is obtained is the molasses left over in sugar factories. In this province, as we have no sugar factories, this source is not available to us unless we import such alcohol from the United Provinces or Bihar. We have considerable quantities of mahua flower in both the forests and the waste-lands and these can be had for the collecting. But unfortunately we could get no reliable information in regard to the quantities of flowers that may be obtained annually from those sources. We understand that even from the known sources, the quantity available is sufficient to provide enough flowers for the preparation of as much alcohol as is necessary in this province to obtain a 20 per cent. alcohol 80 per

cent. petrol mixture. Mahua trees take about 20 years to flower. Therefore, it is not possible to plan immediately excepting on the basis of the quantity available at the present time.

It is estimated that alcohol from mahua can be prepared at a cost of about six and a half annas per gallon, while that from molasses at about four annas six pies per gallon. If the mahua flowers are to be collected and supplied to the power alcohol plant owned by the State, the cost of collecting the flowers will be low and, therefore, it is not necessary for us to allow for speculative effect on the prices of raw materials when such raw materials, now going to waste, are being exploited. If such alcohol is obtained, the cost of a 20 per cent. mixture will come to about Rs. 1-7-0 per gallon, which is only very slightly lower than that of pure petrol, Rs. 1-7-6 at present, but even then the benefit of using our own raw materials, and thus making employment for our people within the province, will in itself be a sufficient inducement to use such a mixture. If we can use charcoal producer gas, as we are suggesting, it will be very much cheaper than even the pure alcohol but it will not be useful except on long runs for buses and lorries and the equipment will be too cumbersome for private cars.

**Coal.**—Under minerals we have already stated that large quantities of coal are available in this province but that the quality is second or third grade. The coal is not of a good coking quality. It has a high percentage of volatiles and ash, and a low calorific value. This quality of coal cannot be used for iron smelting or other important industrial purposes. Suitable means of utilising this coal have to be devised. Experiments should be made to find out the best method of doing so. To ascertain the possibilities of using our coal in the turbine furnace, a few tests were made in a Babcock Wilcox water tube boiler at the Government Engineering School, Nagpur, but the results were not encouraging. In some places pulverised low grade coal has been used with considerable success in well designed combustion chambers.

Another way of utilising non-coking coals to produce high thermal efficiency is by using Producer Gas Plants using coal. This method, especially where a gas engine with suction producer is used, is said to produce 26 per cent. thermal efficiency as against 12 per cent. with a reciprocating steam engine and boiler and 18 per cent. with a steam turbine and boiler. The suction producer plant may have an added advantage, if by-products such as sulphate of ammonia and tar can also be recovered by its use. The Government will be well advised to investigate into this possibility of utilising our low grade coal to good purpose.

The Department of Industries had an inquiry made into the possibility of producing motor spirit from coal by hydrogenation but this is stated to be expensive.

If the by-products obtained can find a ready market, the method of low temperature carbonisation or distillation may prove an easy way out. As we had pointed out earlier, finding markets for these is a frequent source

of war. Hence we need to proceed with care. At all events, we recommend that the Government should give its earnest attention to this problem of a cheap fuel and having got plenty of coal, the problem resolves itself into one of finding the best way of using it.

## CHAPTER VI.—TRANSPORT, MARKETS, ETC.

In the production of most of the economic goods, transport, also, like power, plays an important role. Raw materials have to be taken to the places of production and finished goods have to be conveyed from the places of production to their markets or consuming centres. In decentralized methods of production, it does not play such a vital part as in centralized methods of production. Often times, the peace of the world hangs on controlling transport. Far flung empires, like the British, almost owe their very existence to the safeguarding of ocean routes. This necessitates maintenance of large armies, powerful navies and swift air forces.

We have in a measure touched upon this problem in Part I (Chapter VI, paragraph 29). There we have indicated that where time is of the essence, speed is a desideratum but that the use of motor lorries, at the present time, with imported vehicles and fuel, is a drain on the country's resources. If these vehicles are made in our country and utilize the fuel available here, they can very well be used in cases where the articles to be transported call for speed. Where rapid transport is concerned, we shall also consider the question of the state of roads, etc. We have already given some figures to show how the bullock-cart fits in the village economy.

**Roads.**—This province is very inadequately provided with roads. These are under the control of different authorities. There are about 7,000 miles of Provincial Government roads, of which over 5,000 miles are classed as class I, over 1,500 miles as class II, and less than 500 miles as class III. The class I roads are the only ones which have proper culverts and bridges and are well metalled. These are open to motor traffic and form mainly the trunk roads. The unmetalled roads are more or less like feeder roads which can be used by bullock-carts but not by heavy lorries.

Roads under the district councils total up to above 500 miles, of which only 300 miles are class I. As nearly half of the area of this province is under forests, we would expect a large mileage under the Forest Department. First class roads total up to only 19 miles but it has over 10,000 miles of second class roads and over 100 miles of cart-tracks and it maintains a tramway of about 70 miles.

Besides these of course, there are village tracks under their panchayats but the mileage for them is not available. Speaking generally, we may say that class I roads are essential for fast motor traffic. In some measure they are even harmful for bullock-cart traffic, as many of the bullocks used in agricultural operations are not shod, and, therefore, their hoofs wear out by going on hard tracks. It is not unusual to see that even on the class I roads, bullock-carts make a track for themselves through loose earth by the side. Therefore, we may safely say, that the maintenance and construction of class I roads

form a part of the cost of providing motor traffic. Apart from commercial considerations, class I roads are also necessary for military purposes. These roads cost about Rs. 5,000—Rs. 25,000 per mile to construct and their maintenance comes to Rs. 600 to Rs. 700 per mile annually. Last year, about 20 lakhs of rupees were spent on repairs of such roads. If we look upon these roads as part of the cost of motor traffic, these expenses are legitimately chargeable to such traffic. The licence fees on motor vehicles amount to about four lakhs and the Central Government contributions come to about an equal amount, so that, only less than a half is paid for by the real beneficiaries and over 10 lakhs becomes a charge against general revenue. This is not all. Over 16 lakhs of rupees, which are not included in our figures, are spent on the establishment. Again the expenditure on such roads is a drain on the province when there is a large mileage of such roads surfaced with tar and bitumen, which are not manufactured within our province. In addition to these Government roads, there is a considerable mileage of such roads within the cities and towns also which is so treated by the municipalities from the point of view of health. It is true that this treatment is essential to safeguard the people from dust. On this account, wherever the class I roads used by motor lorries pass through villages, such roads should be surfaced with tar for at least two furlongs beyond the village limits as well as through the village and the extra expense involved in this must be borne by the motor traffic and not by the general tax-payer. At present buses and cars pass through the villages leaving in their wake clouds of dust which is injurious to health. This is a criminal neglect of public duty vested in the State. We are glad to see that in this year's budget the Provincial Government has set apart a lakh and a half for rural communications. But this can only touch the fringe of the problem, as such roads and tracks must be increased by thousands of miles before the communications in this province can be said to be satisfactory. Fortunately as far as we know there are no roads barred to cart traffic in this province and we do hope that this infringement on the primary rights of villagers, which is beginning in different parts of the country, will not be allowed to be introduced here.

Unmetalled roads, classes II and III are good enough for motor traffic provided they are in proper gradient. If the mileage of such roads can be increased, it would be decidedly to the advantage of the people.

The Forest Department roads are mainly used for the transport of forest produce, the cost of construction of fair weather tracks is about Rs. 500 that of maintaining them works out to only about Rs. 11 per mile, but the present total mileage is very inadequate, as it does not bring within reach of operations greater portions of the forest areas in this province.

**Means of transport—(1) Bullock cart.**—Carting may be said to form a subsidiary occupation of the agriculturist during his off season and, therefore, by providing satisfactory roads, the Government will be helping to increase the purchasing power of the agriculturists. We have already dealt with the

claims of cart haulage to Government attention in Part I. We need not go further into that at this place to indicate the distributive element in this occupation. We are glad to note that the Forest Department has already taken steps to encourage bullock-cart transport of its produce. This is a step in the proper direction.

(2) *Lorries and Buses.*—We have dealt with the subject of vehicles run on petrol fuel and shown how this mode of transport impoverishes the province owing to the fact that both vehicles and fuel have to be imported thus disturbing our natural economy. Such a power-driven vehicle only benefits one or two people, such as the driver and the conductor, as against which it dislodges about 40 persons directly from their employment. We are glad to note that the Forest Department has made a beginning to encourage vehicles run on producer gas generated from charcoal. This in a measure at least minimizes the maladjustment caused by petrol fuel. In a province like this where the forests are widely distributed charcoal is an ideal fuel for such vehicles.

We had an opportunity of examining one such motor bus running on producer gas. The running of the vehicle was smooth and after a run of about 20 miles the engine was cool enough to be touched by hand. The generator is expensive and requires some improvement in regard to supercharging and boosting arrangement for negotiating high gradients, enriching the mixture by increasing the hydrogen content, to make the starting on gas easier, a provision of extra gas at low speed, better cooling and filtering of the gas, slight adjustment in the compression ratio, better carburettion with supplementary liquid fuel to improve acceleration. Apart from these minor mechanical adjustments, other improvements can be effected if Government itself takes interest in this method of motor transport. The performance of the vehicle that we tried proved beyond doubt the feasibility of this proposition, especially in long distance traffic. It consumes a maund of charcoal costing about twelve annas for a run of 80 miles. If the same vehicle is run on petrol, it would take about four gallons costing about Rs. 6. So the saving in fuel alone would be about an anna per mile. This generator has a life of about five years which would be more or less the life of the vehicle also. It seems to us that this mode of transport may be undertaken by the Forest Department itself, as well as by an organization of the Government which will ensure uniformity of rates and fares and the general comfort of passengers.

The conception of this method of transport is in keeping with the economy of our country and we trust that the Government will examine the question with a view to making petrol-driven vehicles a thing of the past. Charcoal has an advantage over other kinds of fuel, in that it is able to supply readily a gas free from tar and acid. It may be of interest to mention here that such vehicles are used in European countries, not only for road traffic but also for rail-cars. In France, such a rail-car develops a speed of 75 miles per hour with an average consumption of less than a pound of charcoal per H. P. hour, thus making a saving of 70 per cent. in fuel when compared with petrol

**Passenger traffic.**—It may not be out of place here to mention that many of the "tongas" and horse-driven carriages available for transport are in a very bad condition. In municipal towns, the municipality licenses these vehicles but a glance at the ponies of tongas awaiting at any railway station will convince one that the licensing rules are a dead letter as far as proper inspection is concerned. In the interest of prevention of cruelty to animals, the Government should insist that the animals should be in good condition, and institute prosecutions against any infringement on this score. The carriages also are passed once or twice a year and the inspection seems to consist in merely looking at the paint on the wood-work. A proper test of the springs and axles and other material parts of construction of the carriages should be reported upon. The construction of both carts and tongas requires investigation and improvement. Putting on pneumatic tyres with foreign built wheels does not solve the problem of improvement to these but is rather an extension of a market for foreign produce. We have to safeguard ourselves from the specious arguments of the salesmen of foreign producers. The pneumatic tyres for bullock-carts are definitely an attempt to create a market and also to shift the cost of maintenance of roads to the dumb millions. Government and other public bodies, as we have explained elsewhere, have to be wary of adopting devices which are detrimental to the interests of our villagers. Importing foreign made wheels or wheels prepared by centralized methods of production will impair the occupation of the blacksmith and the carpenter. In the measure in which we see these so-called improvements in the proper setting of the economic organization of our villages, we shall save them or destroy them.

(3) **Animal transport.**—The Forest Department employs a few elephants, buffaloes and bullocks for extracting large-sized timber from very rugged country. Some buffaloes and a few donkeys are also used as pack animals. These are, however, ill-cared for and ill-nourished.

(4) **Waterways.**—Owing to the geographical features of the province, there is very little of river transport. Bamboos are floated down to the main road to and down the Godavari from Sironcha to Rajahmundry. Because of the nature of the river beds and the scarcity of water, this mode of transport, which is one of the cheapest, is not feasible to any great extent.

(5) **Aerial ropeways.**—Some mines transport their ores and coal by ropeways.

(6) **Railways.**—Being in the heart of the country, the main lines of railways from Bombay to Calcutta and from Delhi to Madras, cross the province and there are a few branch lines within the province itself, totalling up to 2,500 miles in all. Railways can make or mar the economic condition of a country, according as the policy of the authorities is to encourage production locally or elsewhere. The railways are controlled in India by the Railway Board. Unfortunately, the policy of this board is inimical to the interests of our country as a whole and especially to those

of cottage and village industries. The Provincial Governments have no power to regulate the rates even within their own province. It is not possible for us to examine this problem in all its aspects within the scope of this report, but we shall endeavour to illustrate, by a few instances, how the railway rates do not encourage production and manufacture within this province but direct such chances of employment to ports and thence to foreign countries.

