



REPORT
OF THE
MICA ENQUIRY COMMITTEE
1944-45

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REPORT OF THE MICA ENQUIRY COMMITTEE

CHAPTER I

THE CONSTITUTION OF THE COMMITTEE AND THE CONDUCT OF THE ENQUIRY

The Mica Enquiry Committee was constituted by the Government of India by a Resolution dated the 23rd October, 1944*, directing the Committee to "enquire into and report on all problems relating to the mica industry and its present and future development including the following:—

(i) Immediate problems relating to the Mica Control Order, 1940 (both in regard to war production and long term policy) and the review of any orders that may have been passed by Government in connection with that Order;

(ii) The present system of marketing—both inland and abroad;

(iii) Standardisation of quality;

(iv) The extent to which alternative sources of supply may have jeopardised or are likely to jeopardise the position of this country as the principal supplier of muscovite mica;

(v) The extent to which other materials that may be used as substitutes for mica, may have displaced or are likely to displace mica from its uses in the industry;

(vi) Increased utilisation of mica in this country for the manufacture of finished goods;

(vii) Methods of development with special reference to the following:—

(a) Research,

(b) Conservation,

(c) Methods of mining,

(d) Methods of processing,

(e) Methods of marketing,

(f) Methods of meeting competition;

(viii) The desirability of setting up a suitable machinery whether by the appointment of a Central Mica Committee or otherwise to watch the interests of the mica trade and industry; and

(ix) Any other matter of importance as may be brought to the notice of the Committee."

The following gentlemen were appointed assessors and technical advisers to assist the Committee in the enquiry:—

Assessors

Rai Saheb Pradhan Suryavarti Prasad, Inspector of Mica Accounts, Kodarma (representative of the Government of Bihar);

Mr. E. Watson, Domchanch and Mr. Chandmall Rajgaria, Giridih (representatives of Bihar Mica Miners and Dealers);

Mr. S. Y. Krishnaswami, I.C.S. (representative of the Government of Madras);

Mr. D. Narayana Reddi, Gudur (representative of the Madras Mica trade);

Mr. Ram Kumar Agarwala, Bhilwara (representative of the Rajputana Mica trade); and

Mr. Chapal Bhattacharya, Giridih (representative of Mica labour).

Technical Advisers

Director, Geological Survey of India; and

Director, Scientific and Industrial Research, or in his absence, another representative of the Directorate of Scientific and Industrial Research.

Subsequently, the Chief Inspector of Mines at Dhanbad was directed to give the Committee all possible assistance in the enquiry.*

The reasons for the setting up of the Committee were given by the Government of India in an earlier Resolution, as follows:—

“(i) Recent events have shown that the present organisation of the mica industry and trade is extremely unsatisfactory and tends to encourage methods and practices that are detrimental to the healthy development of the industry;

(ii) The present mining practices are generally so wasteful and primitive that an enquiry by a competent Committee into the best means of conserving this important mineral asset of the country seems essentially necessary at this stage;

(iii) The present methods of marketing leave a good deal to be desired, and standardisation of quality will become increasingly urgent in post-war years. It is considered necessary to obtain authoritative advice on these questions so that the industry may be properly organised to face the problems that will arise after the war; and

(iv) The mica industry in this country will, in all probability, have to face increasing competition from abroad soon after the cessation of hostilities. Such competition may arise from alternative sources of supply as well as from possible substitutes which recent technological advances may eventually produce. It is necessary that these problems of the future should be studied in advance by a competent authority.”†

The Chairman took charge of his duties in the forenoon of the 8th November, 1944, and a preliminary meeting of the Committee was held at Patna on the 20th and 21st November, 1944. At this meeting it was decided to call for memoranda on the subjects referred to the Committee for enquiry, from individuals and associations connected with the mica industry, or otherwise interested in it and competent to express their views. Besides addressing the invitations for the submission of the memoranda to known individuals and associations, advertisements were inserted in English and Vernacular newspapers circulating in the principal mica producing areas in India asking for expressions of opinion from interested and competent persons. The date originally fixed for the submission of these memoranda was necessarily short, as the Committee wished to have some idea of public views on the subject before its first visit to the mica mining area. The date was subsequently extended and memoranda were received as late as June, 1945.

In all memoranda were received from forty persons, firms or associations. A complete list of them showing the dates of the receipt of the memoranda is set out in Appendix II. Some of these memoranda were elaborate documents dealing with several aspects of the industry. Most, however, were short notes dealing with a few points with which the author was familiar or specially concerned. Whatever the length and nature of the memoranda, they were all carefully considered and were found of great value for focussing the attention of the Committee on the particular matters, which were in controversy and needed investigation. They were also the basis upon which the Committee selected witnesses for formal examination. In making this choice, however, the Committee did not feel itself bound to examine as witnesses all the persons who had submitted

* Government of India, Department of Labour, D. O. letter No. MD.-55, dated the 28th December, 1944.

† Government of India, Department of Labour, Resolution No. MD.-55, dated the 15th May, 1944.

memoranda. It gave preference to persons possessing first-hand knowledge about the industry and about the problems under investigation, and tried to avoid a multiplicity of witnesses on the same point. Also, the Committee did not feel bound to confine its choice to the persons who had submitted memoranda. Had it done so, it would have deprived itself of the assistance of many competent witnesses, well qualified to advise the Committee about the industry.

The Committee began its first-hand acquaintance with the industry by a visit to the Bihar mica belt lasting from the 15th to the 21st December, 1944. In this tour the Committee inspected mines, prospecting pits and factories in order to acquaint itself with the prevailing methods of mining mica and preparing it for the market. In the course of this tour, the Committee inspected eleven mines and eleven factories. In January 1945 from the 16th to the 23rd the Committee visited the mica producing area of Rajputana, and in the following month from the 8th to the 17th it toured in the Madras area. In these tours, in addition to inspecting mines, prospecting pits and factories, the Committee recorded the formal evidence of thirty-seven witnesses. On the way to Madras, the Committee took the opportunity of meeting the Chairman of the Joint Mica Mission at Calcutta and examining him as a witness. It also inspected a mica-nite factory at Salkia, Howrah. The Committee closed its investigation in the field by two visits to the Bihar area lasting from the 18th to the 24th March and the 17th to the 27th April, 1945, during which it recorded the formal evidence of thirty witnesses. Complete lists of the mines and factories inspected and the witnesses formally examined are given in Appendices III to V.

In these tours the Committee was accompanied throughout by four or more of its assessors and technical advisers, and found them of the greatest assistance in the examination of witnesses and the inspection of mines, prospecting pits and factories.

Besides the formal examination of witnesses, the Committee took the opportunity, during its visits to the mines and factories, of discussing the problems of the industry with the miners and dealers, and of questioning their employees and labourers. It also obtained a considerable amount of information from official and other sources by means of correspondence and by the supply of relevant literature.

Finally, in three meetings lasting from the 4th to the 9th June, the 16th to the 23rd July and the 6th to the 11th December, 1945, the Committee discussed the subject at length with its assessors and technical advisers, and came to the conclusions which are set out in the following chapters.

CHAPTER 11

INTRODUCTORY

Characteristics of Mica

The term mica includes several minerals, all characterised by a highly developed basal cleavage, enabling them to be readily split into very thin sheets of even thickness. This thickness may be even less than one *mil* (one thousandth of an inch), and the splitting may be done by a woman or a child working with a sharp pointed knife. When free from extraneous stains these sheets are transparent, and their flexibility, toughness, and heat-insulating qualities make them suitable for the chimneys of incandescent lamps and the inspection windows of oil stoves, in which form mica is familiar to most people.

In addition, mica has various other qualities specially fitting it for electrical purposes. It is impervious to water and is chemically stable and relatively inert. It has high dielectric strength, a low power factor and a high dielectric constant. It is practically incompressible and can stand vibration. Its volume is unaffected by changes of temperature. In very thin flakes, known as splittings, it can be bonded together by some binding material which is itself an insulator, and can be made up into sheets of any desired thickness, shape and size; this product, known as micanite or built-up mica, has certain special uses as an insulator. The resonating quality of mica makes it an important ingredient in telecommunication. A large quantity of high quality block mica is annually used for the condensers of radios and the iconoscopes of television apparatus.

Varieties of Mica

The principal micas of commercial importance are muscovite and phlogopite. Both are silicates of potash and alumina, but the latter contains magnesia as well. It is somewhat softer than and not so resilient as muscovite, but can stand rather higher temperatures. For some limited purposes phlogopite is more suitable than muscovite but, apart from these uses, muscovite is the mica in general use in the electric industry and comprises about ninety *per cent.* of the total world production of mica.

Occurrence of mica in India

India's importance as a producer of mica is clear from the fact that before the war over seventy *per cent.* of the world's supply of sheet muscovite came from India. This mica is derived almost entirely from three areas, Bihar, Madras and Rajputana. The relative importance of the three areas will appear from the figures below, showing the production of mica in India in the years 1934-1943:—

Output of Dressed Mica in India during the Years 1934-1943, in Cwt.

Year	Bihar	Madras	Rajputana	Other Provinces and States	Total
1934	45,979	9,189	538	..	55,706
1935	50,821	8,799	544	..	60,164
1936	71,738	13,742	1,591	..	87,071
1937	85,978	15,834	2,814	32	104,658
1938	84,235	23,155	4,936	880	113,206
1939	85,662	22,869	9,189	2,876	120,596
1940	84,270	26,688	27,583	1,754	140,295
1941	128,955	15,121	39,084	1,232	184,392
1942	121,774	18,344	44,359	865	185,342
1943	103,468	20,271	34,973	869	159,581

The Bihar belt is the oldest and most important of the three areas. It lies in the districts of Hazaribagh and Gaya, with small portions in the adjoining districts of Monghyr and Bhagalpur. The mines are scattered over an area measuring roughly ninety miles by twenty miles. They produce the famous Bengal Ruby mica which has long been regarded as the best mica for electrical purposes. The Madras mines lie mainly in the Nellore district, and are scattered over a belt measuring roughly sixty miles by eight to ten miles. Madras produces some ruby mica of good quality; the greater portion of Madras mica is green coloured and generally obtains a lower price than Bengal Ruby mica. The Rajputana mines lie partly in the Chief Commissioner's Province of Ajmer-Merwara, and partly in the States of Mewar, Tonk, Jaipur and Shahpura. Mica has been found in other States in Rajputana, but so far only in negligible quantities. The mica is mostly of the ruby variety; but much of it is buckled and does not command the same price as the product of Bihar. Mewar State, the principal producer in Rajputana, has come into the field very recently, and the mica so far obtained is from near the surface. The industry in Rajputana is young, and the processing of mica has not yet advanced far enough for direct export. Rajputana mica finds its way into the hands of Bihar dealers who prepare it for the foreign market. It is, therefore, too early to say what the quality and value of Rajputana mica will eventually turn out to be.

Manner of its occurrence

Muscovite mica is found in veins associated with pegmatite rock. The vein commonly consists of a core of quartz and an outer layer of pegmatite. The mineral is, in many cases, distributed as irregularly scattered pockets in the pegmatite—as one of the witnesses described it, like plums in a pudding. Generally, it is found in one or more of four zones, namely the hanging-wall and the foot-wall, where the pegmatite is in contact with the country rock, and the two upper surfaces or contacts of pegmatite with the quartz core, where the latter is present. Apart from this, the distribution of mica does not obey any known rule. It is not certain that a pegmatite containing an economically workable quality of mica in one section will continue to yield such mica, or indeed any mica, in another or a deeper section. Further, the continuance of the pegmatite itself is a matter of speculation. The pegmatite vein may pinch out suddenly, and the most careful search may reveal no continuation.

Processing of Mica

Mica is found imbedded in the pegmatite vein in the form of what are known as "books" of mica. These are crystals of mica and comprise the mineral in its crude form. They may vary in size from a few cubic inches to big blocks, measuring two to three hundred square inches in the plane of the laminations and one foot or more across it. For preliminary treatment, the books are rifted into slabs, varying from eight to thirty *mils* in thickness, and the worst flaws are then cut away. This work is usually done with sickles and the mica at this stage is described as sickle-dressed block, or more shortly as S.D.B. Of recent years, small dealers and some of the bigger producers are using knives for the initial cutting before passing the slabs to the sickle-dressing department; it is claimed that this involves less waste. After sickle-dressing, the mica goes to the grading department, where the mica is graded according to size. Finally, the mica passes to the sorting department, which is the most important stage. The principal qualities upon which sorting depends are clearness, hardness, flatness, colour, and the size and number of "air" inclusions and "vegetable" and mineral stains. The different degrees of these qualities are not capable of exact measurement, and it takes years of experience to make a good sorter. Besides possessing the capacity to classify mica, the sorter must be an expert with the knife, and be well acquainted with the value of different qualities of mica. A block of mica consists of a large number of adhering films. It may be that the defects which affect the quality of the block are confined to one or two of these films. A skilful sorter by removing a film from the surface, or by splitting a thick block into two thinner blocks and removing a defective film

between them, may raise the quality of the resultant blocks and make a big increase in the selling value of the mica. On the other hand, a mistake in judgment on his part will affect the weight, and therefore the value, of the mica which can be sold as block.

After the sorting stage the mica is in three forms, block mica, *chillas* and waste. Block mica is the dressed, graded and qualified product, varying in thickness from eight to thirty *mils*. The superior qualities of the block mica and the bigger sizes of the inferior qualities are largely exported as such. The *chillas* are thin sheets of mica, less than eight *mils* thick, removed in the course of processing and qualifying mica. With the block, which is not exported as such, they undergo further processing into splittings, wrappers, condenser films, condenser plates, washers and discs.

Splittings, measuring not more than one and a quarter *mils* in thickness, are manufactured from block mica and from *chillas*. The work is invariably done by hand, partly in factories and partly in the homes of the labourers. Women and children quickly become expert at splitting, and their earnings by this means both in the factory and in the home form an important addition to the incomes of the labouring classes in the mica producing areas. Splittings may be in three forms, loose, book-form or pan-packed. Loose splittings are generally of small sizes such as Grades No. 5½ and less. They are manufactured either in the factory or in the homes of the labourers. Bigger size loose splittings, such as Grades Nos. 5 and 4, are sometimes manufactured in the factories from *chillas*. Book-form splittings are made from larger sized block; each splitting is dusted with mica powder and the splittings are put together in the shape of the original block. They are very much in demand for the manufacture of better qualities of micanite. In pan-packing the splittings are arranged in uniform layers at the bottom of circular or rectangular pans. When the layer has reached a thickness of about one-eighth of an inch it is pressed together from the top and the bottom. As freshly made splittings have the quality of sticking together with pressure, the whole layer can then be removed and handled as one mass. The demand for pan-packed splittings is now comparatively small.

Wrappers are films of specified thickness, varying from three-fourths *mil* to one and a quarter *mils*. They are put up in the form of book-form splittings, but are not dusted with mica powder. In order to prevent them from sticking to each other, they are polished on each side with a pad of cloth. Such films are extremely flexible; for one of their uses they are rolled tightly several times round the central spindle of aeroplane motor spark plugs, measuring a little over one eighth of an inch in diameter. They are mainly used to screen leads to stop arcing and radio interference. They are generally required in the larger sizes, Grades No. 4 and up. They must be free from defects, and are carefully examined at the time of packing. They are generally manufactured from block of stained quality.

Condenser films are used as dielectrics in radio and other condensers. They are required to be made to specified thicknesses between three-fourth *mil* and four *mils*, and are manufactured from block of Good Stained or Fair Stained quality. The sizes usually supplied are of Grades Nos. 3 to 6. Condenser plates are merely condenser films cut to shape. The films and plates supplied for this purpose must be of good quality and comply strictly with the requirements as to thickness.

Washers and discs are cut or punched according to requirements. They can be easily made by the countries manufacturing electrical equipment and the export of these from India is comparatively small.

Dump-cut mica

The block mica used in the manufacture of loose splittings is derived partly from the mines and partly from dumps of waste mica at mines and factories. These dumps were originally formed when there was a small demand for splittings. With the increased use of micanite, they were found to contain mica

which could be manufactured into saleable splittings. The dump mica is used for the manufacture of No. 6, Third Quality, Loose splittings, and these dumps are freely resorted to when the demand for such splittings, which is very variable, goes up. The extent to which this source of splitting quality mica is still available will appear from the following figures, obtained from the manufacturers through the Inspector of Mica Accounts:—

Production of Mica Block from Factory and Mine Dumps in Bihar, in Owt.

	1942	1943	1944
From Mine Dumps :	30,781	17,835	12,537
From Factory Dumps :	18,039	6,925	5,820
Total	48,820	24,760	18,357

Dealing in Mica

The practice of the miners varies as to the extent to which they process the mica before disposing of it. There are some who go through the entire process and export the finished product. Others sell the mica in the crude form, without any processing at all. Still others sell at various stages in between. Thus, there has grown up, in addition to the miners, a class of dealers who act as middlemen between the miner and the foreign market. Some of these middlemen buy the crude mica, dress it partly, and sell it to other dealers, who finish the processing, and export the mica. Some complete the dressing themselves and export the mica, and others act merely as collecting agents, who collect mica, crude or sickle-dressed, from small miners, and sell it to bigger dealers. There are some again who manufacture and deal in splittings only. The size of the business of the dealers may vary from an annual turnover of Rs. 5,00,000 to a turnover of Rs. 5,000. These figures relate to persons who are purely dealers. The mining companies have also found it convenient to purchase mica for manufacture and sale in addition to their own product, and hence have extended their business to dealings. The extent to which dealing has increased will be apparent from the number of licences in existence in Bihar at the end of each of the years 1932 to 1944. The figures for 1939 are omitted because the Bihar and Orissa Mica Act, under which these licences were issued, was repealed in that year, and was not replaced by the Mica Control Order till the next year. In considering these figures, some allowance should be made for several miners and mining companies who have taken out dealer's licences.

Total Number of Licenses in Force at the End of the Year

Year	Miner's Licenses	Dealer's Licenses
1932	44	143
1933	62	145
1934	75	148
1935	105	165
1936	110	175
1937	193	242
1938	223	324
1940	115	372
1941	179	656
1942	200	613
1943	220	615
1944	230	550

In Madras and Rajputana there is no system of licensing, and no specific enquiry was directed by us as to the number of dealers. However, from our general enquiries we are in a position to say that there is practically no dealer in Rajputana, and a comparatively small number of dealers in Madras. The greater part of the Rajputana product is sickle-dressed by the miners, and is sold to Bihar dealers who visit Rajputana. Some of the Rajputana miners have recently taken out dealer's licenses, and are trying to process and sell their own mica in Bihar. In Madras ten to twelve dealers share between them the bulk of the export trade, and besides them there are small dealers who act as their collecting agents.

CHAPTER III

MICA THEFT

The problem of mica theft is a very vexed one, the investigation of which has occupied a considerable part of the Committee's time. So far as Madras and Rajputana are concerned, the problem does not exist. In Bihar, the existence of mica theft is admitted, but there are two opinions regarding it. According to one section of the industry, the theft is not enough to cause any concern. It does not exceed in proportion theft existing in other industries and in other walks of life. The problem is merely one of proper superintendence and control. According to the other section, the theft is excessive and endangers the continued existence of the industry. It is pointed out that mica is a semi-precious mineral, the better qualities of which sell at prices which, weight for weight, are higher than those for silver, and that mica is mined in jungle areas at scattered mines, and passes through the hands of numerous coolies and subordinate staff before it comes to the factory of the owner of the mine. Further, it is difficult if not impossible to identify, and, once it has been removed from the custody of its legitimate owner, the thief or receiver can sell it openly, without fear of successful prosecution. The prevention of theft by supervision alone is, therefore, impossible. The effect on legitimate trade is harmful in two ways. Firstly, the honest miner is deprived of his property. Secondly, the thief and the receiver, not having had to bear the cost of mining, can put the mica on the market at a low price, and thus bring down the value of the mica still left to the legitimate owner.

The complaint is not a new one. It was raised as long ago as May 1906 in a conference at Kodarma, presided over by the Commissioner of Chota Nagpur and attended by Indian and European members of the industry. Among suggestions made for dealing with the problem were the enforcement of a system of passes to accompany consignments, of mica, and the prohibition of the transport of mica by night. The conference recognised that its proposals would necessitate the registration of all miners and dealers, but considered this a small matter compared with the urgent necessity of putting a stop to mica stealing. In 1907 the Kodarma Mica Mining Association was formed and, among the principal duties specifically allotted to its executive committee, were the devising of measures to prevent trading in stolen mica, the giving of help to the police to detect illegitimate dealings in mica, and the prevention of the re-employment of persons concerned in mica theft.

From its establishment to the present day, the Kodarma Mica Mining Association, an association with both Indian and European members, has advocated the necessity and urgency of measures for the suppression of mica theft. A draft bill for this purpose, prepared by it in 1913, was not proceeded with by the Government of Bihar and Orissa, because its provisions did not meet with the approval of the rest of the trade. The Kodarma Mica Mining Association continued its activities nevertheless, and about the year 1924 a special officer, Mr. B. C. Mukherjee, Deputy Magistrate, was deputed to make an enquiry at the spot into the question of mica theft. Towards the end of the year, or in early 1925, the Deputy Commissioner of Hazaribagh in consultation with the Secretary of the Kodarma Mica Mining Association drew up another draft bill for dealing with the problem. In the meantime a rival association, the Bihar and Orissa Mica Association, had come into being in 1925. It opposed the proposed legislation, and its opposition has been urged as proof that the agitation of the Kodarma Mica Mining Association was not a real one. This is not borne out by the Annual Report of the Bihar and Orissa Mica Association for 1932-33, which explains that, when it made this opposition, the Association was "not unmindful of the gravity of the evil", but thought that it could be effectively dealt with under the ordinary law, and was afraid that the proposed legislation

"would prove a halter round the neck of many a *bonafide* mica dealer and miner and hinder the growth and development of the industry". In other words, the Bihar and Orissa Mica Association did not agree with the provisions of the draft bill, and feared that the remedy would prove worse than the disease.

In spite of the opposition of the Bihar and Orissa Mica Association, the Bill was sent up to the Local Government but was thrown out by the Legislative Council. In 1929 it came before the Legislative Council again in an amended form and, after further modification by a select committee, it passed into law as the Bihar and Orissa Mica Act, 1930. This Act came into operation in the year 1932, and remained in force till it was repealed during the time of the Congress Ministry in March, 1939. The reasons given by the Government of the day for repealing the Act were its general unpopularity, its harshness towards small prospectors, and the unfair way in which its insistence on accurately kept accounts worked as between big and small operators, the latter having their accounts checked frequently and being punished for petty discrepancies, whereas the accounts of big companies were not checked at all, as no check was possible without stopping their operations for three or four months at a time. We are not concerned with the correctness of these reasons. It is sufficient that the Government of the day did not deny the need for protective legislation. On the contrary, the Government gave an assurance of suitable legislation in these words:—

"It does not mean that we are not conscious of the view points which were placed before the Hon'ble the Prime Minister by the big companies. What we propose to do is that after the Act is repealed, we shall invite them to a consultation and ask them to give us the benefit of their advice and we shall try to give them whatever protection they require for the preservation of their mica in the big forest areas. After all, these mines are situated in big forest areas and the view that we take is, that we shall give as much protection as the miners require for the protection of their mica in the forest areas, but we do not want that in order to give them protection, the small dealers or miners living in the villages should, in any way, be harassed, that is to say, instead of applying the Act to the villages and to the centres of trade, we want to give protection to the miners at the spot where their mica is stolen, that is to say, the forest areas and the mines themselves."*

Then followed a short period in which the mica industry of Bihar was not regulated by special legislation, but the provisions of the Act with certain modifications were soon restored by the Mica Control Order, 1940.† The object of the Government of India in passing this Order was to regulate and control the transport of mica, in order to prevent the mineral from falling into the hands of the enemies of the Allies. In this connection, it is of some interest to note what happened at a meeting between officials of the Government of India and representatives of the Bihar and Madras Mica Mining Industry, held in New Delhi on the 4th January, 1940. The following extract from the minutes of the meeting is relevant:—

"The meeting next considered the question of the re-enactment of the Bihar and Orissa Mica Act I of 1930, which was repealed by the Local Congress Government last year. Certain amendments were suggested which have been the subject of detailed consideration at a meeting held by the Mica Industry of Bihar on the 6th January, 1940. It was adjudged by both Indian and British representatives to be imperative that this repealed Act be once more enacted in the interests of war output and to control the illicit dealing in stolen mica".

*Bihar Legislative Assembly Debates, Volume IV, Part I, 16th January to 13th February 1939, Pages 263-264.

†*Vide* Government of India, Department of Labour, Notification No. M-1273, dated the 25th May, 1940.

‡This is an error in the minutes. "the Mica Industry of Bihar" should read "the representatives of various Departments of the Government of India".

Apparently, there was then no serious difference in the trade as to the necessity for special legislation to deal with theft. Before us, however, there has been a sharp difference on this point between the two sections of the industry.

Since the Mica Control Order first became law, the position seems to have been accepted by the Government of India that some action against mica theft is necessary. We say this with reference to the amendment of the Mica Control Order by the Government of India, Department of Labour, Notification No. M-1273, dated the 31st May, 1944, inserting a sub-clause in clause 4 of the original Order, restricting the purchase, sale or transfer in any other way of crude mica and ungraded block mica (locally known as *bima*).

In proof of the seriousness of the evil, it is usual to refer to the considerable excess of exports over production shown by published statistics. The suggestion is that this excess to a large extent represents mica illegitimately obtained and, therefore, not reported. The table below gives the output of block mica in Rajputana and Bihar, and the exports from Bombay and Calcutta, the ports from which this mica is exported. It is necessary to group the figures in this manner, because the mica from Rajputana comes to Bihar and is exported from there. The Indian Trade Returns, from which the export figures are taken, follow the financial year. Allowing a few months for the preparation of mica for the market after its removal from the mine, we have taken the exports for one financial year to correspond to the output of the calendar year which ends in that financial year. Thus, the output of 1920 would correspond to the exports of the year 1920-21. The figures stop at 1938, corresponding to the financial year 1938-39, as, after that, normal conditions were disturbed by the outbreak of World War II.

Year	Output of Block Mica in Bihar and Rajputana	Exports of Block Mica from Calcutta and Bombay
	Cwt.	Cwt.
1920	8,743	9,100
1921	6,983	3,885
1922	7,585	9,312
1923	6,248	12,219
1924	7,400	10,038
1925	7,732	14,316
1926	7,504	10,554
1927	8,207	9,751
1928	9,006	8,531
1929	10,003	2,824
1930	10,345	8,091
1931	8,001	5,460
1932	6,086	6,467
1933	8,268	12,123
1934	11,629	18,262
1935	12,841	19,650
1936	18,332	21,673
1937	22,198	22,104
1938	22,293	18,050
Total	1,99,404	2,32,416

According to this table, exports do not invariably exceed production but, taken over the whole period, they exceed production by about 16.5 per cent. The compilation has been made on the assumption that block mica forms 25 per cent. of dressed mica, figures of the annual output of which are published by the Geological Survey of India. This is the proportion according to some

of the witnesses examined by us. Dr. Dunn's estimate is 27.5 to 29 per cent.* Adopting this proportion, the excess of exports over production becomes small and, allowing for other causes suggested to the Committee, such as the inaccurate reporting of output, the failure of small miners to submit returns, and the import of foreign mica for splitting and re-export, the excess becomes insignificant. These statistics, therefore, do not establish the existence of a considerable amount of illicit dealing in mica, but the result is purely negative. It does not disprove the allegations of excessive theft, for the existence of legislation, requiring the keeping of accounts and the issue of transport passes, creates a tendency for stolen mica to pass through the books of dishonest miners and be reported as the output of their mines.

The other evidence, generally cited in support of the allegation of excessive mica theft, consists of the statistics of criminal cases relating to illicit dealings in mica. The following table of such cases, which ended in conviction, or which did not lead to conviction but were declared true by the trying court or the investigating police, has been compiled from figures obtained through the Inspector of Mica Accounts, Rai Sahab Pradhan Suryavarti Prasad. The figures relate to the entire mica belt of Bihar:

Crimes Connected with Mica

Number of Convicted and True Cases in Bihar Belt

Year	Number of cases
1932	37
1933	30
1934	34
1935	46
1936	30
1937	40
1938	36
1939	67
1940	71
1941	110
1942	137
1943	161
1944	62 1st portion } Total 32 2nd portion } 94.

The figures for 1944 are shown separately for the portion up to the 21st June 1944 and the portion after that date. During the latter portion, the amendment restricting the sale of crude and *bima* mica was in force.

It may appear that an annual incidence of from thirty to one hundred and sixty cases in an area of about 1800 square miles is of no consequence, but these are cases reported to the police, and form only a portion of the cases actually occurring. It is not even certain that all detected cases are reported to the police. Mica is unidentifiable and, often, a report is not made to the police unless there is direct evidence or the circumstantial evidence seems strong. The figures show very little fluctuation during the period 1932 to 1938. In 1939 there is a rise, which continues into the subsequent period up to 1943. Then there is a sudden drop. The increase in 1939 corresponds to the repeal of the Bihar and Orissa Mica Act. As there is not a corresponding fall in the number of cases with the passing of the Mica Control Order, it is not possible to say with certainty that the increase is connected with the repeal of the Act. It may merely point to a stricter enforcement of the law, which continued equally strict in 1940 on account of the importance of mica for war purposes. The significant point about these figures is the sudden drop in 1944. The

*Records of the Geological Survey of India, Vol. LXXVI, 1942, Bulletins of Economic Minerals, No. 10. Mica by Dr. J. A. Dunn, page 54.

figures of general crime in the Hazaribagh and Gaya districts, obtained from police records and given below, show a corresponding drop in 1944, but not to the same extent.

Crimes against property

(Theft, Burglary and Allied Sections)

Number of Convicted and True cases in the Districts of Gaya and Hazaribagh

Year	Gaya	Hazaribagh
1932	1,596	1,225
1933	1,455	1,042
1934	1,431	912
1935	1,516	922
1936	1,373	1,040
1937	1,354	909
1938	1,461	1,052
1939	1,672	1,419
1940	1,655	1,440
1941	1,861	1,980
1942	1,970	2,405
1943	2,377	2,985
1944	1,775	2,283

The figures of convicted and true cases instituted in the first and the second portions of the year 1944 could not be obtained without an amount of labour, which would not have been justified by the result. A sufficient indication of the trend of cases in 1944 is furnished by the figures of the institution of cognizable cases in these districts before and after the critical date. These are as follows:—

Cognizable Crime

Number of cases Instituted in Gaya and Hazaribagh Districts

District	1944, First Period	1944, Second Period
Gaya	1,336	1,440
Hazaribagh	1,088	1,275

In both districts, we find not a marked fall but, on the contrary, a slight increase. The sudden fall in mica crime between the first and second portions of the year, therefore, does suggest that the restriction on the sale of crude and *prima mica* had an effect in reducing illicit dealings in mica and, conversely, that there is an appreciable amount of such dealings.

The oral evidence on the point of theft is very conflicting. On the side of the opponents of special legislation for this purpose are ranged representatives of some of the biggest producers of mica in the area. If the agitation about theft is true, they are among the biggest sufferers. Hence, the Committee has been at some pains to understand their attitude to this question. An indication of a possible reason is the suspicion, expressed by some witnesses, that there is an ulterior motive behind the agitation, and that an attempt is being made to force dealers and small miners out of the industry, and gradually to create a monopoly. That this suspicion is not confined to the witnesses only would appear from some of the questions put by assessors during the recording of evidence before the Committee and, in answer to such a question, a witness of some standing in the industry stated that a suspicion of this sort was "in everybody's mind".

This suspicion alone is not sufficient to explain the stand taken by these firms. Perhaps, the real explanation is to be found in the nature of the special legislation which hitherto has attempted to deal with the problem. It has been based on account-keeping and the issue of passes to accompany all consignments

of mica. It is generally agreed that this method has proved ineffective in suppressing the evil. All that a trafficker in mica has to do is to get in touch with a dishonest miner, and he is free to carry his mica about under cover of a pass, which no one can challenge. Similarly, it is a matter of simple book-keeping for the dishonest person to keep accounts tallying with his stock, however it may have been obtained. On the other hand, discrepancies may creep into the accounts of an honest licensee, by reason of accumulations of small errors in weighing, loss of weight by drying of stock received in a damp condition, and other such causes, or because he cannot employ a good accountant. There is a strong feeling in the industry that the existing law has been enforced harshly against such innocent persons, and a reluctance to continue subject to this law. This is the feeling, which led an advocate of action against mica theft to say to us

“I would far more suffer mica theft to a greater extent than to have the Defence of India Rules operated upon me”

and, again,

“My contention is that whereas I want that sufficient security for capital should be there, but at the same time I should say that there should not be any laws which harass us”.

That illicit dealings in mica are not negligible is suggested strongly by a statement contained in the memorandum of a prominent producer of mica with reference to prices obtained by big exporters in the foreign market. While asserting that mica theft is not considerable, the memorandum states.

“To add to this the illicit mica—whatever its magnitude—does augment the misery of the large miner exporters”.

The statement, that foreign prices are affected by illicit mica, may or may not be correct, but it certainly betrays the writer's impression that illicit dealings are not really inconsiderable.

That mica theft is not negligible is, also, suggested by certain proposals made before this Committee for the exclusion of dealers from plying their trade in or near the mining areas, and for prohibiting the sale of *bima* mica. These proposals emanated from a witness, who was originally opposed to special legislation dealing with theft, and point in the same direction as the explanation we have suggested for the opposition to special legislation. What these people appear to be afraid of is a law, which will harass and not relieve. They admit that theft exists, and are willing to have provisions which will make it less without harassing them.

This admission represents the findings and attitude of the Committee. Undoubtedly, there is an appreciable amount of illicit dealing in mica, and some firms suffer from it more than others. The conditions are such that complete elimination of it is not possible, but something should be done to keep it within reasonable limits, taking care that the legislation is not such as is likely to harass the honest members of the industry.

CHAPTER IV

CONSERVATION

In 1928 an apprehension was expressed in America that the supply of mica from India might fail.* It was based on two grounds, firstly the fear that the mica deposits might pinch out at shallow depths, and secondly that the conditions in the industry were such that the bigger and more efficient producers might be forced out of it.

The geologists we have examined have been emphatic that there is no geological reason for any apprehension on the first ground. The mica bearing pegmatites were formed long ago at great depths in the earth's crust. At these depths the conditions necessary for the formation of the pegmatites must have existed over a range of at least a few thousand feet of depth, and the existing mines, very few of which extend below five hundred feet in vertical depth, cannot have affected materially India's natural reserves of mica. According to Dr. Dunn of the Geological Survey of India,† there is no sign of exhaustion in the Bihar mica belt, and it has a long future ahead of it provided mining is done on sound lines. A similar opinion about the Madras area has recently been expressed by Dr. B. C. Roy, another officer of the Geological Survey of India, after a survey of the mica belt lasting over three field seasons.‡ In addition to these two areas the Rajputana field has recently come into the picture. It is true that a considerable portion of its mica is black-spotted and buckled, but we have also seen some mica there of the highest quality. With deeper and more extensive working, it is possible that the quality of the mica may improve.

The second ground on which the apprehension was based related to the existence of mica theft. According to Mr. Hobson, even including the figures for Madras and Rajputana where theft is unknown, exports are double the reported produce. This is certainly a very alarming discrepancy, but is due to the inclusion of splittings, the production of which from mine and factory dumps is largely omitted from the returns of out-turn. On account of their small value and large bulk, splittings do not generally form the subject of theft. Hence, we have left them out in our consideration of the point in the preceding chapter. The picture about theft, therefore, seems to be overdrawn. Undoubtedly there is sufficient theft to call for action, but there is no reason to think that it threatens the existence of the big miners.

The real danger to conservation lies in the employment of improper methods. On this question, also, there are two points of view. According to one party, the entire structure of the industry is wrong. The industry is no longer one for the small man, but should be in the hands of big capitalists, able to afford the qualified technicians and machinery necessary for the proper running of the mines, whilst the small man, who scratches the surface, gets what he can and then quits, should go. According to the second view, there is ample room in the industry for the small man; in fact, he is necessary for its existence, as he is the prospector and the finder of mica.

The prospecting of mica is usually done by small parties of men, who go out with picks and shovels and dig pits in all likely places. When mica is found, they follow it from book to book. If the mica fails, they stop their work and move to another place. All the technical witnesses we have examined have agreed that this trial and error method of prospecting is at present the only one possible in the industry. Mica occurs in small and scattered pockets,

* Note on the Marketing and Utilization of Mica by G. Vernon Hobson, Bulletin No. 40 of Indian Industries and Labour, 1928, page 14.

† Memoirs of the Geological Survey of India, Vol. LXXVIII, 1942; The Economic Geology and Mineral Resources of Bihar Province, by Dr. J. A. Dunn.