Our province is rich in the production of oilseeds and hides. Taking these articles we shall see what it would cost for a person in the province to manufacture an article and send it to the ports and what it would cost for a person at the port to buy the raw materials and manufacture the thing at the port. In doing so, we shall concern ourselves only with the difference caused by the railway freight and not with other circumstances affecting the cost of production. Therefore, for our purposes, we shall assume that all other items are identical both at the port and inside the province.

Taking 100 maunds of mahua seeds, the freight *via* Nagpur to Bombay at Re. 0-7-5 per maund comes to Rs. 46-6-0 while 100 maunds of the same seeds taken to Akola *via* Nagpur will cost, at Re. 0-5-0 per maund, Rs. 31-4-0. Assuming that this seed is crushed at Akola and yields 35 maunds of oil and 65 maunds of cakes, the transport of the oil to Bombay will cost, at the rate of Re. 0-12-10 per maund, Rs. 28-1-0 and the oil cakes will cost, at Re. 0-4-7 per maund, Rs. 18-10-0. Thus, the transport of the seed to Akola and the oil and the cake to Bombay will cost in all: Rs. 31-4-0 + Rs. 28-1-0 + Rs. 18-10-0 = Rs. 77-5-0, while the direct transport of the seed to Bombay, as we have said, costs Rs. 46-6-0 thus making a difference in favour of Bombay of Rs. 31-9-0 per hundred maunds of seeds, on the railway freight alone. This is on the Great Indian Peninsula Railway.

Calcutta, which is on the Bengal-Nagpur Railway, gets a similar advantage. The freight on 100 maunds of mahua seeds, *via* Nagpur to Calcutta, at Re. 0-14-6 per maund, amounts to Rs. 90-10-0. While if the seeds were crushed at Raipur, the railway freight on the seeds to Raipur will, at Re. 0-6-8 per maund, amount to Rs. 41-10-8 and the freight on oil from Raipur to Calcutta, at Rs. 1-2-8 per maund, will amount to Rs. 40-13-4. Similarly, the freight on the cake to Calcutta, at the rate of Re. 0-5-5 per maund, will amount to Rs. 22. Thus the cost of preparing the oil in this province and sending it to Calcutta would come to Rs. 41-10-8 + Rs. 40-13-4 + Rs. 22 = Rs. 103-14-0. While the transport of the oil-seeds to Calcutta will cost only Rs. 90-10-0. Thus it makes a difference, in favour of Calcutta, of Rs. 13-14-0 as against Raipur.

Now, if we examine this question in relation to hides, whether it is cheaper to tan within the province or send them to the ports, we again find the same result. In the process of converting raw hides into tanned leather we have to use for 100 maunds of hides, 25 maunds of lime and 400 maunds of sunari bark and 10 maunds of myrobalan. There are no special rates available for hides to Bombay. Therefore, if we take the special rate from Cawnpore to Bombay on 100

maunds, the freight will be, at Re. 0-14-5 per maund, Rs. 90-1-8, the freight on 25 maunds of lime *via* Wardha at Re. 0-15-10 a maund comes to Rs. 91-10-0 and on sunari bark *via* Wardha, at Re. 0-8-3 per maund, on 400 maunds of the bark amounts to Rs. 206-4-0 and on 10 maunds of myrobalan from Betul *via* Itarsi, at Re. 0-1-11 per maund, amounts to Rs. 7-7-2, *i.e.*, it will cost a tanner in Bombay in freight Rs. 312-14-8 to tan one hundred maunds of hides. While a tanner in Wardha will have to pay freight for 100 maunds of hides at Re. 0-12-0 per maund, Rs. 75 and freight on 25 maunds of lime, at Re. 0-2-0 a maund, Rs. 3-2-0 and on 400 maunds of sunari bark at Re. 0-5-7 a maund, Rs. 139-9-4 and on 10 maunds of myrobalan from Betul at Re. 0-6-6 a maund, Rs. 4-1-0. Now to transport the finished leather from Wardha to Bombay at Rs. 1-9-9 per maund, the freight will cost Rs. 160-15-0, thus making a total of Rs. 382-11-4. Thus Bombay gets an advantage of Rs. 69-12-8 on railway freight alone on 100 maunds of leather produced.

Ultimately the burden of discriminating rates falls on the cultivator as merchants take the costs of transport into account when fixing prices for their purchases. As we have repeatedly pointed out, such exports of raw materials create unemployment in this province. For this disservice of creating unemployment through the discriminatory rates of the railways, the country is made to pay.

This examination reveals to us the need for a radical change in the policy and revision of the railway rates to accord therewith. We have no doubt that the 10,000 special rates that have been granted have been given after careful consideration but this consideration has not been from the national point of view. It seems to us, that the Provincial Government needs to take necessary steps to represent the matter to the Railway Board and also adopt measures to counteract such discrimination by counter-vailing adjustments of terminal taxes, octroi duties, etc. The railways have been built up at the cost of the general tax-payer and unless their operations are conducive to his welfare, they will not justify their existence.

**Taxes, market dues, octroi duties, etc.**—In Part I, Chapter 2, paragraph 8, under the heading of "Impediments to Production" we have dealt with some of the matters that will affect the productivity of cottage and village units through increased cost of raw materials. A great deal of what we have said there can also be stated in connection with forest resources.

The system of allowing contractors to collect forest produce on payment of certain dues is open to objection. Such a system can only be applied where the article collected is for personal consumption. But where the produce of the forests is to form the raw material for an industry, the Forest Department should be a guarantor of the purity, the quality and the grade of such articles. Therefore, it would seem best to tackle this question of the supply of raw materials departmentally. This would mean much greater organization and administration than that functioning today. Again, in regard to fodder also, there are good reasons to think that indiscriminate grazing can and

does damage forests. The method of regulating this is not by charging high grazing fees but by undertaking to supply the necessary fodder to the people at reasonable prices by preparing silage, etc., departmentally. Similarly, if all forest produce such as honey, lac, medicinal herbs, etc., are collected, graded, and placed on the market by the department, it will make for efficiency and at the same time it will do away with any damage that may be done to the forest by outsiders collecting these articles. Timber is graded but not seasoned before it is put on the market. The sale of forest products is often entrusted to contractors who buy the right to collect at Government auctions. Here again, the Government appears to be anxious to simplify its administration, even at the cost of the public getting inferior articles. The Forest Department should be entrusted with the responsibility of seeing that no raw material of industry and no forest products reach the market or the consumer until the department has satisfied itself that the commodity is of the very best that can be given to the public.

#### CHAPTER VII.—RECOMMENDATION AS TO ORGANIZATION

**Information.**—In what has been discussed so far, we have repeatedly referred to the inadequacy of the information available. Proper statistical records should be maintained in regard to the quantity of material available and the transactions that take place. A few years ago statistics regarding the rail-borne traffic of this province used to be published but lately this publication has been discontinued. It is false economy to curtail expenses on such vital sources of information. Even in the case of agricultural production, about which some form of statistics are kept by the village accountant, the information is not as accurate as one would wish it to be. The statistics of other village industries are hardly recorded anywhere.

**Co-ordination of Departments.**—We have pointed out from time to time how the various departments have been functioning desultorily without a set plan of co-ordination with one another. Each department's outlook is circumscribed by what it considers to be its preserve which it guards with the zeal and jealousy of a watchdog. The interests of the people do not appear in relief in the picture. In fact, even a department like the Agriculture Department functions in splendid isolation from the lives of the farmers, whom it professes to serve. On the other hand, the Agriculture Department, not only in this province, but also elsewhere, is more in touch with the requirements of sugar mills, cotton mills, oil mills and tobacco merchants than with the man behind the plough. We feel that the economic welfare of the country cannot be advanced without a close co-ordination of the policy and work of the departments of Agriculture, Forests, Mines and Industry. All these four must be integral parts of one consolidated department of State appertaining to the economic life of the people. Therefore, if it is desired to advance the industrial life of the people of this province, there must be an undivided effort put forth by all these departments with a singleness of purpose. To enable us to



realise this state of affairs, it would be necessary for us to reorganize all these four departments. To this end, we make the following recommendations :—

**Economic Council.**—To decide the policy and the general outline of operations for the entire province, there should be an Economic Council of not more than seven members, all of whom should be public men with considerable experience of the requirements of the masses. They should not be in any way interested financially in any of the schemes before the council. If possible, they should give their service without any charge to the Government.

This Council may be brought into existence by nomination by Government and it should meet from time to time and formulate schemes and plans of operation for the various departments. They should take into consideration the needs of the province in regard to the prime necessities of life and lay out a plan which would enable this province to provide adequately for the food materials, fodder, manure, clothing and the like, to meet the internal demand. They should also consider ways and means of utilising the resources, both mineral and forest, of the province. The plan should be designed to ensure the supply of raw materials to various industries and to see that, as far as possible, nothing other than finished goods leave the province.

**The Economic Executive Board.**—When the schemes submitted by the Economic Council have been examined and approved by the other departments of Government, such as, Finance, Law, etc., and when sanctioned by the Government, they will be put into effect by the departments on the lines of work decided upon by an Economic Executive Board, which will consist wholly of *ex officio* members, viz., the Chairman of the Economic Council, the Secretary to Government, the four Directors of the Departments and the seniormost Chief Chemist, Chief Engineer and Business Manager, making nine members in all.

**The Secretariat.**—The Secretariat of this Economic Department will consist of a Secretary to Government who will be assisted by four under-secretaries, representing the four departments. The Secretary and under-secretaries may be members of the Civil Service. They will not be eligible to sit in the Economic Council, but the Secretary to Government will function as the non-member secretary of the Council.

**Departments.**—Each of the four departments will be in charge of a Director. The Director should be a technical man with at least seven years' experience in the department. He will be assisted by a Chief Chemist, a Chief Engineer, and a Business Manager. These three officers should have had at least 10 years' experience in commercial and industrial work. As far as possible the Directors of the departments should be selected from such officers of these departments. The Chief Chemist of the department will be in charge of all research and industrial laboratories of the department. Similarly, the Chief Engineer will be responsible for the work in his section, and the Business Manager for that in his. Each department

will have its units spread over the whole province, wherever such units are called for, and at all events, at the headquarters of each district. The Director should be on tour or on field work for at least eight months in a year.

The Department of Agriculture will have to see to the supply of water, manures, seeds and to marketing; and, as far as possible, payments will be received in kind or in the form of service after the harvest, from the farmers for those articles. The department will be required to plan out and control the areas under cultivation, to ensure a proper distribution of articles needed both for consumption and for raw materials for industries.

Similarly, the Department of Forests will plan out its work according to the requirements of the other departments and supply manure, fodder, and raw materials, in adequate and dependable quantities from year to year.

The Department of Mines should find out the capacity of the industries to consume the output of the department, and adjust its working accordingly. Of course, in all those matters a certain amount of surplus over the requirements of the province may have to be produced, in order that we may exchange such products for articles produced elsewhere.

The Department of Industries will have to place its requirements before the other departments and see that no hitch arises owing to the lack of supply. In addition to its being responsible for the co-ordination and rational working of all cottage and village industries, this department will undertake the running of public utilities, such as, electric power stations, provisions of transport facilities, making of machine tools, smelting of iron, steel-making, rolling-mills, etc. The needs of various industries in regard to finance and marketing facilities will also be under the care of this department.

Such a scheme visualizes that the hub of economic activities will be centered in the villages. Such of the industries where capital risk and public considerations weigh heavily will be undertaken by one of these four departments. Therefore, we do not contemplate private enterprise in centralized industries. If for any reason such public service cannot be rendered departmentally and the help of private enterprise is called in, the final responsibility for the conduct of that enterprise will rest with the State.

**Finance.**—Naturally, the principle of service when introduced in state functions will involve large expenditure in its wake. An Economic Department as the one adumbrated above, cannot be expected to pay its way for some years to come. For instance, the Forest Department may take a few decades before its plan of operations can reach a bearing stage. In the meanwhile, such expenses as are incurred should be capitalized in the form of interest bearing public debts. Even in private economy expenses on a plantation before it reaches the yielding stage are capitalized. Hence there can be no objection to Government following the same principle. In the early years of the scheme the cost of maintaining research sections cannot

be taken into consideration in fixing the prices of articles, as doing so may place the articles beyond the present straitened means of the consumers. After a period of years, however, when the scheme is well under way, it may be feasible to meet the expenses of the research sections by including this factor in arriving at the costs, as the eventually increased purchasing power of the people will enable them to pay a higher price. In any case, the profit motive should not be allowed to predominate in controlling the policy of the departments. We have pointed out in Part I of our Report that the Department of Industries receives a beggarly allotment for its work. If the Government is serious about the economic welfare of the people, it should be prepared to place adequate finances at the disposal of these departments. We have no doubt that if these schemes are put into effect courageously, in time the departments will more than justify their existence.