‡ The Nellore Belt by Dr. B. C. Roy, G. O. No. 4477, dated the 20th October 1944 of the Government of Madras, Development Department.

and the method of boring is quite unsuitable. Geophysical prospecting, which depends on the interpretation of anomalies in electrical, magnetic, and other properties between the mineral sought and the rock in which it occurs, is also unsuitable for the mica content of the pegmatite is too small for it to be successfully located by these methods. Experiments, made by Mr. B. L. Gulatee of the Survey of India in the Bihar Mica Belt*, suggest the possibility by this means of locating pegmatites which are covered with an over-burden. This may be of use in areas like Madras and Rajputana, where there is often no outcrop of the pegmatites; but this is only a part of the problem, for not every pegmatite contains mica. Geophysical prospecting may also be useful in establishing the depth of known mica-bearing pegmatites, and in finding their extension when they have petered out in the course of mining. The Geological Survey of India will shortly be creating a Geophysical Cadre, and further research on the possibility of finding mica by these methods may be expected. In the present state of our knowledge however, the finding of the mica must be done by labourers, who dig for it and hunt till they find it. The geological knowledge which they require for the search is small—merely an acquaintance with the pegmatites and the associated rocks, and an insight into the behaviour of mica. This knowledge they acquire from experience, and their skill was frankly acknowledged by Dr. C. S. Fox, formerly Director of the Geological Survey of India, who expressed the opinion that, without the prospector of the *uparchala* type of working, the mica industry will suffer a very serious handicap. According to Professor Bose of the Indian School of Mines, also, such persons make the best prospectors. In this connection the following remarks of Major T. G. Trevor, who was intimately connected with prospecting and mining in South Africa for twenty five years as a Government Inspector of Mines and for fifteen years as an independent worker, are relevant:—

“It is often thought that the field geologist and the educated mining engineer will take the place of the uneducated prospector of the past. One might as well expect the agricultural expert to take the place of the ploughman

“Allowing that minerals are present in the area, the actual discovery of their deposit may be compared to a lottery in which every stone is a ticket. An actuary may be able to tell you if a lottery is a fair gamble, or, the chances against you are unfair. Similarly, a geologist may be able to tell you if the ground holds out good prospects of economic minerals, but neither actuary nor geologist has much more chance of drawing a prize than any uneducated punter or prospector. In the ordinary way the prize will be most likely to fall to the man who takes most tickets or examines most stones”.†

The fate of the pit, after the successful locating of a promising deposit, depends upon the position of the prospector. He may be doing the work as the servant of the owner of the mining right. If so, his employer takes over the pit, giving him such payment or reward as he thinks fit. This is the system in Madras and Rajputana. It is followed to some extent in Bihar, but the system of prospecting by contractor is more common. The contractor is an independent labourer, who works the area under cover of the license held by the owner. He receives no payment, but reimburses himself by selling the mica recovered. Usually, he is bound to sell to the owner at prices agreed on between them. When the pit begins to pay well, the owner steps in and takes over. The bigger miners generally find the contractor system more economical than departmental prospecting, and are careful to treat the contractors with consideration, even though the terms of agreement are not well defined, and there is nothing in writing. In fact, there are some who allow the contractor to continue as long

* Report on the Geophysical Prospecting for Mica-Bearing Pegmatites by B. L. Gulatee, Mathematical Adviser, Survey of India, 1942.

†Prospecting and Discovery of Mines in South Africa, by Major T. G. Trevor, Transactions of the Institution of Mining and Metallurgy, Thirty-eighth session—1928-1929, Vol. XXXVIII.

as he is able, and take over only when he comes to them and reports that he is unable to go on. There is another kind of prospector who is to be found in some of the zamindari areas in Bihar. He works under a *hukumnama* (order), granted by the proprietor and covering a short period, usually one year, and is entitled to sell the mica on terms similar to the contractor. He takes a licence in his own name. Under the terms of the *hukumnama*, when the pit becomes a mine in the opinion of the proprietor or the output from it reaches a certain level, the proprietor may offer him a mining lease on terms fixed by the proprietor. If he refuses, the proprietor takes over and carries on.

After this the pit is worked as a mine, and the manner of its working depends on the financial ability and technical knowledge and experience of the miner. The miner may work without any system, following the mica from book to book, or he may sink a vertical or inclined shaft, and develop the vein by horizontal drives joined together by rises or winzes. The former method results in labyrinthine workings, in which water and debris can only be removed by hand labour. The latter gives a well laid-out mine, which can be mechanised as soon as the miner thinks that the prospects justify the outlay. One need that arises very early in both cases is some mechanical means for pumping out water, and in the absence of financial ability to this extent the miner has to stop, stope out the mine, and withdraw.

The main complaint against these small operators is that they destroy the surface indications of mica. This has been denied by the greater number of the technical witnesses examined by us. In the words of Dr. Fox:

“They (the *uparchala workers*) are adding to our knowledge The surface indications often cannot be seen until the *uparchala work* is done”.

Far from destroying the indications, these small miners are the real prospectors. They do the most difficult thing in mica mining, namely the location of the deposit. Their abandonment of the mine places no difficulty in the way of subsequent miners, more competent than themselves. Several abandoned mines in Bihar have been reclaimed and are working successfully. To the suggestion that the cost of the production of mica is increased because the second miner, before he reaches the lowest working point, has to do over again the work done by his predecessor, the answer was rightly given by one of the witnesses that the second miner saves by getting a proved vein and thus avoiding expenditure in prospecting. The only drawback is that this reclamation has to be done at a risk, as there is usually no definite information available about the old workings, and the newcomer has to decide on scraps of information, gathered from labourers and villagers, whether it is worthwhile reopening the mine. It is in this direction that we feel a reform is urgently needed, and all the witnesses examined agreed that action on the lines to be suggested by us is desirable. Records should be kept, from which the newcomer will be able to ascertain the history of the pit or mine he wishes to reclaim. Among the details to be included in these records we would mention:

1. Location.
2. Depth.
3. Horizontal dimensions.
4. Total quantity of mica raised.
5. Percentage of No. 5 and up in the entire bulk.
6. Average quality of the mica.
7. Width of the vein.
8. Length and size of other workings, if any, *e.g.*, drives, rises, etc.
9. Reasons for abandonment.
10. Condition of working faces at the time of the abandonment.

The above details will be supplied by the miner at the time of abandonment. These records will take the place of the records contemplated by Metalliferous Mines Regulations Nos. 5, 18 and 19. In order to ensure accuracy, verification is desirable. For this purpose, the intention to abandon the mine or pit should be intimated to the recording authority some time before the actual abandonment. Obviously, it will not be possible to keep a record of all pits. Nor will it be necessary, for when the pit is shallow it costs very little to re-open it and see what it contains. The limit may suitably be put at 40 feet of vertical depth. We consider the preparation of this record to be a matter of special urgency and, as it is within the Regulation-making powers of the Central Government under Section 29 of the Indian Mines Act, 1923, we would suggest that it may be taken up at once by the Mines Department, in advance of other action on our report.

The prospector is necessary for the future of the Industry, and we consider that he should not be discouraged by placing too many restrictions upon him. The majority of the witnesses have agreed that unsystematic work to shallow depths does no permanent harm, provided records of the workings are kept. In order to keep the *uparchala* worker, he should be allowed to work free from restriction down to a certain maximum depth, subject of course to the rules of safety and the application of the Mines Act, a subject which will be dealt with later. According to one geologist no serious harm is done by unsystematic mining to a depth of 70 to 80 feet, but another would limit such working to a depth of 50 feet. The former limit represents roughly the depth to which under present day conditions *uparchala* working extends, and we are inclined to accept it, but with a modification. In the case of a vein which slopes very slightly from the horizontal, the imposition of a vertical limit alone would not prevent extensive working. It is therefore necessary to recommend a double limit, namely, that the working may extend along the vein to a distance of 120 feet from the mouth of the mine, provided that the vertical depth does not exceed 80 feet. Ordinarily, by the time this limit is reached, a mine should be well established and systematised, if it has not already been established, should be insisted upon. In some cases, however, it may be necessary to encourage the prospector to go on beyond this limit. The head of the technical staff appointed to enforce systematisation may be given the power to allow this at his discretion, subject to a limit of another fifty feet along the vein. There is no need to apprehend that the limits which are being recommended by us will lead to unsystematic mining to great depths. It is only in very favourable circumstances that such work is likely to reach these limits. As was explained by one of the witnesses examined by us, a stage soon arrives at which unsystematic mining can proceed no further and the miner has to stop. Another witness, a mining engineer with experience of Bihar mica mines, put this stage at 100 feet or less of vertical depth. Hence, it is likely that before reaching the limits suggested by us, the miner will be compelled either to systematise or to give up the mine to a more efficient miner.

The next requisite for the purpose of conservation is that, when this limit is reached, the miner must be compelled to operate in a way that will get the maximum of output that can economically be extracted out of the mine. The object should be to penetrate to the lowest depth at which mica occurs in the mine, to extend the drives to the utmost horizontal limits of the vein, to explore by suitable crosscuts the possibility of deposits of mica in other zones of the vein, and, before abandoning the mine, to search for possible extensions of the vein, both vertically and horizontally. To do this successfully, the miner must work on a plan or system. Hence, we have spoken above of systematisation. The term is applicable to any methodical working and it would perhaps have been more correct to speak of "technically efficient mining". This nomenclature, however, would be somewhat clumsy, and, as the terms systematisation and systematic mining were understood without any difficulty in the sense in which we used them by all the witnesses to whom they were put, we

shall continue to use them. What is the best system to be followed in any particular case it is for the mining engineer to decide. Generally, it has been found that the system of driving and overhead stoping is most suitable, but local conditions differ, and what suits Bihar will not necessarily be best for Madras or Rajputana.

The question is how the technical assistance necessary for systematic development is to be provided. There are two possibilities. Either we may insist on the miner engaging qualified technicians, or we may provide technicians who will visit the mines and give the necessary advice. As we consider it desirable that systematisation should begin at the latest from a depth of 80 feet, and as we consider that small miners who are prepared to systematise should be encouraged to remain in the industry, we would recommend the second method. The problems of mica mining are generally fewer than in other types of mining. The dimensions of the vein are comparatively small. The rock is hard and progress is slow. The amount of debris is limited at the stage of development, and the raising continues to be small in quantity at the time of stoping, when only mica is removed. Danger from inflammable and poisonous gases is practically unknown. It is therefore possible for an intelligent man, who is prepared to give his time and thought to the work, to mine systematically with occasional guidance from a qualified engineer. We ourselves visited a mine developed on unexceptionable lines by two young men, educated up to the standard of the Matriculation, who had received a few instructions on the principles of mining. The staff we visualise will inspect the mines regularly, and give the miners necessary directions for systematic working. Compliance with such directions will be compulsory, and will be enforced by suspension or cancellation of the miner's licence, if necessary. It will be open to the miner to appeal against such directions. In the case of a frivolous appeal, the appellate authority may direct him to pay the cost of the appeal and a penalty not exceeding Rs. 50. If the staff does its duty with discretion, we do not think that there will be many appeals.

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The Committee would have liked the duties of this Inspectorate to have been done by the staff which is responsible for administering the Indian Mines Act, 1923. Unfortunately, the Mines Department is unwilling to undertake this work. Its point of view, as explained by Mr. N. G. Chatterji, Senior Inspector of Mines, is that it would be wrong for the Mines Department, which is concerned with enforcing the rules for safety, to make itself responsible for technical advice. In these circumstances, it will be necessary to constitute a special cadre for this purpose. It will consist of a Chief Inspector of Mica Mines, drawing Rs. 1,000 to Rs. 1,500 a month, with his headquarters in Bihar, and 6 Inspectors of Mines drawing from Rs. 600 to Rs. 800 a month, 4 of them stationed in Bihar and 2 in Madras. They should be holders of the diploma in mining of the Indian School of Mines or the B.Sc. (Mining) Degree of the Benares Hindu University or some other equivalent qualification, and should have at least two years actual experience of mica mining. Initially, this latter qualification may not be available but, as soon as it is practicable, it should be insisted upon. In addition to this, the Chief Inspector should have a First Class Colliery Manager's certificate or other equivalent qualification. For Ajmer-Merwara an Inspector will not be necessary; an inspector from Bihar or the Chief Inspector of Mica Mines can visit that area. A permanent Inspector for that area may be appointed if the States desire to utilise his services and agree to contribute to the cost. The Inspectors will be appointed by the Central Government, but in the different areas will work under the directions of the local Warden's Board. The appellate authority for each area will be a board of three, selected by the Mica Warden from a panel of technically qualified men chosen by the Warden's Board. We contemplate that these men will be persons working in the field, who will be entitled only to their out of pocket expenses for this work. At present, it may not be possible to find a sufficient number of such men, and if

may be necessary to include in the panel Government Officers stationed in or near the area.

Besides enforcing compulsory systematisation, the duty of the Inspectorate of Mica Mines will be to inspect mines which are still within the limits of unsystematic working, whether they have been reported under Section 14 of the Indian Mines Act, 1923, or not, and to give the miners help and advice. We would like here to make it clear that the limits we have suggested for systematisation are maxima limits only. There is no reason why, in a suitable case, systematisation should not be introduced at an earlier stage, and in such cases we would expect the Mica Inspectorate staff to advise and encourage the miners to systematise. They would also advise the miners about technical mistakes or breaches of the law, which might come to their notice. So far as these duties are concerned, their position will be advisory.

We also contemplate that the records of abandoned mines suggested above will be maintained by this Inspectorate. For this purpose, and for the performance of their Inspectorate duties, they will want complete information about the mica mines. We would, therefore, suggest that the reports of the opening of mines submitted under Section 14 of the Indian Mines Act should, in areas where there is an office of the Inspectorate, go to that office. The section requires the report to be sent to the District Magistrate but, in practice, this requirement has been often overlooked, and the report has gone only to the Chief Inspector of Mines. Hence, no inconvenience will be caused by our proposal that the report should go to the Inspectorate of Mica Mines instead of to the District Magistrate, and such information as the District Magistrate may require will be readily available to him at the office of the Inspectorate of Mica Mines.

With the increase in the size of the operations, a stage will ultimately arrive, when it will be necessary for the mine to have a technically qualified manager. Three different criteria have been suggested as to how that stage should be determined, the depth of the mine, the amount of capital investment in machinery, and the number of labourers employed. The depth of a mine has no necessary connection with the size of its operations. A vein with a long strike may employ more men and present greater problems at 50 feet than a pipe vein at 100 feet. As regards the second criterion, we would not like to place any discouragement on the investment of capital in procuring requisite machinery. We would base our recommendation on the third criterion, which is the course advised by the Chief Inspector of Mines and by the Director of the Geological Survey of India, and suggest that the employment of a technically qualified manager be made compulsory, in the case of an underground mine, when the number of labourers employed underground in a day of twenty-four hours is not less than 140, and, in the case of an open-cast mine, when the number of labourers employed in a day of twenty-four hours is not less than 200 men. The technical qualifications necessary for such managers will be discussed in a later chapter.

This brings us to the final stage of the mine. After prospecting and exploring, the miner develops the mine, that is to say he opens up the vein to its horizontal and vertical limits. In this work he removes only so much material as is necessary for making shafts, drives and crosscuts, and for ensuring proper ventilation. Along with this material he recovers a certain amount of mica, but usually the bulk of the mica remains in the pillars in the form of reserves. When he finds that the mine is fully developed, the miner proceeds to stope, that is to remove the mica content of the pillars, beginning from the bottom of the mine and working gradually to the top. Occasionally, it may happen that he stopes out the mine before reaching this stage, for instance when the period of his lease is about to expire, or because he has not the skill and experience to follow up the indications at the bottom of the mine. Stopping out at depth, before the full development of the mine, is much more harmful from the point

of view of conservation than mining, however unsystematic, confined to shallow depths. The cost of reclaiming such a mine is very much more than in the case of *uparchala* and, in view of the uncertainty of the return to be expected, a newcomer does not readily undertake the reclamation. To guard against loss of mica caused by premature stoping, we would suggest that it be made compulsory for an approach to be left to the deepest working point, provided that this shall not be required when the stoping is done with the previous approval of the Chief Inspector of Mica Mines.

It was suggested to us that a considerable amount of waste is caused by incomplete picking up of mica during stoping. At this stage the bottom of the mine is filled with debris from the stoping of the lower depths, and the mica detached from the pillars by the later working is apt to be concealed by this debris and overlooked; mica thus left behind in the mine is practically irrecoverable. The remedy suggested is the laying of sheets of metal, such as corrugated iron, over the accumulated material, so that after each explosion only the debris lying over the accumulated material, so that after each explosion only the debris lying above the metal sheets need be searched. This is a matter of technical detail, for which it is difficult to legislate. It may be left to the Inspectorate of Mica Mines to give the miners the necessary guidance on such points.

Another source of loss suggested is faulty processing and sorting. There are several factors which enter into this—for instance, the method of processing adopted, the skill of the processors and sorters, the power of superintendence and technical knowledge of the manager or owner of the factory and so on. The old Madras method of scissor-cutting into rectangles wastes much mica that is preserved by the Bihar system of irregular polygonal shapes, and has been largely abandoned. It arose from the Madras system of charging royalty on the weight of the dressed mica at the pit's mouth, which affects conservation in yet another way, as it necessitates a double processing of mica, once at the mine for royalty purposes and again at the factory to prepare the mica for the market. The former processing appeared to us to be very crudely done, and the dumps at the Madras mines were the biggest that we saw anywhere in the course of our tours in the mica producing areas. This is a matter to which we shall revert later. There is, also, the difference in procedure in the rifling of the crude mica and the initial cutting out of flaws, some doing it with a knife and some with a sickle. In the matter of sorting, we have seen mica put aside for splitting which was fit to produce condenser films, worth about double the price. We do not consider that these matters call for legislation. They are largely dependent on the personal factor, the alertness and technical knowledge of the person in charge of the factory and his capacity for selecting the right men and getting the best out of them. Any general changes in procedure may safely be left to be regulated by the trade itself.

Finally, reference has been made to loss by the employment of superior quality mica for uses for which inferior quality mica will do. In India, we are not in a position to do anything about this, as almost the whole of our mica is consumed abroad. We understand that some work along these lines has been done in the United Kingdom and in America during World War II, but we are not aware of the details. One such line of investigation, relating to the use of mica for condensers, is discussed in a later chapter.

We cannot leave this subject without mentioning a practice which has grown up in the Kodarma Reserved Forest in Bihar, where the mineral rights are owned by the Provincial Government, and are leased out at a flat rent of Rs. 6 per acre, and in the case of more recent leases at Rs. 12 per acre. This rent covers the royalty and other charges recoverable from the lessee. To ensure that the mining is done on proper lines, the previous mining experience of the intending lessee and his financial capacity are taken into consideration at the time of granting the lease. This object is completely defeated by some lessees who have found it profitable, instead of doing the mining themselves, to allow the whole or a portion of the area leased to be mined by persons who pay an agreed amount

to the lessee and carry on the work, for themselves, without any supervision by him. This is really a sublease, and is forbidden by the terms of the lease, but the practice is hard to check, as the work is done under cover of the lessee's licence and it is difficult to prove that it is being done by someone else. Our proposals above, though they will not prevent this malpractice, will avoid its worst effect, by ensuring that after a certain maximum depth mining is done on systematic lines.

CHAPTER V

THE INDIAN MINES ACT, 1923, AND THE RULES AND REGULATIONS THEREUNDER

Unlike the Bihar and Orissa Mica Act and the Mica Control Order, both relating to mica and confined in their application to the Bihar belt, the Indian Mines Act, 1923, operates throughout British India and deals with all mines. It is concerned chiefly with considerations of health and safety, and the regulation of the employment of labour in the mines. Its provisions, relating to the determination of the qualifications necessary for managers of mines and allied matters, have been utilised to enforce the employment of technically qualified persons in coal mines, but have been neglected so far as mica mines are concerned. In exercise of the powers relating to inspections and surveys of mines and the submission of notices and reports of mineral output and other matters, the Mines Department has been empowered to call for statistics and to collect information regarding existing and abandoned mines. But, there is nothing in the Act expressly directed at effecting conservation or introducing technical efficiency in the working of the mines.

The Act is administered by a staff of Inspectors under the Chief Inspector of Mines, who has his office at Dhanbad. The Mines Department, of which he is the Head, is concerned with mines of all kinds throughout British India, and the extent of the attention it is able to give to mica mining appears from the following table relating to mines of which reports have been submitted under section 14 of the Act:—

Number and Inspection of Mica Mines governed by the Indian Mines Act in Bihar, Madras and Rajputana

Year	BIHAR				MADRAS				RAJPUTANA			
	Total number of mines	Number of mines working throughout the year	Number of mines inspected	Number of Inspections	Total number of mines	Number of mines working throughout the year	Number of mines inspected	Number of Inspections	Total number of mines	Number of mines working throughout the year	Number of mines inspected	Number of Inspections
1	2	3	4	5	6	7	8	9	10	11	12	13
1930	407	202	64	65	81	41	41	44	20	2	11	14
1931	276	126	99	121	57	27	30	34	9	0	0	0
1932	279	94	10	12	32	20	11	11	4	0	0	0
1933	334	119	64	64	33	17	13	15	10	1	8	10
1934	444	150	112	120	46	17	26	27	5	2	2	2
1935	543	210	209	247	54	26	42	42	5	3	3	3
1936	581	237	71	81	86	32	51	52	32	4	12	12
1937	770	271	158	168	103	45	72	72	36	6	14	14
1938	689	315	88	93	119	64	72	72	31	7	0	0
1939	645	302	176	180	124	55	74	74	41	6	14	16
1940	619	232	148	153	118	39	42	44	45	7	0	0
1941	623	297	189	196	108	47	52	52	62	8	30	38

The totals in columns 2, 6 and 10 relate to all mines, working, opened and closed during the year. As it is not necessary for the Mines Department to inspect abandoned and discontinued mines unless questions of safety arise, the figures of mines open throughout the year are given in columns 3, 7 and 11 for comparison with the number of inspections. We have been assured that the Inspector of Mines visits every mine that is working at the time of his inspection, but it appears from the table that a large number of open mines in Bihar remains uninspected every year. The explanation suggested by the Mines Department for this disparity, namely that mines closing down for less than two months are not required to report the fact to the Chief Inspector of Mines and are therefore, included in the figures in columns 3, 6 and 10, supports the suggestion made to us in the course of our enquiry that several mines are closed down temporarily to avoid inspection. We understand that, in order to avoid this evasion, it is proposed in the near future to appoint under the Mines Department a permanent Inspector for the Bihar mica mines. This, however, will cover merely questions of safety and compliance with the Indian Mines Act and the Regulations and Rules thereunder. Our recommendations relate also to matters of technical efficiency and, as the Mines Department is unwilling to make itself responsible for this, it will be necessary to establish a special Inspectorate of Mica Mines.

The Indian Mines Act defines a mine as meaning any excavation where any operation for the purpose of searching for or obtaining minerals has been or is being carried on, and as including all works, machinery, tramways and sidings, whether above or below ground, in or adjacent to or belonging to a mine; provided that the term shall not include any part of such premises on which a manufacturing process is being carried on, unless such process is a process for coke-making or the dressing of minerals. According to this definition, a prospecting pit is a mine from the making of the first stroke with a pick. A mine dump, from which splitting quality mica is being recovered by dressing, would also appear to be a mine within this definition.

It is obviously impossible for the Indian Mines Department to maintain records relating to every superficial pit coming within this comprehensive definition. Hence, by a notification under section 46 of the Act, certain mines were exempted from the provisions of the Act. The relevant portion of the exempting notification No. M-1051, dated the 20th January 1938, reads as follows:—

“In exercise of the powers conferred by section 46 of the Indian Mines Act, 1923 (IV of 1923), and in supersession of the notification of the Government of India in the late Department of Industries and Labour No. M-1051, dated the 1st October 1935, the Central Government is pleased to exempt the mines, groups of mines, classes of mines, parts of mines, and classes of persons specified in the first column of the annexed Schedule from the operation of those provisions of the said Act, which are specified in the corresponding entry in the second column thereof, subject to the conditions, if any, specified in the corresponding entry in the third column thereof.”

Schedule

Mines and classes exempted 1	Provisions from which exemption is granted 2	Conditions attached to exemption 3
<p>3. Mines or parts of mines in which excavation is being carried out for prospecting purposes only and not for the purpose of obtaining minerals for use or sale : Provided that—</p> <p>(i) not more than 20 persons are employed in or about such excavation ;</p> <p>(ii) no part of the excavation extends beneath the superjacent ground ; and</p> <p>(iii) the depth of the excavation measured from its highest to its lowest point nowhere exceeds 20 feet or, in the case of an excavation for coal, 50 ft.</p>	All	

The evident intention is that pits not exceeding twenty feet in vertical depth will be exempt from the provisions of the Act, unless complications affecting safety are likely to arise owing to some part of the excavation extending beneath superjacent ground or a comparatively large number of labourers being employed, but, owing to the peculiar nature of mica, practically every prospecting pit, however shallow and whatever its nature, falls outside the exempting clause. This results from the fact that, in the prospecting of mica, there is nothing like a preliminary assay of the mineral. Mica is used in its natural state, and such mica as is recovered by means of prospecting operations is sold by the prospector or his employer. In fact, as we have indicated above, the profit to be obtained from the sale of such mica is often the inducement which is responsible for attracting the small prospector and the prospecting contractor. Further, clause (ii) of the proviso, if strictly applied, would bring a large number of mica prospecting pits outside the exemption before the limiting depth of twenty feet is reached. This is because, in prospecting for mica, the prospectors do not dig vertically down, but follow the indications of mica from book to book. The exemption being thus impracticable of enforcement in strict accordance with its terms, compliance with its requirements seems to have been left largely to the miners themselves, each of whom puts his own interpretation upon it. For instance, the practice of the miners varies considerably regarding the reporting of the mine under section 14 of the Act, which runs as follows:—

“The owner, agent or manager of a mine shall, in the case of an existing mine within one month from the commencement of this Act, or, in the case of a new mine, within three months after the commencement of mining operations, give to the District Magistrate of the district in which the mine is situated notice in writing in such form and containing such particulars relating to the mine as may be prescribed.”

An enquiry from leading miners has elicited that one reports as soon as the pit reaches a depth of twenty feet, another reports within three months of the commencement of mining operations, whatever the depth of the excavation, a third does so within one month, a fourth reports when the prospect appears promising and likely to turn into a mine as distinct from a prospecting pit, three others submit a double report, the first a general report of prospecting in a particular area and the second a report of a named mine, as soon as a prospecting pit seems likely to develop into a mine as distinct from a prospecting pit, and so on.

There is, further, a misapprehension regarding the above notification, namely, that the exemption relates only to the reporting of the mine under section 14 of the Act and that, until the mine is so reported, it is exempt from the provisions of the Act. The fact is that the notice under section 14 has nothing whatever to do with bringing the mine within the operation of the Act; it merely ensures that the authorities concerned get certain information about the mine. The exemption is derived from the notification itself, and extends to all mines covered by the description in column (1) of the schedule. A mine not so covered comes within the operation of all the provisions of the Act, whether it has been reported or not.

We have suggested above that mica pits should be reported to the Inspectorate of Mica Mines. Under the notification just set out, there are four factors upon which the exemption from the necessity for making a report rests. The first factor, namely, that the excavation should be for prospecting alone and not for obtaining minerals for use or sale, is impracticable in the case of mica. The second, that not more than twenty persons should be employed, is practically covered by the fourth factor, for there are very few if any pits, not exceeding twenty feet in vertical depth, which employ as many as twenty persons. The third factor, namely that no part of the excavation extends beneath superjacent ground, is concerned merely with safety. As we shall propose below that the safety provisions of the Act should apply to all pits, whether reported or not, this requirement is unnecessary. The fourth factor, that the

depth of the excavation should not exceed twenty feet, is one about which there can be no misapprehension. We would, therefore, propose that it should be made the sole criterion of the necessity for reporting a mica mine under section 14. This would furnish the Inspectorate of Mica Mines with particulars of all mines exceeding twenty feet in vertical depth. As we contemplate that the Inspectorate will maintain detailed records of mines exceeding forty feet in vertical depth, a further report to the Inspectorate will be necessary when the mine reaches that depth.

The Indian Mines Department will continue to have its responsibilities with respect to these pits and mines under the Indian Mines Act, and the necessary particulars about them will be readily available to the Department from the records of the Inspectorate of Mica Mines. It will be for the Department to decide whether it requires a copy of the report, submitted when the excavation reaches the depth of twenty feet. If it does, provision similar to that contained in Metalliferous Mines Regulation No. 4 can be made for sending a copy of the report to the Indian Mines Department. There is, however, another possibility which we would suggest for consideration. In reply to an enquiry as to the necessity for reporting prospecting pits to the Indian Mines Department, the Chief Inspector of Mines wrote:

"From the point of view of safety in working mines I do not think it is necessary to send notices of opening of prospecting pits to the Department of Mines, but I consider it would be advisable for information to be sent to a Government official who could check up on the prospecting and determine the stage when such excavations became mines."*

In the life of a mine there are four stages recognised, namely, prospecting, exploring, developing and stoping. In the first two stages the mine is still in the prospecting stage. When the occurrence of mica in economically workable quantities and qualities is established, the stage of development begins and, in popular parlance, the prospecting pit is said to have become a mine. It appears to us that it would be sufficient if only pits which have become mines in this sense are reported to the Indian Mines Department. This report will go through the Inspectorate of Mica Mines, where an office of that Inspectorate exists. The decision of the senior Inspector of Mica Mines within the area may be made final as to whether the pit has become a mine in this sense or not. In order to avoid pits with a comparatively big output from remaining unreported to the Indian Mines Department, it may further be provided that a pit, the output of which has reached 100 maunds of crude mica in one month, shall be regarded as a mine in this sense. Our proposal will provide the Indian Mines Department with particulars of mica mines as distinct from prospecting pits but, as explained below, it will not lessen the extent of their authority and responsibility in respect of prospecting pits.

The exemption granted by the notification under section 46 is from all the provisions of the Act, including the safety provisions. We learn from the annual reports of the Chief Inspector of Mines that fatal and serious accidents frequently occur in pits which are only a few feet deep. Hence, it appears to us that the exemption granted is too wide, and we have examined the provisions of the Act and the rules and regulations thereunder, to see how far they are unsuitable for prospecting pits.

Sections 1 to 3 of the Act are general in nature and there is no reason for exemption from their provisions. Sections 4 to 8 deal with the Chief Inspector and the Inspectors of Mines, their functions and their powers. Here, again, there seems to be no reason for exempting any pit, however small and insignificant. For instance, under clause (c) of section 6 the Chief Inspector and the inspectors are empowered, among other things, to examine and enquire into the state and condition of a mine or any part thereof, and all matters and things connected with or relating to the safety of the persons employed in the mine. If danger to persons employed in a mine can arise even at shallow depths, it

should be open to the inspecting staff in exercise of legal powers to enter and inspect all mines. Section 7 also illustrates this point. It empowers a person authorised by the Chief Inspector or an Inspector to enter a mine and survey, level or measure it, at any reasonable time by day or night. One of the criteria, deciding under the present notification whether a mine is exempt from the Act, is a vertical depth of twenty feet. Measurement is necessary in order to decide whether the depth exceeds twenty feet or not, and yet the officer making the measurement will be acting without legal authority if the depth happens to be less than twenty feet. Section 9 imposes secrecy in respect of information obtained under the Act. No question of exemption arises. Sections 10 to 13 deal with Mining Boards and Committees, and are of a general nature. Section 14 requiring notice to be given of mining operations has already been discussed. Sections 15 and 16 deal with managers of mines and define the duties and responsibilities of owners, agents and managers. As section 15 provides that the owner or agent of a mine may appoint himself as manager and the qualifications required of a manager are within the power of a prescribing authority, there is no reason why small mines should be exempt from these provisions. Section 17 requires the provision and maintenance at every mine of latrine and urinal accommodation in accordance with such requirements as may be prescribed. Section 18 makes a similar provision regarding medical appliances, in respect of mines notified by the Central Government. There is no reason for exemption from these two sections, for we may trust the prescribing authority to avoid exercising these powers in a manner which will be burdensome to, or impossible of performance by, small mines. Section 19 deals with the powers of Inspectors in cases where causes of danger not expressly provided for exist, and should certainly apply to all mines. Section 20 provides for notice to be given to the authorities about accidents, causing loss of life or serious bodily injury or of certain other specified kinds. As we find in the annual reports of the Chief Inspector of Mines references to such accidents, which have occurred in pits only a few feet deep, it seems necessary that this section should apply to all mica mines. Sections 21 and 22 contain general provisions relating to accidents and the publications of reports under sections 11 and 21 of the Act. Sections 22A to 23 deal with hours and limitation of employment. They provide for a weekly holiday, a maximum working week of 54 hours either above ground or below ground, and certain other details. They are of universal application. Section 23B requires the manager of a mine to post a notice outside the office of the mine giving details of the hours of work. In our opinion, this is unnecessary for small mines, and may be confined in its application to mines employing not less than twenty labourers in a day of twentyfour hours. Sections 24 and 25 are merely exempting sections, providing that certain provisions shall not apply to certain persons or in certain circumstances. No question of exemption from the provisions of these sections can arise. Section 26 provides that no child shall be employed in a mine, or be allowed to be present in any part of a mine which is below ground. This should apply to all mines irrespective of size. Section 26A provides that young persons *i.e.*, persons who have not completed their 17th year, shall not be allowed below ground without a certificate of fitness. This, too, should apply to all mines. Section 27 contains a general provision relating to disputes regarding the age of a child or young person, and should apply to all mines. Section 28 requires the maintenance of a register of persons employed in the mine. This is not necessary in the case of small mines, and should apply only to mines employing not less than twenty labourers in a day of twentyfour hours. Sections 29 to 32 are general sections dealing with the making of regulations, rules and bye-laws, and should apply to all mines. Section 33 requires abstracts of the Act and of the rules and regulations thereunder to be posted up at or near every mine. It seems unnecessary to insist on this in the case of petty prospecting pits, and mines employing not more than twenty labourers in a day of twentyfour hours may be exempted from the provisions of this section. Sections 34 to 44 deal with penalties and procedure, and no question of exemption arises. Section 45 empowers the Central Government to decide whether

any excavation or working is a mine within the meaning of this Act. Under Section 46 the Central Government can exempt, either absolutely or subject to any specified conditions, any local area or any mine or class of mines or any part of a mine or any class of persons from the operations of all or any specified provisions of the Act. Under section 47 the Central Government may reverse or modify any order passed under the Act. Section 48 applies the Act to mines belonging to the Crown and section 49 protects, against legal proceedings, acts in good faith done, or intended to be done, under the provisions of the Act. No question of exemption from any of these provisions of the Act, arises.

To sum up, the only sections in respect of which exemption appears to us to be called for are sections 14, 23B, 28 and 33. Exemption in respect of the last three sections should, in our opinion, be given to mica mines employing not more than twenty labourers in a day of twentyfour hours. As regards section 14, we have explained our views in detail above.

Only a few of the Metalliferous Mines Regulations call for express mention.

Regulation 3 provides that, on or before the twentyfirst day of January in each year, the owner, agent or manager of every mine shall forward to the District Magistrate and to the Chief Inspector annual returns in respect of the preceding year and, if any mine is abandoned or the working of any mine has been discontinued over a period exceeding three months, or if a change occurs in the ownership of any mine, returns in the annual return forms must be submitted, within one month from the date of abandonment or change of ownership, or within four months from the date of discontinuance. Under this regulation, the Chief Inspector of Mines gets returns, relative to each mine reported under section 14, of (1) the total amount of dressed mica raised, (2) the total amount of dressed mica consigned and (3) the total value of the mica consigned, calculated upon the actual or estimated selling price at the mine. As the accounts at the mine show only the amount of crude mica raised and despatched, and as not all miners dress their own mica, and not all those who dress their mica keep the mica of one mine separate from the mica of other mines, the figures supplied in these returns are generally imaginary figures, estimated from the figures of crude mica raised and despatched. We recommend below returns from proprietors, licensees and prospector's permit holders in respect, not of individual mines and factories but, of their workings as a whole, and hope that the figures so obtained will be more accurate than the estimated figures contained in the returns to the Chief Inspector of Mines. Nevertheless, the returns to the Chief Inspector of Mines provide a valuable historical record of each mine, and may usefully be continued. We would, however, confine these returns to the bigger mines, that is to say to the mines which have reached the stage of development as above defined. In the forms suggested by us, we have provided separate columns for reported mines, unreported mines and mines dumps. The Chief Inspector of Mines' returns will relate to the reported mines alone. Under the definition of a mine, given in the Act, this will include also mines dumps from which splitting block is being recovered. This is not realised by all miners, and special provision should be made in the form of the return for figures relating to production from mines dumps. In the returns, now being submitted to the Chief Inspector of Mines, some miners also show the output from prospecting. This relates to prospecting which is grouped under particular reported mines. These returns do not necessarily cover all the prospecting work of the particular miner, and do not include the prospecting done by small miners who have not reported under section 14. It seems to us that no useful purpose is likely to be served by asking the miners, submitting the returns, to show figures of the outturn from prospecting. Further, we would suggest that in areas where there is an office of the Inspectorate of Mica Mines, one copy of the returns should go to that office instead of to the District Magistrate as at present provided.

Regulations 4 to 8, and 18 relate to the report under section 14 of the Indian Mines Act, and to subsequent reports relating to the abandonment or re-opening

of the mine, or to change of the ownership thereof, or to certain other matters relating to the working of the mine. Some of these reports are required to go to the Chief Inspector of Mines through the District Magistrate, and some to go direct. Where there is an office of the Inspectorate of Mica Mines, it is necessary that that office shall have complete information relating to the mines. We would, therefore, propose that all such reports in such area should be required to go to the Chief Inspector of Mines through the local office of the Inspectorate of Mica Mines.

Regulation 21 relates to the appointment of a competent person to be the manager of a mine, and provides that, where several mines are near each other, one person may be appointed the manager of such mines. The Chief Inspector of Mines is the final authority for deciding the competence of a person to perform the duties of manager. He is, also, the final authority for deciding whether one person can properly perform the duties of manager in respect of several mines. Further, certain other powers are given to him in respect of managers appointed under these provisions. As the Inspectorate of Mica Mines will be in close touch with the working of the mines, it would be convenient if these powers are given to the Chief Inspector of Mica Mines.

Some of the regulations seem to us to be too elaborate for the purpose of small mines. To take an example, regulation 43 provides that a competent person or persons, appointed for the purpose by the manager or underground manager, shall inspect at least once in every shift every part of the mine in and through which any person has to work or pass, for the purpose of ascertaining the condition thereof as far as ventilation, roof, sides and general safety are concerned, and, if more than twenty persons are employed in the mine simultaneously, shall without delay write or cause to be written a full and accurate report of the result of such inspection in a book to be kept at the mine for the purpose, and shall sign and date the report. Further, a competent person appointed by the manager for the purpose shall once at least in every week examine the state of the shafts by which persons descend or ascend and, if more than twenty persons are employed in the mine simultaneously, shall without delay write or cause to be written a full and accurate report of the result of the examination. Every such report shall be recorded in a paged book to be kept at the mine for the purpose, and shall be signed and dated by the person who made the examination. Similarly, regulation 44 provides that every place where work is carried on, or where men are stationed or pass, shall be placed under the charge of a competent person appointed by the manager or underground manager. Perhaps, it would be better if the small miner was not expected to understand and apply complicated regulations. Being unable to understand them, he tends to fight shy of them, and thus defeats their object altogether. We suggest that it might be useful to examine the regulations as a whole, and to modify the more complicated regulations so as to make them applicable only after a mine has reached a suitable stage of development. The matter is a technical one in which we do not feel competent to give more definite advice.

Under section 30 of the Indian Mines Act, as modified by the Government of India (Adaptation of Indian Laws) Order, 1937, rules may be made by the Central Government for prescribing the scale of latrine and urinal accommodation, the provision of drinking water and for several other matters. Under the law, as it stood formerly, these powers were vested in the Local Governments, who have made the rules now in force in the different areas. These rules deal, generally speaking, with sanitary and health provisions relating to latrines and urinals, the laying down of certain scales for ambulance and first-aid provision, the registration of labourers, and certain safety requirements. The register of labourers prescribed should not be required to be kept at mines employing not more than twenty labourers in a day of twenty-four hours. The other provisions are of a general nature and dependent on directions given by the Provincial

Government or the Chief Inspector of Mines, Provided that these powers are not used so as to impose burdensome duties upon small miners, there is no objection to these rules.

Finally, we would suggest that, after the establishment of Mica Wardens in the different areas, the rules and regulations may usefully be revised in consultation with them, the Inspectorate of Mica Mines and the Indian Mines Department, with a view to simplify them for the purposes of the mica mines, and to avoid duplication of work between the Inspectorate of Mica Mines and the Indian Mines Department.

CHAPTER VI

MINERAL RIGHTS AND MINING LEASES, PROPRIETOR'S CERTIFICATES, MINER'S LICENSES AND PROSPECTOR'S PERMITS

From the point of view of the right to minerals, there are three classes of land. In the first group the right is vested in the Government, in the second Government has a share in the mineral rights, and in the third Government does not exercise any rights at all.

Land of the first group is to be found to an extensive degree in all the three areas, the title being vested in the Provincial Government. In no case does the Provincial Government attempt to carry on mining operations itself. Such operations are entrusted to lessees, and there are elaborate rules relating to the grant of mining leases. The Mining Concessions (Central) Rules, 1939, in force in Ajmer-Merwara, have been framed by the Government of India in the Department of Labour. The rules in force in Bihar and Madras have been prescribed by the Provincial Governments but, being derived from models originally received from the Government of India, they are on lines similar to the Mining Concessions (Central) Rules, 1939. The rules lay down that mining leases shall be given only to approved persons, holding a Certificate of Approval under the rules. In granting these Certificates the financial capacity, the previous experience in mining, and the reputation and character of the applicant are taken into account. The person so approved may take either a prospecting licence or a mining lease. The former, granted for a period of one year on the payment of a small fee, entitles the licensee to the sole right to search for, win and carry away the specified mineral, subject to the payment of royalty. The licence may be renewed for one or more periods of a year each, subject to a total period of three years, and the licensee on or before the termination of his licence has a right to a mining lease in accordance with the terms contained in the Government rules for mining leases.

The principal terms of a mining lease are the area, the period, and the payments required to be made by the lessee in consideration of the lease. The rules provide that the total area held by the lessee under the lease in question and other mining leases shall not exceed ten square miles. This does not prevent the lessee acquiring concessions of mineral rights exceeding this maximum in lands in which Government has no interest. As regards the period of a lease, the rules provide for a maximum period of thirty years, and for renewal for another period not exceeding thirty years. In practice, leases have been granted for very much shorter periods. For instance, when we visited Ajmer-Merwara we found leases being granted for a period of three years with an option of renewal for another three years, and in Madras for some time an attempt was made to restrict mica mining leases to a maximum period of five years, but subsequently the Provincial Government decided to permit such leases to be given for a maximum period of twenty years. The provisions as to payments due from the lessee vary in the three areas. In Madras and Ajmer-Merwara, a surface rent of 8 annas to Re. 1-4-0 per acre, and a royalty of 5 per cent. on the pit's mouth value of the mineral raised, subject to a dead rent of about one rupee per acre, are imposed. In Bihar, in the Kodarma Reserved Forest, a flat rent of Rs. 6 per acre, recently raised to Rs. 12 per acre, has taken the place of royalty, dead rent and surface rent. Regarding the methods of mining to be followed, the leases provide in general terms that the lessee must carry on the work "in a skilful and workmanlike manner and upon the most approved principles".

Lands of the second group occur in Madras and Ajmer-Merwara. In Madras, very little control is exercised in respect of these lands, beyond insisting upon Government's right to a share in the income of the land and the necessity for Government permission before any mining operations are undertaken on the

land. The registered holder may carry on the operations himself, or may allow a lessee to do so. In the former case he alone, and in the latter he and the lessee, execute an agreement binding themselves to pay to the Provincial Government royalty or dead rent, as the case may be, in addition to the land assessment payable for the time being in respect of the land. The period of agreement is generally for twenty years, and provides for "proper and workmanlike" mining. The royalty is generally charged at a percentage on the pit's mouth value of the mineral, subject to a dead rent of eight annas to one rupee per acre, and bears no relation to the payments due from the lessee to the registered holder in respect of the lease. For instance, in one case we found Government getting about Rs. 600 per annum as royalty, whereas the registered holder was getting from the lessee Rs. 1,600 in addition to $12\frac{1}{2}$ per cent. of the net profits. In Ajmer-Merwara, the Government derives its title to a share from condition (iv) of the *Istamrari* Sanad, which requires the *Istamrardar* on the discovery of any mines in his estate to inform the Government and, in addition to the assessment fixed by the Sanad, to pay to the Government such royalty not exceeding half of the net profits as the Government may be pleased to demand. In exercise of this interest, the Government insists on the lease, if any, being given only to persons holding a Certificate of Approval, and takes a fixed proportion, usually $6\frac{1}{2}$ per cent., of the *Istamrardar's* net profit from the lease. The terms of the lease between the *Istamrardar* and his lessee are left to them entirely.

Lands of the third group occur in Madras and Bihar. In neither Province is any control exercised by the Provincial Government, as such, in respect of these lands. It is open to the owner of the mineral rights to mine the land in any manner he pleases, or to lease it out for this purpose on such terms as he thinks fit. Under the Bihar and Orissa Mica Act, a proprietor wishing to mine in his land was entitled as a matter of course to a proprietor's certificate. Similarly, a lessee of mining rights was entitled to a miner's licence on payment of the necessary fee but, in his case, the Local Government was empowered to cancel the licence, if the licensee was convicted of an offence under Chapter XVII of the Indian Penal Code committed in respect of mica, or was guilty of repeated failure to comply with any of the provisions of the Act. The position has been considerably modified by the Mica Control Order, under which the proprietor may still get a proprietor's certificate without payment of any fee, but only at the discretion of the Provincial Government, which is also empowered to cancel the certificate after giving the registered proprietor a reasonable opportunity to show cause against cancellation. Similarly, the grant of a miner's licence to a lessee of mining rights has been made discretionary, with the Controller and the licence is liable to cancellation by the Provincial Government after giving the licensee a reasonable opportunity to show cause against cancellation. There is nothing in the Mica Control Order to indicate the principles on which the discretionary power thus placed in the hands of the Controller and the Provincial Government is intended to be exercised. From the known objects of the Order, however, we may infer that the prominent consideration would be the prevention of illicit dealings in, or in respect of, mica.

For the future, our object must be primarily the enforcement of proper methods of mining and the conservation of mica, and to achieve it there must be control over the miner, whether he is the owner of the mineral rights or merely the lessee thereof, and whether the Government has or has not any title to the mineral rights in the land. Further, some control should be exercised, as between the owner of the mineral rights and his lessee, to ensure that the terms granted to the latter will be consistent with mining in accordance with approved methods.

To begin with the owner of the mining rights, we consider that, if he wishes to recover for himself the minerals to which he is entitled, he should do so under a licence, just as much as a lessee has hitherto done it in Bihar. We find,

however, that in Bihar the proprietor is very sensitive about his position, and is anxious to have a distinction made between him and a mere lessee. It is probable that the same feeling will be found in the other two areas. The proprietor may therefore be given a proprietor's certificate, as is now the practice in Bihar, but the grant of the certificate should be subject to the discretion of the granting authority, for there may be reasons why the certificate should be refused. For example, the land in question may be known not to be mica-bearing land, and there may be reason to suspect that the applicant wants the certificate for some improper purpose. In order to protect the applicant against unfair discrimination, it may be provided that the authority dealing with the application must give reasons for refusing a certificate, and that the refusal shall be subject to an appeal. Further, it appears to us that there is no reason why a proprietor should be entitled to get a certificate free of any payment, whereas a lessee has to pay a substantial fee before he can get a miner's licence. The proprietor's certificate and the miner's licence are both merely a permission given to the grantee to undertake mining operations. So far as the grant of this permission is concerned, the proprietor and the lessee, who derives his title to the minerals from a proprietor, stand in exactly the same position. Thirdly, as regards the liability to cancellation and suspension of his certificate, there is no reason why the proprietor should be in a different position from the lessee of mining rights. The obligation to mine in accordance with the directions of the Inspectorate of Mica Mines applies to both of them to the same extent, and both should be liable to be stopped if they refuse to work in accordance with these directions. So, also, they should equally be liable to be stopped from operating, if they are found guilty of offences raising an implication of moral turpitude and connected with mica.

Our remarks above relating to proprietor's certificates indicate our opinion with respect to miner's licences. These should be granted at the discretion of the granting authority, with the proviso that a refusal should be only for reasons to be stated, and subject to an appeal. They should be liable to suspension or cancellation. Cancellation should be subject to appeal. Suspension should not be for a period exceeding one year, and this form of discipline should be confined to specified grounds and made non-appealable. Among suitable grounds, we may suggest disobedience of the directions of the Inspectorate of Mica Mines, and conviction of an offence connected with mica and raising an implication of moral turpitude. A conviction which is not subject to an appeal should not be regarded as a conviction for this purpose.

We come now to a consideration of the minimum terms which we think necessary in a mining lease in the interest of proper mining. Firstly, the lease must be granted for a period sufficiently long for the proper development of the property leased. If the lessee's tenure is short or is uncertain in its duration, he will be tempted to take what he can get from the land in the quickest way open to him, regardless of what the effect may be on the future of the deposit. On a consideration of all the possibilities, it seems to us that this period should be at least fifteen years. This may comprise the whole period for which the lease is originally granted, or be the total of this period and the period for which the lease may be renewed, provided that the original period of the lease is at least seven and a half years. To make our meaning clear, the lease may be for seven and a half years with a provision for renewal for another seven and a half years, or for ten years with a provision for renewal for another five years, or for a period of fifteen years without any provision for renewal. Here, we would like to make it clear that we recommend this merely as a minimum. The rules relating to Government lands make provision for leases for thirty years with an option of renewal for another thirty years, and the standard form of lease in Madras provides for a third period of thirty years. We do not wish to be understood to be of the opinion that such periods are unnecessarily long. Each case has to be dealt with on its own facts.

and periods of this length are necessary for the proper exploitation of big areas. The big miner, however, who takes such a lease, is generally capable of understanding and looking after his own interests, and we are concerned to protect the small man, and to ensure that he gets a lease for a long enough period to be able to work on proper lines.

Secondly, the right to renewal must be a real right. In this connection, we may refer to the renewal clauses in the standard forms of mining lease in the rules for mining concessions relating to Government land in the three areas. They provide that, if the lessee desires to take a renewed lease and complies with certain specified conditions, the lessor "will" execute and deliver a renewed lease to the lessee. The use of the word "will" instead of the word "shall" has raised some doubt as to the absolute right of the lessee to a renewal, and the opinion has been expressed before us, by an officer concerned with the administration of the rules, that the word "will" gives a discretion to the lessor in the granting of a renewed lease. We are not aware that the use of this word has so far caused any difficulty in the renewal of a lease, and we feel doubtful whether the Government concerned will agree with this interpretation. We mention the point, however, to emphasise the necessity for making the renewal clause as clear as possible, in order to safeguard the rights of the lessee.

Further, the reality of the right is affected if the terms upon which the renewed lease will be given are not defined at the time when the lease is originally granted. As an example of a lease in which the terms are not so defined, we may mention that the standard form of mica mining lease prescribed for Government land in Bihar provides that, if the lessee asks for renewal and complies with the specified conditions, a renewed lease may be granted to him "at such rents as may then be fixed by the Local Government or, if it is then decided to charge royalty instead of rent, at such rents and royalties as may then be prescribed respectively by the Local Government or by the Governor-General-in-Council, as the case may be". Under this clause the lessee, at the time of taking the lease, can have no idea what rents or royalties will be fixed for the period of the renewed lease. He is in fact at the mercy of his lessor, and the rents or royalties fixed may be such that the right of renewal can not be exercised by him.

A similar provision occurs in the Madras form, which provides that, on compliance with the specified conditions, the lessee may be given a renewed lease "at such rents not exceeding twice the rents hereby reserved and at such royalties as may on the day next following the expiration of the said term hereby granted be in force under the orders of the competent authority, and on such terms and under and subject to such covenants and agreements as may then be decided upon by the Governor and intimated to the lessee in writing, but in any event including this present covenant but varied so that no third renewal is claimable and so that during a second renewal the royalties payable shall be such as may on the day next following the expiration of the said term hereby granted be in force under the orders of the competent authority, and the rents payable thereunder shall be such as may be fixed by the Local Government but such rents shall not exceed twice the rents reserved under the first renewal lease". This should be read along with Clause 2A of part V of the Schedule to the lease form which provides:

"The Governor shall have the right to vary the rate of royalty during the currency of the lessee (lease) provided the lessee is given six calendar months' notice of the intention of the Governor to vary the rate of royalty on the expiry of such notice".*

The renewal clause thus places a limit on the rents that may be fixed for the period of the renewed lease, but leaves the royalty and other terms and covenants and agreements to the discretion of the Governor.

It is not possible to speak of a right of renewal, unless the person to whom that right is given knows the maximum terms, which can be imposed on him for the fresh period. We do not contemplate that, at the time of granting a lease, the lessor will tell the lessee the exact terms on which the renewal will be granted. It is possible, however, for the lessor and the lessee to come to some agreement as to the limits within which these terms will fall. As an illustration we may cite the renewal clause in the form prescribed by the Mining Concessions (Central) Rules, 1939, which provides for a renewed lease "at such rents not exceeding twice the rents hereby reserved and at such royalties as may on the day next following the expiration of the said term hereby granted be in force under the orders of the competent authority but otherwise upon the like terms and under and subject to the like covenants and agreements as contained, in these presents (other than this present covenant)". The clause relating to royalty provides for royalty at the rate of 5 *per cent.* of the sale value at the pit's mouth of the mica, produced from the land and sold or carried away by the lessee, subject to a certain dead rent. At the time of taking a lease in this form, therefore, the lessee knows exactly the terms on which he can get a renewed lease, and the limits within which his rent and royalty will lie.

That the terms and conditions on which the lease is granted should be definite for the original period of the grant would appear obvious; but, that this is not always the case is indicated by the above cited clause in the standard form of mica mining lease approved for use in the Madras Government area, empowering the Governor to vary the rate of royalty during the currency of the lease. An attempt to relieve the harshness of this provision is made by clause 3 of Part VI of the Schedule which reads:

"Provided that in case the lessee shall have paid such royalty at such rate and so calculated as aforesaid and shall produce to the said Collector within two years from the date of the export from the said mines of the mica in respect of which such royalty was payable a certificate by the shipper of such mica in a form prescribed by the Local Government together with a certificate or certificates from the broker or brokers to whom the mica was consigned showing the actual receipts from sales of such mica of each dimension as mentioned in the said appendix hereto, then and in that case, the lessee shall be entitled to receive from the lessor such amount (if any) as the lessee shall have paid in excess of the royalty payable on the mica sold at the price or prices mentioned in such receipts. Provided also that the consignments of mica do not break bulk prior to shipment and are kept before shipment in such place and subject to such restrictions as may from time to time be prescribed by the Board of Revenue".*

The relief, however, is merely apparent. The procedure for claiming a refund is very cumbrous, and requires that consignments of mica do not break bulk prior to shipment. This is entirely contrary to the accepted practice, according to which the mica consigned from the mine is subjected to further processing before export. The second processing is due to different standards being followed for charging royalty and for the purposes of export. Even if a common standard was adopted, however, export without breaking bulk would only be possible if all the processes necessary for preparing mica for the foreign market could be completed at the mine, a task which can be properly performed at factories situated at a central place where expert supervision and trained labour are available, and not at mines big and small scattered over large and sparsely populated areas. We are not aware that the power given to the Government by this clause has been abused, but we have thought it of importance to discuss this provision at length, because the standard forms prescribed by the Government for its own use often form the model upon which mining leases for privately owned areas are drawn up, and such a provision in a private lease may

be used by an unscrupulous lessor to bring unfair pressure to bear upon the lessee, after the latter is committed to the mining operation and no longer in a position to withdraw.

In the Kodarma Reserve Forest the mica-bearing land has been divided into blocks of forty acres, and no lease can be granted for less than one such block. This system suits an area where the pegmatites are distributed more or less compactly over a large block of country, the mineral rights in which are vested in one body. It will not be suitable where these conditions do not exist. On the other hand, a pegmatite with a rich content of mica may furnish a big mine even within a superficial area of a fraction of an acre. There has therefore been no insistent suggestion made to us for prescribing a minimum limit of area for a mining lease. On the contrary, we have been pressed to recommend a maximum limit, principally for the purpose of preventing large areas of mica bearing land from getting into the hands of big operators. Such big operators are best able, by employing technically qualified men and by utilising the latest machinery and approved methods of mining, to serve the interests of conservation, and the magnitude of their operations and the size of their capital investment in the business require a reserve of mica bearing property upon which they can draw, when the deposits under immediate exploitation begin to fail. So long, therefore, as there is no sign of any danger of a monopoly being created by the concentration of large areas of mica-bearing land in the hands of a few such miners, we see no reason for discouraging them by imposing a limit as suggested; and, at present, we do not see any such sign. It has been argued before us that these big miners act contrary to the interests of the country by following a dog-in-the-manger policy, and keeping large areas of land rich in mica unworked and useless. We fail to see any necessity for every square inch of mica-bearing land to be worked immediately. The property that is at present under exploitation is sufficient to meet current demands, and the areas now unworked form a useful reserve to be drawn upon when the demand increases, as well as when the supply from the other areas grows smaller. The country does not suffer in any way from these areas being kept in reserve. Nor do the owners of the mineral rights in these lands suffer anything, because the provisions relating to dead rent, in the mining leases granted by them, ensure an annual return in respect of these lands even when the lands are not being exploited, and the mineral remains in the land, ready to bring in a substantial royalty as soon as operations commence upon that land. Further, there are cases of mica mining leases granted in relation to enormous areas of land which are not entirely mica-bearing land; for instance, leases covering the entire area of an Istamarari or proprietary estate. Leases of this sort are also to be found in the States visited by us in Rajputana. The application of a maximum limit of area to such leases would be meaningless.

Another provision which we consider desirable in mining leases is one enabling the lessee to terminate the lease with notice. As the occurrence of mica is very uncertain and the vein is liable at any time to pinch out suddenly, the lessee is likely to be penalised very severely unless he has a chance of withdrawing from the lease in such a contingency. Provision for such a withdrawal is contained in the rules relating to mining concessions in Government land, and enables the lessee to withdraw after giving twelve months' notice. We consider this period unnecessarily long, specially in the case of smaller leases. A period of six months' notice is, in our opinion, sufficient.

Finally, we would like the lessee to be given the right to work also other minerals found in the pegmatite, on payment of an agreed royalty. Besides quartz and felspar, which form the principal components, several rare minerals such as beryl, gem garnet, gem tourmaline, tantalite etc., are occasionally found in the pegmatites. At present, these minerals are left on the dumps or in the mine, from where they are practically irrecoverable after the mine is

abandoned. Certain varieties of felspar are used in the glass trade and in the pottery, enamel and sanitary-ware industries; felspar is also used as an abrasive. It is possible that felspar from the mica mines can be similarly utilised. Similarly, uses may be found for the quartz as in the manufacture of silicon carbide and high quality glass. We visualise that the possibility of using felspar and quartz and the other minerals in these and other ways will be investigated, and that in order to encourage the exploitation of assets, which are now entirely wasted, only a nominal royalty will be charged on these minerals until such uses are established.

Of the above desiderata the most important is the first mentioned, that is to say a reasonable period of time during which the lessee will be entitled to hold the property. To enforce this, we would suggest that a miner's licence should be refused in respect of a mining lease if either the period of the lease is less than seven and a half years, or the total of this period and the period, for which the lessee is entitled as of right to renewal, is less than fifteen years. This provision should apply to all mica mining leases executed after a date to be fixed by the law making the provision. The authority empowered to grant licences will scrutinise the leases, in order to determine *prima facie* whether the applicant is entitled to hold the property for the minimum period. This is not intended to enable the authority to go behind the document and to raise objections of a technical nature, or to decide questions of disputed title or possession. It is not necessary to make special legislative provision for the power to surrender the lease with due notice. The insistence on a reasonable period for the lease will itself effect this object, because the lessee will be unwilling to bind himself for a long period without reserving to himself an opportunity of withdrawing whenever necessary. It is difficult to make legislative provision for the other desiderata. In the long run such matters must be left to private contract, and it will be for the trade itself or the Central Mica Committee, by necessary publicity and propaganda to educate public opinion in the matter.

The above proposals cover the case of mining and prospecting by the owner or by the lessee of mineral rights. They do not cover operations by a person who has acquired from the owner of mineral rights permission for a short period to prospect in the land, in order to decide whether he will take a mining lease, for example, the holder of a prospector's licence under the rules for mineral concessions in Government land. The rule about security of tenure for at least fifteen years will prevent such a person from getting a miner's licence; hence, we propose that he should be allowed to operate under a prospector's permit. The permit will be granted on payment of a small fee and will be for one year, renewable for another year. We contemplate that, ordinarily, prospecting will be completed in at the most two years, and there will be no provision for the second renewal of a prospector's permit. This will not prevent the authority concerned from granting a new prospector's permit in a proper case in respect of the same land. The holder of a prospector's permit will be entitled to operate to the limits within which systematic mining is not compulsory, provided that he is really prospecting. Apart from the fact that he operates under a permit and not under a licence, he will be governed by the same provisions as the person operating under a miner's licence. His workings must be reported to the Inspectorate of Mica Mines when they reach the depth of twenty feet, and again when they reach the depth of forty feet, and will be liable to inspection by this Inspectorate as well as by the Indian Mines Department. As soon as the pit becomes a mine in the sense defined above for the purpose of reporting to the Indian Mines Department, the work must stop, and can only be continued under a miner's licence or a proprietor's certificate. The prospector's permit will be cheaper than a proprietor's certificate and a miner's licence, and there is no objection to a proprietor or the holder of a mining lease doing prospecting under a prospector's permit. It will be the duty of the Inspectorate of Mica Mines to see that this is not abused, and that the permit is not taken

advantage of to do mining on a small scale, and to defeat the provision that mining can be done only by a person who has security of tenure for at least fifteen years.

We contemplate that a prospector's permit will be granted or refused in accordance with the advice of the Inspectorate of Mica Mines. As it is always possible for the proprietor of land, in respect of which a prospector's permit has been refused, to apply for a proprietor's certificate for the same land, and in case of refusal to bring the matter before a higher authority, we do not think it necessary to create further complications by providing for an appeal against an order refusing a prospector's permit.

CHAPTER VII

HOW TO DEAL WITH MICA THEFT

Having considered the question of conservation, we are now in a position to take up the various methods suggested for dealing with the problem of mica theft.

The first suggestion is that the number of miners and dealers should be restricted. There are some who would confine the industry to big miners and do away with the dealers altogether, for according to them the dealers and the small miners between them provide the channel through which stolen mica finds its way to the market. There is no reason to think that the bigger miners enjoy the monopoly of honesty in the industry, and we think that there is no justification for making size the criterion for the grant of a miner's licence. In fact, as we have already said, we consider the small miner necessary for the good of the industry. The establishment of a special Inspectorate of Mica Mines will ensure closer supervision, and only the *bona fide* miner is likely to come in. Hence, we are of the opinion that no artificial restriction in numbers is necessary. As regards dealers, we cannot agree that they should go out altogether. There are several dealers who are doing an honest business, and are fulfilling a real need in the industry. They are, also, necessary for the small miner, who cannot afford to let his capital be tied up for the period, required for preparing mica for the market and finding purchasers for it. There is no reason, however, to permit the number of dealers to increase without limit. Those who are already in the industry may be permitted to remain, but the Trade itself should decide if it wants any new ones to come in. This can be done by the Mica Warden's Board, which we shall propose below. Reasons need not be recorded for a refusal; there will be provision for an appeal, but the appellate authority should not interfere except on a ground against which the Warden's Board has had an opportunity of showing cause. As regards persons already in the business, we would suggest that in Bihar, if the Mica Control Order is still in operation when the new legislation comes into force, the dealer's licences under the Mica Control Order should be treated as having been granted under the new legislation, and that, if there is an interval of time between the lapsing of the Mica Control Order and the commencement of the new legislation, licences should automatically be granted to persons, who held dealer's licences at the time of the lapse of the Mica Control Order and apply for such licences under the new legislation within a certain period after its commencement, say three months. In Madras and Rajputana, dealer's licences should be granted as a matter of course to persons who were carrying on business as dealers for such period, prior to the commencement of the new legislation, as the Provincial Government may fix. The aim in fixing this period should be to prevent persons, who make a pretence of dealing merely to take advantage of this provision, from getting licences as a matter of course. Persons, who were *bona fide* carrying on business as dealers from before, should not be made dependent on the discretion of the licensing authority.

The next suggestion is the establishment round the mining centres of a Protected Zone, within which dealers will not be allowed to establish their godowns. Provision for such action is contained in clause 12 sub-clause (1) of the Mica Control Order, which empowers the Controller to restrict dealer's godowns and factories to areas notified by him for the purpose. It has been strongly urged before us, and we agree, that this interferes unduly with the home splitters, who cannot be expected to go long distances to the dealer's godowns to collect the mica for splitting and to deliver the split product. The splittings business is a very important part of the industry in India. The cheapness and the efficiency of Indian splitting labour has enabled India practically to monopolise the world market of splittings, and it would be unwise to do anything likely to impair this position. Further, home splitting is a cottage

industry which contributes largely to the income of the labouring population of the mica areas. After a full consideration of all the possibilities, we have, therefore, decided to recommend that dealers may be permitted to have their godowns in the Protected Zone, but they should not be permitted to deal in, possess or transport, in or through this zone, block mica of Grade 5 or above, or mica capable of yielding block mica of Grade 5 or above. At times, when there is a special demand for bigger sized splittings, mica of Grade 5 is distributed for home splitting. The authority to raise the above limit to Grade 5 may be given to the Mica Warden's Board, which should also be empowered to determine the limits of the Protected Zone.

An alternative solution, which was put before the Committee and which, for some time, found favour with us, was to keep dealers out of the Protected Zone altogether, and to permit the home splittings business in the Zone to be carried on by splitting contractors. By this term are meant persons who, in return for certain payments, take splitting quality mica from the licensees, get it split by home splitters, and return the splittings to the licensees, the ownership of the mica and the splittings remaining vested throughout in the licensees. This solution would have necessitated the licensing, or the granting of permits to, splitting contractors. Under such licences or permits they would have been entitled to transport mica of Grade 5½ or less, get it split, and return the splittings to their employers. On further consideration, it was felt that this would be an unnecessary complication, because it would be easy for a dealer to take out a contractor's permit, really for himself but in the name of another, and thus operate in the Prohibited Zone in the guise of a contractor.

The next suggestion was to stop dealings in crude and *bima* mica. It has been admitted before us that dealings in crude and *bima* mica are liable to abuse, and that dishonest persons can show in their accounts, under cover of purchases of *bima* and crude mica, large sized blocks obtained by them by illicit means and not really the produce of the crude and *bima* mica, and we have mentioned above the effect that the restriction on the sales of crude and *bima* mica has had on the incidence of crimes connected with illicit dealings in mica. *Bima* mica is sickle-dressed mica, which has not been graded into sizes. Once mica has been sickle-dressed, there is very little work in grading it according to size. Hence, there is no justification for allowing the sale of *bima*, and we have no doubt that the restriction forbidding the sale of *bima* mica of Grade 5 and above should continue. As regards crude mica, we are of a different opinion. The restriction on its sale has hit a large number of small miners, who cannot find the labour necessary for processing the mica in the mining area, and who cannot afford to maintain, in addition to the mine, a factory in the factory area. The restriction has also affected an equally large number of small dealers, who used to make an honest profit by purchasing crude mica, dressing it with the knife, and manufacturing block and splittings with less waste than is possible in the larger factories. Even dealers who do not deal directly in crude mica have been affected, because the mica which they used to purchase from the small dealers just mentioned is no longer available to them. Taking all these matters into consideration, we are against the prohibition of the sale of crude mica, but would recommend that the sale of crude mica should be restricted to particular centres outside the Protected Zones. Such centres should be selected by the Mica Warden's Board, and should be located near the marketing centres.

The next suggestion is the restriction of the number of agents who may be appointed by licensees and registered proprietors, and of the godowns that may be established by them. It is pointed out that under the present administration of the law in Bihar, the position in June 1944 was as follows:—

1. (a) Proprietor's Certificates	54
(b) Miner's Licences	199
(c) Dealer's Licences	580

2. (a) Proprietor's Authorised Agents	234
(b) Miner's Authorised Agents	1,201
(c) Dealer's Authorised Agents	1,752
3. (a) Proprietor's Registered Godowns	224
(b) Miner's Registered Godowns	824
(c) Dealer's Registered Godowns	2,027

It is urged that these numbers, especially of the dealers, their agents and godowns, are not justified by the honest needs of the industry. The agents are appointed under clause 7 of the Mica Control Order, and are authorised to exercise, on behalf of the licensee or registered proprietor, any of the powers conferred on him under the Mica Control Order or his licence or proprietor's certificate. The Controller has some discretion in the matter of endorsing their names on the licence or proprietor's certificate. Apart from the power to confine dealer's godowns to particular areas, the Controller under the Mica Control Order has no power to restrict the number or the location of godowns. In the discussion of the above suggestion, the trade assessors agreed that the power to restrict the number of agents is one which may affect honest business prejudicially, and should not be conferred on any authority. There should, however, be a discretionary power to exclude a particular agent on personal grounds, for instance that he has been convicted previously of an offence, connected with mica and raising an implication of moral turpitude. The trade assessors, also, agreed that it would be unwise to allow an outside authority to restrict the number of godowns which a firm may have. We have already recommended a Protected Zone, in which dealer's godowns will be allowed but transactions will be restricted to the smaller grades of mica. In addition, we consider that there should be a discretionary power to forbid the use of particular godowns, which on account of their location, or for some other reason, appear to be used or likely to be used for an illicit purpose. Both these discretionary powers need to be used with caution. We contemplate that, ordinarily, the Mica Warden will endorse the name of any agent who is proposed, and permit the use of any godown which is notified. In cases of doubt, he should place the matter before the Mica Warden's Board, which will deal with the matter as it thinks fit.

The suggestion about the restriction of the transport of mica to the hours of day light found no support before the Committee. Every one agreed that it would not be practicable to enforce such a restriction, and that it would hamper legitimate trade:

The suggestion, that lessees holding large areas of mica-bearing land should surrender areas at present not being worked by them, did not find much support. It was pressed particularly with reference to the Kodarma Reserve, where the land on which the pegmatites occur is divided into squares each measuring forty acres, and is let for mining purposes only in complete squares at a flat rent as above noted. According to this view, the reason for mica theft is that the miners holding a large number of squares are unable to protect them, and therefore should give them up. This is a somewhat astonishing reply to give to a person, who asks for protection in the enjoyment of rights legally acquired by him. The squares, which are still unworked, form the reserve upon which the miner will draw when the output of his present mines decreases, or when the demand for mica increases. He is prepared to pay for this reserve, and is doing so at the rate which he would pay on squares which are being fully worked. So, Government loses nothing. It is unlikely that such theft as occurs from these squares can be anything but very superficial. Hence, from the point of view of conservation, also, there seems to be no reason for interference.

The next suggestion is the prohibition of the system of contractors. We have described above this system of prospecting. Supervision is difficult, and it is an easy matter for a dishonest contractor to conceal superior pieces of mica.

and sell to the owner of the mining rights only the inferior mica. This happens, particularly, when the prices paid by the latter for the mica are very low. The danger is recognised by the miners, who realise that it is in their own interest to pay a reasonable price and, as a general rule, they do so. Undoubtedly, the system lends itself to mica theft, a fact which has been pointed out ever since the agitation about mica theft began, but the system has persisted, nevertheless, even with bigger miners, because they think that it is more successful than departmental prospecting. We hold no brief for the system, and do not wish to give it the stamp of our approval, but we realise that it is a system which will continue, even if it is prohibited. The contractor works under cover of the owner's licence. If the system is forbidden, he will continue to work as before, but accounts will be manipulated to show him as a departmental employee. In consequence, such a prohibition will serve no useful purpose.

The next suggestion relates to account keeping, and the issue of passes to accompany all consignments of mica. This is the system attempted by the Bihar and Orissa Mica Act, and it is generally admitted that it has been a failure. It does not prevent theft by the dishonest person, who has the intelligence and capacity to manipulate his accounts to cover his dishonest dealings. On the other hand, it opens to pointless harassment the honest man into whose accounts discrepancies happen to find their way. This does not mean that we would do away altogether with compulsory account keeping. Accounts are necessary if the industry is to be regulated, but it should be clearly understood that they are necessary for statistical purposes and not for preventing theft, and inaccuracies found in the accounts should be regarded from this standpoint. Under the present law, every licensee and registered proprietor is bound to keep regular accounts, and becomes liable to criminal prosecution if he fails to do so. In future, we consider, he should not be liable to a criminal penalty unless the defects in the accounts, in the opinion of the Court, justify an inference of dishonesty or deliberate falsification of accounts. The licensee and the registered proprietor should, also, be protected against punishment for bad or dishonest account keeping on the part of their employees. This may be done on the lines of sub-section (2) of section 16 of the Indian Mines Act, which is set out below:—

“In the event of any contravention of any such provisions by any person whomsoever, the owner, agent and manager of the mine shall each be deemed also to be guilty of such contravention unless he proves that he had taken all reasonable means, by publishing and to the best of his power enforcing those provisions, to prevent such contravention:

“Provided that the owner or agent shall not be so deemed if he proves—

“(a) that he was not in the habit of taking, and did not in respect of the matter in question take, any part in the management of the mine; and

“(b) that he had made all the financial and other provisions necessary to enable the manager to carry out his duties; and

“(c) that the offence was committed without his knowledge, consent or connivance.”