The scheme itself will afford openings for talented men of every kind. We should reiterate here our recommendations that the salaries of the officers should bear some reasonable proportion to the income of the average tax-payer. It would not be possible to run any business with such highly disproportionate overhead charges, much less can a Government based on the service principle hope to achieve its end by spending the bulk of its budget on salaries of a few persons.

If this reorientation is carried out the Economic Department, comprising the present Agriculture, Forest and Industries Departments with a Department of Mines, will become perhaps the largest and the most extensive department of the State. That is what it should be. When this happens, it will be reflected in the Governmental expenditure and the diagram we had given in Chapter IV of Part I showing the distribution of Public Expenditure may have to be recast in such a way as to interchange the position of these departments with those of administration. We had suggested in Part I that powers and obligations in regard to Public Finance as between the Central and Provincial Governments call for realignment. The recommendations we have made in this part will only add point to the argument.

**Education.**—To the four departments, that we have hitherto discussed, we should like to have added the Education Department; but the vast field of the work of this department demands a separate portfolio to itself. Nevertheless, we should like to point out the great need for its co-ordination with these nation-building departments, if the education imparted is to have any living contact with the daily life of the people. At present, this

department, like all other departments, functions remote from the people. To correct this failing in the system of education, the Wardha Scheme was formulated and has been adopted in this province in the Vidya Mandir Scheme. It will not be difficult to dovetail that scheme of education into the general economic plan we have sketched above. If this is done, we shall be preparing our youths, not to take their place in the queue of the unemployed, but to fill their niches in the economic structure of the province.

**Functional Aids.**—Even at the risk of the charge of repetition being levelled at us, we would like to recall the suggestions we have made in Part I of the Report that the Government departments should render various forms of help to the village industries according to the requirements of the processes involved in each of them. In particular, the need for technical improvements makes a claim on the scientific section of the department. In certain cases organizational help should be given, as we have suggested under the textile industry and in the production of lac. Everyone of these industries requires to be carefully studied and planned and fitted into the general scheme. If the Government wishes to implement these recommendations, the difficulties involved are not insurmountable as the Government itself, being a large consumer, can lead the way in creating a market. It uses large quantities of cloth, leather, paper and various building materials, which, in themselves, if they are obtained from the cottage industries will give an impetus to economic recovery. But we fear the inertia of years may prove a heavy load and may not be dispelled in a moment. A beginning has to be made and we trust the Government will face it with courage and hope.

J. C. KUMARAPPA, *Chairman.*

CHATURBHUIJBHAI JASANI.

V. V. SUBHEDAR.

K. P. GHIARA.

R. N. JHA.

\*K. P. SAGREIYA.

\*A. N. KAPPANNA.

WALTER DUTT.

D. V. REGE (*Director of Industries*)

S. ITTYERAH.

E. R. MAHAJANI.

\*R. S. THAKUR, *Secretary.*

*Dated the 17th September 1939.*

\*Subject to my note appended herewith.

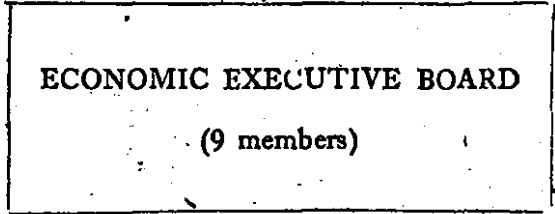


**ECONOMIC COUNCIL**

**Chairman Economic Council**

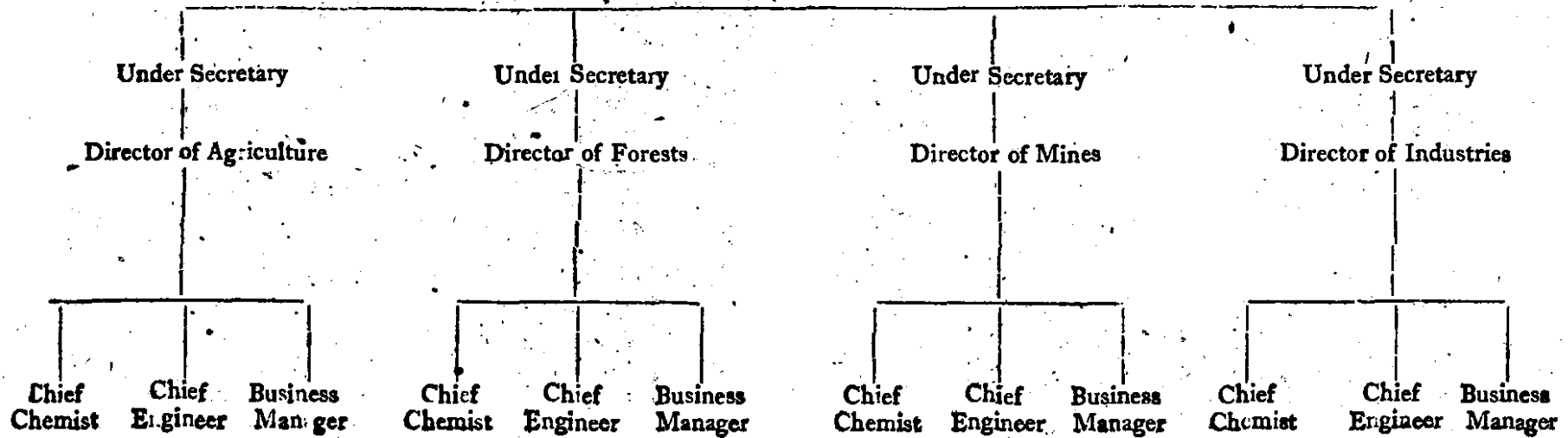
**Secretary**

**Four Directors of the Departments—  
Agriculture, Forests, Mines and  
Industries.**



**Senior Chief Chemist  
Senior Chief Engineer  
Senior Business Manager**

**Secretary**



**A list of a few Centralized Industries which could be carried on by the Government**

- |   |  |
|---|--|
| (1) Sawmills.   | (13) Quarrying and mining.   |
| (2) Seasoning of timber.  | (14) Iron and steel smelting and rolling.<br>Making tubes and wires.             |
| (3) Preservation of wood.   | (15) Manufacture of Ferro manganese.   |
| (4) Manufacture of veneers, plywood<br>and lamin-boards.  | (16) Extraction of copper and aluminium.   |
| (5) Building railway carriage bodies.   | (17) Manufacture of tools and machinery.   |
| (6) Manufacture of paper pulp and of<br>straw board.  | (18) Manufacture of the rolling stock of<br>railways.                            |
| (7) Wood distillation and recovery of<br>by-products.   | (19) Making of clay mixtures and firing of<br>pottery.                           |
| (8) Silage.   | (20) Manufacture of cement.  |
| (9) Manufacture of pharmaceutical pre-<br>parations and, vaccines and sera.<br>(Veterinary preparations.)                           | (21) Manufacture of block glass and plate<br>glass.                              |
| (10) Splitting of fats and oils to obtain<br>fatty acids for soap manufacture, and<br>glycerine.                                    | (22) Manufacture of graphite crucibles<br>and lubricants.                        |
| (11) Transport by lorries on producer gas.  | (23) Manufacture of heavy chemicals and<br>fertilisers.                          |
| (12) Gas and electric supply—<br>(a) Coke ovens and by-product works<br>(i.e., coal distillation and re-<br>covery of by-products). | (24) Manufacture of high class pigments,<br>paints, varnishes and printing inks. |
| (b) Production of electricity—hydro-<br>and thermal.  | (25) Manufacture of electrical goods.  |

**The Expenses of the Industrial Survey Committee**

**1st January 1939 to 30th September 1939**

*[Inaugurated 16th January 1939 : Dissolved 17th September 1939.]*

	Rs.	a.	p.
Field work on the survey of 606 villages ..	3,298	6	0
Travelling expenses of members ..	265	5	0
Secretary's remuneration ..	5,585	0	0
Office establishment ..	2,014	4	0
Contingencies—stationery, postage, etc. ..	1,214	15	9
<b>Total ..</b>	<b>12,377</b>	<b>14</b>	<b>9</b>

**List of Subjects reported on by Sub-Committees and others**

A list of subjects dealing with forest, mineral and power resources and transport taxation and marketing on which the sub-committees and others have reported and which are available for inspection at the office of the Director of Industries, Central Provinces and Berar, Nagpur.

*Forest resources.*

Forest Resources of the Central Provinces reserved forests.  
 Forest occupations and Industries.  
 Forest villages and their development.  
 A classified list of Central Provinces Timbers, stating possible uses.  
 On the creation of Fodder and Fuel Reserves.  
 Wood Preservation.  
 Seasoning of wood.  
 Propagation of lac.  
 Utilization of lac.  
 Tanning materials.  
 Oil seeds.  
 Match manufacture.  
 Pencil manufacture.  
 Paper-pulp making.  
 Gums and resins.  
 Bones and horns.  
 Essential oils.  
 Medicinal herbs.

*Mineral resources.*

Manganese.  
 Iron ore.  
 Tungsten.  
 Copper.  
 Bauxite.  
 Coal.  
 Clays.

Building stone.  
 Marble.  
 Sandstone and quartzite.  
 Laterite.  
 Sand.  
 Limestone.  
 Asbestos.  
 Soda and Salt Resources  
 Barytes.  
 Ochres.  
 Corundum.  
 Semi-precious stone.  
 Graphite.  
 Soapstone (steatite).

*Power resources.*

Possibilities for Hydro-Electric Development.  
 Possibilities for Thermal-Electric Station.  
 Coal as a source of power.  
 Charcoal as fuel.  
 Power alcohol.

*Transport taxation, marketing, etc.*

Roads.  
 Means of transport.  
 Railway rates in relation to Trade and Industry.  
 Taxation.  
 Marketing.

## NOTE BY SRT. R. S. THAKUR

The present survey was intended to be a survey in its usually understood and accepted sense, viz., a regular collection, scrutiny and co-ordination of industrial data, with a view to set forth in a clear manner the possibilities of establishing industries in the province. That the Government intended it to be so and not merely an industrial and economic inquiry, as was undertaken by the Government of Bombay, is clear from the Committee's terms of reference Nos. 2 and 3:—

2. To supervise the collection of data relating to large, small and especially cottage industries from previous publications and reports by an officer appointed for the purpose.

3. To advise the officer-in-charge as regards the lines on which the industrial survey of the province should be undertaken and to review its progress from time to time.

I consider that a proper industrial survey of the province, which should include a census of production covering raw materials, semi-finished goods, finished goods, power produced, and total reserves as regards minerals, our requirements—present and future, etc., is almost *a sine qua non* of any scheme of planned production, more so under our present limitations. I would, therefore, commend this important question to the at-

tention of the Government. In this connection, the detailed scheme submitted by the officer-in-charge to the Chairman of the Industrial Survey Committee and to the Director of Industries last April may be referred to.

I fully agree with the principal recommendation of the Committee, viz., that the State should own or closely control the means of large-scale production and distribution on the principle of a living wage, as an ideal to be aimed at. I would go a step further and suggest that provision should also be made for the housing, health insurance, medical attendance and old-age pensions of the workers employed in State factories.

I consider it imperative to add this note, as I have all along felt that due regard was not paid to the terms of reference which are unambiguously clear nor to the scope of the work in relation to the immediate needs of the province.

Finally, I wish to dissociate myself from the strictures passed on the Education Department on page 3 of the Report.

R. S. THAKUR,

Member,

Industrial Survey Committee,  
Central Provinces and Berar.

## NOTE BY SRT. A. N. KAPPANNA

This part of the report is based on a kind of survey of literature available on the mineral, forest and other resources of the province. The survey should have been conducted by the Committee on a more comprehensive basis. I suggested to the Chairman at one of the meetings of the Committee in March 1939 that we might request the Government to secure the services of a qualified Economic Geologist to undertake the mineral survey of the province from a quantitative industrial view point. My suggestion does not appear to have received any serious consideration. The Committee was charged with the task of supervising the collection of data by an officer appointed for the purpose and having the survey conducted by the officer after laying down the lines on which he should do the work [Terms of reference (2) and (3)]. The Committee decided, by a majority, that the services of the competent officer placed at our disposal need not be made use for these purposes and proceeded to finish the work by the appointment of a few sub-committees. The report presented therefore, is more or less a catalogue of the materials available in the province and

their possible uses, compiled from well-known publications. Even in this respect, I do not regard it as comprehensive. Each one of the main subjects dealt with by the sub-committees required expert knowledge and the members of the Committee, by the simple process of grouping themselves into sub-committees, have not been able to impart expert touch, except in a few instances, to their findings. Under the circumstances, therefore, even where definite information is available, the conclusions presented are indefinite.

The collection of data relating to large and small industries was not undertaken at all.

I feel constrained to append this note to the Report but it was unavoidable as I have all along felt that the work of the Committee never progressed on proper lines.

A. N. KAPPANNA,

Member,

Industrial Survey Committee,  
Central Provinces and Berar

## NOTE BY SGT. K. P. SAGREIYA

1. General.—There is much in the report with which I differ and I believe there is a large section of the thinking public who would do likewise. I have also from time to time differed regarding the manner in which this survey has been conducted. Scientific methods and accuracy are essential in such matters\* and as a citizen and servant of the State I cannot be expected to dissemble my views.

2. The methods of propaganda by speeches or articles in the press available to the protagonists of opposite views are not open to official members but I may be permitted to refer to the views on the subject of such eminent persons as Pandit Jawaharlal Nehru, Dr. Megh Nad Saha and Sir M. Visvesvaraya to anticipate the charge that my criticism has not been constructive.

3. Procedure.—I shall deal with the events as they have happened after the publication of Part I of the report which incorporates my Note No. 1 subject to which I signed it. At the next meeting of the Committee the subject matter which constitutes Volume 2 of Part I of the report was discussed. This comprises a series of monographs by certain individuals on the various cottage industries mentioned in Volume 1. They were written before Volume 1 was published but were subsequently considerably modified, especially the village survey reports of Wardha and Balaghat (none of the original notes were anything like so detailed and the two village survey reports are not typical). Members were invited to scrutinize them and to make suggestions for the consideration of the authors. My suggestion that the views and the notes of the members should be discussed by the Committee was not accepted. Other members of the Committee had not therefore the benefit of a discussion of the points of views of individual members which might have helped to modify their own conclusions nor were the individual views put to the ordinary test of verification and criticism†. The decision of the Committee to insert a clause at the beginning of this Volume 2 to the effect that members are not necessarily in agreement with the views expressed in these monographs was of course inevitable in the circumstances but it is unfortunate that the views of the Committee on the material and views set out in these monographs could not be discussed and formulated. As these monographs form the basis of Part I, Vol. 1 of the report, and are an integral part of the Committee's report, I propose to reiterate in a subsequent section of this note the important points on which I differ from the authors of some of the monographs.

\* "I do not know anything, except it be humility, so valuable in education as accuracy. Direct lies told to the world are as dust in the balance when weighed against falsehoods of inaccuracy; and accuracy can be taught."

—Sir Arthur Helps.

† "The future of our civilization depends upon the widening spread and deepening hold of the scientific habit of mind."

—Prof. John Dewey.

"The man of science has learned to believe in justification, not by faith, but by verification."

—Huxley.

4. At the same meeting, the Committee appointed the four sub-committees referred to in the opening chapter of Part II of the report, for reporting on the Forest, Mineral and Power resources and on Transport, Taxation and Marketing of these resources. The reports of these sub-committees and the detailed information on which they were based were circulated amongst members but were not discussed at any meeting of the primary members. (A list of subjects on which I furnished information is given as an Annexure to this note.) Instead, only a draft of the final report (Part II) prepared by the Chairman was placed for discussion at a subsequent meeting of the Committee. At this, the final meeting of the Committee, the individual members had an opportunity of expressing their views and suggesting modifications, and the draft was modified here and there but not to the extent necessary to secure general agreement to bring out the points of view of all sections of the Committee. This final meeting also decided to publish, after editing, the detailed information which forms the basis of Part II. This will help in a critical examination of the Committee's views. This second note of mine sets out the remarks subject to which I have agreed to sign the Chairman's draft as modified at the final meeting of the Committee.

5. Observations and recommendations, Part I, Volume 2 of the report (monographs on cottage industries).—As the monographs represent the views only of individual contributors I confine my remarks only to fundamental points, though there is much in these monographs with which I do not agree at all.

6. (i) Hand-spinning and Hand-weaving.—Though I favour the popularization of *swadeshi* goods which are both reasonably priced and serviceable, I cannot agree with the general "economics" propounded at the beginning of the monograph. There can be no two opinions about the fact that in nation-wide planning the chief aim should be to give a living wage to the unemployed and the underemployed. But the author has ignored the vital fact that at the same time, planning, if it has to bring prosperity to the country, must increase the wealth of the nation. This can only be done by the most profitable utilization of its resources of raw materials and labour‡. Utilization of these resources merely to keep everyone working and subsisting in a state of wretchedness and semi-starvation would be not only an unjustified

‡ To cite but one example, familiar to me, creating of plantations to increase the production of grass for stall feeding or paper making, fuel of which there is great scarcity and trees yielding products of economic value such as fats, medicines, gums, etc., is such an undertaking. It is true that this may not be immediately productive, in which case State help is needed, though chances are that if the sites are properly selected and afforestation is carried out by the agricultural method they will begin to give immediate returns. There is no doubt that these will enormously increase the wealth producing capacity of the land and thus prove beneficial to the people. In fact grass and firewood are two of the few primary needs of the agriculturists on which their general prosperity depends.

waste of efforts but a crime against humanity. Improved machines, swadeshi or foreign, are the fruit of centuries of effort on the part of man to make the best use of that most unique and potent human faculty—the intellect. For, instance, the *Kolhu* is nothing but a crude machine for expressing oil from seeds, invented at the infant stage of civilization. It is not by reverting to a picturesque medievalism that we can build a new Jerusalem on India's peasant land but by taking advantage of the Godlike power over the forces of Nature that unrelenting human effort has placed in our hands, and by using that same power judiciously to ensure for every man increasing physical comforts and a fuller life. To attempt to resist the advent of upto-date machinery is futile. It can no more be prevented than the process of Evolution. Such attempts are like attempts to stem the tide with a broom-stick; it will not be stemmed.

7. The suggestion is made later, that if the cherished goal of replacing machines or preventing the use of newer ones cannot be accomplished by propaganda, the Provincial Government should place a ban on efficient power-driven machinery which competes with crude contrivances. The objection is not so much to *foreign* machinery as to *efficient* machinery, because it requires less human labour. I should not mind if this suggestion is tried out by way of an experiment, but should the intention be to launch straight-away schemes of cottage industries on the lines suggested in the report, when large-scale industries will freely compete with them, it will be suicidal. I for one can clearly see the writing on the wall.

8. It is also suggested in the note that to meet the local demand for cotton for hand-spinning and hand-weaving, more of it should be grown to the exclusion of food crops. Here, I would, by way of an instance, point out that if instead of more cotton more *juar* were to be grown\* it will besides giving more grain, also increase the supply of roughage for cattle which is badly needed. Any one who cares to study the livestock problem *vis-a-vis* economic well-being of the peasantry cannot fail to be convinced that the miserable condition of the cattle is primarily due to semi-starvation and malnutrition. Increased production of oil seeds and their crushing locally in efficient power-driven presses will similarly increase the supply of concentrates for the cattle in the form of oil cakes and also incidentally supply oil for soap-making and other uses. On the other hand if the aim is to produce seeds just enough to keep the *Kolhus* going nothing but a fraction of the total fodder requirements can be met, and what is worse the number of animals who will share it will disproportionately increase, to say nothing of the drudgery of labour.

9. (ii) Production of Kheri (country steel).—In making his recommendations the writer has ignored certain vital points. These are—

10. (i) Iron foundries utilizing wood as fuel are likely to consume wood faster than it can be grown and thus the cost will increase with time owing to increasing lead,

\* But no when cotton is grown for export purposes or for use in mills: money yield should then be the primary consideration.

with the inevitable result that the foundries must eventually close down for sheer want of fuel within a reasonable distance. This is what happened in our province, and in fact all over the world. I will quote only one instance with which most of the forest officers trained on the continent of Europe are familiar.

11. In the forest of Tronçais in Central France, following the Industrial Revolution, an iron foundry was set up in the year 1788. The lessee was given the right to exploit 2,500 hectares (6,000 acres) of a hitherto-untouched High forest for obtaining the supplies of wood for fuel. By the year 1805 the supply became so scarce that the foundry had to be closed down.

12. (ii) Not all the wood from a forest can be or rather should be used as fuel. The timber and small poles must be used as such if the forests are to give a profit and more so because these are the primary needs of the local population which must be satisfied.

13. The statistical details cited in the note require to be thoroughly checked, especially those concerning raw materials. I only deal with the figures of charcoal, on which as a forest officer I can speak with some authority.

14. The estimated yield amounts to 0.5 ton per acre per annum. Assuming 50 lb. as the weight of wood per cubic foot, this gives a mean annual increment of 22 cubic feet per acre. (Forests are worked on the basis of a sustained yield, and therefore, only the increment can be cut.) Similarly in a recently clear-felled area of 3.5 acres of Central Provinces IV quality mixed forest in Balaghat (density of stocking 0.9, age about 50 years) which may be taken as the average quality of forests in the locality where iron smelting is proposed to be started, the yield was 10,200 stacked c.ft., i.e., 5,100 solid c.ft., which represents a mean annual increment of 29 c.ft. per acre. This is, however, the *total* production which, besides wood used as fuel, also includes poles and some timber both of which fetch a better price, and in any case must be so utilized to meet the local demand. This shows that the assumed figure of 22 cubic feet is an over-estimate.

15. Taking the Jubbulpore-Narsinghpur Forests, the total workable area is nearly 400 square miles and the yield at the rate of 320 tons per square mile will be 128,000 tons. As against this the highest actual outturn of timber and fuel has been 1,321,958 c.ft., namely, only about 30,000 tons which again shows that an assumed yield of 22 c.ft. of firewood for making charcoal is definitely an over-estimate.

16. Even assuming that the yield of wood is 320 tons per acre, the yield of charcoal employing ordinary methods would not be more than 50 tons. (15 per cent by weight of green wood under ordinary conditions; the best paraboloidal kiln gives 24 per cent.)

17. The figures of cost are also very low. The cost using the improved paraboloidal kiln is Rs. 13-4-0 for 45 maunds, that is, five annas per maund (Central Provinces Forest Pocket Book). The *Indian Forester* for April 1925 gives the cost as seven annas per maund, whereas the author allows only three and a half annas per maund.

18. The royalty of four annas per ton of charcoal, that is, less than a pie per cartload of firewood, is absurdly low. Government might give away wood free of royalty. Actually this will mean a subsidy of twelve annas per ton of firewood.

19. (iii) Dairy Industry.—Dairy farming is but one aspect of the major problem of the improvement of live-stock with a view to promoting the general economic welfare of the people. This latter subject deserves the closest consideration—in economic planning, and what is more important it must be approached with an absolutely unbiased\* mind in order to arrive at irrefutable conclusions on which the recommendations are to be based.

20. The exhaustive note on Dairy Industry bristles with prejudices and the recommendations are based on questionable deductions and even half-truths. Lest these remarks may appear unnecessarily trenchant I quote a few instances. Among other reasons the wretched condition of the cattle is ascribed to the influx into the large towns, of "thousands of milch cattle which eventually fall into the hands of the butcher". Later it is stated that "the State grants licences for grazing to the largest number of animals in order to (italics mine) realize more money, with the result that the stock is underfed". Further on it is stated that "there is no provision for cutting grass at the right season or for reserving any areas for bad days".

21. As against these incorrect observations a dispassionate study of the problem will convince even the most sceptical that the wretched condition of the cattle has nothing whatever to do with the migration of cattle from the rural to urban areas, and in fact the average yield of milk per animal is higher in urban areas than in rural areas. The number of animals slaughtered is insignificant. Almost all of these animals are totally useless for any other purpose, and a major part of them come from the rural areas as the inevitable result of underfeeding.

22. The second assertion, after giving the dog a bad name proceeds to hang him. Nothing is farther from the truth than the statement that the State encourages grazing in the forests, and to increase its revenue has fixed low grazing fees. It is, however, true that the grazing made available is of a poor quality. But even then it is far superior to what is available at much higher rates in private grazing grounds. The rates in reserved forests are nominal (ranging from one anna (average less than six annas) per animal, per year and are, therefore, nothing but a subsidy to the cattle owners residing in close proximity to the forests at the expense of the general tax-payer. Beyond a certain intensity (and the actual incidence is far heavier than the optimum) grazing is detrimental to tree-growth and is therefore discouraged in areas which are primarily managed for the production of timber and firewood, and if this has not been possible

\* "The greatest and the noblest pleasure which men can have in this world is to discover new truths; and the next is to shake off old prejudices."