Alternatively, the provision may be made on the model of section 71 of the Factories Act, 1934 (XXV of 1934), which has the advantage that the person on whom the responsibility is sought to be shifted is brought before the Court and the necessity for a second trial is avoided. This section is as follows:—

“(1) Where the occupier or manager of a factory is charged with an offence against this Act, he shall be entitled upon complaint duly made by him to have any other person whom he charges as the actual offender brought before the Court at the time appointed for hearing the charge; and if, after the commission

of the offence has been proved, the occupier or manager of the factory proves to the satisfaction of the Court—

“(a) that he has used due diligence to enforce the execution of this Act, and

“(b) that the said other person committed the offence in question without his knowledge, consent or connivance,

that other person shall be convicted of the offence and shall be liable to the like fine as if he were the occupier or manager, and the occupier or manager shall be discharged from any liability under this Act.

“(2) When it is made to appear to the satisfaction of the Inspector at any time prior to the institution of the proceedings—

“(a) that the occupier or manager of the factory has used all due diligence to enforce the execution of this Act, and

“(b) by what person the offence has been committed, and

“(c) that it has been committed without the knowledge, consent or connivance of the occupier or manager, and in contravention of his orders,

the Inspector shall proceed against the person whom he believes to be the actual offender without first proceeding against the occupier or manager of the factory, and such person shall be liable to the like fine as if he were the occupier or manager.”

Finally, it is suggested that the special police force maintained for dealing with mica crime should be increased. According to the police witnesses examined by us, the force consists of one Inspector of Police, three Sub-Inspectors, two Assistant Sub-Inspectors and twenty-three constables. This seems inadequate for an area of about 1800 square miles. If the force is to be effective, it must be increased in consultation with the authorities administering the mica legislation. Further, there is a feeling that there is not sufficient co-operation between the special police force and these authorities. We think that, if it is not possible to place the force under the control of the Mica Warden, he should at least be effectively associated with its control.

The above recommendations represent the furthest that we are prepared to go in order to deal with the problem of mica theft. They will not eliminate mica theft altogether, for that is impossible; but they will, in our opinion, give the trade as much protection as is practicable, consistently with the avoidance of harassment to honest members of the industry; and it is in this spirit that we would wish the law to be enforced. What we look forward to is, not an unthinking enforcement of the letter of the law, but a sympathetic administration by authorities who realise that the provisions are intended to help, and not to hinder, the industry.

CHAPTER VIII

Grading and Classification of Mica

According to present practice, mica is graded as to size and classified as to quality.

With slight changes from time to time; the Bihar system of grading has been in existence for many years. It is based, not on the total superficial area of the block, but on the area of the maximum rectangle of sound mica which can be cut out of it, the necessary determination being made with the help of templates or squared paper charts. The grades as they are today are given in the statement below:—

Bihar system of grading, according to areas

Grades	Area in square inches
Over over Ex. Ex. special	100 and over.
Over Ex. Ex. special	80-100.
Ex. Ex. special	64-80.
Ex. special	48-64.
Special	36-48.
No. 1	24-36.
No. 2	15-24.
No. 3	10-15.
No. 4	6-10.
No. 5	3-6.
No. 5½	2½-3.
No. 6	1-2½.
No. 7	below 1.

NOTE.—(1) The old grade of A1 for sizes 36-48 square inches is now abandoned.

(2) Formerly Grade No. 5½ was taken to be 2½-3 square inches, but it was found impossible to maintain this, and 2½-3 inches has become recognised.

During the past few years the Bihar system of grading has been followed in Madras, Rajputana and other parts of India. It is recognised in international trade, and forms the basis of the standard grading chart of the American Society for the Testing of Materials.* It was adopted by the Joint Mica Mission for the purchases made by it in India, and grading in Brazil and Madagascar is done on similar lines. It would, therefore, be very convenient to make it the standard system for India. A simplification in the nomenclature is suggested by the Madagascar system, *viz.*, the substitution of the terms 0, 00, 000 and so on for the terms Special, Ex. Special, Ex. Ex. Special and so on. A further simplification would be to write these terms as 0, 0², 0³, and so on.

The classification of mica according to quality is a much more difficult problem. As we have said above, quality is a function of many variables, the different degrees of which are not capable of exact measurement. There is no accepted standard of qualities, but certain common terms are used to connote vaguely the different qualities. We set out below a description of the Bihar

classification prepared by Dr. J. A. Dunn, Director, Geological Survey of India, in consultation with Mr. R. A. Hart, Member of the Joint Mica Mission:—

Bihar Classification of Qualities of Mica

Quality	Characteristics
Superfine	The mica must be hard and optically flat. It must contain no stains or flaws of any description.
Clear and Slightly Stained	The mica must be hard and substantially flat and free from cracks. The largest rectangle obtainable must be free from mineral inclusions and stains, but may contain small air stains within a small part of the rectangle.
Fair Stained	The mica must be hard and free from cracks, but may be slightly wavy. The largest rectangle obtainable may contain some small air stains, and within a small part of this area may contain small light stains.
Good Stained	The mica must be hard and free from cracks. It may be wavy but not buckled. It may contain air stains throughout, and may contain light stains and heavier stains or mineral spots around the edges.
Stained	The mica may be fairly hard, and may be wavy and slightly but not badly buckled. It should be free from cracks. The mica may contain stains and small mineral inclusions on the edges and heavier stains over a small part of the area.
Heavily Stained	The mica may be slightly buckled. It may contain heavy stains and mineral inclusions over part of the area.
Densely Stained	The mica may be partly buckled, and may contain dense stains and scattered mineral inclusions.
Silver Stained and White	The same as Stained, but air stains may be of such a pervading character as to impart a silvery or white appearance to the whole surface.
Dotted	Quality as for Good Stained but with isolated black dots throughout.
Densely Stained and Spotted.	As for Densely Stained but with heavy spots and mineral inclusions.
Black Spotted	Hard flat mica with spots and streaks and with mineral inclusions throughout. The spots and streaks not to be generally red in colour.
Red Spotted	As for Black Spotted but the majority of spots and streaks are red.

NOTE :—" Air " stains means, correctly, gas stains or inclusions.

The statement gives the quality designations now accepted in the trade, with a general description of the characteristics corresponding to each term. The definition attempted in the standard specification of the American Society for the Testing of the Materials uses similar descriptive terms which are not capable of exact measurement, and is as follows :

*Classification of Qualities **

Classification	Description
Clear	Free of all mineral and vegetable inclusions, stains, air inclusions, waves or buckles. Hard transparent sheets.
Clear and Slightly Stained	Free of all mineral and vegetable inclusions, cracks, waves, and buckles, but may contain slight stains and air inclusions.
Fair Stained	Free of mineral and vegetable inclusions and cracks. Hard. Contains slight air inclusions and is slightly wavy.
Good Stained	Free of mineral inclusions and cracks but contains air inclusions, some vegetable inclusions and may be somewhat wavy.
Stained	Free of mineral inclusions and cracks but may contain considerable clay and vegetable stains and may be more wavy and softer than the better qualities.
Heavy Stained	Free of mineral inclusions but contains more clay and vegetable stains than that of Stained Quality, and distinctly inferior as regards to rigidity and toughness.
Black Stained and Spotted	Apt to contain some mineral inclusions consisting of magnetite (black), specularite (red), and hydrous iron oxide (yellow).

*A. S. T. M. Designation : D 351-38.

Even a cursory perusal of these descriptions shows how entirely the classification of mica according to qualities is a matter of judgment and not of measurement.

The solution which has been accepted in the trade is the transaction of business either upon inspection of the bulk supplied or in accordance with approved samples. The former method is properly applicable only to a business in which the seller and the buyer can meet in one market. In the mica industry India's customers are in foreign countries, and in selling on inspection the Indian producer is at a disadvantage, unless he is in a position to hold stocks abroad, a thing very few Indian producers are able to do. The method of samples is the system more generally followed, and was the system adopted by the Joint Mica Mission in Bihar. The system followed by the Joint Mica Mission in Madras was slightly different. Type samples approved for Madras were kept at the Mission office in Gudur and were open to inspection by the trade. The trade was asked to sort and grade its mica on the same basis as these samples but, unlike Bihar, it was not supplied with copies of these samples. Instead, it was given the following specification of the different qualities:—*

Sickle Dressed Block Mica

Clear Green 1st	The usual hard pale qualities. The mica must be quite free from spots, stains, buckles, striations or any other imperfections.
Clear Green 2nd	The dark green or brown qualities as above, or any soft green mica, as above. It will also consist of pale green mica having very slight stains, air bubbles, "rainbow" markings or others slight imperfections, <i>excluding dots or spots.</i>
Green BQ.	Pale or dark green mica having stains, vegetable markings or other imperfections and, more or less, the green equivalent to the better known "KC" BQ.
Ruby AQ.	Ruby slightly stained mica, free from dots and in accordance with the generally recognised standard of the description.
Ruby BQ.	Ruby stained and/or very slightly dotted in accordance with the generally recognised standard of the description.
Spotted 1st	Any of the numerous varieties of slightly spotted to spotted micas. The quality should be hard, flat and free from red except for the very smallest occasional red specks.
Spotted 2nd	Spotted to Densely Spotted mica. A reasonable percentage of red permissible, but heavily red spotted and soft to be excluded.

(Heavily Red Spotted mica should be offered separately and would be considered on its merits. The Mission does not promise to purchase it and does not wish it to be produced).

In every instance, each different variety should be packed separately, i.e. although a dark green and slightly stained pale green both come under "Green 2nd" they must not be mixed together.

The reason for this is explained by the following extract from the notes of Mr. R. A. Hart accompanying the standard samples sent to London:

"I want it to be clearly understood that these samples are only regarded as Type samples and their main purpose is to serve as a standard to which the prices are tied.

"It will be found that very few deliveries will coincide exactly with the qualities as represented by the Standards. There are dozens of different mines here and almost without exception each varies slightly in colour, flatness, type of stains or spots and general characteristics. The Clear, for example, will consist of all qualities from light to dark green and brown....."

Apart from this special difficulty in Madras, the sorting of mica in accordance with approved samples is still a difficult matter. The sample of each particular

quality consists not of one piece but of a number of pieces, representing between them the range between the maximum and the minimum defects acceptable within that quality, and these several pieces may contain different defects or the same defects to varying degrees. Thus, a sample of Good Stained mica may contain some pieces with air spots, some with dense air stains, some with mineral spots and lines, and some with dense "vegetable"* stains. In sorting a bulk according to this sample, not only has the degree of each of these different defects to be taken into account in deciding whether a particular block belongs to that quality, but an attempt should be made to see that the bulk supply is fairly representative of the sample, and that it does not predominate in the inferior varieties belonging to that quality. In consequence, the sorting of mica according to a sample can only be successful if a certain degree of tolerance is allowed. The evidence on the point of standardisation showed a curious inconsistency, for several witnesses, who were positive about their ability to sort mica according to any given sample, said that standardisation is not possible. The explanation is that the success of any attempt to standardise mica will depend upon the attitude of the Indian exporter. If his object is to satisfy the customer and to induce him to place repeat orders, there will be no difficulty. On the other hand, the sorting must be unsatisfactory if there is no competition and the exporter tries to make a supply which will "scrape through", knowing that if it is rejected, he can re-sort the mica and still dispose of it. Another aspect of this matter was stressed before us by the witnesses, namely that the customer is prone, to a lesser or greater degree, to find fault with the supply according as his need for the mica is urgent or not. Any unreasonableness upon his part, however, can easily be dealt with by suitable arrangements for arbitration. All the exporter witnesses whom we examined have admitted that for years they have been carrying on business in accordance with approved samples without any objection upon the part of their customers. This was the case even in Madras, in spite of its peculiar difficulties. Hence, we have no doubt that standardisation is possible.

According to the present practice, in which there is no uniform standard of quality, the correlation of prices from year to year and between firm and firm can not be made without a comparison of the samples representing the different transactions. Such a comparison is not possible, and both exporters and importers remain very much in the dark as to the real prices of mica, and depend entirely upon their own shrewdness and their capacity for holding out in order to get reasonable prices. In this mutual struggle between exporters and importers, the former are at a disadvantage, as they are attempting to market abroad a product which has no outlet in their own country, and the bargaining power of the bigger producers who might be able to stand out for a better price is affected by the competition of smaller producers, who can not hold stocks abroad and are compelled to accept low prices. One reason for the suicidal competition between Indian exporters, which has been mentioned by several observers, is thus the absence of fixed standards.

Another disadvantage of the absence of fixed standards of quality for Indian mica is its tendency to create a prejudice abroad against the Indian trade, and to give the impression that Indian exporters do not make supplies up to the accepted standards. Complaints of this kind were common in the past, and were made even under the system of standardisation established by the Joint Mica Mission. We were shown the Mission's file of valuation reports on stock received in the United Kingdom, and found several comments to the effect that the supply was as much as 50 per cent. below standard. Among the firms affected by these comments were some of unexceptionable reputation, the honesty of whose sorting cannot be questioned. In these circumstances, the comments suggest that they were based upon somewhat higher standards than

*The term "vegetable" used in this table is incorrect. It refers to matter included along or near the edge of the block, sometimes of a clay-like nature. The material is a coarse mineral.

those accepted in India by the inspectors of the Joint Mica Mission; in other words, that there was really not a common standard. Complaints and misunderstandings of this sort would, we feel, be avoided if there was a proper standard enforced by a competent authority.

We would, therefore, like to see a definite attempt made to prescribe standards of quality for India. So far as Bihar and Rajputana mica is concerned, we do not think that there will be much difficulty in prescribing such standards. In the circumstances above stated, the prescription of standards for Madras will be more difficult, but not incapable of solution. We have not attempted to draw up a set of standards ourselves, *firstly* because it is a highly technical matter, and *secondly* because we think that, before laying down these standards, the principal foreign consumers of Indian mica should be consulted, and in the short time at our disposal and during a state of war it was not possible for us to consult them.

Such a standard of classification will necessarily be based upon the visual tests at present being followed, but the desirability and the possibility of standardisation in accordance with objective tests, capable of exact measurement, must not be lost sight of. A considerable amount of work on these lines has recently been done in the United States of America at the instance of the War Production Board.* It began in September, 1942, when the supply of Good Stained and better ruby block from India was found insufficient to meet the increased demand for use in the condensers of telecommunication apparatus in tanks, aeroplanes and ships, as well as for other war purposes, and it became necessary in consequence to employ for these purposes mica from other sources and inferior mica from India. In the course of this investigation the Bell Telephone Laboratories, New York, invented two portable hand-operated battery sets by which the conductivity, dielectric strength and power factor of mica can be evaluated in a few seconds, and with the help of these machines a large quantity of mica, which according to previous practice would have been rejected as unsuitable for condenser use, was selected and used with satisfactory results in condensers of large capacitance and of radio frequency transmitter types. On the basis of these experiments, a tentative classification of condenser mica on electrical values was drawn up by the American Society for the Testing of Materials, since incorporated in A.S.T.M. Specification D748-43T, and was shown by tests made on a commercial scale to be reliable and practicable. In this system, the mica is classified into three ranges according to its power factor value, designated E-1, E-2 and E-3. Upon a comparison of the percentage yield of selected E-1 non-conducting block, condenser films, condenser plates etc., from low quality block and from Indian ruby Good Stained block, it appears unlikely that it will be economically advantageous to use the lower qualities of mica for high grade condensers so long as an adequate supply of Good Stained and better ruby mica is available. It is possible, however, that these instruments can usefully be employed for classifying Good Stained and better ruby mica according to its electrical properties, before its export from this country.

The above possibility of grading mica according to objective standards is of special interest to Madras, which is affected by the prejudice against green mica entertained by manufacturers of electrical apparatus. The Madras trade

*Minutes of a joint National Research Council and A.S.T.M. Mica Committee meeting held at Bell Telephone Laboratories on May 12, 1943, N.R.C. project 517:

Testing, Grading, Classifying and Quality Control of Mica, N.R.C. project 517, War Metallurgy Committee's report W51, dated August 11, 1943:

Commercial Trial of an Electrical System of Classifying Block Mica Quality, N.R.C. project 537, W.M.C. report W89, dated February 25, 1944:

Final Report on commercialization of Mica Testing Equipment, N.R.C. project 537, W.M.C. report W151, dated October 26, 1944:

Research Report on commercialization of Mica Testing Equipment, N.R.C. project 537, W.M.C. report W170, dated 31st December, 1944:

Saving Mica by testing by K. G. Coutlee. Bell Laboratories Record, September 1944. Vol. XXII, No. 13, page 509.

considers its green mica, quality for quality, as good as Bihar ruby mica, and resents the lower prices offered for it in the foreign market. Our attention has been drawn to the statement of Dr. B. C. Roy, of the Geological Survey of India, that recent tests in the Government Test House at Alipore, Calcutta, have shown that the Nellore green mica is not inferior to Bihar mica.* An enquiry from the Government Test House at Alipore has elicited the information that the tests in question were confined to one batch of green Madras mica, and that similar tests were not performed on Bihar ruby mica. Therefore, the statement that these tests establish that Madras green mica is as good as Bihar ruby is open to doubt. The prejudice against green mica is explained in the following telegraphic communication received by the Committee from the High Commissioner for India in the United Kingdom:—

“Reference your telegram of 19th June. Mica Control have furnished following information in reply. *Begins.* The following remarks apply to green mica from whatever source it is obtained and not merely to Madras green. While many samples of green mica when tested have power factors equal to ruby others are extremely poor in this physical characteristic. The inconsistency is marked in the case of green mica from different mines but may even be apparent in samples from the same mine. The power factor becomes very important at radio frequencies, that is the frequency at which the mica will actually be used. Where the use micasheets stringent power factor requirements green mica could only be safely utilised if each separate plate were tested at radio frequencies. There are many uses such as valve bridges and certain types of condensers where power factor is of no great importance and here green mica can be safely used and is in fact being used for such purposes at the present time. The general trade prejudice against green mica arising from this inconsistency in power factor will be difficult to overcome as the processor prefers to have in stock mica which can be used for all purposes and is not limited in its applicability. *Ends—High Commissioner.*”

A report to the same effect has been received by us from Associated Insulation Products Limited, London. The uncertainty of the power factor in green mica is also commented on by G. Richards Gwinn in Information Circular No. 7258 of the United States Bureau of Mines. As regards the remedy for this state of things the following remarks of Sir Arthur Fleming, Technical Director of Associated Insulation Products Limited, are relevant:—

“A solution which has been suggested is the carrying out of a power factor test on all green mica at the source with consequent increased production cost, this would, of course, have to be a 100 per cent. test and not sampling test. However, such is the suspicion (justifiable) in the trade that the end user in this country would not accept tests at the source without carrying out his own tests before using green mica in any apparatus where power factor is of importance. This situation would probably clear itself after a period of years when the end-user became satisfied that the quality as passed by the tests in India was consistently maintained, but any failure to exclude the doubtful mica at the source would seriously imperil any confidence that might have been gained.

“It should be noticed that it is imperative that the power factor tests should be carried out at radio frequency and not at 800 cycles which is a common testing frequency. Unless the Alipore tests were carried out at 106 cycles they can be considered worthless for establishing any confidence in green mica.”

On the basis of comparative tests made at the instance of the Committee on samples of Clear green and Clear ruby mica, the Council of Scientific and Industrial Research, New Delhi reports that green mica is as good as ruby mica. These tests were performed at a frequency of 1,000 cycles. Hence, in view of the above remarks of Sir Arthur Fleming the results are not being reproduced by us.

*The Nellore Mica Belt, by Dr. B. C. Roy, Government of Madras, Development Department, G. O. No 4477 dated 20th October, 1944.

Before closing this chapter, it is of interest to mention that, for the purpose of calculating royalty on mica, the Madras Government insists on the mica being sorted to sizes which have no relation to the grades of mica as exported. These sizes, referred to as classes, and the royalty charged are given below:—

Schedule showing the scale of values to be adopted for the purpose of calculating the royalty leviable on every pound of mica removed from the premises of a mine

Class	Stained mica		Clear mica	
	Rs.	A. P.	Rs.	A. P.
I. 4 square inches and under	0	4 0	0	5 0
II. Above 4 square inches and not more than 8 square inches	0	6 0	0	11 0
III. Above 8 square inches and not more than 16 square inches	0	15 0	3	8 0
IV. Above 16 square inches and not more than 32 square inches	2	4 0	6	2 0
V. Above 32 square inches and not more than 48 square inches	4	8 0	8	12 0
VI. Above 48 square inches and not more than 64 square inches	6	12 0	12	4 0
VII. Above 64 square inches and not more than 80 square inches	9	0 0	15	12 0
VIII. Above 80 square inches and not more than 96 square inches	11	4 0	19	4 0
IX. Above 96 square inches and not more than 112 square inches	13	8 0	22	12 0

and so on.

Flimsy mica—8 annas per pound, irrespective of size and quality.

Scrap and waste mica which cannot be used as mica—Rs. 5 per ton, irrespective of size and quality.

Waste mica which cannot be used for rounds or sizes, but which can be used for splittings—Rs. 70 per ton, irrespective of size and quality.

NOTE.—The size of plates shall be calculated for assessment according to the greatest rectangular area the slabs will yield.*

*The Madras Mining Manual, 1929, page 165.

CHAPTER IX

USE OF MICA IN INDIA

As no record, official or non-official, is kept of the use of mica in India, and as the published figures of production are inaccurate and are often exceeded by the figures of export, it is only possible to guess at the amount of mica used in India. In 1935 Dr. C. S. Fox estimated the amount at about 2,000 cwt. a year.* We have attempted to collect information on the subject by means of direct enquiries from firms and bodies likely to use mica and its products, such as railway and electric supply companies, firms of electrical engineers, colliery companies, manufacturers of lubricants, makers of electrical apparatus such as fans, bulbs, electric irons, heaters and toasters, manufacturers of motor tyres, iron and steel manufacturing companies, and manufacturers of micanite and ground mica. The result of the enquiry has not been entirely satisfactory. In the first place, we found it difficult to get a complete list of firms and companies likely to use mica and its products; secondly, not all of those who were addressed replied to our enquiries; and thirdly, many of the replies sent were incomplete, or gave the information in such a defective or vague manner that the information was not capable of compilation.

Mica in the shape of block is used to some extent in the manufacture of electrical apparatus, such as fans, cookers, electric irons, toasters and so on. A stimulus to this portion of the industry has been given by the fall caused by war conditions in the supply of these articles from foreign sources. The only firm making such articles, which has given us particulars, puts its annual requirements of block mica at over 3,000 lbs. The Indian railways use a considerable amount of block mica for insulation purposes and for the repair of electrical machinery, but the annual requirements of different railways vary considerably from each other. Thus, the North-Western Railway uses about 500 lbs. of block mica, the Bombay, Baroda and Central India Railway about 200 lbs., the Bengal Nagpur Railway about 100 lbs., and the Great Indian Peninsula Railway about 350 lbs. The needs of electric supply companies are surprisingly small. For instance, the annual requirements of the Barrackpore Electric Supply Company Limited are only 2 to 3 lbs., and the consumption of the Cawnpore Electric Supply Corporation, Limited in the years 1943 and 1944 was only 20 lbs. The Bombay Electric Supply and Tramways Company, Limited combines transport with the supply of power and naturally shows a larger consumption, about 1,400 lbs., per annum. The surprising thing is that this mica, till recently, was imported from the United Kingdom. Four iron and steel manufacturing companies, which have furnished particulars, consume between them about 1,200 lbs. of block mica annually, and three collieries between them consume about 40 lbs. annually.

The next important use of mica is in the shape of micanite. In the factory visited by the Committee the work of laying the splittings was being done entirely by hand labour. The types of micanite under manufacture were hard and flexible micanite sheets, micanite tubes, micanite paper, micanite cloth and micanite washers. None of the other micanite manufacturers to whom we have written has given any particulars, but from some of the consumers we have ascertained that micanite tapes are also manufactured in India. The factory visited by us does not represent the earliest attempt to make micanite in India, for Dr. Dunn mentions that attempts were made as long ago as 1914—1918 to manufacture micanite in Bihar, but were killed by the invention of a mechanical method of laying splittings and of a new bond, Glyptal, in place of the Indian product shellac, and by the imposition of tariff restrictions in the United States.†

*Quinquennial Review of the Mineral Production of India for the years 1929—33 Records of the Geological Survey of India, Volume LXX, 1935, page 249.

†Records of the Geological Survey of India, Vol. LXXVI, 1942, Bulletin of Economic Minerals, No. 10—Mica by Dr. J. A. Dunn, page 60.

Reports regarding the use of micanite were received from Indian Railways, firms of electrical engineers, electric supply companies, manufacturers of iron and steel and electrical apparatus, and colliery companies. The annual consumption is somewhat difficult to estimate, because it was stated in some cases by weight and in some cases by the number of sheets or rolls. We shall therefore quote a few specifications from some of the letters received.

North-Western Railway

Cloth mica	75 lbs.
Sheets moulded micanite	210 lbs.
Micanite Tape	350 yards.

Great Indian Peninsula Railway

Micanite sheets, flexible	1,254 lbs.
Micanite sheets, moulding	374 lbs.
Micarta folium	278 lbs.
Mica and paper flexible linen sheets	272 lbs.
Tape mica and Linen	303 rolls.
Tape micanite various kinds	3,798 rolls.

The Bombay Electric Supply and Tramways Company, Ltd.

Micanite strips	100 lbs.
Micanite sheets, soft	2,400 lbs.
Micanite tubes	16 lbs.

The Tata Iron and Steel Company, Limited ; Consumption in 1944

Hard micanite sheets	304 lbs.
Flexible micanite sheets, cloth backed and paper backed	312 lbs.
Commutator micanite sheets	2,091 lbs.
Mica "V" rings	115 pieces.
Mica Tapes	798 rolls of 36 yards each.

British India Electric Construction Company, Limited

Moulding Mica	640 lbs.
Mica paper	500 lbs.
Mica Folium	50 lbs.
Commutator Micanite	40 lbs.

Most of these companies and firms formerly used imported micanite but, of recent years, have been using such Indian micanite as is available. One of the railway companies is reported to be making micanite for its own use. The principal defects pointed out in Indian made micanite are:—

1. Uneven thickness of micanite sheets, and variation in the inner and outer diameters of micanite tubes.

2. Inability to supply micanite sheets within the tolerance of thickness permissible in the construction of commutators.

3. Softness—a defect which affects the use of Indian micanite for commutator V-rings. This defect is reported to be less now than it was formerly.

4. A tendency to use too much bond material. In this respect, also there has been an improvement, but there is still room for more.

5. Flexible micanite tends to become stiff after a short period of use.

6. Indian micanite tends to flake more readily than imported micanite.

7. Indian micanite is somewhat brittle as compared with imported micanite. In spite of these defects, however, Indian-made micanite has been declared to

be on the whole satisfactory by important railway companies, iron and steel manufacturers, and electric supply companies, and we have thought it worthwhile to enumerate the defects found in it to indicate the lines along which improvement is necessary.

The above figures give some idea, though necessarily a very vague one, of the extent of the use of micanite in this country. In addition, we made an attempt to ascertain from the Customs authorities the amount of micanite imported annually into India, but these figures were not available to us, because separate records of micanite are not maintained. It would be of value to the industry to maintain such figures.

On the data set out above, all that can be said is that there is in India a considerable market for micanite, which has still to be captured by the Indian micanite makers. In the absence of big electrical industries and more heavy industries powered by electric machinery it is necessarily a small market, but it is not negligible. A better idea of its extent can easily be obtained by keeping records of the import into India of foreign-made micanite; and, if the Indian manufacturers are prepared to improve their product so that other industries will not suffer by being compelled to use it, we would recommend the imposition of tariffs to protect the Indian micanite industry. We feel, however, that the stage for the imposition of such a tariff has not yet arrived.

There is also a big market outside India, but it is confined to industrial countries which manufacture electrical apparatus on a large scale, and these countries are all manufacturing their own micanite; for example, the United States of America, the United Kingdom and Germany. The following figures compiled from the United States Minerals Yearbooks show that during the war there has been a flow of micanite from India into the United States:—

Mica plates and built up mica: Import into the United States for consumption from British India

Year	Quantity lbs.	Value Dollars
1934	103	252
1935	116	274
1936	Nil	Nil
1937	100	908
1938	Nil	Nil
1939	438	999
1940	6,205	10,076
1941	1,786	997
1942	82	879
1943	110,055	66,502

This, however, is only a temporary condition, and it appears unlikely that the United States or any other country will willingly allow such an essential industry to be displaced by the Indian industry, and any attempt by India to sell its micanite abroad will probably be met by tariff barriers. Hence, it appears to us that, until electrical industries on a large scale are established in India, there is not much scope for a considerable increase in the manufacture of Indian micanite.

Finally, in connection with the encouragement of the micanite industry in India we would emphasise the need for co-operation between electrical engineers and the makers of micanite. "If electrical engineers could be persuaded to submit their insulation problems to the manufacturers of micanite or mica plate, who retain highly technical specialists to advise on the solution of those problems, it would be found that in almost every case a micanite insulator could be devised to perform the work and to perform it more efficiently than

anything else. Propaganda among electrical engineers along these lines appears to be a profitable avenue of effort.”*

The next item of consumption is in the shape of ground or pulverised mica. The use of mica in this form has reached its peak in the United States of America, as will be clear from the following statement compiled from the United States Minerals Yearbooks:—

Ground or Pulverised Mica (including mica from Kaolin and Schists) Sold by producers in the United States of America, 1925—43

Year	Dry-ground		Wet-ground		Total	
	Short tons	Value	Short tons	Value	Short tons	Value
		Dollars		Dollars		Dollars
1925—29 (average).	2,436	89,624	2,821	301,122	5,257	390,746
30—34 (average).	5,967	155,471	2,517	224,838	8,484	380,309
. . .	15,178	341,825	3,145	201,148	18,323	542,973
1936 . . .	20,800	457,042	4,785	265,374	25,585	722,416
1937 . . .	21,150	457,879	6,095	381,933	27,245	839,812
1938 . . .	19,757	466,959	7,329	457,595	27,086	924,554
1939 . . .	23,222	547,539	7,702	608,794	30,924	1,156,333
1940 . . .	21,809	515,930	6,175	500,698	27,984	1,016,628
1941 . . .	31,914	733,559	11,505	798,792	43,419	1,532,351
1942 . . .	36,369	805,163	10,610	848,195	46,979	1,653,258
1943 . . .	40,256	1,027,781	11,326	962,363	51,582	1,990,144

So big is the demand that it has been found worthwhile in the United States to mine mica purely for grinding, and to recover mica by washing kaolin or kyanite and by crushing mica schist. In addition, waste mica is imported from foreign countries such as British India, Canada, the Union of South Africa and Brazil. We give below a statement of the imports from British India:—

Mica waste and scrap imported into the United States from British India

Year	Quantity in short tons	Value
		Dollars
1931	222	2,219
1932	336	2,107
1933	236	2,659
1934	1,613	14,138
1935	1,667	9,204
1936	2,709	11,023
1937	4,718	18,110
1938	3,170	17,331
1939	Not available	
1940	2,162	13,921

* Note on the Marketing and Utilisation of Mica by G. Vernon Hobson. Bulletin No. 40 of Indian Industries and Labour, 1928.

Over half of this product is used as backing for rolled asphalt roofing and shingles to prevent sticking. It is often used also as decorative surfacing for these materials, and some of it may be incorporated in the roofing itself. It is said that the incorporation of this material imparts a slight fire resistance against falling sparks. The material used is ground to about 60 mesh by dry-grinding. The next important consumer is the wall paper industry, which requires selected qualities of mica finely ground by wet-grinding. During the war just ended, the consumption of these two industries has been considerably reduced on account of demands for war purposes, and a large portion of the ground mica has been diverted to use in paints and in coatings on tents and tarpaulins for protecting and waterproofing them. In the manufacture of paints both dry-ground and wet-ground mica are used. The following remarks from the Minerals Yearbook, 1938, are relevant in connection with this use: "Sound reasons exist for employing large quantities of mica in almost any kind of paint. In addition to embodying the functions of lubricant and extender, the transparent mica flakes serve to bond the film, prevent it from cracking, and improve adherence in much the same way as do the leaflike metal particles in aluminium and, more recently, metallic-lead paints." It is also reported that ground mica of 325-mesh mixed with aluminium bronze powder has produced a paint possessing superior resistance to salt air and chemical fumes. Another important use is in the rubber industry as an ingredient of special rubber insulation for flexible wire connections, as an inert filler in hard rubber and certain types of rubber goods, as a lubricant in the moulding and vulcanising of motor tyres, and as a dusting powder used between the casing and inner tubes of motor tyres to prevent friction and sticking. Other uses are welding-rod coatings, pipe-line enamel, moulded electric insulation, house insulation, Christmas-tree and cinematograph snow, manufacture of greases and oils, annealing, plastic specialities, textiles, oil-well drilling, welding, concrete and foundry facing, lagging for pipes and boilers, coating levee mattresses, ornamentation of concrete, tile and stucco surfaces, inert filling in gramophone records, an ingredient in the manufacture of explosives, a base in cleanser compounds, and lithographing. Used in moulded electric insulation it is said to increase the dielectric properties and heat resistance of the material. It has its own value as a lubricant and is used, either dry or mixed with oil, for lubricating parts where the use of graphite or an excess of grease or oil would be objectionable.

As against the large number of the uses of ground and pulverised mica enumerated above, it is surprising to mention that the Committee has been able to find very little evidence of its use in India.

Since the year 1936 motor tyres are being manufactured in India, and this industry consumes about 100,000 pounds of ground mica annually. Owing to war conditions some of this is drawn from Indian sources, but the specifications of ground mica for use in this industry are very exacting and, although the firms engaged in it express their willingness to standardise the Indian product for this purpose, it is doubtful if Indian producers will keep this market unless they improve their product considerably.

Mica seems peculiarly suitable for use as lagging for pipes and boilers, as will appear from the following extract from the Handbook of Mica by Mr. Ramani Ranjan Chowdhury:—

"The undernoted experiments obtained on the heat insulating property of mica are very important. These experiments, conducted by R. Atkinson, the Chief Engineer of the Canadian Pacific Railway, determined the heat losses of some large steam boilers of equal sizes insulated with different lagging. The

experiment was carried on with the water content of 7,000 pounds in each of the boilers experimented upon.

Nature of lagging used	Drop in temperature in 5 hours	Temperature at end of 5 hours
Boiler without lagging	84 degrees C	128 degrees C.
„ with asbestos mixture	53 „ C	159 „ C.
„ with magnesium blocks	33½ „ C	178½ „ C.
„ with wood and air space between	33½ „ C	178½ „ C.
„ with asbestos and wood	30 „ C	181 „ C.
„ with mica waste	20 „ C	192 „ C.

The results of experiments by Prof. Capper are quoted showing that the loss by condensation over a given surface of steam piping was 1.56 lb. of steam in the case of pipes without lagging.

Prof. Capper's experimental results

Lagging used	Loss of pressure after 1 hour in lb. per sq. inch.	Loss of heat in calories (heat unit) after an hour
Boiler not insulated	56	231,000
„ with wood and asbestos paper insulation	20	73,000
„ magnesium	13	43,900
„ with kiesselguhr	24	77,900
„ with mica waste insulation	6	21,400

In this connection Mr. Chowdhury elsewhere gives the following interesting extract from a paper read by Mr. C. H. Mitchel of Toronto, Canada, before the Ontario Mining Institute:—*

“By taking the scrap or waste mica pieces and sub-dividing them as finely as possible and then quilting them between galvanised wire-netting, it is possible to produce a fire-proof mat flexible and clean and a non-conductor of heat. The finer the flakes, the more effective they become as each one in itself is an effective non-conductor so that the greater the number in a given space, the higher the results are in checking the escape of the heat waves. The mats or quilts are not only fire-proof but are flexible and elastic which is a most valuable feature as they will expand or contract with the iron they cover without cracking or flaking off. Use of these mats is recommended for covering boilers to which they are secured by means of hooks attached to iron bands, which are passed around the boiler under the mats.

“Besides, the waste mica is made into sectional covering for all sizes of steam and hot water pipes, the only difference being that the mica is stitched between a wire core which fits the pipe and an outer covering of the canvas.

*The Uses and Applications of Sheet and Waste Mica by Ramani Ranjan Chowdhury Bulletin No. 3, June, 1939, of the Geological Mining and Metallurgical Society of India.

The sections are secured to the pipe, by lacing around the boot hooks, which are riveted up the seam at convenient distances. Coverings for all sizes and shapes of fittings including elbows, tees, crosses and globe valves are also made and secured to the iron in the same way.

"These mats have been in constant use for nearly two years on locomotives, liable probably to heavier and more constant vibration than is found anywhere else and at the end of this time they have been found in perfect condition and likely to last a number of years longer.