—Frederick the Great.

in certain accessible tracts it is not from any desire on the part of Government to collect more revenue but to meet popular demand and treating it as a "necessary evil". In fact low grazing rates are positively harmful as they encourage the keeping of useless animals who in turn compete for the available fodder with the essential cattle and thus bring about their degeneration also. The supply to slaughter-houses is Nature's remedy to adjust matters. It is prompted by that instinctive urge in man which teaches him to ameliorate his condition by getting rid of what is a drag on him rather than a source of comfort, even in the face of false sentimental scruples—"false" because slaughter is a kindness, indeed a deliverance, from the state of perpetual semi-starvation to the dumb creatures, which are literally the *Kamdhenus* of this country.

The third assertion ignores the fact that all the areas that are not open to grazing are open to grass cutting at any time of the year and that to encourage stall feeding the agriculturists are allowed to remove grass during winter—when it is most nutritive—at special reduced rates, and indeed in certain tracts even free.

23. The solution lies in increasing the production of fodder and concentrates, improving the cattle by selective breeding and discouraging the keeping of "scrub" animals.

24. Part II of the Report.—I fully endorse many recommendations which are of a far-reaching character but there is also much in the report which I cannot accept without reservation, or at all.

25. The report follows the basic trend of the "economic" doctrines propounded in Part I of the report. Even at the risk of being accused of pedagogy I must state that the usual warning given to research workers has not been heeded, namely, that the chief obstacle in the way of arriving at the truth is the worker's personal bias (often unconscious) of which the extreme form is an innate desire to find evidence in support of a favourite hypothesis. In the present case the hypothesis is to make the village an autonomous economic unit, or in the words of the report "the scheme visualizes that the hub of economic activities will be centred in the village". This conception conveniently ignores the *zeitgeist* and refuses to face the realities of the situation.

26. After pointing out that a greater portion of the forest is privately owned, which the report rightly considers fundamentally wrong, it launches a frontal attack on the Forest Department with the remark that the administration of even the Government forests "is not planned with a view to the encouragement and the improvement of industries". Obviously the underlying conception is that the forests must be primarily utilized to foster the industries of the Committee's choice and in the manner indicated by them, without any regard to the generally accepted role of the forests in the economic life of the province as a whole. To cite but one instance, a supply of free firewood might make iron smelting on a cottage basis a

success but this may in consequence deprive the entire local population of their supplies of firewood, poles and timber and thus cause a genuine hardship.

27. The report then makes a dogmatic statement that "the Department works without a comprehensive scheme or plan and that the present administration is organized more or less purely from the revenue yielding point of view". It has not been realized that more than 95 per cent. of the reserved forests are worked under systematic and comprehensive working plans based on carefully prepared stock-maps and a consideration of the silvicultural requirements of the crop and the nature of demand. No other province in India can boast of such a high percentage. These plans aim at eventually obtaining the highest sustained yield of the produce most in demand, both locally and for purposes of export, so that the people may get their requirements close at hand and yet be relieved of the burden of taxation to the utmost extent. Apart from the low rates for grazing or other forest produce removed for *bona fide* domestic purposes, the grazing concessions alone amount to nearly 12 lakhs of rupees, and other free grants to 1½ lakhs, besides which there is a surplus of nearly 14 lakhs. It is true that sufficient money is not being put back into the forests to hasten the process of bringing them into full bearing—barely 1.7 per cent of the gross revenue is spent on such works—but for this the blame does not attach wholly to Government which must make concessions to popular demand which is not always alive to the policy of conserving the growing stock by reducing the surplus or increasing the forest rates.

28. Chapter III, Forest Resources.—This chapter opens with the suggestions that the privately owned forest should be State managed. This is a sound recommendation as far as it goes, as lack of adequate control is certainly resulting in a gradual depletion of the private forests. But the difficulties in effecting the transfer are not discussed and no measures suggested to overcome them. In this connection the possibility of organizing *Communal*\* or *Panchayat* forests deserves re-examination with this essential difference that although the commune may be given a large measure of freedom to manage their day to day affairs, a certain amount of State supervision should be stipulated to ensure that—

- (i) the personal interests of the members of the commune for the time being do not adversely affect the sustained yield from the forests, especially as poorer members constantly urge more extended utilization than the forests can stand, without any regard to the needs of the posterity,
- (ii) the indebted communes may not attempt to meet their liability by over-exploiting the forests, and
- (iii) the forests are under the general supervision of a competent manager, which small communes cannot employ.

\* *Gemeindewalder* of Germany and not in the sense in which the word communal is used in India, e. g., in "communal electorate".

29. Communal forests should go a long way in consolidating and strengthening corporate life and in increasing the production of such necessities as fodder and fuel.

30. The report has rightly emphasized the importance of collecting statistics of growth and yield and organizing research to increase the productivity of the forests and to better utilize the resources. I wholeheartedly endorse this recommendation. In fact as the present incumbent of the post of the Silviculturist I have been advocating this for some time. The Committee has gone even beyond these recommendations. To bring the forest into full bearing at the earliest period it would not mind if the Forest Department becomes a deficit department. I cannot endorse this view, however laudable the motives actuating it. Forests the world over are maintained primarily for producing revenue unless they are considered necessary for protective or aesthetic reasons and even in the present condition of the Central Provinces forests they need not become a liability to Government. With judicious management, of which the foundations have been truly laid, they can continue to yield a small surplus and at the same time their productivity can be increased without curtailing the basic supplies. In fact this is the primary task before the Forest Department. The obstacles in its path are the unreasonable demands for cheap grazing and the implied wish of Government not to curtail the surplus. Sound forest management demands the conservation of all financially immature growth and its careful tending, and the replacement at the earliest opportunity of all stagnating or unproductive growing stock by growth of greater promise. This can be done with but a temporary and slight drop in the revenue if the basic policy of the Government can be suitably modified. A broader outlook and confidence in those who profess forestry is all that is needed. The recommendation of the Committee to extend departmental operations is a step in the right direction, but for obvious reasons it cannot be pushed too far, for the staff and funds that will be required to do this may not be forthcoming. At this stage I cannot over-emphasise the desirability of launching schemes of improvement only after they have been tried out on an experimental scale and found to be feasible, for which purpose a properly equipped research branch is necessary, the need for which the committee has recognized. To this I may add the desirability of looking to the welfare of the province as a whole, and not of a certain class of artisans only.

31. I now come to the important question of regulating grazing in the forests and the supply of fodder from them as also from other areas on which greatly depends the condition of the live-stock. I have studied this problem at some length and I find that I cannot see eye to eye with the Committee. I claim that my conclusions are supported by factual evidence, and I am second to none in my anxiety to ameliorate the condition of the peasantry by improving their live-stock.

32. The conclusions to which I have come are—

The existing condition of the cattle is deplorable. If proper statistics were to be



taken it will be found that a considerable number of animals are not only a liability to the cattle owners but also a serious drain on the provincial resources of fodder. There is little doubt that a much smaller number of dual-purpose and robust cattle could provide all the labour and milk products needed by the province. The low efficiency and milk yield are primarily the result of insufficiency of food of the right type and promiscuous breeding. The shortage of fodder is due to the poor condition of pastures and more so to the heavy incidence: the useless cattle competing with the essential cattle. Another reason, often lost sight of is that too much reliance is placed on grazing alone which barely gives enough roughage and no concentrates which are necessary for muscle building and for increasing the supply of milk. In our climate we cannot have permanent pastures. We have mere grass crops once a year from July to November. For the rest of the year the animals which are not stall-fed subsist on any rubbish they can pick up and in fact on their own reserves. It is an undisputed fact that cattle relying primarily on grazing such as those in close proximity to the forests are far inferior to those in the intensively cultivated tracts where they are stall-fed with cultivated fodder or straw of crops and concentrates. Similarly the low efficiency is due to prolific breeding which is Nature's remedy to perpetuate the race, and on which there is no check. A contributory factor is the extremely low rates charged for grazing and the religious scruples against eliminating the uneconomic cattle.

33. The solution, I repeat, lies in—

- (i) maintaining just the optimum number of efficient cattle (and the present number is excessive);
- (ii) increasing the production of cultivated fodder and concentrates; and
- (iii) improving the grazing grounds by inexpensive methods such as weeding or reseeded and then admitting grazing in them under control by limiting the incidence and giving pastures periodical rest to recover.

34. Of these (i) can be achieved by compulsory castration, selective breeding and discrimination between the "essential" and the "surplus" cattle by keeping the rates for the former low and gradually increasing the rates for the latter and eventually making them prohibitive. (ii) can be done by increasing the acreage under fodder yielding crops like *juar* and *maize*, or cultivating pure fodder crops such as *berseem* (Egyptian clover), etc. A reduction in the land revenue from such lands will go a long way in giving an impetus to such cultivation. Similarly, grass available in remoter tracts can be utilized either as hay or silage which suggestion of mine has been approved by the Committee. Here I would like to emphasise the fact that the habit of stall-feeding is practically unknown and indeed pronounced by some\* as detrimental to the health of cattle, which of course is untrue. Intensive propaganda is therefore necessary to eradicate such notions.

\* The Cow Preservation League of Calcutta in their memorial to His Excellency the Governor of the Central Provinces and Berar.

Lastly, (iii) deserves the most careful consideration. The grazing grounds are very extensive. In fact their extent cannot be increased any further because the remaining area is either occupied, cultivated or essentially tree clad, and cannot be excised, for the purpose of grazing without upsetting the economic balance in land utilization. They are, however, of very low yielding capacity and no improvement is possible without a very heavy initial outlay of funds, and the curtailment of existing privileges. The only equitable method of raising funds is to commercialize the rates for "scrub" cattle, keeping of which must be discouraged at any cost. After this, public opinion must be created for the necessity of restrictions.

35. Chapter IV, Minerals.—State control has been advocated for industries, cottage as well as large-scale, utilizing mineral (or forest) resources, and it is further stressed that service and not profit should be the primary motive that should guide the management. The implications of the practical application of this recommendation do not seem to have been fully realised nor are the various stages by which, the degree to which, and the period during which, the recommendation should be applied to each industry set out sufficiently clearly to admit of a critical examination. It is obvious, however, that an attempt to apply the recommendation even to a limited extent will involve a very heavy initial and recurring capital outlay to be expended mostly as grants-in-aid. Unless the methods by which the money is to be raised and utilised are suggested, no useful opinion can be formed on the recommendation. A general economic planning should aim at securing the most equitable allocation of the available productive resources to different activities and therewith the fullest satisfaction of the consumers' needs, and not within each industry or service regarded as a self-contained unit. The details of such co-ordination between the various occupations and industries are of the essence of such a scheme. Until they are set out, it is difficult to say whether (i) State management or (ii) private enterprise, supplemented by regulations relating to the kind, quality and quantity of goods produced according to the requirements of the people, and the payment of a living wage to the employees and a reasonable profit to the capitalist, can better utilize our unused resources and at the same time provide greater employment.

36. Chapter V, Power.—I am not competent to examine the details on which the recommendations have been based and will, therefore, confine my remarks to the recommendations proper.

37. It is stated that as power supply is a public utility service the profit motive should not enter. I am afraid this is a pious hope. So long as there is no source, direct or indirect, of obtaining funds for generating and distributing power, I do not see how such a scheme can be launched. If private enterprise is prepared to undertake this work I see no reason why it should not be encouraged.

38. The report recommends that the Forest Department should plan to produce sufficient supplies of firewood so as to be able

to meet the fuel requirements of the villagers. I believe there is no dearth of supplies, except in certain intensively cultivated tracts where the forests have disappeared or become very depleted owing to reckless cutting, heavy grazing and fires. In such tracts attempts should be made to create fodder-and-fuel reserves by the agri-silvicultural method as is being done in the United Provinces. The main factor responsible for the present state of affairs is not the lack of supplies but the low purchasing power of the people, which calls for remedies elsewhere.

39. Similarly the reason why producer gas driven vehicles are not gaining ground is not the paucity of supply of charcoal which is available in abundance, nor its price which is insignificant, nor its quality, for the very best charcoal could be had for a slightly higher cost. What it is mainly due to I am unable to say. Increasing the production of charcoal for other uses is, however, a recommendation which I fully endorse, though I do not favour destructive distillation of wood as I believe the demand for the by-products will be incomplete and as such the industry will not pay.

40. The suggestion that departmental collection of mahua flowers will be more economical, I do not endorse, as I believe the present cost is incredibly low on account of the fact that most of the mahua is collected by the poorest people who either consume it themselves or sell it at a price which barely gives them a living wage. Nor do I agree with the remark that much mahua is going to waste at present. It is the principal food of the poorest people for some months and all mahua is scrupulously collected and used. I do not favour utilizing this raw material for making power alcohol unless the supplies exceed the requirements of the poor people.