"An advanced process of manufacture of mica matting is reported to have been developed by the Mica Boiler Covering Co. of Canada. Some of the railways in India have already been using mica lagging *but the insulating properties of mica and its superiority compared with other known insulators, require wide publicity among the users.* The technique of electric and heat insulation has not received the necessary amount of attention from the authorities and industries concerned."

In spite of the remarks of Mr. Mitchel regarding the use of mica lagging on railways in India, we have come across only one railway company which does so. Besides this, we found one mining company in Rajputana utilising mica in this way, and two colliery companies have reported such use. In all, the annual consumption for this purpose which has come to our notice is about six to seven tons. Evidently, Mr. Mitchel's remarks about the necessity of wide publicity for the heat insulating properties of mica are as applicable to India as to Canada.

Enquiries addressed to the manufacturers of lubricants have elicited no reply regarding the use of ground mica in this industry. Nor have any railway companies reported the use of ground mica in axle boxes. The only report of the use of ground mica in the manufacture of grease comes from an iron and steel manufacturer, the annual consumption being about five tons.

Apart from the above uses, small quantities of ground or powdered mica are used for moulded insulation, for dusting mica splittings and for decorative purposes.

The mica grinding mill which the Committee inspected had only recently been brought into use. No replies were received from other manufacturers of ground mica. Hence, the Committee is not in a position to estimate the amount of ground mica made in the country. Separate figures of ground mica imported into the country are not available from official Indian records but, as the United States of America is the principal exporter of ground mica, the following table compiled from the United States Minerals Yearbooks probably gives a correct picture of the extent of the imports:—

Ground Mica imported into India from the United States of America

Year	Quantity	Value
	lbs.	Dollars
1937	15,756	719
1938	.	..
1939	2,800	122
1940	29,500	813
1941	49,000	1,173
1942	40,000	900
1943	56,300	1,307

From the above account it is clear that only a small amount of ground mica is used in this country. This conclusion is reinforced by the figures given above of the import of waste mica from India into the United States of America. With the numerous uses to which ground mica can be put, it is a matter for great regret that India's resources of waste mica should be allowed to go out of the country in this manner. We have no doubt that there is a great scope in India for the use of mica in this form, and all that is necessary is that a little thought and investigation should be given to the matter. Not only is there a large potential demand in the country, but the following figures taken from the United States Trade Returns will show that there are also large foreign markets, in which *prima facie* there is no reason for discrimination against Indian ground mica as distinguished from ground mica manufactured in the United States:—

Domestic Exports of Ground or Pulverised Mica from the United States of America to Foreign Countries in pounds

Country	1937	1938	1939	1940	1941	1942	1943
United Kingdom . .	1,155,756	1,290,589	928,127	326,688	336,000	198,360	144,000
Belgium	319,132	394,195	363,816	46,920	..	..	..
France	62,528	25,557	44,585	44,000	..	..	..
Germany	463,513	474,912	611,760	..	..	..	..
Netherlands . . .	55,990	40,022	98,815	72,240	..	..	..
Sweden	28,910	27,410	74,040	..	..	..	..
Canada	653,957	393,681	609,206	682,334	690,238	737,675	700,413
Argentina	22,710	11,185	40,224	46,648	53,405	31,593	..
Venezuela	181,000	41,370	1,980	..	258,000	350,000	4,700
Netherlands East Indies . . .	27,225	11,600	54,100	72,200	47,700	24,200	..
Union of South Africa	3,957	3,605	28,158	34,420	202,460	Not known	..

As regards the prospects of such a venture in India, the following remarks from The Mica Industry* are relevant:—

“Although the process of wet grinding could not be undertaken by wholly inexperienced operators with the expectation of immediate success, it is not a highly complicated process. Moreover, it does not require very much capital. Therefore, countries like India with ample supplies of desirable scrap at hand, low wage rates, and very cheap containers (gunny sacks), could conceivably become headquarters for the ground mica supply of the world, both dry and wet-ground. It is probable that if ground mica were much cheaper than it is at present, it would find an expanding market, but at the expense of some competing commodities such as talc.”

Mica can also be used in the form of waste. We have already cited above a description of its use as lagging. In 1902 Sir Thomas Holland suggested the utilisation of scrap mica in the roofs of houses and carriages, and even in clothing, as protection against the sun's rays, and noted that according to information received by him a layer of mica waste one-quarter inch thick, placed under an ordinary tiled roof exposed to the hot weather sun in Bengal, made an

* United States Tariff Commission Report No. 130, Second Series, 1938, page 120.

average difference of fifteen degrees in the temperature of the air immediately under the roof.* An interesting instance of the use of this property of mica for keeping even the temperature of a store-house for seed potatoes in the State of Tonk was mentioned to us by Lieutenant K. C. G. Heath of the Geological Survey of India. We are unable to give any details, as the further particulars asked for by us have not yet been supplied. In the same way, mica waste may be used as packing for ice-boxes and freezing machines. Finally, the suggestion has been made that, by reason of its potash contents, mica may be used as a fertilizer. The possibility of this was discussed in America in 1915-16.†

In view of the difficulty with which mica decomposes and the resistance which it offers to weathering agencies, this possibility is doubted by Dr. H. S. Spence‡, and it is probable that such success as may have attended experiments in this direction was due to the mechanical action of mica on the soil, as suggested by Sir Thomas Holland.§

Our remarks above suggest several lines of research regarding the possible utilisation of mica in India. Such an investigation is very necessary in view of the fact that, out of the crude mica raised from the mines, only about twenty *per cent.* is used in the shape of dressed mica and its products, and the balance is cast aside as waste. This enquiry should take the form not only of original research for the discovery of new methods of utilising mica or of preparing mica for known uses, but also an investigation into the uses to which mica has been put in other countries, and into the methods employed by such countries for preparing mica for these purposes. Besides this, the investigation should be supplemented by propaganda to make known the results of the investigation to all persons and bodies likely to put the knowledge to commercial use. That such propaganda is necessary will appear from the ignorance regarding mica and its products which we found even in technical circles. To quote one instance, an enquiry addressed to a rubber manufacturing company of some standing elicited the following reply:—

“It is our understanding that micanite is a type of sheet mica which can be used in place of glass for window of gauges and various types of recording instruments. If this is so, would it be possible to have a sample sheet sent to us so that we can test it and if satisfactory use it in our factory.”

In another case, an electric supply company of a big city said, “Indian mica has been used and found unsatisfactory, specially for commutators, as there were impurities in it which carbonised in use. Clean and pure Indian mica has been found satisfactory, but is difficult to obtain.” As it seemed probable that these remarks referred to micanite and not to mica, the electric supply company was addressed on the subject, pointing out that mica is a natural product of which a high quality is to be found in India, and asking for particulars about the purchases of Indian mica which were found to be unsatisfactory. In reply, we were informed that the remarks referred to mica but no particulars could be given as the company had discontinued using Indian mica for many years. The Committee is still inclined to think that the remarks in question related to micanite but, if it is true that the remarks relate to mica, it is certainly a matter for regret that the company should find it necessary to go abroad in order to get a satisfactory quality of mica for its purposes.

*The Mica Deposits of India by Sir Thomas Holland, Memoirs of the Geological Survey of India, Vol. XXIV, Part II, 1902, page 75.

†The uses and Applications of sheet and waste mica by Ramani Ranjan Chowdhury. Bulletin No. 2, June 1939, of the Geological Mining and Metallurgical Society of India.

‡“Mica” by H. S. Spence, page 115, published by the Department of Mines, Canada, 1929, and the “Canadian Mica Trade” by Dr. H. S. Spence, Bulletin of the Imperial Institute, Vol. 37, 1909, page 627.

§The Mica Deposits of India by Sir Thomas Holland, Memoirs of the Geological Survey of India, Vol. XXIV, Part II, 1902, page 74.

CHAPTER X

MARKETING

We have stated above that the consumption of mica in India is small. Hence, there is little to be said on the subject of internal marketing.

In the producing areas, mica is sold mainly in the form of crude mica, mixed block, sorted block and splittings. Most of the miners and dealers have godowns in the principal marketing centres, for example Kodarna, Domchanch and Giridih in Bihar, and Gudur in Madras. Transactions take place at these godowns. Petty dealers go to the outlying godowns of small miners and dealers, collect mica from there and sell it, with or without further processing, at the marketing centres. The Rajputana mica is largely purchased by dealers from Bihar who visit Rajputana for the purpose. Since a few years, however, some of the Rajputana producers have appointed authorised agents in Bihar, to whom they send their mica for sale, with or without further processing. Other Rajputana producers, in order to avoid the agents' charges which are said to be somewhat high, have taken out dealer's licences in Bihar, and have established their own godowns there for processing and selling their product. In all the above transactions, the parties to the sale are in one place and have the mica before them. The buyer, therefore, knows exactly what he is purchasing, and the amount paid by him depends upon the ruling prices, the urgency with which the purchaser wants to buy the mica, and the anxiety of the seller to get rid of it. These are the ordinary economic factors determining price in any market, and there is no reason for interference.

Indian consumers of mica, micanite and ground mica draw their supplies mainly from several firms in Calcutta and a few firms in Madras, Bombay, Cawnpore and Lahore. It is to be feared that these firms get their stocks from foreign sources. A few of the consumers make their purchases from the mica fields, principally from Giridih, but the demand is so small that it is probably not worthwhile for the producers in the mica belts to cater specially for it. The proprietors of the only micanite factory which we saw are the owners of mica mines and the splittings used by them are their own product. So, also, the only grinding machine which we saw belonged to a proprietor of mica mines who ground his waste mica. Apart from this, we have no information where other manufacturers of micanite and ground mica draw their raw materials from. As we have suggested above, there is room for propaganda to inform consumers in India about the possible uses of mica and its products, and the sources within the country from which these materials may be had. In addition to this, if the standardisation of mica recommended by us is established, it will help in the matter of fixing prices, and thus make it easier for consumers to get their supplies directly from producers in the mica fields.

Before World War I, the foreign trade in Indian mica was carried out almost entirely through the London market, which was the centre of the international mica trade. The Indian exporters used to send their product on consignment for sale by brokers in London who, in consideration of a commission payable partly by the seller and partly by the buyer, used to act as a link between the Indian exporter and the foreign purchaser. On arrival in the United Kingdom, the mica was inspected and valued by the broker and the valuation was reported to the exporter. If the exporter did not accept the valuation, it was open to him to refuse to sell and to wait for a better market. In doing so, however, he was at a considerable disadvantage for, in addition to tying up so much capital for an indefinite period, he had to pay heavy warehouse and insurance charges. The finance for these shipments was generally provided by the "importer" whose function was to advance a certain proportion of the invoice value against shipping documents. London mica brokers with one exception, did not

advance money against shipments; there was one good reason for this, namely that an advance would affect the impartiality of the broker and make him anxious to sell first the mica on which he had money outstanding.

Till Indian exporters had established themselves, the system of brokers was the only one possible. The stock of an exporter of mica consists of a large number of grades and qualities, of which each consumer ordinarily needs only a few. Hence, in order to dispose of his product directly to consumers, the Indian exporter would have had to be in touch with a large number of consumers in foreign countries. On the other side, the consumer would naturally be reluctant to enter into direct transactions with unknown exporters dealing in a commodity so variable in quality as mica, and preferred to deal with known brokers, upon whose inspection he could rely or who could show him the mica which he was asked to purchase. The system was not without its advantages for the exporter. In a falling market it is easy for a dishonest customer on some pretext to refuse to take delivery of the mica, whereas it was to the interest of a broker, remunerated on the commission basis, to get the best price he could for the mica; and, in the contrary case of a rising market, the exporter who sold direct to a consumer stood to gain nothing by the rise, whereas in such a case the broker's valuation would be above the invoice value. The above considerations still prevail, and a considerable amount of the Indian product is even now sent on consignment to London brokers, of whom there are only four of any importance. A competent witness examined by the Committee estimated that about 30 to 40 *per cent.* by value of the total exports are sent out of India by this method. The broker's commission was formerly $2\frac{1}{2}$ *per cent.* from the seller and $2\frac{1}{2}$ *per cent.* from the buyer; it is now generally 2 *per cent.* from the seller and $2\frac{1}{2}$ *per cent.* from the buyer.

As Indian exporters became better known in foreign countries, a system grew up under which they exported mica on definite orders against agreed samples. Initially, this was done subject to inspection and approval, and the price was collected through bankers to whom the shipping documents were sent. Here, again, the shipper was at a disadvantage if the purchaser objected to the supply as being inferior to sample. In that event, either he had to sell the mica at the purchaser's valuation, or hold his stock in expectation of better prices later on, a step open to the disadvantages noted above. The system was subsequently modified and the importer, on placing an order, opened in favour of the exporter an irrevocable letter of credit for 80 to 100 *per cent.* of the invoice value of the mica, negotiable against the shipping documents. Letters of credit for the full invoice value were, of course, given only to established exporters of good reputation. Where the letter of credit was for less than this amount, the balance was paid after the receipt and approval of the mica. Under this system the exporter was in a better position than under the previous two systems, as he was assured of at least 80 *per cent.* of the invoice value of his shipment. This method of doing business still persists. The purchasers fall into two groups. The first group consists of large manufacturers of electrical equipment, and of processors of mica and manufacturers of mica-nite who supply their products to smaller manufacturers of electrical equipment. The second group consists of "middlemen", who import the mica for re-sale. These "middlemen" should be distinguished from the brokers, who do not acquire any interest in the mica, but merely receive the shipment and arrange for its sale in consideration of a commission from the exporter and the purchaser of the mica.

Besides these methods of doing business, there are a few exporters who maintain stocks abroad, either in their own offices or with authorised agents. They are in the best position to get good prices for their mica, since their stock is always available to meet sudden demands, and they have the staying power to stand out for fair prices. So far as we are aware, there are only three such firms, all belonging to Bihar. In addition to doing business in this way, they also employ the method of export against letters of credit. Their export business by both these methods of dealing has been estimated before us at 50

to 60 per cent. by value of the total exports. We have said that the estimated proportion of export on the consignment basis is 30 to 40 per cent.; the balance, about 10 per cent. is estimated to be exported by other exporters on the letter of credit basis.

As long ago as 1928 Mr. Hobson expressed the opinion that the price charged by the mica brokers for their services in the "consignment" business was unreasonably high.* Conditions have changed since then, but the charges of the brokers remain the same. There is another disadvantage to Indian trade in the continuance of this system, namely that the shipper is at the mercy of the broker. According to a trade witness of considerable importance examined by us, the *pro forma* invoice value put on consignments is reduced by the broker in 70 to 75 per cent. of such consignments. It is true that the exported may refuse to sell on the broker's valuation, but there are drawbacks as we have pointed out and, even when he decides to do so, he is still afraid to offend his broker. For instance, one witness related to us how, upon being approached by a shipper whose splittings were lying in London for about two years, he managed to secure an order for them from America, but the shipper was afraid to sell direct. The witness, therefore, had to purchase the splittings from the broker and shipped them himself. Even so, he cleared a profit of 50 per cent. This incident suggests that there are cases in which the shipper on the consignment basis does not get a fair price, and we feel that the low prices obtained by such shippers must furnish a handle to purchasers abroad for forcing down the prices of mica offered for sale by bigger shippers.

Formerly, the position of the broker was very strong, because Indian exporters were not known abroad and the business methods of at least some of them were not above reproach.† This state of things has altered now. Several Indian firms, big and small, have been shipping mica for many years and are well known abroad. Also, the standard of Indian trading has definitely improved. It is significant that, in the memoranda and other intimations received from abroad by the Committee, there has been no complaint against Indian business methods. On the contrary, the Canadian Westinghouse Company Limited and the Mica Company of Canada Limited have expressed their satisfaction with the shipments received by them from India.

Apart from the depressing effect on prices due to mica exported under the consignment system, the prices obtained by Indian mica are prejudicially affected by the unrestricted competition between as many as fifty to sixty large and small Indian exporters, trading independently of one another and each on his own samples. This fact is universally acknowledged in the trade, and the majority opinion in the trade is in favour of some sort of organised trading which will avoid the above disadvantages. We have, therefore, been at some pains to devise such a system. Several suggestions from various sources were received by us and we mention them below:—

1. A central Government selling agency, to whom mica will be supplied by a voluntary association of producers on the basis of established quota of output and fixed standards, at prices arranged by an advisory board composed, in part, of representatives from all the three mica fields. The prices will be fixed with regard both to foreign competition and to the cost of production, with the aim of returning, if possible, a profit of 25 per cent. to the mechanised producers. Such further profit, if any, as might be earned by the selling agency after paying operational costs, will be distributed *pro rata* among the producer members.

*Note on the Marketing and Utilisation of Mica by G. Vernon Hobson, 1928. Bulletin No. 40 of Indian Industries and Labour, page 2.

†Note on Mica by J. Coggin Brown, officiating Superintendent, Geological Survey of India, 1923, Bulletin No. 15 of Indian Industries and Labour, page 17; Note on the Marketing and Utilisation of Mica by G. Vernon Hobson, 1928, Bulletin No. 40 of Indian Industries and Labour, pages 5—6; Handbook of Mica by Ramani Ranjan Chowdhury, 1939, page 315.

2. That Government itself should purchase the entire product, and sell it in the foreign market for such profit as it is able to make.

3. That there should be in India two bodies, one representative of the Indian producers and the other of the foreign purchasers, and that the latter should buy Indian mica through the former, in accordance with a purchase policy and at prices agreed on between the two bodies. The standards of mica will be fixed by the body representative of the buyers, and the delivery of mica will be made subject to inspection by the inspectors of that body. In the case of special mica products not appearing on the general schedule of standards, the body representing the buyers will be free to place the order with any concern it pleases.

4. Marketing on a co-operative basis.

5. A purchasing syndicate consisting of licensed mica miners and processing dealers, which will prescribe standards for and purchase the mica produced in the field paying a basic price fixed by its committee of management, and will sell the mica at a profit abroad. It will also receive orders for special products of mica, and divide or distribute them between members capable of handling these orders. The scheme will be financed by a loan of one crore of rupees from the Provincial Government at an interest of about 3 per cent., repayable either by a percentage contribution by members out of the value of each lot of mica supplied by them to the syndicate, or by the application to this purpose of a portion of the profits made by the syndicate. The profits of the syndicate, after payment of interest on capital and of the instalments towards repayment of capital mentioned above, will be utilised for the provision of research for the development of the industry, the creation of a reserve fund, and the distribution of bonuses to the members. This proposal related to Bihar alone, with a suggestion that similar bodies might be established for the other two areas with some provision for co-ordination between the three areas.

6. A central Board representative of miners and processing dealers, which will fix standards and minimum prices for mica, in accordance with which exporters will be compelled to sell their mica. The Board will maintain a staff of inspectors to inspect the goods and enforce the standards. No shipment will be allowed without a certificate from the Board. Each exporter will be required to report to the Board particulars of each shipment, in order to enable the Board to have complete control over his transactions and activities in the matter of exports.

7. A similar body, which will itself negotiate with consumers abroad, and receive orders which it will distribute among its members. The shipment will be left to the members, but will be made after inspection by the Board's inspectors and the grant of a shipping certificate by the Board.

8. A central body through which individual firms will receive orders from abroad. The negotiations will be made by the individual firms themselves, but the prices at which the mica will be sold will be fixed by the central body.

9. A system of licensed exporters and fixed standards. The licences will be granted initially on the basis of exports made by the firms concerned during a fixed period, and will be liable to be cancelled if exports fall below a certain value. New licences will be granted to firms which appear likely to be able to export up to a certain minimum annual value, and will be liable to cancellation if this minimum is not attained within a certain fixed period.

The only one of these schemes which was suggested in any detail was scheme No. 5, set out in full in Appendix VI. As we were anxious to get the ideas of the trade on the subject of organised marketing, a copy of the detailed scheme was sent to the Madras Mica Association as one of the schemes submitted to the Committee, and the Association was asked to consider the question generally and to favour the Committee with its views on the subject. At the same time, the Committee's assessors representing the Bihar trade were

asked to consult the Bihar trade in the matter and, if possible, to associate the leading Rajputana producers with the deliberations at a suitable stage. In reply, the Madras Mica Association expressed its general agreement with the formulation of a marketing scheme, but refrained from working out the details. It suggested that the Committee should consider the matter on its general principles and broad outlines and make its recommendations and that, after the Central Government had indicated its willingness to take up legislation and the extent of the help which it is willing to give, the drafting of the scheme should be taken up by a committee consisting of representatives of the Government, the Mica Trade and the Mining Industry. The attempt to induce the Bihar trade to make a definite suggestion had a somewhat similar result. At the instance of Mr. Chandmall Rajgaria, Assessor, the question was considered by a joint meeting of the Bihar Industries Association (Mica Section), the Mica Factory Owners Association and the Bihar and Orissa Mica Association, held on the 10th July, 1945. As the meeting could not come to any definite conclusion, no further steps were taken for consulting either the big Rajputana producers or the other important association in Bihar, namely, the Kodarma Mica Mining Association. The final decision of the meeting was that "as the Associations have not had time enough yet to finally arrive at a conclusion regarding the form, constitution and other details of a suitable Marketing Organisation for mica, the Associations are of opinion that the Central Mica Enquiry Committee be requested to leave the question of marketing organisation open for a full and further enquiry by a fresh committee composed of economists and such other persons who may be able to formulate an efficient organisation for the purpose." The Committee was not informed by Mr. Watson, Assessor, whether the matter was considered by the Kodarma Mica Mining Association, of which he is a prominent member. In the above circumstances, the Committee has considered the different schemes for itself, with such help as it could get from its assessors and technical advisers. Unfortunately, during the final discussions on the subject, the only trade representative present was Mr. Chandmall Rajgaria, who rendered great help to the Committee in coming to its final conclusions. At the same time, he made it clear that he was not committing himself to an approval of the scheme finally decided upon and that, in any views that he might have expressed during the discussions on this subject, he was speaking only for himself and not as a representative of the trade.

We shall begin by a consideration of scheme No. 5, that is to say, the only scheme which was submitted in detail to the Committee. We understand that there were three principal reasons which were urged against the practicability of this scheme in the joint meeting of the three Associations.

Firstly, it was felt that the natural effect of a scheme which provides a purchaser for all mica that might be produced will be to stimulate production. Hence, it is necessary to fix production quota for different producers. Now, in mica, there are several uncertain factors determining the rate of output from the mines, and the regulation of output is a very difficult matter indeed. Also, as between several producers, it is not easy to fix a principle on which separate quota can be allotted. This question was put by the Committee to the author of the scheme when he was examined as a witness. His reply was that, to begin with, there will be no quota. They will be fixed later, say after six months, on the basis of the experience of the working of the scheme. Another suggestion made by the witness was that the quota would be fixed on the basis of the average annual production of the miners taken over a number of years. It appears to the Committee that, if the determination of the quota is made dependent on the working of the first few months, there will be a race between the different producers during this time, which will give an entirely false picture of the proper production of the different firms. It is, further, difficult to see how it will be possible to fix quota for new entrants into the trade. This difficulty affects, also, the other suggestion, namely, that quota should be based on average past production. Further, this method of determining quota is

likely to kill individual initiative, for it is difficult to see how a determination of quota based upon averages of past production can make it possible for a firm, which is more efficiently run than other firms, to progress proportionately to its greater efficiency. The second objection, which weighed strongly against the scheme, related to finance. The original draft of the scheme suggests that a capital loan of Rs. 1,00,00,000 will be sufficient. In his evidence, however, the author admitted that in adverse circumstances the capital necessary might be as much as five crores. Placing the amount necessary at three crores, the annual interest on this sum at the rate of 3 per cent. would be Rs. 9,00,000. Adding to this amount, an annual expenditure of Rs. 2,00,000, likely to be incurred as the working expenses of the syndicate, the total amount represented by these two items alone comes to Rs. 11,00,000, that is to say, 11 per cent. on Rs. 1,00,00,000, which is the expected normal annual value of the exports. This heavy sum, it was felt, would be a big handicap against the successful working of the scheme. Thirdly, it was felt that the scheme would lay an undus amount of responsibility on the managers or directors entrusted with the sale of stocks of mica kept by the syndicate in foreign countries, and that an efficient supervision of the operations of such managers or directors would be difficult. Another weighty objection to the scheme was elicited during the examination of the author as a witness, namely, the provision for ten whole-time directors of the syndicate, who will be representatives of the full members. As whole-time directors they must be paid by the syndicate and their remuneration will be a heavy item of expenditure. This, however, is a minor consideration as compared with the improbability of the full members being able to spare their best men from their own business to work on the committee of management of the syndicate. In consequence, it is likely that they will send their less able men, and that the management of the syndicate, responsible for marketing the entire product of the field, will be in the hands of second-rate men.

We turn now to the other schemes mentioned above. As details of the schemes were not given to the Committee, it is possible that in some instances we have not understood fully the intentions of the proposers and that our criticisms might be, for that reason, unfair.

Scheme No. 1 is in a sense a variant of scheme No. 5 which has been discussed above—the place of the Syndicate being taken by a central Government selling agency, and a voluntary association of producers being substituted for compulsory membership of the Syndicate. The scheme is open to the same difficulties as scheme No. 5 with regard to finance, the fixing of quota and the management of stocks of mica in foreign countries. Further, the Committee is doubtful whether, in the present state of the relations between the principal producers of mica in India, a voluntary association of this sort can be effected. The scheme makes no provision for a loss in the transactions of the selling agency, and does not indicate who will bear such a loss.

In scheme No. 2 it is proposed that Government itself should take the place of the Syndicate, and that, unlike the Syndicate, it should trade on its own account and not on behalf of the producers of mica. The scheme was condemned by all the witnesses to whom it was put. The demand for mica is very uncertain and varying, and dealing in mica is a highly specialised business, for which Government servants are not fitted by their training and experience. Under the scheme, Government will have the monopoly of the purchase of mica in India for export purposes; but no indication is given how the price at which Government will purchase is to be fixed. Further, as the monopoly purchaser, Government will be under a moral obligation to purchase the whole product, and there is a danger of over-production unless quota are fixed. The scheme is, therefore, open to the already noted difficulty regarding the fixing of quota. We think that this scheme can only be justified if Government makes itself responsible for the production and processing of mica in India in addition to the marketing of it abroad; that is to say, if the mines are nationalised.

Scheme No. 3 is on the lines of the Joint Mica Mission, which for over three years since August 1942 purchased mica in India on behalf of the Allied Nations. The presence at one place of organisations representing the buyers and the sellers will simplify the problems of standardisation and, so far as the sellers are concerned, eliminate altogether complaints about sub-standard supply. It is unlikely, however, that one body can be formed representative of buyers in all foreign countries wanting Indian mica. Even if we were concerned only with the United Kingdom and the United States of America, it is doubtful if this would be possible, for all the memoranda received from abroad indicate that foreign purchasers are anxious to get back to the previous system of free trading.

One suggestion for marketing on a co-operative basis was that there should be a central co-operative processing factory, which will classify, grade, pack and ship all mica mined in Bihar. It is contemplated that, in such circumstances, Bihar mica will come to have a recognised hall-mark in the world's markets, and can be disposed of direct to the ultimate consumers through the Co-operative Association's own agents appointed in the different centres of distribution. It is very unlikely that an association on this scale can be effected voluntarily, and it is probable that any attempt to effect it by means of legislation will be defeated by the impossibility of determining the extent of the share in the co-operative business of the different firms entering into the association. A second proposal for co-operative trading says: "I am, however, in favour of a *voluntary co-operative system of marketing* under Government (Central) or State patronage and control. Standardisation of mica (both in quality and size) should be the condition precedent for such co-operative marketing. Indian mica can be marketed abroad profitably through a joint body of official and non-official trade advisers to the Government of India. I would also suggest that the desired object can be achieved if the principal interests in mica are merged together voluntarily in the form of a merger company for the purpose of marketing mica. The mining side of each individual firm or member should be kept separate and the road should be kept open for individual enterprise." This proposal assumes that a voluntary association of the mica producers is possible—a supposition which the Committee's experience of conditions in the trade does not warrant as correct. The suggestions as regards marketing abroad are too vague for discussion. A third suggestion, which was thrown out in the course of the examination of witnesses before the Committee, was that a number of small producers might combine and form a co-operative society, and thus place themselves on a level with bigger producers and trade on equal terms with them. It appears to us that this is a feasible idea, but it is within the competence of the Provincial Registrars of Co-operative Societies, and does not call for further discussion by this Committee.

Scheme No. 7, for a central Board which will itself negotiate with consumers abroad and distribute between its members the orders received by it, has to solve a very intricate problem, namely, the devising of some principle for a fair distribution of the orders between the members. The problem is similar to the above discussed problem of the fixing of quota. Supposing this problem to have been solved and an order to have been made over to a particular member, it will then be for that member to comply with the order. Apparently, the customer abroad will have no say in determining which particular producer will make the supply. Inspection of the mica exported will be made by the Board's inspectors, but the ultimate responsibility for supply up to standard will rest on the member making the supply. No suggestion was made that the Board itself would assume the responsibility for sub-standard supplies. In these circumstances, Indian mica would be at a disadvantage as compared with mica coming from foreign sources. Further, this scheme would not permit big producers to keep stocks abroad in order to supply sudden demands as soon as they arise. In this respect, also, Indian producers of mica will be placed at a disadvantage as compared with producers abroad.

Scheme No. 8, for a central Board through which individual firms will receive orders from abroad, empowers the Board to fix the prices although the negotiations for business will be made by the firms themselves. It is unlikely that purchasers abroad will willingly enter into business on these terms, and the probable result will be a secret understanding between the parties which will be given effect to by means of rebates or some such device, in spite of the price fixed by the Board. Bigger exporters are likely to avoid the control of the Board by keeping stocks abroad and, if this is forbidden, foreign mica will be put in a better position to compete with Indian mica.

Scheme No. 9, for licensed exporters and fixed standards, is merely an attempt to keep the Indian export trade in the hands of a few responsible exporters, and thus to limit the competition between Indian producers in the foreign market. It combines the minimum of control with a free scope for individual enterprise in the marketing of mica. The scheme which we propose below combines some of the features of this scheme with those of scheme No. 6, which is the basis of our proposal.

Our scheme, set out in appendix VII below, provides for the export of Indian mica by registered exporters under the control of a Mica Marketing Control Board. The Board will consist of three Government members representing Bihar, Madras and Ajmer-Merwara, and nineteen trade members, of whom eleven will represent Bihar, five will represent Madras and three will represent Rajputana. The Government members will be paid their salaries and allowances by their respective Governments, but the trade members will work in an honorary capacity and will not get any allowance for their work on the Board except their out-of-pocket expenses for journeys outside their respective Regions. The business of the Board will be so intimately connected with the respective businesses of the trade members that they should not grudge giving their services free. In a board of this kind the predominance must be given to the trade. Hence, we have proposed not only an overwhelming majority of trade members, but also a President of the Board who will be a trade member. The number of these trade members may appear somewhat large but, if the Board is to command confidence, it must be fully representative of the three mica-producing areas. The representation of Rajputana by trade members will be necessary only if the bigger producers of mica among the Rajputana States come into the scheme. The relative importance of Ajmer-Merwara and the Rajputana States will appear from the table below, showing the annual output of dressed mica from these areas from the year 1920 onwards:—

Annual output of dressed Mica, in cwts.

Year	Ajmer-Merwara	Rajputana States	Total
1920	2,086	..	2,086
1921	1,872	..	1,872
1922	632	308	940
1923	539	640	1,179
1924	509	355	864
1925	402	316	718
1926	538	153	691
1927	971	293	1,264
1928	539	343	882
1929	311	141	452

Year	Ajmer-Merwara	Rajputana States	Total
1930	284	208	492
1931	185	100	285
1932	177	70	247
1933	326	70	396
1934	387	151	538
1935	384	160	544
1936	1,496	95	1,591
1937	2,034	780	2,814
1938	1,684	3,252	4,936
.	2,338	6,801	9,189
1940	1,842	25,741	27,583
1941	9,910	29,174	39,084
1942	11,596	32,763	44,359
.	7,107	27,866	34,973
1944	3,275	23,725	27,000

If the States keep out of the scheme, Ajmer-Merwara will be sufficiently represented by the Government member. We have suggested Calcutta for the office of the Board, *firstly* in order to avoid possible jealousy between the three producing areas, and *secondly* because this is the biggest mica exporting port in India at present and, for many years to come, the bulk of the Board's work can most conveniently be performed there. We think it possible that the trade may agree to locate the office in the Bihar area, preferably at Kodarma, and that this location would make for more economical working.

In the selection of the trade members, we have given special weight to the big exporters and have proposed the nomination by them of as many as nine trade members. These members will provide experience and skill backed by a due sense of responsibility and, for the sake of their own business, will see that nothing is done which is likely to injure Indian trade interests. At present, there are no exporters in Rajputana with the qualifications necessary for making a nomination. Hence, we have suggested that, in the absence of such exporters, the nomination may be made by the biggest miners. The remaining trade members will be elected in Bihar and Madras by the registered exporters, and in Rajputana by the registered exporters and miners. So as to keep the franchise in the hands of responsible exporters, and to prevent the sudden registration of new exporters to influence a particular election, we have suggested that the vote in Madras and Bihar will be exercised by exporters who have been registered for at least three years and who have exported in that period mica worth not less than Rs. 10,000. The provision is necessarily not so rigid in the case of Rajputana, but insists that there also the exports or the output, as the case might be, must be worth at least Rs. 10,000 in the preceding three years.

The ordinary term of appointment of the members will be three years, but in order to avoid rigidity alternating with a sudden change owing to the simultaneous retirement of all the members at the end of this period, we have provided that about one-third of the trade members will retire every year. This gradual change will also enable the voters in Bihar and Madras to exercise more

the Scheme will ensure to them the supply of the quantity and quality of mica which they want. The success of the scheme, therefore, will depend on a whole hearted co-operation between Indian exporters and the Board's Inspectors to give delivery exactly according to specification; and it is important that the Board's Inspectors shall be well enough paid to be above temptation. We contemplate that their remuneration will be in the region of Rs. 800 to Rs. 1,200 a month. In order to attract an officer of the requisite capacity for the post of the Executive Officer of the Board, we think that the pay of the post should be not less than Rs. 2,000 to Rs. 3,000 a month.

We regret that circumstances compel us to submit the above scheme for the consideration of the Government without having first discussed it with representatives of the trade in the three producing areas. This was unavoidable because, being still new to the industry at the time of our tours, we could not draw up a scheme and witnesses found it difficult to express their views without a concrete proposition before them. We have no doubt that, before action is taken on our recommendations relative to this point, the trade will be given an ample opportunity of expressing its views.

CHAPTER XI

Mica Mining Classes

In chapter four we have recommended that every mica mine, after it reaches a certain stage, must have a technically qualified manager. In view of the number of small mine owners in the mica industry and the narrowness of the margin of profit at which some of the mines operate, it is not practicable to insist that the manager shall be a qualified mining engineer. Having regard to this and to the fact that the problems in mica mining are generally smaller and fewer than in other types of mining, several competent witnesses examined by us have agreed that the proper solution is the establishment of special classes to train managers for the mica mines. The proposed remedy also appeals to the Madras Mica Association, which, in its report for the year 1944-45, says: "We have a desire to point out the need for establishing a school for training managers of Mines. We do not aim at very high training and great technical skill for them. Elementary knowledge of mining and metallurgy capacity to control labour, first-aid training, a bit of underground survey, the common principles of mensuration and acquaintance with small machinery are just the requirements of a Manager. We do not expect high technical skill and deep knowledge of Mining as is imparted at Dhanbad or in the Benares Hindu University. We feel that a student with S. S. L. C. educational qualifications and two years training would be suitable for our purposes. We earnestly suggest to the Madras Government that a school for training of Managers might be established at Gudur in the post-war reconstruction period."

We would like the classes to be made as practical as possible and to be situated in an area where mica mines, run on the most approved lines, are readily available for the instruction of the pupils, and it appears to us that the best centre for such classes would be in the vicinity of Kodarma in the Province of Bihar. Government scholarships or payment of expenses by the mine-owners will be necessary to attract students to the mining classes from other Provinces. The extra cost, which the mine-owners or the Provincial Governments would incur in sending students to Bihar for training, would, in our opinion, be amply paid for by the saving of the cost for the running of separate classes for those areas, and by the superior instruction which can be imparted at a central institution. In the case of Madras, owing to the difference in language and climate and in the mode of living, it is possible that students, particularly of the non-matriculate type, will be unwilling to come to Bihar. If this difficulty is experienced and a sufficient number of students from this area is not available, separate mining classes may be established with the help of the local Inspectors of Mica Mines and such other teaching staff as may be necessary.