41. Chapter VI—Transport, Rates and Taxes—(i) Transport.—The report disapproves of class I roads possibly because they are comparatively expensive to construct and maintain, and because they are considered harmful to bullock-cart traffic. These observations ignore the fact that our class I roads are worse than second class roads in other countries and that but for the metalled surface because of which they are graded as class I, carts will find it impossible to move on them in the rainy season. The report then concludes that the class I roads are primarily constructed for the use of motor vehicles and the military and the cost should, therefore, be legitimately charged to these alone. Here it is forgotten that narrow-iron-tired springless bullock-carts do as much damage to road surface as pneumatic-tired, sprung motor vehicles, and as against less than 10,000 motor vehicles there are over 1,000,000 bullock-carts in the province. The advantages of metalled and tarred roads have been underrated. They not only eliminate the dust nuisance but also reduce the haulage cost considerably, to say nothing of the saving in time.

42. The report then proceeds to say that the railways can make or mar the economic conditions by quoting special reduced rates

for transport to ports with a view to promote the export of raw materials. I am unable to say how far these views are justified.

43. (ii) Rates and Taxes.—The committee would like the Forest Department to do away with contractors' working altogether. Every businessman would like to eliminate the middleman *as far as possible*. But there are practical difficulties in the present case. These are lack of capital outlay and staff for supervision. Moreover I do not believe in curbing private enterprise altogether. A healthy competition between State and private agencies is in itself an impetus to progress in the absence of which exploitation is likely to become too hidebound.

44. The Committee again refers to the question of grazing rates and repeats its condemnation of high (?) rates. It is forgotten that the existing rates in the reserved forests, including the commercial rates, represent but a fraction of the value offered in exchange in the shape of grazing. In fact they are far below the actual dues charged by private forest owners for much inferior grazing, to say nothing of transit dues, graziers' fees and the payment in labour which the agriculturists have to make. When I advocate raising of the existing ridiculously low rates I do not do this with any profit motive but solely to discourage the keeping of "scrub" animals and incidentally to obtain funds to put back in the pastures themselves to improve them and thus provide more fodder to the essential animals who will still continue to pay the existing low rates.

45. Chapter VII—Organization—(i) Co-ordination between departments.—The criticisms made against the departments of Agriculture, Forests and Industries that "their outlook is circumscribed by what they consider to be their preserve and which they guard with the zeal and jealousy of a watchdog. The interests of the people do not appear in relief in the picture, etc.," are a very unkind cut to say the least. So far as the Forest Department is concerned I challenge any one to substantiate these criticisms. If it has oftentimes to curtail the privileges of certain individuals it is because these go counter to the well-being of the community as a whole, which fact, I repeat, the Committee has altogether, ignored.

46. (ii) Proposed organization.—The scheme proposed is well thought out and subject to certain modifications should work well, provided the right type of men and the requisite funds are forthcoming. But I submit that the same objective can be achieved under the existing arrangement, which has the additional merit of combining the administrative with the technical side and thereby not only effecting considerable economy but also keeping the activities of the technicians within the orbit of practical politics instead of allowing them to meander into the field of purely theoretical considerations.

47. I would like to point out here a slight incongruity in the designations of the assistants to the Director of Forests. (I presume the Chief Conservator of Forests will be so

appointed) viz., Chief Engineer, Chief Chemist and Business Manager. These might more suitably be altered to—

- (i) Superintendent of Working Plans and Silvicultural Research who will deal primarily with the cultural side of forestry,
- (ii) Forest Utilization Officer who will deal with the experimental and commercial activities of the department in so far as they concern the raw materials, their conversion up to the stage in which they are required by various industries, their advertisement and marketing, and
- (iii) Forest Engineer who will see to the facilities for the transport of raw materials.

Besides these the Director and his assistants should work in close collaboration with the Forest Research Institute at Dehra Dun.

48. (iii) Education.—It would be presumptuous on my part to comment on the criticism levelled against the Department of Education. But as a product of the selfsame system, I venture a suggestion. Our educational system lacks the vocational basis which has rightly been emphasised by the Vidya Mandir scheme. The University turns

out graduates in hundreds trained "generally" in arts or sciences without any special regard to the requirements of the various industries in which they might be usefully employed to promote the economic welfare of the province. For example, the province is rich in mineral and forest wealth and yet the need for preparing its students to later take up forestry or mining as a vocation has never been considered.

49. Personal note.—I conclude my observations on the report with a personal note. I started the work on this Committee with great enthusiasm, and in the hope of contributing my share, however insignificant it may be, to the major problem before the Nation, viz., to improve the lot of the peasantry, through a better utilization of our resources of materials and labour. What I have been able to do is on record. What I would have contributed had the survey been conducted on the lines I had hoped it would be, it would be presumptuous on my part to suggest. This much however I must repeat, that I have not approved of the manner in which this survey has been conducted without any regard to the terms (2 and 3) of reference. My attempts at converting the Committee to approach the subject with a broader and scientific outlook did not find general approval.

#### ANNEXURE

*List of subjects dealing with forest resources on which notes were furnished.*

1. Forest Villages and their development.
2. Forest Resources of the Central Provinces reserved forests (an exhaustive note submitted through the Chief Conservator of Forest, Central Provinces).
3. A complete list of Central Provinces timbers arranged according to their present and possible uses.
4. Means of Transport, Markets and Rates for forest products. (Note prepared by the Chief Conservator of Forests.)
5. Existing and proposed Forest Occupations and Industries :—
  - (a) Felling and Conversion, including Sawing.
  - (b) Transport.
  - (c) Cultural Operations and Protective Works.
  - (d) Propagation of lac.
  - (e) *Katha* making.
  - (f) *Tendu* leaf collection.
  - (g) Rusa oil industry.
  - (h) Honey and Wax collection.
  - (i) Wood Preservation.
  - (j) Seasoning of Wood.
  - (k) On the Creation of Fodder and Fuel Reserves.
  - (l) Veneers and Laminated-wood.
  - (m) Better and cheaper fencing.
  - (n) Manufacture of small dimension stock as a rural industry.
6. Notes on miscellaneous subjects rough various individuals.
  - (a) Practice of scientific forestry in the province.
  - (b) Forest School at Balaghat.
  - (c) Sleeper and Scantling operations in—
    - (i) Balaghat, and
    - (ii) Bilaspur.
  - (d) *Harra* collection in Balaghat.
  - (e) Depot Sale Organization (general).
  - (f) Departmental timber operations in—
    - (i) Nimar,
    - (ii) South Chanda including Saw Mill and Sales, and
    - (iii) The Melghat.
  - (g) Nursery and Plantation work in—
    - (i) Bilaspur, and
    - (ii) South Chanda.
  - (h) Lac propagation in—
    - (i) Raipur, and
    - (ii) Saugor.
  - (i) Raipur Forest Tramway.
  - (j) Silage experiment in Raipur.
  - (k) *Katha* making in Saugor.
  - (l) *Kulu* tapping in Saugor.
  - (m) Bamboo exploitation in—
    - (i) North Chanda, and
    - (ii) Bhandara.
  - (n) Improvements in the design of various tools, plants, etc., used in forests and Organization of Labour.
  - (o) Education in Forest Villages.
  - (p) Agri-silvicultural Plantations of Berar.
  - (q) *Babul* bams of Berar.
  - (r) *Tendu* leaf collection in—
    - (i) Jubbulpore, and
    - (ii) Bhandara.
  - (s) Rusa oil distillation in Amgaoti.

K. P. SAGREIYA,

Member,

Industrial Survey Committee,  
Central Provinces and Berar.

## THE CHAIRMAN'S NOTE

It has become necessary to add this note to clear up certain misunderstanding of facts contained in the notes appended by three of the members.

In his first note on Part I, Volume 1, Sjt. Sagreiya refers to village surveys and says: "After this information had been collected, as far as I am aware, none of the members were given the opportunity of examining it". The information was collected by over 225 surveyors and was contained in about 750 note-books which were placed in our office for over a month and a half before the final consideration of the report and were available to any member who chose to study them. Several of us availed ourselves of the opportunity and if Sjt. Sagreiya was on tour, it was no fault of the office. It was not a practicable proposition to make copies of these and send them to each member.

Again in his note on Part II referring to the subject matter of Part I, Volume 2, he says that these notes "were subsequently considerably modified especially the village survey reports of Wardha and Balaghat". This is not an accurate statement. For the purpose of our report, the information collected was put together in a great hurry—in about ten days,—and when the Committee decided to publish the information it was necessary to verify facts and figures. It made no material difference to the subject matter. As regards the notes on industries, in the district reports they were given in relation to the village or districts but when we wished to publish them, the accounts given under each district report of any particular industry were sent to one of the surveyors interested in it to be edited and written up to read as a consolidated note for this province. There was no need for discussing these notes, as they were submitted to the Committee by persons with whose views we had nothing to do.

Similarly, the reports of the sub-committees appointed were circulated and we had no right to change their reports. Part II, Volume 1, is based on these reports and hence when that was discussed the relevant portions of the sub-committees' reports were considered. It may be added that the sub-committees were mostly made up of our own members and they submitted their reports after much deliberation and discussion amongst themselves. The members who were interested in particular subjects were as far as possible placed on sub-committees dealing with those subjects. Therefore, in practice, there was no need felt by the other members to cover the ground all over again.

Sjt. Sagreiya finds difficulty in accepting the result of a survey of over 600 villages in this province which shows the *per capita* annual income to be Rs. 12. He believes that "trained economists" estimate it at Rs. 50. It would be interesting to know how many villages these "trained economists" surveyed to base their estimate on facts and if such estimates relate to this province. The proof of this is very simple. One needs only to step into the villages and inquire into the spending capacity of the people. Ask what the farmer, the field labourer, the *chamar*, the potter, etc., spend per month on

their needs, and see if it works out to anywhere near Rs. 200 per family per annum which it should if the *per capita* income is Rs. 50.

Sjt. Sagreiya holds that "economic nationalism is unsound in theory and when carried to excess lowers the standard of living, as has happened in Italy and Germany". It is true that the standard of living has gone down considerably in Italy and Germany but it is not economic nationalism that is to blame but the cost of armaments and military preparations. We must be careful in linking up causes and effects lest we should be misled.

He states "that more than 95 per cent of the reserved forests are worked under systematic and comprehensive working plans based on carefully prepared stock maps and a consideration of silvicultural requirements of the crop and the nature of demand". I dare say the Central Provinces may be in a position to pat itself on the back when compared with other provinces, but we could get no satisfactory information from the department in regard to qualities and quantities of articles available nor were any definite working plans submitted to us.

He states "90 per cent of the area of reserved forests is open to grazing" but he has omitted to add that a good deal of this area is merely "licking ground", as he himself termed it. Where is the generosity in giving rocks for grazing?

Sjt. Sagreiya takes exception to the statement in the report that each department is circumscribed in its outlook to its own preserve "which they guard with the zeal and jealousy of a watch-dog". I invite the readers to go through the notes of Sjt. Sagreiya, Dr. Kapanna and Dr. Thakur and judge for themselves the commendable zeal they evince for their own departments. I had often wished that at least the members of our committee would take a detached view. Dr. Kapanna should have been the last to take exception to what was said about the Education Department. He knows how he was prevented by the Education Department from helping the Committee with the village survey again in the second part, although he was placed on this committee by the Government he was rendered practically useless as the Education Department did not give him permission to work till the 21st September. It will be interesting to note that the Committee dispersed finally on the 17th September and four days after that the permission comes. At this place I need not go into the lack of facilities for research, etc.

All the three dissenters are labouring under a misconception of what a "Survey" is. They have mistaken it for a plan. A survey is a reconnoitring to see the lay of the land and after that should come planning the campaign. To use another analogy surveying is like the blue prints of an architect; this should be followed by detailed plans of the engineer who will indicate the accommodation in the building, the materials to be used, the strength of girders, etc.

The name of the Committee itself indicates the nature of the work it is to do. It is not a planning committee. The terms of reference make the object crystal clear. Our duty was to give the Government a general outline of the policy to be followed using data available "from previous publications and reports" and by visits to villages to study their economic conditions and to report on the industrial possibilities of the raw materials especially of forest resources, and minerals and suggest measures which Government can undertake to revive and promote cottage industries.

We were not asked to submit definite schemes or plans. We have done exactly what we had been asked to do. In our last chapter we have suggested methods of putting into effect our suggestion. It would be up to the Economic Council now to plan how many acres should be under food crops, how many under fodder, etc., and what quantity of oil seeds they need, what amount of timber is required and how much steel. The way of supplying these will be devised by

the Economic Executive Board. The Government will go step by step as and when it is able to implement our suggestion and the picture will be filled in time. To realize what has been suggested, it may take decades, as the suggestions are far reaching and demand considerable reorganization.

Dr. Kapanna's suggestion of appointing an economic geologist to carry out a survey of minerals is not for this Committee to undertake. Such surveys take anything from 5 to 10 years and are very expensive. If the Government wishes to start work on any of the basic industries, it can appoint a prospecting committee of experts. It would be useless appointing such committees long before the work is to be undertaken, as by the time the Government is ready to launch on it, the estimates will be out of date.

**J. C. KUMARAPPA,**  
*Chairman,*  
*Industrial Survey Committee,*  
*Central Provinces and Berar.*

## INDEX

### COMBINED INDEX OF PART I, VOLUME I, AND PART II, VOLUME I

[NOTE.—In the references given below the Roman figures indicate Part I or II of the report and the first volume of each part while arabic figures give the page and (a) or (b) indicate the first or second column of the page: thus I.6.b stands for Part I, Volume I, page 6, second column, and II.12.a will stand for Part II, Volume I, page 12, first column.]

A	C—concl.
Administrative efficiency ... I.5a.	Carpet-making .. I.21a.
Agate .. II.12b.	Carpenter. Work of— .. I.22a, II.2a, II.6a.
Agriculture .. I.6b.	Carpentry .. I.21b.
Agriculture and fertilising .. I.7a, 15a.	Cart wheel making .. I.22a, II.2a.
—and planning .. I.7a.	Caustic soda .. I.17a, II.12a.
—and functions .. I.8b.	Centralized production and military expenditure. .. I.7b.
—and ginning .. I.18a.	Chakkis .. I.12b, 13a.
—and khadi .. I.19a, b, 20a.	Chamars .. I.24b, 25a.
—organization and function .. I.8b, 9a, 14b, 18b, 19b.	—Financial needs of— .. I.25a.
—and publicity .. I.13b, 15b, 28a.	Charcoal .. II.6b, 14a.
—sources of finance .. I.7a.	—activated from husk .. I.13a.
—taxable capacity .. I.7a.	—producer gas .. II.5a, 14a.
—wage payment .. I.18b, 19b.	Charitable trusts .. I.20a.
Aids, functional .. II.20b.	China clay .. I.16a, II.11a.
Alcohol .. II.14b.	Chung Lin Lamp .. I.14a.
All-India Village Industries Association (Maganwadi) ..	Ciment fondu .. II.10a.
—Experiments, investigations and researches. .. I.13a, b, 14a, b, 15a, 24a, 26b, 28a.	Clay .. II.10b.
—Training .. I.30b.	—China .. II.11a.
All-India Spinners Association .. I.14a, 18a, b, 19a, b, 20a.	—fire .. II.11a.
—Centres .. I.19a.	Coal .. I.31b, II.10b, 15a.
Alumina .. II.10a.	—Power from— .. II.15a.
Aluminium .. II.10a, 13a.	—producer gas .. II.14a, 15a.
—Compounds (see Laterite) .. II.10a.	Competition .. I.16b, 17b, 18a, 21b, 24a.
—Ware .. I.16b.	—foreign .. I.22a, b, 23a, 25a, 27b, 30b.
B	—from large scale industries .. I.22b.
Bamboo .. I.30a.	—bullock cart and motor .. I.29a.
—Pulp .. I.30a.	Concessions to industries .. I.21b, 24a.
Bangles .. I.16b.	Constitution of the Committee .. I.1a.
Barter economics .. I.3b.	Cooking utensils .. I.16b.
—and Government funds .. I.3b.	Co-operative societies .. I.7a.
Basalt .. II.11b.	Copper ore .. II.10a.
Baskets in collieries .. I.30a.	Cotton ginning, carding, spinning and weaving. .. I.17b.
Barytes .. II.12a.	Crucible, graphite .. II.12b.
Bauxite .. II.10a, 13a.	Council, Economic .. II.19a.
Bee-keeping .. I.15-b II.7a.	D
Bees-wax .. II.7a.	Dairy farming .. I.26a.
Bell-metal .. II.10a.	Debt Conciliation Board .. I.7a.
Bidi-making .. I.31a, II.7b.	Departments. Co-ordination of— .. II.18b.
Blacksmithy .. I.22a.	—Government .. II.19a.
Bleaching powder .. II.11a.	Department of Industries .. I.8a, 16b, 27b, 34b, II.2a, 4a.
Bones .. I.25b, II.8a.	—allotment .. I.10a, b.
Brasswares .. I.27a, II.10a.	—director .. I.9a, II.19a.
Breeding, cattle .. I.26a.	—efficiency .. I.9a.
Brick-making .. I.17b.	—expenditure .. I.9b, 10a, b.
Building stones .. II.11a.	—finances .. I.9b.
Bullock cart transport .. I.29a.	—general education .. I.9b.
By-products. Uses of— .. I.12b, 14a, 26b.	—history .. I.8a.
C	—industrial education .. I.9a.
Calcium carbide .. II.11a.	—museums .. I.9b.
Canes. Competitions in— .. I.30b.	—organization and functions .. I.8b, 9a, 30a.
Capital and Labour wealth .. I.2b.	
Carcasses. Disposal of— .. I.25b.	
Carding—cotton .. I.17b.	

- D—concl'd.**
- relation to industries .. 1.14b, 19a, 20a, 24a, 30a, II. 5b,
  - research .. 1.13a, 16b, 21a, 22a.
  - scholarships .. 1.9a, b.
  - staff .. 1.8a, 9a.
  - taxes .. 1.24a.
  - textile section .. 1.20a.
  - villages .. 1.8a.
  - Diet .. 1.6a, 25b.
  - Fish in— .. 1.6b, 25b.
  - Mahua in— .. 1.6b.
  - Nutritive survey .. 1.6b.
  - Oil cake in— .. 1.6b, 14a.
  - Quality of— .. 1.6a, 12a, 13b, 15a.
  - Valuable articles of— .. 1.15b, 25b, 26a.
  - Director of Industries .. 1.8a, 9a.
  - Qualifications of— .. 1.8a II.19a, b.
- Earning capacity of a Tamara .. 1.27a, b.
- Earning, daily .. 1.30a.
- Earnings in industries .. 1.12b, 15b, 16a, 18b, 21a, 22a, b, 23b, 27a, 30a.
- Economic Council** .. II.19a.
- Executive Board .. II.19a.
  - organization .. 1.2b, 3a, b.
- Economy, national .. 1.7b.
- Education .. II.20a.
- Department .. II.3a, 20a.
  - General .. 1.9b.
  - Industrial .. 1.9a, b.
  - Village .. 1.22a.
- Efficiency, administrative or creative .. 1.5a.
- Employment .. II.9a.
- Essential oils .. II.7b.
- Exchange, Barter and money .. 1.3b.
- Barter and State expenditure .. 1.4a.
- Excise Policy .. 1.40b.
- Expenditures .. 1.2a.
- Government, out of revenue .. 1.3a.
- Export and labour .. 1.5a.
- Export of raw material .. 1.12b, 13b.
- F**
- Fence Posts .. II.6a.
  - Fertilizing (See Manure) .. 1.7a, 15b.
  - Finance .. 1.2b, II.13a, 19b.
  - Finance, Agricultural .. 1.7a.
  - Government Aid .. 1.20b, 25a.
  - Mineral .. II.13a.
  - Resources .. 1.19a.
  - Teli .. 1.14b.
  - Finances .. 1.9b, 10a.
  - Fire wood .. II.6b.
  - Fish .. 1.25b.
  - Flour-grinding .. 1.13b.
  - Fodder .. II.16b, 7a.
  - crops .. II.6b.
  - Food, methods of production .. 1.6a, 12a, 13b.
  - Forest .. II.16b.
  - Forest Department .. 1.16a, 17b, 21a, II.a, 3a, b.
  - dues .. 1.29b.
  - organization and Policy .. II.a, 3b.
  - products .. II.4b, 7a, b.
- F—concl'd.**
- royalty .. 1.23a, b.
  - Forest Resources .. II.3b.
  - Frikils* .. II.14b.
  - Functional aids .. II.20b.
  - Functions of the Department of Industries. .. 1.8b.
  - Functions of the State .. 1.1b.
- G**
- General Considerations .. 1.1-b.
  - Ghanis (See Oil Pressing) .. 1.13b 14b.
  - Ginning, cotton .. 1.17b.
  - Glass-making. Lime-stone in— .. II.11a.
  - Sajji-matti* in— .. II.11b.
  - Sand for .. II.11b.
  - Quartzite for— .. II.11a.
  - Glass-ware .. 1.16b.
  - Goldsmithy .. 1.28a.
  - Goseva Charnalaya (Wardha) .. 1.25a, b.
  - Government (see State) .. 1.20b, 23b, 24a, b, 25a, 27b, 28b, 30b, 31a.
  - Aid .. 1.20b, 25a.
  - Central and Provincial .. 1.10b, II.20a.
  - Salt Act .. 1.21a, 24b.
  - Departments, Agriculture .. 1.13a.
  - Co-ordination of— .. 1.13a.
  - Education .. 1.13a, 20a.
  - Forest .. 1.12a, 3a.
  - Industries .. 1.8a, 16b, 27b, 34b, II.2a, 4a.
  - Mines .. 1.19a, 18b, 19b.
  - Dues .. 1.16a, 23a, b, 26a, b, II.14b.
  - Expenditure and Employment .. 1.2a, 10a.
  - Forest .. 1.12a.
  - Function .. 1.7a, 15b, 16b, 19a, 20b, 22b, 24b, 25a, b, 26a, b, 30a.
- Government funds .. 1.3b.
- Protection .. 1.30b.
- Graphite .. II.12b.
- Grazing .. II.6b.
- Fees .. 1.20b.
  - Lands .. 1.26a, b.
- Gums .. II.7b.
- Gur from palm tree .. II.15a.
- Gur-making .. 1.15a.
- H**
- Hand-made paper .. 1.28a.
  - Hand spinning .. 1.18b.
  - Hindi Central Provinces ghanis .. 1.14b.
  - History of the Department of Industries. .. 1.8a.
  - Honey .. 1.15b, II.7a.
  - Production .. 1.15b.
  - Horns .. 1.25b, II.8a.
  - Human values and taxes .. 1.2a.
  - Husk from paddy. Utilization of— .. 1.13a.
  - Hydro-electric projects .. II.13a.