The teachers in these classes, should also be practical men and, for this reason, it is our recommendation that the instruction should be imparted by the staff of the Inspectorate of Mica Mines stationed in Bihar. These officers will be in daily touch with the mines operating in the area, and will have an up-to-date knowledge about the problems and difficulties arising in them. Also, by means of transfers from one area to another, the knowledge of the difficulties and problems arising in the other two areas will be acquired by the teaching staff of the school. Our proposal, therefore, is that the Chief Inspector of Mica Mines shall be the Principal, and the Inspectors stationed in Bihar the staff of the Mica Mining Classes.

We set out below our suggestion for a curriculum for these classes:—

Breaking Ground

Common methods of breaking. Rock drilling—by hand labour; by compressed air, portable and stationary compressors; dry and wet drilling. Placing of holes. Blasting; explosives used, their composition, properties and uses; permitted explosives; misfires and blown-out shots.

Timbering

Common methods of support—props, cribs, stulls; shaft and drift timbering; waste rock filling; materials used; decay and preservation of timber.

Haulage and Hoisting

General haulage methods. Rails and methods of laying. Tramways. Mine cars and tubs. Self-acting inclines. Windlass; hoisting engines. Ropes and rope fixing, rope capping; care, examination and treatment of ropes; detaching hooks. Buckets, skips, signals, headframes and pulleys.

Drainage

Sources of mine water. Prevention of inflow; drainage levels and sumps; draining tunnels and adits. Types of pumps, hand, lift and force, steam, single and duplex, pulsometer, centrifugal, electrical. Elementary calculation of dimensions and capacity of pumps. Location of pumps.

Geology

General Geology, dip and strike, faults, folds, pitching, etc. Elementary Metamorphic Geology. Theories regarding origin of pegmatites. Different types of pegmatites. Mica schists. Mineralogy of mica and associated minerals. Geological maps and sections.

Surveying

Plane table surveying. Fast and loose needle dial surveying. Levelling. Plotting. Section drawing.

Mine Sanitation etc.

Composition of atmosphere. Pollution of mine air. Common methods of mine ventilation; splitting air currents; natural ventilation. Common methods of lighting. Simple practical electric wiring. Mine hygiene and medical care. First Aid.

MACHINE CARE AND REPAIR

Processing and Prices of Mica

Crude mica. Rifting. Sickle dressing. Grading. Sorting. Splitting. Specialities and manufactured mica. Prices of mica.

Economics of Mica Mining and Administration of Mines

Mining accounts. Costs of mining; possible sources of loss; methods of controlling and reducing costs. Relations between superior and subordinate staff; discipline; methods of control.

Legislation affecting Mica Mines

The Indian Mines Act, 1923 (IV of 1923). The Workmen's Compensation Act, 1923 (VIII of 1923). The Payment of Wages Act, 1936 (IV of 1936). The Mines Maternity Benefit Act, 1941 (XIX of 1941). Relevant Rules and Regulations under the above Acts.

The inclusion of most of the above subjects explains itself. Only two items call for remark. An elementary knowledge of Geology with particular regard to pegmatites will help the mine manager to understand the behaviour of the vein, and to interpret better peculiarities such as faults, folds etc. It will enable him to record necessary geological details on the mine plans, and to include them in the history of the mine and his reports relating to the mine, so that this valuable information will be available for future workers in the same pegmatite. The mine manager will not ordinarily have anything to do with the processing and marketing of mica. A knowledge of what happens there is necessary, however, for the next item in the curriculum, namely, the Economics of Mica Mining. The inclusion of the Processing and Prices of Mica as a subject for study is, also, intended to open to the student the ultimate prospect of becoming a general manager of his concern, controlling both the mines and the processing factory. The qualifications that we contemplate for the students, who will be admitted

to these mining classes, are of two kinds. The first kind will be academic. The student must have passed the Matriculation examination of an Indian University or some equivalent examination; he must be at least 19 years of age, and physically fit. We were at first inclined to insist that the student must have passed the Matriculation in the first or second class at least. We gave up this idea for two reasons; firstly, because it is a general experience that students who do well in the Matriculation examination continue their studies in the college classes; and secondly, because it is often seen that students who pass in the higher classes are young men of the studious type, who are not of the constitution and temperament required for a mining engineer. The type of man that we want for this work is one strong in constitution and physique, who is prepared to do hard manual labour. Our insistence upon his having passed the Matriculation examination is intended to ensure that he shall have a sufficient general education to be able to understand and profit from the teaching given in the Mica Mining Classes.

As another method of ensuring that we get men of the right type for these classes, we would insist that, for the first six months previous to the commencement of the theoretical work, the student will receive practical training in a mica mine under an approved manager. This training should not be confined merely to seeing the type of work that is done there. It should include the actual doing of all types of work ordinarily done by the labourers employed in the mine. Not only is it our intention by this means to weed out the weaklings, whom we consider unfit to work as mining engineers, but we think that it is only by actually doing the work themselves that these students will be able to understand the various difficulties that arise in the work, and to appreciate the instruction bearing upon these difficulties given later on in the theoretical classes. Secondly, we have a further object in insisting upon these students doing manual work, namely that, when these students qualify to work as mine managers, they will have to control and direct the operations of mine labour; we feel that they can only do this satisfactorily, if they can themselves do the work expected from the labour, and can give the latter practical demonstrations, and not merely theoretical instructions, on how the work should be done.

Following this period of six months' practical training, the student will attend the theoretical classes. This teaching should be illustrated freely by demonstrations of the actual working of different mines. The theoretical training should occupy six months and, after this period, the student will be expected to do practical work for two years as a shift-boss or assistant manager under an approved manager in a mica mine; of this period at least six months should be in the Bihar field. The examination to determine his capacity to take charge of a mine should be held at the end of this period of practical work.

The other qualification, which we contemplate, is one of experience. The student must be literate, and must have worked as a mine manager, assistant mine manager or shift-boss for at least five years in a mica mine, and must be recommended for admission to the classes by a licensed mine-owner, in whose service he has been working in one or other of these capacities for the two years immediately preceding his application for admission. Such a student will be admitted to the theoretical classes without the preliminary practical training of six months, but will only be permitted to appear in the examination after a lapse of one year from the termination of the theoretical training, during which period he must have continued to work in one of the above capacities; of this period of one year at least six months must be in the Bihar field. The idea of insisting upon this further period of work for one year is to enable the student to apply, and thus thoroughly absorb, the theoretical training received by him.

We hope that by recruiting the students from both the above sources, it will soon be possible for every mica mine which has reached the stage above indicated to employ a technically qualified manager.

CHAPTER XII

MICA LABOUR

Mica labour is not specifically mentioned in our terms of reference but is covered by item (ix), "any other matter of importance as may be brought to the notice of the Committee". As this question, with regard to Indian industries generally, is already being investigated by another Committee constituted by the Government of India,* we have not made a detailed investigation of the subject, and shall confine ourselves to general recommendations on a few points.

Wages.

The first item that calls for remark is the low level of the wages paid as compared with wages in other industries. On the mining side, this is largely due to the labour being casual labour, dependent partly on earnings from this industry and partly on agriculture. On the factory side, the reason is the easy nature of the work coupled with the fact that, not only the men, but also the women and children are employed, and a further income is furnished by home splitting done in the labourers' cottages. We think that this state of things, both on the mining side and on the factory side, calls for remedy. The mine workers come and go according to the needs of agriculture and, since they work continuously only for short periods, there is nothing to bind them to a particular mine or a particular mining company; the labour force of the mine is thus in a continual state of change, and the introduction of advanced methods of mining is difficult. The low rate of the wages paid and the casual nature of the labour employed form a vicious circle. On the one side, the wage is low because the labour is casual and inefficient; on the other side labour of a permanent nature is not attracted because the wage is low. An attempt must be made to increase the remuneration, and this should be done in some way which will connect the increase with the length and the continuity of the service rendered. On the factory side, the lowness of the wages is largely responsible for the open employment of children contrary to the provisions of the Employment of Children Act, 1938 (XXVI of 1938), a state of things which calls for early remedy. In increasing the remuneration of the factory workers, consideration should be paid to another aspect of their work. Unlike other minerals, mica is not capable of refinement; it must be used in its natural state, and processing is confined to the removal of the worst flaws. In consequence, damage done by bad cutting can not be repaired, and carelessness on the part of the workmen results in great loss to the factory owner. An immense saving to the factory owner and to the nation would be effected if, in addition to increasing the general scale of wages, some connection is established between the pay obtained by an individual worker for a particular period and the quality of the work turned out by him during that time.

Another factor responsible for the lowness of the wages is the low price hitherto obtained by mica in the foreign market. If the trade can be organised as we have suggested above, and if the competition between Indian exporters can be kept within limits, it should be possible to obtain higher prices. In fixing its minimum prices the Marketing Control Board will, necessarily, have to keep an eye on possible foreign competition; but without forgetting this necessity, it should also give due weight to the need for paying adequate wages to labour. It would be better for India's position in the foreign market, however, that the increase in the wages, both on the mining side and the factory side, should come from an increase in the efficiency of the labour as well as from an increase in the price of the exported product.

In the course of our enquiry, reference was made to a demand on the part of Indian labour for a basic wage. This is a question which concerns all Indian industries generally and goes beyond the scope of our investigation.

* Government of India, Department of Labour. Resolution No. L4012, dated the 12th February, 1944.

Housing Accommodation.

Another device in the building up of a permanent labour force is the provision of good housing accommodation with other necessary amenities, such as drinking water, facilities for marketing, good communications and so on. The housing accommodation provided at several of the mica mines consists of straw huts or sheds constructed with twigs and dry leaves. These are used only by labour which comes from a large distance; most of the labourers prefer to live in their own houses, even if they are several miles away. The answer, rightly given by most of the witnesses to the suggestion that good housing accommodation should be provided at the mines, was that this is not economically possible because of the uncertain life of the individual mines. The solution would appear to be the provision of suitable housing in central areas, combined with good communications and means of transport to and from the mines. Provision of this kind can not be expected to be made by individual miners.. It must come out of the general welfare fund which we shall recommend elsewhere. In this connection, two or three employers of labour have deposed that the provision of houses will not solve the difficulty, because labour prefers to live in its own houses. These witnesses told us that to their knowledge labourers have refused to occupy suitable houses built for them by the firms with which the witnesses were connected. The question of suitability is one of opinion. Unfortunately, the Committee was not able to inspect the houses referred to; but it can not believe that labourers would be unwilling to occupy the houses in question, if there was really no disadvantage attached to them. The proper inference to be drawn is that in the designing, locating and construction of houses out of the welfare fund, care must be taken to associate persons who are in a position to understand the needs of the labouring classes. So far as factory labour is concerned, it is not the practice for the factory owners to provide housing accommodation. It has been represented to us that the housing accommodation available for labour in the factory centres is very unsatisfactory. These representations were not made to the Committee when it visited the factory areas and, therefore, the Committee can not speak from personal knowledge about the conditions. It feels, however, that the matter can safely be left in the hands of the authorities responsible for the administration of the welfare fund.

The Mines Maternity Benefit Act, 1941 (XIX of 1941)

Under the provisions of clause (j) of section 29 of the Indian Mines Act, 1923, the employment of women underground has been forbidden since 1st July, 1929. It is permissible to employ them in open workings and at the surface; this is still done, as will appear from the table below compiled from the annual reports of the Chief Inspector of Mines in India :—

Average Daily Number of Workers at Mica Mines Governed by Indian Mines Act

Year	Number of Workers									Grand Total	Remarks
	Underground			Open Workings			Surface				
	Males	Females	Total	Males	Females	Total	Males	Females	Total		
1	2	3	4	5	6	7	8	9	10	11	12
1926 . . .	7,616	2,850	10,466	2,806	1,461	4,267	2,193	915	3,108	17,841	
1927 . . .	9,875	3,070	12,945	2,808	1,243	4,051	2,005	852	2,857	19,853	
1928 . . .	9,894	2,677	12,571	2,567	801	3,368	1,643	655	2,298	18,237	
1929 . . .	8,516	1,483	9,999	2,577	1,005	3,582	2,020	954	2,974	16,555	
1930 . . .	10,284	...	10,284	2,909	1,634	4,543	2,095	1,144	3,239	18,066*	*With effect from 1st July 1929 employment of women in mica mines was prohibited.
1931 . . .	8,420	...	8,420	3,453	602	4,055	1,769	706	2,475	14,950†	†Low prices and small demand reacted on mica industry.
1932 . . .	6,232	...	6,232	3,526	317	3,843	1,200	731	1,931	12,006	
1933 . . .	8,898	...	8,898	1,406	379	1,785	1,254	622	1,876	12,559	
1934 . . .	10,730	...	10,730	2,326	546	1,785	1,620	731	2,351	15,033	
1935 . . .	14,673	...	14,673	2,703	788	1,952	3,841	1,103	4,944	23,108	
1936 . . .	15,850	...	15,850	3,831	804	3,491	3,037	1,574	4,611	25,096	
1937 . . .	16,984	...	16,984	5,805	1,138	4,635	3,701	1,635	5,336	29,263	
1938 . . .	16,824	...	16,824	5,760	1,264	6,943	4,361	1,950	6,311	30,159	
1939 . . .	17,868	...	17,868	6,242	1,671	7,024	4,677	1,663	6,330	32,111	
1940 . . .	21,938	...	21,938	6,632	1,523	7,913	4,980	1,568	6,548	36,641	
1941 . . .	29,257	...	29,257	9,095	2,718	11,813	6,112	1,726	7,838	48,908	

Their employment is subject to the Mines Maternity Benefit Act, 1941, enacted to regulate the employment of women in mines for a certain period before and after child-birth, and to provide for the payment to them of maternity benefit. This Act came into force on the 28th December, 1942, but the Committee found no instance of the application of the Act in any mine. The explanation, given by a member of the trade of considerable standing, that in consequence of the prohibition in 1929 women are not employed at the mines, is shown by the above figures to be incorrect; and the Committee would suggest that the Act should be strictly enforced. It understands that action in this direction is already being taken by the Indian Mines Department by increasing the number of the Labour Inspectors under that Department. It may make enforcement in the mica mines easier if besides this, the staff of the Inspectorate of Mica Mines are appointed Inspectors for the purposes of this Act. In this portion of their duties, of course, they will work in subordination to the Chief Inspector of Mines.

Employment of Children and Adolescents.

The Indian Mines Act defines a child to mean a person who has not completed his fifteenth year, and forbids, not only his employment in a mine, but even his mere presence in any part of a mine which is below ground. It also places restrictions on the employment of adolescents, that is to say, persons not less than fifteen but less than seventeen years of age. Such a person may not be present in any part of a mine which is below ground, unless a certificate of fitness in the prescribed form granted to him by a qualified medical practitioner is in the custody of the manager of the mine and the adolescent carries, while at work, a token giving a reference to such a certificate. Apart from this, an adolescent is subject to the same restrictions as to the hours of employment as an adult worker. These hours may extend above ground to as much as ten hours a day and 54 hours a week and, below ground, to nine hours a day and 54 hours a week, with, in both cases, rest for one day in every week. It appears to us that the limit is excessive in the case of adolescents, and we would suggest that the hours of labour for such persons be limited to eight hours in one day, which is the ordinary period of a shift, and their employment be restricted to the less strenuous forms of labour. The Indian Mines Act, as it stands at present, makes no provision for restricting the labour of adolescents in either of these ways.

The only Act, expressly governing the employment of labour in the mica factories, is the Employment of Children Act, 1938 (XXVI of 1938), as amended by the Employment of Children (Amendment) Act, 1939 (XV of 1939). It prohibits the employment, in a mica factory, of a person who has not completed his twelfth year, but places no restriction on the conditions of employment or hours of work of persons above that age. In actual practice, the Act is completely ignored. We would like to see the Act enforced as early as is practicable, but the enforcement of the Act will require the provision of some occupation for the children, who will thereby be set free during the factory working hours. The only definite proposal placed before the Committee for this purpose was made in outline as follows:—

“(a) Maximum period in a day during which children may be in factory premises—7 hours.

(b) Maximum period of work—5 hours.

(c) During the balance of two hours, $\frac{1}{2}$ hour to be rest or play and $1\frac{1}{2}$ hours to be instruction in properly designed schools with proper teachers to the satisfaction of Government.

(d) For the $1\frac{1}{2}$ hours instruction time-rate should be paid equivalent to the average piece-work earnings of the hours of work, that is to say 25 per cent. addition to earnings should be made.”

The proposal came to us too late for discussion with the witnesses, but we have consulted the Assessors and Technical Advisers regarding it. We think that there are two serious objections to the scheme. To begin with, it appears to us that it places upon individual factory owners a responsibility which

should lie on the Government, or upon the trade as a whole. Only the bigger factory owners will be able to maintain schools of this kind and, as the earnings of the children will supplement those of the adult members of the family, such factories will be at an advantage as compared with smaller factories; but, as the factory owner will have to pay each child 25 *per cent.* above the piece-rate value of the work done by him, it is doubtful if the children would find employment. Next, it is felt that the period proposed for instruction is insufficient. We would prefer to see central schools, maintained by Government or from a general welfare fund, where the children will be instructed and looked after during the factory hours. The hours of instruction should be at least three to four, according to the age of the children; and, in order to prepare the children for work in the factories, some time may be given to work of the sort now done by children in the factories. The children may be paid a low piece-rate so as to induce them to take a sufficient interest in this work. The schools should be open to children between the ages of six to twelve. Besides the arrangement for looking after these children during the factory hours, provision should be made for giving them one light meal during the day. The profits, if any, from the sale of the piece-rate product turned out by the children may be applied for this purpose, but care will have to be taken that this is not made a reason for exploiting them. The ultimate responsibility for providing the meal for the children must, of course, lie on the general welfare fund.

The Factories Act, 1934 (XXV of 1934), and the Central Provinces Unregulated Factories Act, 1937 (C. P. Act XXI of 1937).

The Employment of Children Act, 1938, merely prohibits the employment in mica factories of children below the age of twelve. Labour conditions in the mica factories call for more regulation than this, and a model for such regulation is provided by the Central Provinces Unregulated Factories Act, 1937, itself based on the Factories Act, 1934. The Central Act applies primarily to industrial establishments which in addition to employing twenty or more workers in one day, use power for some manufacturing process. The Provincial Act is intended to apply to certain specified industries which do not use power, and applies in the first instance to places where 50 or more workers are employed in one day, provided that the Central Act does not apply; the Act also contains a provision for applying it to any place or class of places wherein a manufacturing process or handicraft is carried on and wherein 25 or more workers in one day are employed, provided that the Central Act does not apply. The Provincial Act is necessarily on much simpler lines than the Central Act and omits a large number of sections which are properly applicable only to big industrial establishments or industries using power. Apart from these omissions, the main differences between the two Acts are as follows:—

1. The Central Act provides for a fifty-four hour week for perennial and a sixty hour week for seasonal factories. The Provincial Act permits a sixty hour week.

2. The Central Act forbids the employment in a factory of a child below twelve years of age. It permits a child of twelve or more and an adolescent, that is a person between 15 and 17 years, to work in a factory with a certificate of fitness; a child may not be employed for more than five hours a day, and the same restriction applies to adolescents unless they are certified as fit to work as adults. The Provincial Act permits the employment of persons not less than fourteen years of age without any special restriction; persons between 10 and 14 years of age may be employed subject to a certificate of fitness, but not for more than seven hours in one day or six days in one week.

3. Under the Central Act, the hours of employment for women are restricted to ten in one day as for male workers. Under the Provincial Act, the hours of employment are limited in the case of women to nine hours in one day and in the case of men to ten hours.

4. The criminal fines for offences against the Central Act are, speaking loosely, subject to a limit of Rs. 500. Under the Provincial Act, the limit is Rs. 200.

Under section 5 of the Factories Act, it is possible for the Provincial Government to apply the Act, or particular portions of the Act, to mica factories, but we think that it would be preferable to have a special Act on the lines of the Central Provinces Unregulated Factories Act, primarily applicable to factories employing fifty workers in one day. We would prefer the working hours, however, to be kept at 54 hours in the week, and the scale of penalties to be Rs. 500 as in the Central Act. As regards children, we have already expressed our opinion in favour of enforcing the prohibition of the employment of children under twelve years of age, as provided in the Employment of Children Act. In addition to this, we would like to see the employment of children, not less than 12 and less than 16 years of age, made subject to a certificate of fitness, and the hours of work limited to five hours per day, except in the case of children, not less than 15 and less than 16 years of age, certified as fit to work as adults (*vide* sections 52 and 54 of the Factories Act, 1934). With regard to the number of hours of employment in one day we see no reason for a distinction between adult men and women in mica factories, and would limit them to nine hours in the case of both. In modification of section 5 of the Central Provinces Act, we would empower the Provincial Government to make the Act or any portion thereof applicable to a factory employing twenty workers per day, and would recommend that, in exercise of this power, the provisions of the Act regarding the keeping of registers of workers and the submission of returns should be applied to mica factories employing this number of workers. Such action would bring the provisions with regard to mica factories into line with our recommendations regarding the keeping of registers of workers and the submission of returns of labour in respect of mines and factories employing not less than twenty labourers in a day. Finally, we would incorporate in the Act a provision corresponding to section 30 of the Factories Act, 1934, requiring notice to be given to the authorities of certain accidents.

The Workmen's Compensation Act, 1923 (VIII of 1923)

Under clause (iii) of Schedule II to the Workmen's Compensation Act, 1923, the Act applies to a mica factory in which on any day in the preceding twelve months 50 or more persons were employed, and, under clause (v) of the Schedule, it applies to a mica mine, except one in which on no day of the preceding twelve months more than 50 persons have been employed, or explosives have been used, and whose depth from its highest to its lowest point does not exceed 20 feet. The principle upon which the application of the Act has been limited to some of the mines and factories is not clear to us; we think that it should apply to all mines and factories.

The Payment of Wages Act, 1936 (IV of 1936)

The Payment of Wages Act, 1936, applies in the first instance to the payment of wages to persons employed in any factory, meaning thereby a factory as defined in clause (j) of section 2 of the Factories Act, 1934; but, under the provisions of sub-section (5) of section 1 of the Act, it may be applied to the payment of wages to any class of persons employed in any "industrial establishment" or any class or group of "industrial establishments". The term "industrial establishment", as used in the Act, includes a mine, and also a workshop or other establishment in which articles are produced, adapted or manufactured, with a view to their use, transport or sale. There is no difficulty, therefore, in the application of this Act to the payment of wages to persons employed in mica factories and mica mines. We would recommend its application in respect of such mines and factories employing not less than twenty labourers in a day. This recommendation is on the lines of our recommendations regarding the keeping of registers of labour and the submission of labour returns. in respect of such mines and factories.

SILICOSIS

Another subject regarding labour which has come under our consideration in the course of the enquiry is that of silicosis. Perhaps it would be more correct

to speak of pneumoconiosis*, but, as the term "silicosis" is more familiar to laymen, and is commonly used as a generic term to connote dust-caused diseases of the lungs, we shall continue to use it in this general sense. Persons occupying responsible positions in important mining concerns in Bihar have told us that there are numerous cases of silicosis occurring in mica mines where drilling by power machinery has been adopted; and, at our instance, an enquiry into the subject was made by Dr. Rahman, Assistant Director of Public Health, Chota Nagpur Circle, whose report is reproduced in appendix VIII. His conclusion is that "wherever dry drilling has been carried out and the drillers were exposed continuously to the stone dust, symptoms of silicosis have been noticed with ultimate death from tuberculosis". As noted by Dr. Rahman himself, the enquiry was a hurried one. It was confined to a few mines and lasted only four days. Hence, the results can hardly be treated as authoritative, but they certainly point the way for further enquiry by officers equipped with the necessary specialised knowledge and apparatus.

Research in connection with silicosis has been going on in many parts of the world for several years, and an interesting paper on the subject was submitted to the Institution of Mining and Metallurgy in the early portion of 1934 by Dr. W. R. Jones† of the Royal School of Mines, suggesting that silica dust is not the sole cause of silicosis, and that a more frequent cause is a finer dust arising from minerals which occur in fibrous forms in the ores or country rock, e.g., sericite, sillimanite and tremolite. An indication of some of the work done on this subject in America and of further work intended to be done is contained in an Information Circular of the United States Bureau of Mines, published in February 1938‡. An informative article on the subject by Dr. Vestal, Director, North Carolina Division of Industrial Hygiene, Dr. Winstead, Examining Physician, North Carolina Division of Industrial Hygiene, and Dr. Joliet, Assistant Surgeon, United States Public Health Service, published in 1943§, analyses the results of the physical and X-ray examination of 1,121 men examined for employment in the mica industry in western North Carolina between July 28 and September 15, 1942, when the reduction in the mica imports from India and South America necessitated an increase in the production of the United States. The persons examined fell into three groups. The control group of 222 individuals consisted of men with no previous mining experience. The second group, labelled "mixed", consisted of 443 men with a mixed mining experience, including some of the pegmatite family as well as copper, iron and asbestos, but no mica mining. The third group, labelled "mica", consisted of 456 men with an average mining experience of 8.5 years, of which an average of 4.6 years was spent in mica mining. The incidence of dust pathology found in the three groups was 0 per cent., 5.4 per cent., and 9.4 per cent. respectively, showing a big excess of dust pathology in the mica group as compared with the other two groups. Because it had been accepted at the International Labour Conference in 1934 "that silicosis might also be due to silicates and, in particular, to sericite", Dr. Vestal and his collaborators examined the records of 79 men, whose entire experience had been obtained in so-called "clean" mica, that is to say, mica containing no free silica. This group was made up of millers, bolters and baggers, employed in mica grinding plants and showed a dust pathology of 11.4 per cent. This result is particularly interesting to us in India, firstly; because of statements made to us, and apparently also to Dr. Rahman, that

*Silicosis and Asbestosis by Dr. A. J. Lanza. Industrial Medicine, edited by Drs. Lanza and Goldberg, 1939, page 377.

† Silicosis by Dr. W. R. Jones. Transactions of the Institution of Mining and Metallurgy, Forty-third Session 1933-34, Vol. XLIII, page 341.

‡Some of the Results of Recent Research on the Control or Prevention of Silicosis, by D. Harrington, United States Bureau of Mines, Information Circular 6994, February, 1938.

§Pneumoconiosis among Mica and Pegmatite Workers, by Drs. Vestal, Winstead and Joliet. Industrial Medicine, January, 1943, Vol. XII, No. 1, pages 11-14.

cases of silicosis occur among workers in mica factories engaged in the screening of mica splittings, and secondly, in view of our suggestion above that the grinding of mica in India should be encouraged. The size of this fourth group, as noted by Dr. Vestal and his collaborators, is obviously too small for any definite conclusion to be based upon the results, but the findings indicate that there is no reason for complacency and suggest that the enquiry regarding the occurrence of silicosis should not be confined to the mining side of the industry alone. In the above article, reference is made to another publication on the subject specially relating to the mica industry.* We discovered the reference at a late stage in our enquiry and all our attempts to obtain a copy of it in India were unsuccessful. Doubtless, there is other equally relevant literature, which we failed to get. In any case, the subject is a technical one to be dealt with by specialists, and we can merely suggest an investigation by them and indicate some immediate precautions and remedies.

The following steps taken in South Africa for dealing with the problem are enumerated in the paper of Dr. Jones, referred to above, and in the discussion arising out of it:—

1. The medical examination of every person before he is engaged for underground work; and the subsequent periodic medical examination of such persons.
2. Improvement of underground ventilation.
3. The period that must elapse before work can be resumed after blasting must have been considerably extended.
4. Compulsory wet-drilling and spraying of water in the neighbourhood of working places.

5. The mines work single shift so that they are clear for about fifteen hours out of 24 hours with the clean air sweeping through them.

As regards the efficacy of these steps, the following statements of Dr. Irvine, Chairman of the Government Medical Bureau at Johannesburg, are relevant.—†

“(1) A conservative estimate of the available evidence goes to show that from 1912 to 1916 the average annual production of cases of ‘silicosis’ and ‘tuberculosis with silicosis’ on the Rand was over 800 cases in an average underground complement of from 10,000 to 11,000 underground employees. During the past three years, with a similar average complement, the average annual production has been less than 250 cases, and the number of cases has been steadily dropping for the past seven years.

(2) *The liability of the working miner to contract silicosis is today less by 55 per cent. than it was in the period from 1920 to 1923, and is less by a much greater amount than it was for the period 1918 to 1920.*

(3) No miner who had entered the industry since 1st August, 1923, and who had not worked underground elsewhere, had contracted silicosis up to 31st July, 1933, *i.e.*, during a period of 10 years.”

The question of the proper ventilation of the mines is already receiving attention from the Indian Mines Department. Of the other remedies, there are at least two which can be adopted immediately.

The first of these is the total elimination of dry power drilling. In his paper on the subject, Dr. W. R. Jones doubted the efficacy of wet-drilling because, according to him, water does not lay the fine dust caused by the fibrous minerals to which he attributed silicosis. His theory of the causation of silicosis is, however, no longer accepted, and the results obtained in South Africa would suggest that wet-drilling is not ineffective. Mr. Harrington, also, expresses the belief that wet-drilling will keep dust production well within the allowable limits, but he sounds the warning that, in order to be effective, it must really be wet-drilling. Studies made by the United States Bureau of Mines and other agencies show that “in wet-drilling the holes often are collared or started dry or with

*Pneumoconiosis Among Mica and Pegmatite Workers by Dr. Dreesen and others. United States Public Health Bulletin No. 250.

†(Discussion on) The Action of Harmful Dusts, by E. H. Kettle, M. D., F. R. C. P. (Lond.), Professor of Pathology in the University of London at St. Bartholomew's Hospital Medical College. Transactions of the Institution of Mining and Metallurgy, Forty-third session 1933-1934, Vol. XLIII, at page 515.

a minimum of water sent through the steel; sometimes this 'dry collaring' extends several inches into the hole, as the worker desires to minimize the possibility of having the water splashed or sprinkled upon him". This dry-collaring is responsible for a considerable amount of dust-impregnation of the air in the poorly ventilated places frequently found at the working faces of the mines. It was also ascertained that, under some conditions, the proportion or quantity of the water going through the drill steel is so little and that of the compressed air so great, that the so-called wet-drilling was largely a misnomer.* Reasons of this kind may have much to do with the belief held by some persons, even now, that wet-drilling is not effective in preventing silicosis. Therefore, if wet-drilling is made compulsory, care will have to be taken to ensure that it complies with certain minimum conditions and really is wet-drilling. We may add that, even if the compulsory introduction of wet-drilling is not necessary for the prevention of silicosis, it is the opinion of the technical witnesses examined by us that it will make for general efficiency in the working of the mines and will conduce to the comfort of the labour employed. Besides faster drilling owing to more efficient clearing of tailings from the hole, there is less time lost in changing steel, because the cooling effect of the water lessens the wear of the drill heads. Also, the absence of dust and the general clearness of the air makes working more comfortable for the labourers and facilitates supervision. The question of possible discomfort owing to increased humidity does not arise in the case of mica mines, as they are still very shallow, and we learn from the Chief Inspector of Mines that this drawback has not prevented the employment of wet-drilling in the Kolar Gold Fields, where the mines are 7,000 to 8,000 feet deep.

The other step, which, in our opinion, can be taken immediately is to insist that every person, before he is employed as a driller for machine drilling, must be medically examined and declared to be fit for this employment. It was represented to us that it would be difficult to enforce this, as the mines lie in remote jungle areas and the labour is fluctuating. It might be possible to overcome this difficulty by means of a system of medical certificates, by providing that no man will be employed as a driller in machine drilling unless he holds a certificate of fitness granted to him within a certain period, say six months, by a registered medical practitioner empowered to grant such a certificate. Possibly, a more feasible solution would be a touring medical staff equipped with a travelling X-ray outfit, which will halt for stated periods at central places in the different mining areas where labourers sought to be employed as drillers can be brought to them for examination.

A further question arising in this connection is the possibility of including silicosis in Part B of Schedule III to the Workmen's Compensation Act, 1923 (VIII of 1923), as an occupational disease of mica mining. This is a matter which can only be taken up on the recommendation of specialists after proper investigation.

Height of Drives

Another matter, which was brought to our notice, was the difficulty experienced by labour in some mines where the drives are of insufficient height. We would suggest that a minimum height of 4½ feet may be prescribed. This suggestion has the approval of the Chief Inspector of Mines.

Drunkenness and Gambling

Other evils mentioned are drunkenness and gambling. The former affects both the mining and the factory areas. We consider it desirable that the licensed liquor and toddy shops should be kept outside the mining areas, and that in the factory areas the local Mica Warden should be consulted by the Excise authorities in the location of such shops. Regarding gambling, the worst offenders are said to be the carnivals, which from time to time visit the factory areas. The prevention of gambling in such places is within the powers of the ordinary law and no comment from us is necessary beyond drawing attention to the existence of the evil.

*Some of the Results of Recent Research on the Control or Prevention of Silicosis, by D. Harrington, United States Bureau of Mines, Information Circular 6994, February, 1938.

CHAPTER XIII

THE MICA CONTROL ORDER AND THE NEW MICA LEGISLATION

Under the Bihar and Orissa Mica Act, 1930, the day to day administration of the special legislation relating to mica was placed in the hands of the District Magistrate, but his authority was limited. For instance, he had no power to refuse a proprietor's certificate or even a miner's or a dealer's licence; and he had no option in the matter of endorsing the names of agents on licences and certificates, or in restricting the number or the location of the godowns which might be opened by licensees and registered proprietors. The authority to inspect mica mines and mica dumps and to check stocks and accounts was given to an officer authorised for this purpose by the Local Government; in practice, the Inspector of Mica Accounts worked under the supervision and control of the District Magistrate. Offences against the Act were, most of them, triable only by a magistrate of the first class. A curious exception was an offence under section 19 of the Act, committed by the removal of mica without a pass—an offence apparently regarded as more serious than other offences under the Act, because it was made punishable with imprisonment extending to one year. For some reason, the jurisdiction to try this offence was not confined to a magistrate of the first class. Licences were subject to cancellation by the Local Government if—

(1) the licensee was convicted of an offence under Chapter XVII of the Indian Penal Code, committed in respect of mica, or

(2) the licensee was guilty of repeated failure to comply with any of the provisions of the Act:

with the proviso that a licence was not liable to cancellation solely by reason of a conviction from which the licensee had no right of appeal. The grant of a fresh licence to a person whose licence had been cancelled under this provision was made subject to the previous sanction of the Local Government. There was no provision for the cancellation of proprietor's certificates.

The Mica Control Order, as originally promulgated, reproduced the Bihar and Orissa Mica Act with a few modifications and additions. The District Magistrate retained his power of day to day administration. The grant of a proprietor's certificate still remained outside his discretion, but licences were brought within it, with the proviso that a licence must be granted to any person who, on the 1st April, 1938, held a valid mica miner's licence or a valid mica dealer's licence under the Bihar and Orissa Mica Act, 1930. His order granting, or refusing to grant, a licence was made final. He still had no discretion in the matter of endorsing the names of agents on a licence or a proprietor's certificate or in restricting the number or the location of godowns. The inspection of accounts and stocks continued to be within the jurisdiction of an officer authorised thereto by the Provincial Government, who in practice worked under the control of the District Magistrate. The power of cancellation of certificates was confined to the Provincial Government and applied to licences only. It was slightly extended in respect of failure to comply with the provisions of the Order, the liability to cancellation being incurred by a first failure and not merely by repeated failure as in the Bihar and Orissa Mica Act.

The Mica Control Order was first promulgated on the 25th May, 1940. With minor amendments it continued in this form for about four years. Then, on the 31st May, 1944, several important changes were made in it.

The first and most important of these amendments was the substitution of a "Controller" for the District Magistrate. This term is defined to mean "the officer appointed by the Provincial Government to be a Mica Controller and, until such time as an officer is so appointed, the District Magistrate of the District". All the powers previously exercised by the District Magistrate were

made over to the Controller and, under clause 3 of the Order as amended on that date, the Provincial Government was required "as soon as may be, to appoint an advisory committee to advise the Controller on all matters connected with the administration of this Order". No practical effect was given to these amendments until the 8th of March, 1945, on which date Mr. L. J. Lucas, I.C.S., was appointed Controller; the advisory committee under clause 3 was appointed on the 18th September, 1945. The Controller has been handicapped in his administration by the fact that the whole question of reorganising the industry was under our consideration, and we are not in a position to say anything about the merits of the present arrangement from actual experience of its working. We consider it a considerable improvement upon the previous system, which left the administration of the Bihar mica belt in the hands of four different District Magistrates, each of them fully occupied with other administrative questions arising in his district. Apart from the obvious disadvantage resulting from the division of the mica belt between four officers, each of whom could only give a portion of his time to mica problems, there was also the disadvantage resulting from frequent changes in the personnel of the District Magistrates. For instance, we understand that within the last ten years there have been at least thirteen different District Magistrates in Hazaribagh. The appointment of a special officer to administer the belt as one whole is welcomed by the local industry; but they are not satisfied with a mere advisory committee, and would like the committee to exercise some effective powers. They regard with distrust the exercise of uncontrolled powers by an officer, however well advised, whose acquaintance with the industry will be confined to a few years. We have incorporated into our proposal for a Mica Warden's Board this idea of a committee with powers of control.

The second important amendment was the insertion of sub-clause (5) in clause 4 providing that "no licensee or registered proprietor shall buy or sell or otherwise transfer crude mica or block mica which has not been sorted into sizes in the manner prescribed in the Fifth Schedule to this Order, unless the largest rectangular area of sound mica which can be obtained therefrom is less than three square inches". This amendment was intended to deal with the problem of mica theft; its effect has been discussed by us in Chapter III above. Another amendment, made with the same intention, enables the Controller to prescribe areas within which dealers must locate their godowns. A third amendment gives the Controller discretion in the matter of endorsing the names of agents or licences and proprietor's certificates. In Chapter VII above, we have made our recommendation as to the form in which these three provisions should continue in future.

The fifth amendment of importance makes the grant of a proprietor's certificate discretionary. It provides that any proprietor may apply to the Controller for a proprietor's certificate and the Controller may either grant the certificate or, if he is of the opinion that it should not be granted, forward the application to the Provincial Government with his report for orders. The decision of the Provincial Government on the application so forwarded is final. This amendment goes with another amendment giving the Provincial Government absolutely discretionary power to cancel a proprietor's certificate or a miner's or a dealer's licence provided, only, that before cancellation the Provincial Government shall inform the licensee or the proprietor concerned of the grounds on which it is proposed to cancel his licence or certificate, give him a reasonable opportunity to show cause against the cancellation, and take into consideration any representation that may be made by him. The effect of these amendments is to deprive the proprietors of their long cherished privilege of being able to take out proprietor's certificates at their pleasure, and to operate under them without any fear of having them cancelled. We consider that this was a privilege which could not be continued, and in Chapter VI above, we have expressed our ideas on the subject. We would make the proprietor's certificate liable to the same limitations as regards grant, suspension and cancellation as miner's licences.

The seventh important amendment raised the initial fee for a miner's licence or a dealer's licence from Rs. 50 to Rs. 250 and the annual fee from Rs. 25 to Rs. 150. For the future we would suggest the following fees for the three areas:—

	Bihar		Madras and Rajputana	
	Initial	Annual	Initial	Annual
	Rs.	Rs.	Rs.	Rs.
Proprietor's certificate or miner's licence	250	100	50	25
Dealer's licence	100	50	50	5
Prospector's permit	25	25 (renewal)	10	10 (renewal)

The last important amendment made on the 31st May, 1944, was the insertion of clause 25 providing that the Provincial Government may from time to time issue general instructions for the guidance of the Controller in the discharge of his functions under the Order, and requiring the Controller to act in conformity with those instructions. This provision, like the provision under clause 6 of the Order making final the Controller's order granting or refusing a licence, and that under clause 23 giving the Provincial Government absolute discretion to cancel licences and proprietor's certificates, may have been appropriate under war conditions where a mineral of strategic importance like mica was concerned. For normal times we do not think these provisions at all appropriate.

In the administration, as we visualise it for the future, we would place the more important administrative powers in the hands of the Mica Warden's Board. There will be separate Boards for Bihar and Madras. In Bihar, the Board will consist of the Mica Warden, five members representing licensed miners and registered proprietors, two members representing pure dealers, two members representing labour, one member representing the Provincial Government, the Chief Inspector of Mica Mines *ex-officio*, and the senior Geologist in the Bihar mica belt *ex-officio*. In Madras, in addition to the local Mica Warden, there will be three representatives of licensed miners and registered proprietors, two representatives of pure dealers, two representatives of labour, one representative of the Provincial Government, the senior Inspector of Mica Mines in the Madras mica belt *ex-officio*, and the senior Geologist in the Madras mica belt *ex-officio*. The Mica Warden will be the *ex-officio* Chairman of the Board and will have one ordinary and one casting vote. In Bihar three, and in Madras two, of the members representing the licensed miners and registered proprietors will be nominated by the biggest producers, each such producer nominating one representative. The remaining members, representing licensed miners and registered proprietors, will be elected by ballot by the licensed miners and registered proprietors. Dealer's representatives will be elected by ballot by licensed dealers who are purely dealers, that is to say, who have not also got miner's licenses. In Bihar one of the elected dealers' representatives must be an exporter and the other a non-exporter. The All-India Trades Union Congress will be asked to nominate the representatives of labour in both the areas, and failing nomination within a stated period, the representative or representatives, as the case may be, shall be nominated by the Provincial Government. In each area, one of these members will

represent mining labour and the other will represent factory labour. The period of appointment of the representative members will be three years, any vacancy that occurs being filled up by the means above indicated for the remainder of the period.

For Ajmer-Merwara, there will be a Mica Warden, but a Board on the above lines will not be necessary. An advisory committee representative of licensed miners and registered proprietors and of labour, appointed by the Provincial Government, will be sufficient. If, however, the Rajputana States are willing to come into the scheme, it may be necessary to constitute a Board on the lines of the Boards indicated for Bihar and Madras. In the statement below we give in round figures the average annual output of cut mica of Ajmer-Merwara and the Rajputana States for the period 1940 to 1944:

1. Mewar	19,500 cwt.
2. Ajmer-Merwara	7,000 cwt.
3. Jaipur.	3,000 cwt.
4. Shahpura	2,500 cwt.
5. Tonk	2,000 cwt.
6. Other States, each under	500 cwt.

On the basis of these figures we would suggest the following constitution:—

The Mica Warden of Ajmer-Merwara, <i>ex-officio</i>	1
Miners and Proprietors' Representatives for Mewar	2
Ditto for Ajmer-Merwara	1
Ditto for Jaipur	1
Ditto for Shahpura	1
Ditto for Tonk	1
Labour representative	1
Representative of the Provincial Government of Ajmer-Merwara	1
The Senior Geologist in the Rajputana Mica Belt, <i>ex officio</i>	1
An Inspector of Mica Mines	1

The Mica Warden for Ajmer-Merwara will be the Chairman and have a casting vote in addition to the ordinary vote. The Inspector of Mica Mines will be nominated by the Chief Inspector of Mica Mines.

To the Mica Warden's Boards in Bihar and Madras, and to the Mica Warden aided by his Advisory Committee in Ajmer-Merwara, we would entrust the power of granting licences and proprietor's certificates, and the suspension and cancellation of licences and proprietor's certificates. The refusal or cancellation of a proprietor's certificate or a licence will be subject to an appeal to the Provincial Government. In this connection a desire was expressed by several persons before the Committee that the appellate power should be placed in the hands of some judicial authority. The Committee, however, feels that, as the considerations which will decide the granting or refusal of licences and proprietor's certificates will be practical rather than legal, the vesting of this authority in a judicial officer will be inappropriate. In the cancellation of licences and proprietor's certificates, the decisions of judicial authorities, before whom the licensee or the registered proprietor has been tried and convicted, may form the basis of the proceedings taken; but here also the deciding factors will be practical considerations. The alternative was to place the appellate powers in the hands of either the Divisional Commissioner of Revenue, or the Board of Revenue, or the Provincial Government itself. We prefer to place the power in the hands of the Government, as we think that the administration of this important industry should be taken outside the ordinary District administration and placed directly under the Provincial Government.

As we have already suggested above that in the case of a first conviction the licensee or certificate holder will be liable to the suspension of his licence, the liability for cancellation may be confined to a repeated conviction for an offence

connected with mica, on facts raising an implication of moral turpitude; provided that a conviction, against which an appeal does not lie, will not be taken into account for this purpose. There may be a further provision that if a licensee or registered proprietor, whose licence or certificate has been suspended on two previous occasions, commits an act for which his licence or certificate is liable to suspension, the Mica Warden's Board shall be entitled to cancel the licence or certificate. We are not providing for cancellation or suspension for ordinary failures to comply with the provisions of the proposed mica law, because we are proposing to vest the Warden with powers to punish such contraventions, and feel that, if more serious action is desired, the matter should be brought before an independent authority, such as a criminal court, and the necessary action for cancellation or suspension taken if the prosecution ends in conviction.

The Mica Warden's Board will also be empowered to demarcate the protected zone and to extend the limit of possession of mica therein to Grade No. 5, if necessary. Further, it will have the power to decide the places at which crude mica may be sold outside the protected zone. It will be the governing body for the Mica Mining Classes, and the Inspectorate of Mica Mines operating in the belt will work under its general control and subject to its criticism. On a reference made to it by the Mica Warden it will have the power to prohibit the use of a particular godown, or to refuse to allow the endorsement of a particular agent on a licence or proprietor's certificate. It will also have the power to raise from No. 5½ to No. 5 the grade of mica which splitting contractors and home-splitters will be permitted to carry without a pass.

The Mica Warden will exercise the right of granting or refusing prospecting permits; as we have said above, the refusal of a prospector's permit will be final. He will be empowered to endorse the names of agents on the licences and proprietor's certificates and, in proper cases where he feels that their names should not be endorsed, he will be entitled to make a reference to the Board for orders. Similarly, he will be entitled to make a reference to the Board regarding the use of particular godowns, which appear to him to be undesirable. He will be entitled to inspect stocks and accounts of mica, both at factories and at mines. He will exercise the powers of an Inspector of Mines under the Indian Mines Act, 1923. He will also be entitled to inspect mica factories and, in the event of the application to mica factories of the Factories Act, 1934, or of a special Act on the lines of the Central Provinces Unregulated Factories Act, 1937, he will be an Inspector for the purposes of that Act. He will be the general administrative officer of the Board and will have the power to initiate or sanction prosecution for offences against the mica law. He will also have the power to direct withdrawal of a prosecution initiated or sanctioned by him. In order to avoid the harassment caused by criminal prosecution, as far as possible, we propose that, in addition to this power over the initiation and withdrawal of prosecution, the Mica Warden will be given a limited power of imposing fines, recoverable as fines imposed by Criminal Courts. This power may extend, without any limitation, to the imposition of fines not exceeding Rs. 50 for contraventions of the mica law. In the case of offences against this law, for which the Mica Warden considers *prima facie* that a fine of Rs. 50 would be insufficient, he will give the party charged with the offence an opportunity of going to the courts. If the party prefers to have his case disposed of by the Mica Warden, the Mica Warden may take up the case on its merits and impose such penalty as he thinks fit, not exceeding Rs. 300. The Mica Warden will be under no compulsion to impose a fine exceeding Rs. 50, if on going into the case he thinks a smaller penalty sufficient, and he will of course impose no penalty at all if he finds that the offence is not established. There will be no appeal against penalties imposed by the Mica Warden; but offences dealt with by him in this summary fashion will not be taken into account for cancelling the licence, certificate or permit as the case may be. Besides the above powers which the Mica Warden will exercise in his own right, the Board may delegate to him some or all of its own powers, to be exercised by him in

accordance with the general instructions laid down by the Board. Acts done by the Mica Warden in accordance with these instructions will be regarded as the orders of the Board itself and will be subject to appeal as such.

As under the Bihar and Orissa Mica Act, so also under the Mica Control Order, the Provincial Government is empowered to require licensees and registered proprietors to submit returns, and the forms of the returns are actually set out in a schedule to the Mica Control Order. The trade, however, has been very much opposed to the submission of returns, and this provision in the Act and in the Mica Control Order has never been given effect to. If the industry is to be controlled and rationalised, as we consider that it should be, reliable statistics must be available regarding it, and for this purpose accurate and detailed returns of the production and movements of mica, and about the labour engaged in the industry, are necessary.

At present there are three sets of official figures periodically published regarding mica. The first set appears in the annual reports of the Chief Inspector of Mines in India, and is derived from returns submitted by the mine owners in compliance with the Metalliferous Mines Regulations. They are confined to the mining side of the industry and, even so, give an incomplete picture because they cover only mines reported under section 14 of the Indian Mines Act, 1923. With respect to the figures of output, we have pointed out above that the returns require particulars of the dressed mica output of particular mines, whereas some miners do not dress their own mica and others do not keep separate accounts of the dressed mica product of different mines. Further, the returns ignore another source of mica, namely the mica dumps, which as appears from the figures given by us in Chapter II above is not inconsiderable.

The second set of figures is published in the Indian Trade Returns and shows imports and exports of mica. Since 1939-40 these figures are given under the headings "block", "splittings" and "ground, scrap or waste". They do not distinguish between different descriptions of mica and provide a somewhat crude means of judging the trend of the market.

The third set of figures is published by the Geological Survey of India and covers operations in British India and in the Indian States. This Department gets from the Indian Mines Department the figures of production relating to mines reported under section 14 of the Mines Act. Figures relating to unreported mines in British India are obtained from the Provincial Governments, and those relating to the Indian States from the Political Agents or direct from the State authorities. That the information relating to unreported mines in British India is far from complete is suggested by the following statement:—

Reported Production of Dressed Mica from "Non-Act Mines" in British India

Year	Amount	Remarks
	cwt.	
1939	Nil.	
1940	Nil.	
1941	3,092	In Districts Monghyr (Bihar) and Hazara (N. W. F. P.)
1942	4,448	Ditto
1943	12	In District Hazara (N. W. F. P.)

The reports in respect of the Indian States were formerly confusing, as they were not clear as to whether they related to dressed or to crude mica. This defect has been removed since the location in the Rajputana area of the Mica Production Section of the Geological Survey of India. The figures of export and import are taken from the official trade returns, and classify mica under the heads, "block", "splittings" and "ground mica, scrap or waste". Figures of production relate to dressed mica.

We think that statistics in much greater detail than this are required and in Appendix IX we suggest a form of return for different descriptions of mica, covering all the stages from its recovery at the mines up to its sale in, or export from, India. This return will be submitted half-yearly by each registered proprietor, licensed miner, licensed dealer and prospector's permit holder. If one person combines in himself two or more of the above capacities, it is not necessary for him to submit a separate return in each capacity. Nor, is it necessary for him to submit a separate return in this form for each mine or factory which he is working. One return will cover all his capacities and all his operations. In part A, of the return relating to crude mica, separate columns are provided for mines reported under section 14 of the Indian Mines Act and mines not so reported. This will furnish some basis of comparison between the figures obtained by these returns and the figures published by the Chief Inspector of Mines. Column 13 in part B of the return is intended for mica dressed at the pit's mouth and received in the godown in the shape of sickle dressed block. In part E, we do not propose to ask for the values of the individual descriptions of mica sold in India or exported; we think that there can be no legitimate objection to returns of the total values of the different descriptions of mica grouped as shown in the return. The weights of the different descriptions will, of course, be given separately.

Besides the return relating to the outturn and disposal of mica, we consider it necessary that there should be a return of the employment of labour in mica mines and factories. In Appendix X we have suggested an appropriate form. Like the previous return, this will be submitted by all registered proprietors, licensed miners, licensed dealers and prospector's permit holders, one individual submitting a single return covering all his undertakings in all or any of the above capacities. This return will be made half-yearly at the same time as the previous return. In each return there will be two sets of figures; thus, the return for the first half of the calendar year will give the figures for January and April, and that for the latter half of the calendar year will give the figures for July and October. The figures for each of these months will relate to the day in the first week of that month on which the number of workmen employed by the person submitting the return is the greatest for that week. The return will relate to all such establishments in respect of which the employers are, under the law, required to maintain registers of labour; according to our recommendations they will be mines and factories which employ not less than twenty labourers in one day.

These above returns must be treated as strictly confidential documents. In order more effectively to preserve due secrecy, we think that the best procedure will be for the returns to be submitted direct to the Director, Geological Survey of India, without any copy being sent to local officials such as the District Magistrate or the Mica Warden. The Director, Geological Survey of India will be responsible for compiling and publishing relevant statistics from these returns, and he will be authorised, where he thinks it necessary, to verify the individual returns through his own officers or through the local Mica Wardens or the Inspectorate of Mica Mines. We have made the forms proposed by us as simple as possible, but it is likely that some of the smaller miners and dealers may have difficulty in correctly preparing the returns. If they do, it will be the duty of the Inspectors of Mica Mines to help the miners; the same duty can be performed in respect of the factories by the Mica Warden.

The returns proposed by us will not cover ground mica and micanite. We would recommend the collection of figures of the export and import of ground mica and micanite separately by the agency which now collects particulars of exports and imports for the Official Trade Returns.

As regards the penalty to be imposed in the case of contraventions of the mica law, the present maximum of three years and fine appears to be unnecessarily severe. Penalties on the scale of those provided in the Bihar and Orissa Mica Act, 1930, will be sufficient. Of the new offences, which will be created under our recommendations, we would regard the possession of mica of grades larger than the permitted grades within the protected zone, the sale of *bima mica* and the sale of crude mica outside the permitted centres as serious offences calling for a maximum imprisonment of one year, with or without fine. On a line with the provisions of the Bihar and Orissa Mica Act, we would also recommend that offences against the mica law should be made exclusively triable by a first class magistrate. In view of the power of imposing penalties proposed to be given to the Mica Warden, we do not think that this provision will unjustifiably increase the work to be performed by first class magistrates. If this recommendation is not accepted, we would suggest that at least all offences against the mica law punishable with imprisonment and, also, contraventions of the mica law by failing to keep correct accounts be made exclusively triable by a first class magistrate.

The existing Mica Control Order will necessarily form a model upon which the new legislation implementing our recommendations will be framed. It may, therefore, be of some use to comment on the provisions of the Order so far as the above remarks do not cover them. The comments are set out in Appendix XI.

Finally, regarding the nature of the legislation which should give effect to the recommendations of this Committee, we are definitely of the opinion that, as far as possible, it must be legislation by the Central Legislature. This is necessary to ensure the uniformity that is desirable between the three areas and, also, because some of our proposals require to be regarded from an All-India and not from a Provincial point of view. Mica is a mineral of key importance, occurring in different Provinces and Indian States, and the policy relating to it must be determined on a consideration of what is good for India as a whole. Further, questions relating to export and international trade are involved, and are outside the scope of the Provinces. It is possible that, arising out of our proposals, there may be provisions which are properly applicable to one area but not to another, for example provisions intended to control mica piracy. This does not place any difficulty in the way of central legislation, because such provisions can be expressly applied to the particular area, or made applicable to different areas at different times as they are required.

CHAPTER XIV

GENERAL

The Joint Mica Mission

The Joint Mica Mission, constituted by the Governments of the United Kingdom and the United States of America, bought mica in India for the Allied Nations from August, 1942, to the end of November, 1945. The prices were fixed by the Government of India and the trade had to accept them as the Mission had the monopoly of purchase for export. In the mica producing areas the general impression was that the prices were fixed by the Mission itself and, in the course of our enquiry, we came across much criticism of the purchasing policy of the Joint Mica Mission and of the prices paid by it; but all the material necessary for coming to a considered decision on these points was not placed before us. In view of the expected early closing of its operations by the Joint Mica Mission, we did not pursue the matter. The trade naturally felt aggrieved that the prices of its product were subjected to such strict control at a time when the producers of other commodities were getting high prices. This, however, was inevitable in the case of an article so essential as mica for war purposes.

In the course of its operations, the Joint Mica Mission accumulated in India and abroad a considerable stock of mica; with reference to the problem of disposing of this stock without disturbing the normal course of trade, the Committee was asked for an advance report, dealing with the necessity for controlling the marketing of mica after the cessation of purchase by the Mission. This report submitted by the Committee on the 25th July, 1945, is set out in Appendix XII.

Alternative Sources of Supply

The table below gives particulars of the export of Indian mica during the years 1934 to 1944:—

Export of Indian Mica during the years 1934—1944

Year	Block	Splittings	Waste	Total Block and Splittings
<i>Quantity in cwt.</i>				
1934	20,617	48,368	23,933	68,985
1935	23,774	62,029	56,011	85,803
1936	27,235	95,049	55,380	1,22,284
1937	30,003	1,49,336	1,18,004	1,79,339
1938	18,831	94,253	62,025	1,13,084
1939	31,595	95,643	71,655	1,27,238
1940	18,885	1,05,802	45,636	1,24,687
1941	23,042	1,79,709	5,580	2,02,751
1942	30,650	1,49,790	22,557	1,80,440
1943	46,062	95,178	43,434	1,41,240
1944	25,423	46,814	1*	72,238

* The consignment in question which actually referred to "Mica films" was, in the absence of any suitable head in the Sea-borne Trade returns of British India recorded undistinguished under the heading, "Mica-ground, scrap or waste."

Year	Block	Splittings	Waste	Total Block, Splittings and Waste
<i>Value in Rupees</i>				
1934	35,20,930	24,49,763*	59,832*	60,30,525
1935	43,34,680	32,59,974*	1,40,027*	77,34,681
1936	45,72,240	44,65,821*	1,38,450*	91,76,511
1937	57,47,478	83,17,548*	2,95,010*	1,43,60,036
1938	43,84,730	67,85,554*	1,55,062*	1,13,25,346
1939	67,74,641	84,79,960	1,81,424	1,54,36,025
1940	59,53,895	99,78,846	1,15,954	1,60,48,695
1941	86,22,227	1,79,25,713	12,868	2,65,60,808
1942	1,14,13,753	1,72,53,858	3,11,659	2,89,79,270
1943	1,42,47,761	1,54,87,403	92,455	2,98,27,619
1944	1,09,04,050	1,63,94,458	2,950†	2,73,01,458

During the period covered by these figures, the value of the exported splittings rose gradually as compared with that of exported block and is now definitely greater.

The distribution of Indian exports between the different countries is shown by the following table† relating to the five financial years immediately preceding the outbreak of World War II:—

Destination of Exported Indian Mica

Annual Average for the Period 1934-35 to 1938-39

Country	Description	Weight	Value	Value per cwt.
		Cwt.	Rs.	Rs.
United Kingdom	Block	12,141	26,07,429	212
	Splittings and Waste	34,954	19,61,134	54
	Total	47,095	45,68,563	
United States of America.	Block	5,883	6,60,155	110
	Splittings and Waste	82,191	17,37,559	22
	Total	88,074	23,97,714	

*Estimated.

† The consignment in question which actually referred to "Mica films" was, in the absence of any suitable head in the Sea-borne Trade returns of British India, recorded undistinguished under the heading, "Mica-ground, scrap or waste."

‡ Compiled from Tables 16 and 17 at pages 73 and 74 of Mica by Dr. J. A. Dunn. Records of the Geological Survey of India, Vol. LXXVI, Bulletin of Economic Minerals No. 10, 1942.

Country	Description	Weight	Value	Value per cwt.
		Cwt.	Rs.	Rs.
Germany	Block	1,366	2,30,787	190
	Splittings and Waste	17,861	7,92,949	42
	Total	19,227	10,23,736	
France	Block	767	1,07,186	146
	Splittings and Waste	3,037	1,54,306	55
	Total	3,804	2,61,492	
Italy	Block	1,109	1,49,294	142
	Splittings and Waste	3,493	3,50,168	95
	Total	4,602	4,99,462	
Japan	Block	3,128	7,67,507	210
	Splittings and Waste	9,586	3,76,230	40
	Total	12,714	11,43,737	
Other Countries	Block	932	1,39,072	155
	Splittings and Waste	5,065	1,48,814	31
	Total	5,997	2,87,886	
	Total Block	25,326	46,61,430	184
	Total Splittings and Waste	156,187	55,21,160	35
	Total Exports	181,513	1,01,82,590	

During this period of five years the bulk of the Indian exports went to the United Kingdom and the United States. In comparing the shares in the Indian trade of the United Kingdom and the United States, allowance must be made for the flow of mica from the former to the latter, of which we have spoken in the Chapter on marketing; the greater portion of this mica is Indian mica. Some idea of the volume of this flow will be given by the average annual import from the United Kingdom into the United States in the period 1933 to 1937, which was about 900 Cwt. of block and 600 Cwt. of films and splittings.

The two immediately preceding tables show that splittings form an important portion of India's export trade and that the United States of America is India's largest customer for them. The table below compiled from the United

States Mineral Yearbooks and relating to the period 1938 to 1943 indicates clearly the dominating position which India occupies in this portion of the industry:—

Imports into the United States of Mica Films and Splittings, not cut or stamped to dimensions, not above 1.2 mils thick.

Imported [from	1938	1939	1940]	1941	1942	1943
<i>Quantity in pounds</i>						
British India	1,571,926	1,769,814	6,283,139	10,694,560	10,228,470	14,247,964
United Kingdom	154	6,729	1,099	42,936	5,430	..
Canada	13,304	62,477	79,550	294,281	114,574	40,194
France	588	20,407	5,509	794	..	..
Madagascar	239,483	550,882	646,410	107,420	651,764	20,229
Other countries	-65	44	959	597	121,345	202,058
Total	1,825,520	2,412,937	7,016,666	11,140,588	11,121,583	14,510,445

	<i>Value in \$</i>					
British India	318,546	391,285	1,357,440	2,486,631	2,995,872	3,988,081
United Kingdom	34	2,520	543	12,429	6,941	..
Canada	5,730	26,584	47,530	159,856	82,318	26,331
France	238	4,069	1,610	202	..	..
Madagascar	47,740	123,466	161,216	21,979	192,540	19,523
Other Countries	2,624	473	143	466	71,499	161,296
Total	372,312	548,402	1,568,482	2,681,563	3,349,170	4,095,231

During this period of six years India supplied between 80 and 90 *per cent.* by value of the total splittings imports of the United States. The only other country exporting splittings to a comparable extent is Madagascar, but those splittings are made of phlogopite mica. The secret of India's pre-eminence in this branch of the industry is its cheap labour, which, by years of experience, has acquired superior efficiency. Muscovite mica does not lend itself to mechanical splittings; Canadian phlogopite does, and, in 1941, special equipment was installed in the United States for this purpose. Canadian exports to the United States for mechanical splitting are estimated to have been about 800,000 lbs. in 1943. Dr. H. S. Spence notes, however, that such splittings are rougher and heavier than those made by hand, and we think it unlikely that this development presents a real threat to Indian muscovite splittings. But this is no reason for complacency, for attempts are being made to get the mica of the United States and Brazil split in Mexico, where wages are low and where the labour is said to have shown more aptitude for this work than the labour in Brazil. Whether this experiment will succeed we cannot say, but this threat of foreign competition will have to be remembered by the Mica Marketing Control Board, and the price of mica splittings should not be forced so high that it will pay a country which has cheap labour to import mica for splitting and re-export.

The only country, of which we have any particulars, and which shows any likelihood of becoming a serious rival of India as an exporter of muscovite block, is Brazil. It came into prominence during World War I as a source of strategic mica. By its geographical situation it is in a better position than

India to supply mica in a time of war to India's two biggest customers, the United Kingdom and the United States. This is particularly true of the latter, and it is not surprising that during World War II special efforts were made by the United States to stimulate the production of Brazil. It sent out to that country a special body of technicians, including a large number of mining engineers and geologists, and supplied them with the most up-to-date mining equipment. The result is apparent from the statement below which gives comparative figures of the total annual exports from Brazil and India of dressed mica in the period 1934 to 1944:—

Exports of Dressed Mica from Brazil and India

Year	From Brazil, in Metric Tons	From India, in Tons		
		Block	Splittings	Total
1934	59	1,031	2,418	3,449
1935	110	1,189	3,101	4,290
1936	237	1,362	4,752	6,114
1937	330	1,500	7,467	8,967
1938	521	942	4,713	5,655
1939	435	1,580	4,782	6,362
1940	1,117	944	5,290	6,234
1941	867	1,152	8,985	10,137
1942	866	1,533	7,489	9,022
1943	796	2,303	4,759	7,062
1944	492 (in first half of the year)	1,271	2,341	3,612

We have given the Indian figures separately for block and splittings because the import of Brazilian block into India for splitting and re-export stopped during World War II and, therefore, the Brazilian exports during this period should properly be compared with the Indian exports of block. The prevailing colour of Brazilian mica is ruby; there is also a type of brown mica considered to be as good as the ruby. It is said that the Brazilian mica can be utilised for almost all the purposes for which Indian mica is used. We obtained samples of Brazilian mica and a schedule of the prices at which Brazilian mica was being purchased by the Government of the United States. On a comparison we found the qualities to correspond roughly as follows:—

Comparison between Qualities of Block Mica as Classified in Brazil and India

Brazil	India
Clear and Slightly Stained.	Clear and Slightly Stained.
Fair Stained.	Fair Stained.
Good Stained.	Good Stained.
Stained A.	Stained.
Stained B.	Heavily Stained.
Heavy Stained.	Densely Stained.

The comparative prices are shown below:—

I. Prices of Brazilian Mica, in Rupees per Pound

	No. 6.	No. 5½.	No. 5.	No. 4	No. 3	No. 2	No. 1	No. A1	ESP	X	XX
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
CSS	3 3 0	6 0 0	14 0 0	16 8 0	20 2 0	25 12 0	33 0 0	38 15 0	45 5 0	46 11 0	53 5 0
FS	2 6 0	4 12 0	7 9 0	12 14 0	14 11 0	16 8 0	20 2 0	23 14 0	31 11 0	40 0 0	46 11 0
GS	1 13 0	3 4 0	5 13 0	9 3 0	11 1 0	12 14 0	16 8 0	20 2 0	21 11 0	26 11 0	33 5 0
FS/GS	2 0 0	3 11 0	6 6 0	10 0 0	12 0 0	13 13 0	17 7 0	22 0 0	25 0 0	30 0 0	37 4 0
SA	1 6 0	2 10 0	4 0 0	6 14 0	7 15 0	10 0 0	12 0 0	14 0 0	17 7 0	20 0 0	26 11 0
SB	0 13 0	1 5 0	2 9 0	3 15 0	4 11 0	6 1 0	9 1 0	10 5 0	14 1 0	16 11 0	20 0 0
SAB	0 15 0	1 13 0	3 0 0	5 1 0	6 11 0	7 9 0	10 0 0	11 8 0	15 12 0	18 5 0	23 0 0
HS	0 8 0	0 11 0	1 13 0	3 5 0	4 5 0	5 0 0	6 11 0	10 0 0	11 11 0	13 5 0	16 11 0
CFE	...	...	5 0 0	6 11 0	8 5 0	10 0 0	11 11 0	15 0 0	...	...	...
SFF	...	...	...	4 0 0	5 5 0	6 11 0	8 5 0	10 0 0	...	...	...

N.B.—The qualities GS, FS and CSS carry an additional premium of Rs. 3-10-0 per lb.

II. Joint Mica Mission Prices of Bihar Block Mica, in Rupees per Pound (including 42½% Cost Allowance)

	No. 6	No. 5½	No. 5	No. 4	No. 3	No. 2]	No. 1	Special	Ex. Special	Ex. Ex. Special
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Clear & SS (CL & SS)	4 10 0	9 7 0	17 2 0	24 9 0	29 15 0	34 3 0	40 10 0	47 0 0	59 14 0	76 15 0
Fair Stained (FS)	3 9 0	8 3 0	11 1 0	17 7 0	19 15 0	21 6 0	27 1 0	32 1 0	37 1 0	57 0 0
Good Stained (GS)	2 14 0	6 1 0	7 13 0	13 3 0	16 1 0	17 2 0	19 15 0	23 8 0	30 10 0	42 12 0
Stained (STD)	1 7 0	3 3 0	4 10 0	8 3 0	9 15 0	12 13 0	16 6 0	20 11 0	25 10 0	35 9 0
Heavy Stained (HS)	...	1 12 0	2 8 0	4 10 0	6 9 0	9 4 0	12 13 0	14 15 0	18 14 0	21 6 0
Densely Stained (DS)	...	...	...	2 14 0	5 0 0	7 8 0	10 5 0	12 2 0	14 2 0	18 14 0

From these statements it will appear that, without selling her splitting quality mica, Brazil could produce and export mica at prices which on the whole do not compare very unfavourably with Indian prices. This, however, was at a time when she was receiving help in engineering skill, machinery and capital from the United States, who under pressure of war needs was prepared to take all the strategic mica produced, and it is not possible to say with any certainty whether, with the close of the War, Brazil will be able to continue producing mica under conditions competitive with India. During the War the civilian demand for mica has been starved, and it is likely that, now, a large amount of mica splittings and mica block of lower qualities will be wanted for civilian purposes, and for work of reconstruction arising out of the War. As India is practically the only source of splittings and a big source of lower quality mica, it is unlikely that in the immediate future India will lose its market for mica to any appreciable extent, but we must be prepared to meet a keener competition than in the past from the Brazilian, who, even if the help from the United States does not continue, will have the advantage of the improved mining conditions which development during the War period must have brought about in their country.

Another potential source of muscovite mica is Russia, from where muscovite derives its name. We know that Ruby mica of good quality is available in several parts of the U.S.S.R., but very little information is available regarding the extent of the deposits and the nature and quality of the output. All that we can say is that Russia has been able to satisfy without import her War needs of mica, which must have been considerable; and that the possibility of her coming into the foreign market in future as an exporting country cannot be ignored. This is what the mica because the costly measures taken during the war to stimulate production in the country did not have the required result, and the necessary mica had to be obtained from India and Brazil; the object is to prepare for an emergency by making the country independent of imports. Considerations of this sort will affect other countries also, and we must expect the search to be pursued in many countries.

Some indication of the progress made up to the end of 1943 is given by the following remarks made by an official of the United States War Production Board on November 15, 1943:—

“During the past year and a half there have been very intensive efforts made in this country to develop mica substitutes and components containing no mica as a replacement for mica-containing components. As regards development of a substitute for mica, we can say that there is nothing being manufactured and nothing in the laboratories which gives us any promise of duplicating all of the desirable characteristics of mica. Each of the materials being developed may have some properties equal to that of mica but will fall considerably short of mica on other characteristics. This means that the possible usefulness of each substitute must be limited by its own particular properties.

“Much more success has been achieved in the substitution of other types of components for mica-bearing components, for instance, paper capacitors and ceramic capacitors are being developed and also manufactured to be used in place of mica capacitors. Polectren is a material coming within this category. It is a synthetic resin, polyvinyl carbazole, and is used to impregnate paper for use in paper condensers. Its use allows the manufacture of paper condensers with somewhat improved characteristics over paper condensers using any other impregnating agent.

“The opinion most generally held in this country is that the best substitute for high-grade mica, that is, mica of Good Stained quality or better, is the next lower quality of mica Stained quality. We have built up a substantial surplus of lower quality and better. Considerable experimental work has been proceeding to determine to what extent lower quality mica can be used in capacitors. This work has not yet been concluded, but the partial results obtained

to date are quite encouraging. It now appears very likely that lower quality mica will be declared suitable for at least the lower grade capacitors, that is, those for which performance specifications are not the most exacting. A definite conclusion of the research work on the use of lower quality mica in capacitors is expected about the end of January 1944."

The experiments relating to the substitution of high grade United States Tariff Commission said about Russia in 1938:—

"Although there are usually no exports and no imports of sheet mica reported by the Soviet Union, evidence of a considerable domestic consumption is found in the substantial production of electric generators, motors, and appliances, amounting in recent years to 600 to 800 million rubles annually."*

We are unable to say anything more definite than this regarding alternative sources of supply and the extent to which they are likely to affect the Indian trade. The question depends upon many factors, for example, the type and richness of the deposits, their segregation or dispersal, the average quality and size of the mica produced, the local mining and manipulative ability, the availability of labour and mining materials, facilities for transport, organisation of local markets, reliability of producers and shippers, reliability of standards, etc., and an answer to the question requires a study of the problem at the spot by a Committee including at least one mining engineer and one business man, both thoroughly acquainted with the conditions in which mica is produced in and exported from India.

Substitutes for Mica

In 1928, Mr. Hobson noted the danger that owing to the uncertainty of the continuation of Indian supplies of mica a search would be made for, and mica would be replaced by, synthetic substitutes. We have said above that there is no reason to apprehend a failure of the supply of Indian mica. The search for substitutes, however, still goes on, and its intensity has grown all the greater because of the recent war. In the United States recently publicity has been given to a list of essential materials for which substitutes are required, prominent in the list being mica. The desire of the Fighting Services in America is said to be to eliminate mica by mica of lower quality have already been referred to in one of the preceding chapters, and we have stated there that, on economic grounds, it is unlikely that higher quality mica will be replaced in this field by lower quality mica.

The subject of substitutes is a highly technical one and the investigation is conducted in foreign countries; so the Committee was not in a position to get first-hand evidence about it. Besides, the results of technical work on the subject done during the War were not available to the Committee. In these circumstances, the Committee can do no better than reproduce without comment a communication received in March, 1945, through its Assessor, Mr. E. Watson, from Sir Arthur Fleming, Technical Director of Associated Insulation Products Limited, London:—

"One should perhaps first review the growth of the electrical manufacturing industry since the beginning of this century, and compare it with the corresponding growth in the demand for mica. I have no actual figures before me, but there is no doubt that the output of manufactured electrical plant has increased at a vastly greater rate than the demand for Mica, and one might be led, on this account, to the conclusion that substitutes are being used. Basically, however, one must view the position from an entirely different angle. At one stage of the Electrical Industry Mica was used for all kinds of insulating purposes because it was one of the very few suitable materials available, and in many of those early instances its use was not justified by the technical requirements, so that in course of time many materials, such as varnished papers and

fibres, were employed quite satisfactorily, and while the total demand for Mica did not diminish, the demand estimated, for instance on the basis of the Kw. capacity of plant manufactured, fell away very considerably.