	<b>I</b>							<i>M—concl.</i>	
implements	..	I.22b, 27b.			Measures (See Weights)	..	I.8b.		
Import—Silk yarn	..	I.23a.			Medicinal herbs	..	II.8b.		
—Mats	..	I.23b.			Metal wares	..	I.27a.		
—Dependance on	..	I.6a, 12b, 27b, 30b.			Middle men	..	I.20a.		
Imported goods	..	I.24a, 27a, b,			Milk	..	I.26a.		
—animals	..	I.27a.			—supply	..	I.26b, 27a.		
Income and Expenditure	..	I.2a.			Military Expenditure	..	I.7b.		
Income—per capita	..	I.6a, 26b.			Mills and village industries	..	I.12b, 13b, 14b, 20b, 27b.		
Industries Act—State Aid to	..	I.20b.			Mill Yarn	..	I.20a, b.		
—Dead	..	I.27a.			Minerals	..	II.2b, 8b.		
—Large scale, cheapness of—	..	I.7b.			—Miscellaneous	..	II.12b.		
—Control	..				Mineral springs	..	II.12b.		
—Functions	..				Mines and Minerals, Department	..	II.18b, 19b.		
—Importance	..				—employment	..	II.2b, 9a.		
—Ownership	..				—exploitation	..	II.2b.		
Information	..	II.18b.			—extent	..	II.9a.		
Iron	..	II.9b.			—importance	..	II.8b.		
Iron ore	..	I.31b.			—information	..	II.12b.		
—Smelting	..	I.9b.			Mines and Minerals Ores	..	II.9a, b.		
	<b>J</b>				—Ownership	..	II.2b.		
	<i>N i.</i>				—Processes of	..	II.9a.		
	<b>K</b>				—Technical survey	..	II.2b.		
Kattha industry	..	II.7b.			Miscellaneous minerals	..	II.12b.		
Key Industries	..	I.2b, 14a, 21b, 22a, b, 23a, 25a, 26b, 30b.			—Village industries	..	I.31a.		
Khadi Pratisthan	..	I.30b.			Money	..	I.27b.		
Kheri	..	II.9b.			—and Bargaining Power	..	I.3b.		
Kunkum	..	I.31a.			—Barter Economics	..	I.3b.		
	<b>L</b>				—Circulation	..	I.27b, 29a.		
Labour	..	I.12a, b, 13b, 14a, 15a, b, 17a, 18a, b, 24a, 29a, b, 30a.			—effect on market	..	I.3b.		
—Cost	..	I.2b.			—effect on middleman	..	I.3b.		
—Wealth and Capital	..	I.2b.			—State expenditure	..	I.3b.		
Lac	..	II.8a.			—Crops	..	I.4b, II.6b, 7a.		
—Industry	..	I.29b.			Motor. Cost of—	..	I.30a.		
Lacquer work	..	I.29b.			—Producer gas for—	..	II.16b.		
Laminated Boards	..	II.5b.			—transport	..	II.16b.		
Land Mortgage Bank	..	I.7a.			—Cost of—transport	..	II.16b.		
Land revenue	..	I.23b.			Municipalities	..	II.5b.		
Laterite	..	II.11b.			Museums	..	I.9a, b.		
Leather Tanning	..	I.24a, b, 25a, II.8a.			—Magan Sangrahalaya	..	I.9a.		
—Lime-stone in—	..	II.11a.				<b>N</b>			
Licensing	..	I.13a, 14a, 16b, 20a, 22b, 23a, 24a, 26b.				<i>Nil.</i>			
Lime-stone	..	II.11a.				<b>O</b>			
Lonar Lake	..	I.17a, II.12a.			Occupation, subsidiary	..	I.25b.		
	<b>M</b>				Ochres	..	II.12a.		
Maganwadi Ghani	..	I.14b.			Octroi Duties	..	II.18a.		
Malguzar, Grazing Fees	..	I.26b.			Oil cakes	..	I.26b.		
—Rights	..	I.5a, 6b, 7a, 16a, 25b, 26b.			—pressing	..	I.13b, 22b.		
—Royalty	..	I.23b.			—seeds	..	I.13b.		
Malguzari forests	..	II.2a.			Organization of Department of Industries	..	I.8b.		
Management of power supply	..	II.14a.			Organization Government	..	I.24a.		
Manganese	..	II.9a.			—Industries	..	I.28b, 30a.		
Manures (See Fertilizers)	..	I.7a.			—Village	..	I.1-b.		
Marble	..	I.31b, II.11a.				<b>P</b>			
Markets	..	II.15b.			Paddy husking	..	I.12a.		
—Dues	..	II.18a.			Papad khar	..	I.14a.		
Marwadi ghani	..	I.13b.			Paints	..	I.14a.		
Match-making	..	I.30b, II.5b.			Paints. Barytes in—	..	II.12a.		
Mat-weaving	..	I.23b.			Paper, Hand made	..	I.28a.		
					Paper-making	..	I.28a.		
					Paper-making Anji, a centre for	..	I.28b.		
					—Raw materials for	..	I.28a.		
					—Sizing in	..	I.28a.		
					Paper mill-made	..	I.28a.		
					Pencils. Graphite for	..	II.12b.		
					Personnel of the Survey Committee	..	I.1a, b.		
					—Sub-Committees	..	II.		



- P—contd.**
- Pigments, ochres as .. II.12a, b.  
 Pisciculture .. I.25b.  
 Planning, Agricultural .. I.7a.  
 Planning and Government Departments. II.18b.  
 Planning. Lack of, in economic organization. I.19a, 20b.  
 —and poverty .. I.14b.  
 —Need of .. II.18b.  
 —Type of .. II.19a b.  
 Pneumatic tyres .. I.23a, II.17a.  
 Pottery .. I.15b.  
 —Clay for— .. II.10b.  
 Poultry rearing— .. I.26a.  
 Power— .. II.13a.  
 —and industries— .. II.13a.  
 —employment— .. II.13a.  
 —Importance of .. II.13a.  
 —Investigation .. II.13a, b.  
 —Kinds of .. II.13b, 14a, b, 15a, b.  
 —ownership .. II.14a.  
 —production .. II.14a.  
 Power production, methods of— .. II.14a, b, 15a.  
 —supply, Management of— .. II.14a.  
 Price of kambal .. I.21a.  
 Preservative wood .. II.5a, b.  
 Producer gas .. II.5a, 14a, 15a.  
 Production .. I.4a.  
 —and distribution of wealth .. I.2b, 3a, 13b, 19b.  
 —economy of large scale .. I.7b.  
 —Impediments to— .. I.5a.  
 —Methods of— .. I.7b, II.2b.  
 Profit .. I.4a.  
 Public utilities .. I.2b.
- Q**
- Quarries .. I.16a.  
 Quartz .. I.16a.
- R**
- Railways .. I.28b, 29a, 30a, II.17a.  
 —discriminatory rates .. II.17b, 18a.  
 Raw materials .. I.4a, 16a, 27a.  
 Recommendations as to Organization II.18b.  
 Recommendations (also see under various industries.) ..  
 —Aid, functional .. I.20b.  
 —Bee-keeping .. I.15b.  
 —Block glass for bangles .. I.16b.  
 —Diet .. I.6a, b.  
 —Director .. I.9a, II.19a.  
 —Education .. I.9b.  
 —Financial and distributive functions of the Department of Industries. I.14b.  
 —Ginning .. I.18a.  
 —Hand pounded rice .. I.13a.  
 —hand spinning .. I.18b.  
 —licensing of oil mills .. I.14a.  
 —licensing of rice mills .. I.13a.  
 —Licensing sale of metallic utensils I.16b.  
 Museums .. I.9b.  
 —Pottery .. I.16a.  
 —Research, oil pressing .. I.14a.  
 — „ paddy husking .. I.13a.  
 —Roofing materials .. I.17b.
- R—contd.**
- Soap making .. I.17a  
 —Vegetable oil lamp .. I.14a.  
 —Weaving of wool .. I.21a.  
 —Rice mills, banning of— .. I.13a.  
 —Sindhi gur making .. I.15a.  
 —Village, statement of accounts .. I.3a.  
 —Weaving .. I.19a, b, 20a.  
 —Of wool .. I.20b, 21.  
 Reference. Terms of— .. I.1a.  
 Research .. I.13a, 14a, b, 17a, b, 21a, 22a.  
 —dyes .. I.27a.  
 Resin .. I.7b.  
 Resources. Conservation of— .. I.24b, II.2b, 9a, b.  
 Revenue, land .. I.23b.  
 Rice mills .. I.12b, 13a.  
 Roads .. I.29b, II.15b.  
 Road metalling. Basalt for— .. II.11b.  
 Rope making .. I.23b.  
 Rope-way .. II.17a.  
 Russa oil .. I.31a, II.7b.
- S**
- Saggi matti .. I.14a, II.11b.  
 Salaries of officers, high .. I.8b, II.20a.  
 Salt Act .. I.21a, 24b  
 Salt and soda .. II.11b.  
 Sand .. II.11b.  
 Sand stone .. II.11a.  
 Scheelite .. II.10a.  
 Scholarships .. I.9b.  
 School of Handicrafts .. I.22a, 27b.  
 Scrutiny of articles of village shop .. I.5b.  
 Seasoning of wood .. I.22a, 29a, II.5a, b 6a.  
 Secretariat .. II.19a.  
 Semi-precious stone .. II.12b.  
 Sericulture .. I.23a.  
 Sheep breeding .. I.21a.  
 —cross breeding .. I.21a.  
 Silage .. II.7a.  
 Sleepers .. II.6a.  
 Small dimension stock .. II.6.  
 Soap making .. I.14a, 17a.  
 Soap stone .. II.12b.  
 Sodium carbonate .. I.17a.  
 Spinning, cotton .. I.17b.  
 Staff, Department of Industries .. I.8a.  
 State control .. I.24a, II.19b.  
 State and low prices .. I.2a.  
 State, long range view point .. I.1b,  
 —short range view point .. I.1b.  
 Steatite .. II.12b.  
 Stones, semi precious .. II.12b.  
 Sub-committees .. II.1a.  
 Subsidiary trades and occupation .. I.13b, 25b.  
 Sugar manufacture .. I.15a.  
 Survey .. I.10b.  
 Survey, Industries .. I.11a.  
 —procedure .. I.10b, II.1a.  
 —villages .. I.11a.
- T**
- Tsecavi loans .. I.7a.  
 Tanning .. I.21b, 24a.  
 —materials .. I.25a, II.8a.

INDEX

<i>T—concl'd.</i>	<i>V—concl'd.</i>
Taxable capacity .. I.2a, 7a.	Village industries .. I.12a.
Taxed, bamboo .. I.30a.	—bamboo .. I.30a.
Taxes .. I.2a, II.18a.	—bee-keeping and honey production .. I.15b.
Taxes and human values .. I.2a.	—bidi-making .. I.31a.
Taxation. Incidence of— .. I.2a.	—blacksmithy .. I.22a.
Telangheri diary .. I.26b.	—brass-and metal-wares .. I.27a.
Telis .. I.13a, 14b.	—carpentry .. I.21b.
Textile Section, Department of Industries. I.20a.	—cotton ginning, carding, spinning and weaving. I.17b.
Thermal stations .. II.13b.	—dairy-farming .. I.26a.
Tiles-making .. I.17b.	—disposal of carcasses .. I.25b.
Timber .. II.4b.	—dyes-making .. I.27a.
Tongas .. II.17a.	* —flour grinding .. I.13b.
Tools .. I.22b, 27b.	—glassware and bangles .. I.16b.
Toy-making .. I.27b.	—goldsmithy .. I.28a.
—Culture in— .. I.27b.	—gur-making .. I.15a.
Trade. Ruin in— .. I.21b.	—lac industry .. I.29b.
Transport .. I.28b, II.15b.	—match manufacture .. I.30b.
—aerial rope ways .. II.17a.	—mat-weaving .. I.23b.
—animal .. II.17a.	—miscellaneous industries .. I.31a.
—and employment .. I.29a.	—oil-pressing .. I.13b.
—and imports .. I.5b.	—paddy-husking .. I.12a.
—bullock cart .. I.29a, II.16a.	—paper-making .. I.28a.
—bus and lorries .. I.22a, 29a, II, 16b.	—pisciculture .. I.25b.
—Different methods of— .. I.28b.	—pottery .. I.15b.
—means of and departments .. II.16a, b.	—poultry-rearing .. I.26a.
—means of and employment .. II.17b.	—rope-making .. I.23b.
—means of and incidents of burden .. II.16a.	—sericulture .. I.23a.
—means of and national economy .. II.16a.	—sheep-breedin .. I.21a.
—means of and public welfare .. II.16a, b.	—soap-making .. I.17a.
—passenger traffic .. II.17a.	—sugar manufacture .. I.15a.
—railways .. II.17a.	—tanning .. I.24a.
—water ways .. II.17a.	—tiles-and brick-making .. I.17b.
Tungsten .. II.10a.	—tools and implements .. I.27b.
Tyres Pneumatic .. I.23a, II.17a.	—toy-making .. I.27b.
	—transport .. I.28b.
	—weaving of wool .. I.20b.
	Village organization .. I.1b.
	—survey .. I.1b, 1fa., 34b.
<b>U</b>	<b>W</b>
Udbattis .. I.31a.	Wages .. I.22b, 31a.
Unemployment .. I.23a, 29b.	Wealth. Conservation of— .. I.25b.
Uses of forests .. II.1b.	—distribution .. I.2b.
Utilization of bones .. I.25b, 30b, II.8a.	—Kinds of— .. I.2b.
—horns .. I.25b, II.8a.	Weaving, cotton .. I.17b.
—husks .. I.13a.	—Improvement in— .. I.20b.
—lac .. I.30a, II.8a.	—wool .. I.20b.
—oils .. I.14a.	Weights and Measures .. I.8b.
—soapstone .. II.12b.	Wolframite .. II.10a.
—waste wool .. I.21a, II.6a.	Wood Power from— .. II.14a.
	—seasoning .. I.22a.
	—waste .. II.6a.
	Wool. Grading of— .. I.21a.
<b>V</b>	—sizing .. I.21a.
Varnishes .. I.14a.	—waste. Utilization of— .. I.21a.
Vegetable oils .. I.13b.	—weaving .. I.20b.
—as illuminants .. I.13b, 14a.	
Veneers .. II.5b.	<b>X</b>
Vidya Mandir .. I.9b, II.20b.	<i>Nil.</i>
Village. Condition of— .. I.11a.	<b>Y</b>
—Conservation of— .. I.25b.	<i>Nw.</i>
—employment .. I.28b.	
—forests .. II.7a.	
—and Government .. I.8b.	
Village. Disintegration of— .. I.11b.	