"Then again, because certain usages of Mica were well established where the conditions were exacting from the point of view of either temperature or mechanical considerations Electrical Designers were reluctant to employ any substitute until it had been tried out for a period of some years. This applies particularly to very low voltage equipment, such as that used in the automobile industry. Here, where electrical parts have to be produced by mass production, it sometimes happens that an assembly process can be cheapened by the use of insulating materials which will withstand certain excessive stresses during the assembly process, and in such cases, if necessary, materials which are much more costly than Mica may be used and still the ultimate result will be a reduction in the cost of the finished product. During the War the demand for Mica, particularly, of course, for capacitors, has increased enormously, and much of this demand will diminish when War production ceases. As against this, however, the impetus which has been given to the already rapidly growing Radio industry is such as to lead to a very much greater post-war demand as compared with the pre-war demand for Mica used in the various phases of Radio work, including television.

"While the improvements in certain synthetic materials and some forms of fibrous insulation have been considerable, the only important development in dielectrics which may affect the use of Mica, other than for capacitors, is that of woven glass fibre treated with certain heat-resisting synthetic preparations. For certain electrical plant operating under high temperatures and heavy duty, this material may to some extent replace sheet prepared from built up Mica splittings with paper, silk or fabric backing, but there is no evidence at the moment that this competition will be far-reaching.

"In the field of capacitor insulation a number of substitutes have been developed under the stress of War conditions, some of which will persist in the future to a limited extent, but here again the basic consideration is whether the conditions demand a material having the dielectric, mechanical and heat-resisting properties of Mica, and, with the exception of ceramic insulation, none of the substitutes possesses to anything like the same degree as Mica the requisite characteristics.

"The following are some notes which I asked Mr. J. M. Fleming to prepare as a result of the extensive investigations he has made on the subject of Mica substitutes both here and in the States. I fully agree with the views he expresses—

"In spite of many endeavours, and in some cases much publicity, no material has yet been developed which is successful as a substitute for Mica. Due to shortage of this essential material, however, in a number of cases apparatus using mica has been replaced by apparatus using alternative materials. In this category of alternative materials fall the advertised Mica substitutes which are materials having some properties approaching those of Mica which render them unsuitable for incorporation in apparatus to replace Mica-using apparatus. In other cases manufacturing technique and improved production methods have led to a modification of design which results in the elimination of Mica from a limited number of items.

Alternative Materials

The condenser field presented the most obvious field for far-reaching economy of Mica. Ceramic condensers and tubular paper condensers have always been available, and a natural step was to increase the use of these wherever space considerations and particular electrical characteristics did not demand the small size of the Mica condenser or its high precision and stability. Two materials which have been much advertised as Mica substitutes—Alsifilm (or Diaplex) and Plectron (or Lectrofilm)—have also entered the field.

"*Polectrom* is an impregnated paper and far from being a true Mica substitute. The use of this material results only in the production of an improved paper condenser whose employment is restricted to places where paper condensers would otherwise be used.

"*Alsifilm* is a resin-impregnated Bentonite Clay film which can be handled like Mica sheets for the stacking of flat plate condensers. In condensers for one particular use it has some advantage in electrical properties over Mica, but this is only a limited application and has not yet gone beyond the development stage. Experiments have also been made with a view to using this material for other purposes, such as field coil insulation, but there is no immediate possibility of its replacing Mica for general electrical insulation. It can be regarded as a new entry into the insulating field rather than as a Mica substitute.

Improved Production Methods

Development of the ceramic plug will almost certainly cause the replacement of Mica insulation in spark plugs by ceramic insulation, such as Corundite or Alundum, in the future. In certain small motor applications (particularly for the automobile industry) Mica has been replaced by synthetic resin and synthetic resin impregnated materials. This change has been dictated solely by production considerations. The replacing materials are in themselves more expensive than the Mica insulation, but ease of production and assembly when the entire commutator can be moulded in one portion justify the alternative. This change is only practicable, however, in the case of large scale mass production of small parts, and cannot be regarded as generally symptomatic of any impending change in the Electrical Industry."

Medical Facilities, Public Health, Communications, Education and Labour Welfare—

In the Bihar mica belt there are two public hospitals, one at Kodarma with twenty-seven beds and the other at Giridih with twenty-four beds. The financial condition of the Kodarma Hospital, as described by its Secretary and confirmed by the Civil Surgeon, is deplorable. Its annual income, which includes contributions of Rs. 1,000 from the Provincial Government and Rs. 3,000 from the District Board, and subscriptions and donations amounting to about Rs. 1,300, is estimated at Rs. 6,000, whilst the estimated annual expenditure is Rs. 11,000. Besides this, when we visited the area last March, the Secretary was facing an expected deficit of Rs. 10,000 on a new hospital building, the old building having been condemned as unfit, and the Civil Surgeon writes that for want of funds it is not possible to effect much needed improvements. The Giridih Hospital is financially in a better condition, its estimated annual income being Rs. 12,000 including contributions of Rs. 6,000 from the District Board, Rs. 3,000 from the Municipality and about Rs. 2,000 from donations and subscriptions; but the existing hospital building has been condemned and the construction of a new building awaits the finding of the necessary funds. In addition to these two hospitals, dispensaries for treating out-patients are maintained by the District Board at Markacho, Dhanwar, Mirzaganj, Satgawan, Jhajha and Rajauli. Other medical facilities consist of a missionary dispensary at Tisri, and arrangements for the treatment of employees made by the principal mining companies, namely, a dispensary at Jhumri-Telaiya and a hospital with twelve beds at Dubour maintained by Messrs. Chaturam Horilram Limited, one dispensary at Tisri and another at Domchanch maintained by Messrs. F. F. Chrestien and Company Limited, and one hospital with eight beds at Giridih maintained by the Indian Mica Supply Company. In the Madras area, there are only the Government hospital at Gudur with eighteen beds and one Local Fund dispensary at Podalakur in Rapur Taluk.

We feel that while there is no need for an increase in the number of medical institutions in the Bihar area, an improvement in the Public hospitals at Kodarma and Giridih is urgently called for in the matter of equipment and funds. We also regard it as a serious matter that in an area where so many

miners and factory workers are engaged there is no facility for an X-Ray or a bacteriological examination. We would therefore suggest provision for this at one of the two big hospitals; perhaps Giridih will be more suitable as it is provided with electric power and is the subdivisional headquarters town. For the Madras area, we agree with the suggestion of the Madras Mica Association that there should be two more dispensaries, one at Kalichedu and the other in the Shaw mine area. Another necessity for the mining area is some ready means of conveyance for bringing patients from the mines to the Hospitals for treatment. For this purpose, we would suggest the location of motor ambulances at Kodarma, Giridih, Gudur and Ajmer.

Public health, communications and education in the mica mining areas are the concern of the respective District Boards, which naturally do not pay particular attention to the needs of the mica mining industry. Nothing special is done by these bodies for the health and the education of the mining community, and the mine owners have to supplement the through roads provided out of public funds by their own system of unmetalled roads; one of the mining companies retains its own road staff for this purpose. It is felt by the trade, particularly in Bihar, that in view of the road cess realised from the mica mining areas, it is entitled to more than it gets, and we would suggest that, if possible, the mica interests should be given some representation on the Local Bodies in Madras and Ajmer-Merwara. In Bihar we think that a different arrangement is possible. An enquiry from the Collectors of districts Hazaribagh, Gaya, Monghyr and Bhagalpur elicited that the annual cess collection from the Bihar mica mines is about Rs. 27,000. This amount could be supplemented by the welfare cess, to be realised by a percentage levy on the value of exports, and the fund, with such further contributions as may be made by the Provincial and the Central Governments or received from other sources, may be administered by a Mica Mines Board on the model of the Board constituted for the coal mining areas under Hazaribagh Mines Board Act, 1936 (Bihar Act III of 1936). Like that Board, the Mica Mines Board will be responsible for sanitation, drainage, conservancy, housing, water supply, medical treatment, and other functions of the District Board at the discretion of the Provincial Government. As regards the constitution of the Board, we would suggest three representatives of the miners and registered proprietors, three representatives of mining labour, one District Board Member, the Assistant Director of Public Health, Chota Nagpur, the Mica Warden, the Chief Inspector of Mica Mines and the Senior Geologist. The Mica Warden should be the *ex-officio* Chairman of the Board and have a casting vote in addition to an ordinary vote. As regards the welfare funds in the Madras and Ajmer-Merwara areas, since the amounts will be comparatively small, we would suggest that they should be administered by the local Mica Warden with the help of his Committee acting as an advisory committee.

Central Mica Committee

We have been asked to report on the desirability of setting up suitable machinery, whether by the appointment of a Central Mica Committee or otherwise, to watch the interests of the mica industry. We think that these duties can very well be performed by the Mica Marketing Control Board, which will be a body representative of the entire Indian mica industry. Besides watching ordinary trade interests, we would associate this Committee with the conducting of research. In the course of the preceding chapters and particularly in the chapter dealing with the increased utilisation of mica in India, we have suggested several directions in which research is necessary. We have also indicated that the work to be done by this department will be not merely original investigation of new uses for mica and new methods of dealing with mica and preparing it for the market, but the ascertainment of results already achieved in other countries, and the publication of these results and the results of original research to associations and individuals in India likely to make use of them. In associating the Mica Marketing Control Board with the contri-

of research, we would alter its constitution by adding to it the Director, Scientific and Industrial Research, and the Director, Geological Survey of India, and by empowering it to co-opt such other technically qualified members as may be considered necessary. We would also like the Board, in this aspect of its duties, to have a technically qualified Chairman and a technically qualified Secretary. We are handicapped in making more definite recommendations regarding the nature and control of the research agency because we have not had the advantage of the advice on this subject of the Director, Scientific and Industrial Research.

Electric Power

We would draw attention to the immense benefit which the mica industry would get from the supply of electric power for running the mica mines. At present the power used in mechanised mines is derived from steam boilers or crude oil engines, and the cost of the necessary fuel is a big item in the budget of the mining companies using that form of power. On a rough calculation, it was estimated that the expenditure of the Indian Mica Supply Company for the transport of coal alone was over Rs. 70,000 in one year. The supply of electric power would make it possible to use compressed air cheaply, and would facilitate the ventilation of the mines. It would simplify lighting, both at the surface and below ground, and would conduce to the comfort of the miners by eliminating one cause of heat and smoke. Further, the electric plant would be less cumbersome than the plant now in use at the mines, and the transport of it from one mine to another, as the occasion arose, would be easier than it is today. The supply of electric power should not be difficult in the Madras area, as the Committee understands that a source of energy is available about thirty miles away from the mining area. In Bihar, a scheme for the supply of electric power throughout the province is under consideration. If there is no immediate prospect of the scheme being taken up, the Committee has no doubt that a Company would be found willing to run a supply scheme upon commercial lines.

Manufactured Mica

In the statement below we give particulars of the import into the United States of partly manufactured mica from India:—

Imports into the United States of partly manufactured Mica from British India, in lbs

Year	Mica Film, over 1·2 mils thick, not cut or stamped to dimensions	Mica Film and Splittings, cut or stamped to dimensions	Block Mica, cut or stamped to dimensions, shape or form
1	2	3	4
1935	252,804	160	58,182
1936	530,582	2,434	41,966
1937	368,700	8,010	118,299
1938	143,500	7,360	33,342
1939	247,000	16,941	60,327
1940	343,235	19,410	73,782
1941	499,587	14,710	148,624
1942	1,884,105	110,236	355,834
1943	2,170,228	20,645	43,121

Column 2 of the statement relates to condenser films, which, as was explained in Chapter II, are made to specified thicknesses. Column 3 relates to these films cut to specified dimensions, exceeding in size $5/16$ inch by $7/16$ inch and not perforated. This is the smallest rectangle used in the manufacture of fixed condensers for radio receivers, and films of larger size cut or stamped to special dimensions are regarded, for the purpose of assessing the import duty, as raw material for the cutting of the final shape or pattern. Column 4 relates to block mica cut or stamped to specified shapes but not split to thickness. Mica imported from India in this form consists usually of discs and washers. The manufacture of these three descriptions of mica products, even though only partial, gives extra employment to Indian labour, and brings a higher price to the exporter in India. Their import into the United States has been discouraged for a long time by the imposition of a special tariff of 40 per cent. *ad valorem* on the partly manufactured block and uncut films, and 45 per cent. *ad valorem* on cut films. The statement shows that their import into the United States went up considerably during World War II. The Indian trade feels that in view of the readiness with which it supplied mica for war purposes at dictated prices, there should be no tariff discrimination against these partly manufactured products. Many arguments are put forward to explain why processors of mica in one country cannot supply manufactured mica to the manufacturers of electric equipment in another country. It is explained that, owing to continual improvements, the specifications of the latter are liable to sudden and radical changes, and they cannot deal with processors at a distance, as prompt delivery of mica made to exact specifications is necessary. Further, it is stated that Indian labour is unable to work within the tolerances required by the end-user. Granting all these handicaps against the marketing of their product, the Indian exporters feel that there is no reason for the special tariff against these products, and are anxious that some negotiations should be taken up with the Government of the United States to induce them to bring the duty on these items of import into line with that on other imports of mica.

Royalty in Madras

At the end of the Chapter on grading and classification, we have mentioned that the Madras Government levies royalty on mica mining leases on its own scale of valuation and according to a special system of grades. The scale requires the mica to be classified as stained mica and clear mica but, in practice, all the mica is taken to be stained mica and the valuation depends upon the grades only.

During the operations of the Joint Mica Mission, it was felt that the Government valuation for the purposes of assessing royalty was very low as compared with the price paid by the Joint Mica Mission. Hence, in April 1944, the Madras Government substituted for the old scale of values a new scale based on the Joint Mica Mission's grades, classification and prices. This scale is reproduced below:—

Schedule showing the scale of values to be adopted for the purpose of calculating the royalty leviable on every pound of mica removed from the premises of a mine

Type	Area	Quality and value of one pound in weight			Remarks
		A. Q. (Green clear) 1st and Ruby A. Q.	B. Q. (Green clear) and Ruby B. Q. and Green B. Q.	Stained and spotted	
		Rs. AS. P.	Rs. AS. P.	Rs. AS. P.	
Block, Gr. 7, 6 and 5 1/2	Below 1 sq. inch to 2 7/8 sq. inches.	2 8 0	1 10 0	0 8 0	<i>Green clear 1st.</i> —The usual hard pale green qualities free from spots, stains, buckles, striations or any other imperfection.
Block, Gr. 5	3 to 5 7/8 sq. inches	4 6 0	2 10 0	0 14 0	
Block, Gr. 4	6 to 9 7/8 sq. inches	8 2 0	5 0 0	1 12 0	<i>Ruby A. Q. Slightly stained ruby mica.</i>
Block, Gr. 4	10 to 13 7/8 sq. inches	9 10 0	6 4 0	3 8 0	
Block, Gr. 2	14 to 23 7/8 sq. inches	12 0 0	7 8 0	4 8 0	<i>Green clear 2nd.</i> —The dark green or brown qualities as in the case of 1st or any soft green mica. It will also consist of pale green mica, having very slight stains, air bubbles, rainbow markings or other slight imperfections excluding dots or spots. <i>Green B. Q.</i> —Pale or dark green mica having stains, vegetable markings or other imperfections and more or less the green equivalent to the better known 'K. C.' B. Q. <i>Ruby B. Q.</i> —Stained and/or slightly dotted ruby mica.
Block, Gr. 1	24 to 35 7/8 sq. inches	14 0 0	9 8 0	5 12 0	
Special	36 to 47 7/8 sq. inches	20 0 0	13 0 0	6 12 0	
Ex. Special	48 to 59 7/8 sq. inches	22 0 0	17 0 0	7 8 0	
Ex. Ex. Special	60 to 80 sq. inches	30 0 0	23 0 0	8 12 0	
Ex. Ex. Special	80 to 100 sq. inches	38 0 0	29 0 0	10 0 0	
Ex. Ex. Special	100 and over sq. inches	46 0 0	34 0 0	11 0 0	

Thin Block

No. 4 and below

No. 3

No. 2

No. 1 and up

1 8 0

3 4 0

4 0 0

4 10 0

Scrap capable of being made into splittings : Rs. 150 a ton.

Scrap not capable of being made into splittings : Rs. 5 a ton.

On the representation of the Madras Mica Association, however, the order was kept in abeyance, and this Committee was asked by the Central Government to consider the point in the course of its enquiry.

In discussing the processing of mica we remarked that the Madras Government's present system of charging royalty entails great waste because it necessitates a double processing of mica, the first processing for grading the mica for the assessment of royalty and the second for qualifying and re-grading the mica for export. As the mica is not allowed to be removed from the pit head until the royalty has been paid thereon, the first processing has to be done at the pit head. To us it appeared that this processing was very crudely done. The reason is that sufficient skilled labour is not available in the mining areas and, as the mica has to be dressed in small quantities at several places, the collection of skilled labour specially for this purpose would be costly and difficult; further, satisfactory supervision of work done in the different centres is far from easy. With one exception, all the trade witnesses examined by us in Madras expressed the above opinion. The solitary exception said that he had no difficulty in getting his mica dressed satisfactorily at the pit head. It may be that this witness is particularly lucky in the location of his mines. It is also significant that he is concerned only with two mines and has never been an exporter.

The revised schedule, as approved by the Government in April, 1944, introduces a further complication. It requires not merely the grading of the mica, but also its classification as A.Q., B.Q., and Stained and Spotted. This will intensify the problem of finding labour at the pit head capable of processing and sorting the mica for the purposes of assessing royalty. We have our doubts also as to the capacity of the Government Mica Inspectors, who are responsible for assessing royalty, to verify the sorting of the mica according to quality. As one of the witnesses examined by us remarked, there would be some point in charging royalty on this system if the Government could guarantee that the qualification as passed by the Government Mica Inspectors would be accepted by the Joint Mica Mission for its purchase.

Apart from the above difficulty, we think that the new scale probably raises unduly the valuation of mica for the assessment of royalty. The Government was unable to supply us with figures of the increased realisation of royalty expected from the change, because the financial results had not been worked out. However, some indication of the probable result is given by a statement which was made to us regarding the refund of royalty, realised according to the new scale before orders were received from the Government keeping the revised schedule in abeyance. Regarding this refund, we were told that in the case of one assessee the refund was about 90 per cent. of the royalty realised; in other words, the increased royalty in this case was ten times the old royalty. The statement was made to us without a reference to the papers, but it came from a responsible source and, even making some allowance for a faulty memory, it would indicate that on the new scale there is likely to be a considerable increase in the royalty charged, and such an increase will naturally have an adverse effect on the industry.

We found the local industry very much opposed to the present system of charging royalty. It expressed a preference for the realisation of royalty on the Bihar system of a flat rate per acre leased. It appears to us that this system is unsuitable for the Madras area, where the lands in which Government owns all the mineral rights and those in which it owns only a share of the mineral rights are completely intermingled with each other.

The alternative to this system is that of charging royalty at a fixed rate on the crude or on the dressed mica output of the mine. The assessment of it on dressed mica is, however, open to the same objection as the present system, namely, that it will require the dressing of the mica at the mine. The better

system, therefore, appears to us to be the assessment of royalty on the outturn of crude mica. We give below a statement of the mica outturn in the district of Nellore and the royalty collected thereon, obtained by us from the Collector of the District:—

Outturn of Mica in the District of Nellore and realisation of royalty thereon

Year	Total outturn of crude mica in the district	Total outturn of cut (dressed) Mica	Total outturn of waste rounds (mica fit for splittings)	Total amount of royalty on mica collected in the District	Total leased area in the District liable to the payment of royalty
1	2	3	4	5	6
				Rs. AS. P.	Remarks.
1937 .	...	1,485,092—12	4,444,501—4	32,647 13 8	
1938 .	4,731,999—12	1,471,691—7	6,786,508—12	38,064 12 1	Particulars for 1937
1939 .	6,662,616—6	2,339,705—11	3,430,120—8	49,744 3 3	and 1944 not
1940 .	4,916,360—0	1,425,794—7	465,658—14	40,140 6 11	available for want
1941 .	6,769,531—14	1,591,656—14	2,320,957—0	37,795 4 6	of information
1942 .	8,051,044—2	1,754,336—11	2,470,806—4	38,846 9 10	from the Mica
1943 .	14,891,854—15	1,567,813—10	3,237,810—9	36,289 9 9	Executive Staff.
1944 .	...	1,044,384—0	1,947,281—15	27,299 4 1	
	46,023,407—1	12,680,474—8	23,098,645—2	3,00,828 0 1	Ac. 7018—3 effnts.

This shows that the annual royalty realised during this period varied from about 1.5 pies to .46 pie per pound of the annual output of crude mica. On this basis we would suggest that an assessment at seven annas per maund of crude mica, roughly equivalent to one pie per pound, would be a fair charge. This charge should be made not on all the crude that comes out of the mine, for much of it is waste which is of very little value, but on crude mica removed from the pit head to the factory. This may, of course, be supplemented by a special royalty on waste mica removed from the pit head for sale, grinding or other use. Further, there should be provision for a minimum royalty or dead rent.

Mica Inspectors in Madras

The assessment and realisation of the royalty in Madras is entrusted to the Government Mica Staff consisting of an Inspector, getting Rs. 75 to 100 per month with a fixed travelling allowance of Rs. 27/8/- per month, and three assistant inspectors. Besides this duty, they undertake verification work for the granting of leases and are responsible for seeing that the Indian Mines Act and the Rules and Regulations thereunder are observed. The inspector is required to be a graduate in Geology, but no mining experience or technical knowledge of mining is required in the case of either the inspector or an assistant inspector.

The system of the assessment of royalty is that, as soon as a miner has a certain quantity of mica ready for consignment from the mine, he informs the inspector, who deposes one of the assistant inspectors to verify and weigh the mica and assess the royalty. When this is done the miner has to deposit the royalty before he can remove his mica. Any delay in the assessment of the royalty means a considerable loss to the miner. Further power is placed in the hands of the staff by making it responsible for seeing that the mining laws and regulations are observed. The system is open to very serious objection, as it places a comparatively low paid staff in a position of great power over an important industry. For obvious reasons there were no open complaints

against the Government Mica Staff, but the feelings of the local trade showed themselves in grumbling about the inspection of the mines by persons with no technical training, "very keen in finding faults with the miners for petty violations of the rules".

The establishment of the Inspectorate of Mica Mines will make it unnecessary, in future, for the Government Mica staff to inspect the mines from the technical point of view. It may then confine itself to its proper duties, namely, the assessment and realisation of royalty and the safeguarding of the interests of Government as full or part owner of the mineral rights. Even here, we would suggest a modification, namely that, in assessing royalty as proposed by us, the basis should be the accounts kept by the miner, and it should not be made compulsory for the mica to be weighed by the Government Mica Staff, and the royalty deposited, before the mica is removed from the mine. In order to prevent fraud as far as possible the accounts of the miners and their stock, both at the mines and the factories, should be made open to check by properly authorised Government officers at all reasonable times. It may be apprehended that this will leave a scope for dishonest miners to falsify their accounts and avoid payment of royalty. It is difficult to devise a scheme which entirely excludes this possibility, and we do not think that this result is achieved even by the present system. We make this statement advisedly, because we found by verification in at least three of the pit head factories visited by us that proper accounts of the mica raised from the mines are not maintained. It is true that in the accounts there were entries relating to the quantity of crude mica raised daily from the mine and the quantities of it issued every day for processing together with particulars of the daily dressed product. These figures, however, were all round figures, and were obviously imaginary. The first real figures that appeared in the accounts related to the mica verified for the assessment of royalty.

Travancore

As Travancore State is the principal source of phlogopite mica in India, Mr. Chandmall Rajgaria, Assessor, visited the Travancore field at the instance of the Committee. His report, reproduced in Appendix XIII, shows that there are rich deposits of this mineral in Travancore with encouraging future possibilities. This source of mica will doubtless be very useful when India is sufficiently developed industrially to utilise its own mica.

Finance

Our proposals above cover the following main items of expenditure:—

1. The Mica Wardens and the Mica Wardens' Boards.
2. The Inspectorate of Mica Mines.
3. The Mica Mining Classes.
4. Labour Welfare and the Mica Mines Board in Bihar.
5. The Mica Marketing Control Board.

We suggest that this expenditure be met by a percentage levy upon exports—supplemented by fees, fines and penalties, and by contributions from Central and Provincial Government funds. The levy, which we would recommend, is 6 per cent. *ad valorem* on all mica exported from India. Estimating the annual export of mica at Rs. 1,00,00,000, which would not appear to be unreasonable in view of the level reached during and immediately before World War II, this would give an annual income of about Rs. 6,00,000. Out of this amount we would allot five-twelfths, *i.e.*, about Rs. 2,50,000, to welfare work to be administered as above suggested, by the Mica Mines Board in Bihar, and by the Mica Wardens in the other two areas. We would allot one-quarter, *i.e.*, about Rs. 1,50,000, to the Inspectorate of Mica Mines and the Mica Mining Classes, and one-third, *i.e.*, about Rs. 2,00,000, to the Mica Marketing Control

Board, which, as we have suggested above, will also be concerned with research and will perform the work of a Central Mica Committee for looking after the interests of the industry generally. The Mica Warden and the Mica Wardens' Board will be responsible for local administration; they will perform work of the kind that the Mica Controller and his staff now perform in Bihar. We think that the necessary funds for this should come from fees, fines and penalties and the deficit, if any, should be made up, as at present, from Provincial Government funds. Labour Welfare and the Mica Mines Board will be partly Central and partly Provincial concerns and the balance necessary for these purposes should be shared by both the Governments. The other items will be principally a Central concern and the supplementary funds necessary for them should come from Central Government funds.

CHAPTER XV

SUMMARY OF RECOMMENDATIONS

We summarise below the recommendations contained in the foregoing chapters:—

1. Maintenance of Records of Abandoned Mines and Prospecting Pits

(a) A record should be maintained by the Inspectorate of Mica Mines of all abandoned mines and prospecting pits exceeding 40 feet in vertical depth.

(b) The preparation of the record should be taken up at once by the Indian Mines Department under the Regulation making powers of the Central Government under section 29 of the Indian Mines Act, 1923.

(Chapter IV, pages 16, 17 and 19.)

2. Compulsory Systematic Mining

Mining free from restriction as to system should be permitted along the vein to a distance of 120 feet from the mouth of the mine, provided that the vertical depth does not exceed 80 feet. At the discretion of the Chief Inspector of Mica Mines it may be permitted for another 50 feet along the vein. Beyond these limits mining must be systematic.

(Chapter IV, pages 17 to 18.)

3. Technical Assistance to Miners

Technical assistance to the miners, necessary for the systematic development of mines, will be given by the Inspectorate of Mica Mines, which will consist of one Chief Inspector of Mica Mines on a salary of Rs. 1,000 to Rs. 1,500 a month with his headquarters in Bihar, and six Inspectors of Mica Mines drawing Rs. 600 to Rs. 800 per month, four of them stationed in Bihar and two in Madras. They will be appointed by the Central Government, but in the different areas will work under the direction of the local Warden's Board. Compliance with the directions of the Inspectorate in mines which have passed the above limit will be compulsory, and will be enforced by suspension or cancellation of the miner's licence. There will be a provision for appeal against the directions of the Inspectorate. The Inspectorate will also give help and advice in mines still within the limits of unsystematic working.

(Chapter IV, pages 18 to 19.)

4. Reporting of Mines

(a) The report, under section 14 of the Indian Mines Act, of the opening of a mica mine should go to the Inspectorate of Mica Mines instead of to the District Magistrate.

(b) A second report should be submitted when the mine reaches a depth of 40 feet.

(c) The excavation should be reported to the Chief Inspector of Mines when it becomes a "mine", in the sense that it has got past the stages of prospecting and exploring and has entered the stage of development, provided that a pit, the output of which has reached 100 maunds of crude mica in one month, shall be regarded as a mine in this sense. The report will go through the Inspectorate of Mica Mines, which will have the final authority to decide whether a pit has become a mine in this sense or not.

(d) Reports under Metalliferous Mines Regulations 4 to 8 and 18 relating to the opening, abandonment, re-opening, etc., of the mine should go to the Chief Inspector of Mines through the Inspectorate of Mica Mines.

(Chapter IV, page 19 and Chapter V, pages 26, 28 and 29.)

5. Compulsory Employment of Qualified Mine Manager

The employment of a technically qualified mine manager should be made compulsory, in the case of an underground mine, when the number of labourers employed underground in a day of twenty-four hours is not less than 140, and, in the case of an open-cast mine, when the number of labourers employed in a day of 24 hours is not less than 200.

(Chapter IV, page 19.)

6. Stopping

It should be made compulsory for an approach to be left to the deepest working point of the mine, provided that this shall not be required when stopping is done with the previous approval of the Chief Inspector of Mica Mines.

(Chapter IV, pages 19-20.)

7. Exemption from the Indian Mines Act, 1923

The provisions of the Indian Mines Act with the exception of section 14, 23B, 28 and 33 should apply to all mica mines and prospecting pits. Mica mines less than 20 feet in vertical depth should be exempt from section 14. Exemption in respect of sections 23B, 28 and 33 should be given to mica mines employing not more than 20 labourers in a day of 24 hours.

(Chapter V, pages 25 and 26-28.)

8. Annual Returns under the Metalliferous Mines Regulations

(a) The provisions regarding returns contained in the Metalliferous Mines Regulations should apply to "mines", in the sense defined in recommendation 4 (c) above.

(b) Special provision should be made in the form of the return for figures relating to production from mine dumps.

(c) Figures relating to production from prospecting pits should not be included in these returns.

(d) One copy of the returns should be sent to the Inspectorate of Mica Mines instead of to the District Magistrate as provided in the Regulations.

(Chapter V, pages 28-29.)

9. Mine Manager

The Chief Inspector of Mica Mines should be vested in respect of mica mines with the powers, relative to mine managers, now vested in the Chief Inspector of Mines under Metalliferous Mines Regulation 21.

(Chapter V, page 29.)

10. Complicated Regulations

It would be useful to examine the Metalliferous Mines Regulations as a whole and to modify the more complicated Regulations so as to make them applicable only after a mine has reached a suitable stage of development.

(Chapter V, page 29.)

11. Rules under the Indian Mines Act

The register of labourers prescribed under these Rules should not be required to be kept at mines employing not more than 20 labourers in a day of 24 hours. The powers given to the Provincial Government and the Chief Inspector of Mines under the other Rules should not be used so as to impose burdensome duties upon small mine owners.

(Chapter V, pages 29-30.)

12. Revision of Regulations and Rules under the Indian Mines Act

After the establishment of Mica Wardens in the different areas, the Rules and Regulations may usefully be revised in consultation with them, the Inspectorate of Mica Mines and the Indian Mines Department, with a view to simplifying

them for the purposes of the mica mines and to avoid duplication of work between the Inspectorate of Mica Mines and the Indian Mines Department.

(Chapter V, page 30.)

13. Proprietor's Certificates

A Proprietor wishing to conduct mining operations must take out a proprietor's certificate. This certificate should be subject to the same conditions and restrictions as a miner's licence.

(Chapter VI, pages 32 to 33 and Chapter XIII, page 84.)

14. Miner's Licence

(a) The grant of a miner's licence will be discretionary with the Mica Warden's Board. Refusal of a miner's licence will be subject to an appeal to the Provincial Government.

(b) The Miner's licence will be subject to cancellation and to suspension for a period not exceeding one year. The power of cancellation and suspension will be exercised by the Mica Warden's Board. Cancellation will be subject to an appeal to the Provincial Government. There will be no appeal against suspension.

(Chapter VI, page 33 and Chapter XIII, pages 86 to 87.)

15. Desiderata for Mining Leases

(a) The period for which the mining lease is granted must not be less than $7\frac{1}{2}$ years, and the total of this period and the period for which the lessee is entitled, as of right, to a renewal of the lease must be not less than fifteen years. A miner's licence should be refused in respect of a mining lease which does not comply with this condition.

(b) The terms and conditions on which the lease is granted must be definite.

(c) The right to a renewed lease must be a real right.

(d) The terms on which the lease will be renewed for a fresh period must be definite and ascertainable.

(e) The lessee must be entitled to terminate the lease at any time with notice, preferably not more than six months.

(f) The lessee should be given the right to work other minerals found in the pegmatite on the payment of an agreed royalty. This royalty should be a nominal one until the use of these minerals is established.

(Chapter VI, pages 33 to 37.)

16. Prospector's Permit

This will cover prospecting operations. The permit will be granted for one year on the payment of a small fee and will be renewable for another year. The permit holder will be entitled to operate to the limits within which systematic mining is not compulsory, but otherwise will be governed by the same provisions as a person operating under miner's licence. The work will stop when the working becomes a "mine", in the sense defined in recommendation 4 (c) above. The prospector's permit will be granted by the Mica Warden. There will be no appeal from the refusal of a prospector's permit.

(Chapter VI, pages 37 to 38.)

17. Dealer's Licence

(a) Dealer's licences will be granted automatically to certain persons, namely, persons holding dealer's licences under the Mica Control Order at the time when that Order lapses or when its place is taken by the new legislation, and persons carrying on business as dealers in Madras and Rajputana for such period prior to the commencement of the new legislation as the Provincial Government may fix.

(b) The grant of dealer's licences to new-comers will be discretionary with the Mica Warden's Board. Refusal of a dealer's licence will be subject to an appeal to the Provincial Government.

(Chapter VII, page 39 and Chapter XIII, page 86.)

18. Protected Zone

The Mica Warden's Board may demarcate Protected Zones, within which mica dealers will not be permitted to deal in, possess or transport, mica exceeding Grade No. 5½, or mica capable of yielding block mica exceeding Grade No. 5½. The Mica Warden's Board may raise the above limit to Grade No. 5.

(Chapter VII, pages 39 to 40.)

19. Sale of Bima Mica

The restriction forbidding the sale of *bima* mica of Grade No. 5 and above should continue.

(Chapter VII, page 40.)

20. Sale of Crude Mica

The sale of crude mica should be restricted to particular centres selected by the Mica Warden's Board outside the Protected Zones. These centres should be located near the marketing centres.

(Chapter VII, page 40.)

21. Endorsement of Agents on Licences and Proprietor's Certificates

Ordinarily, the Mica Warden will endorse the name of any agent who is proposed. In cases of doubt, he will place the matter before the Mica Warden's Board which will deal with the matter as it thinks fit.

(Chapter VII, pages 40-41.)

22. Use of Godowns

Ordinarily, the Mica Warden will permit the use of any godown which is notified. In cases of doubt, he will place the matter before the Mica Warden's Board which will deal with the matter as it thinks fit.

(Chapter VII, page 41.)

23. Keeping of Accounts and Transport Passes

Accounts shall be kept by all certificate holders, licensees and permit holders, and mica must be accompanied by transport passes, except when it is expressly exempted. Criminal liability for failure to keep regular accounts will be incurred only if the defects in the accounts, in the opinion of the Court, justify an inference of dishonesty or deliberate falsification of accounts.

(Chapter VII, page 42.)

24. Responsibility of Employees of Licensees, Certificate Holders, etc.

The licensees, registered proprietors etc., should be protected against punishment for bad or dishonest account-keeping on the part of their employees by making the employees responsible on the lines, either of section 16 (2) of the Indian Mines Act, or section 71 of the Factories Act, 1934 (Act XXV of 1934).

(Chapter VII, page 42.)

25. Special Police Force

The special Police Force maintained for dealing with mica crime should be increased in consultation with the authorities administering the mica legislation. If it is not possible to place this Police Force under the control of the Mica Warden, he should at least be effectively associated with its control.

(Chapter VII, page 43.)

26. Grading of Mica

The Bihar system of grading mica should be adopted throughout India. The nomenclature of this system may be simplified by substituting 0, 00, 000 or 0, 00, and so on, for the terms Special Ex. Special Ex. Special, and so on.

(Chapter VII, page 44.)

27. Standards of Quality

A definite attempt should be made to prescribe standards of quality for Indian mica. Such standards will necessarily be based upon the visual tests at present being followed, but the desirability and the possibility of standardisation in accordance with objective tests capable of exact measurement must not be lost sight of.

(Chapter VIII, page 48.)

28. Micanite

(a) The increased manufacture of micanite in India is dependent mainly on its increased use within the country.

(b) Attempts should be made to remove the defects enumerated by the Committee.

(c) If the product is improved, a protective tariff may be imposed to encourage the consumption in India of Indian made micanite.

(d) There should be propaganda among electrical engineers in order to increase their co-operation with manufacturers of micanite in India.

(Chapter IX, pages 51 to 53.)

29. Ground Mica

There is great scope in India for the increased use of ground mica, and there is a big market for it abroad. An attempt should be made to establish the industry in the country.

(Chapter IX, pages 57-58.)

30. Waste Mica

There is scope for the increased use of waste mica in India; for example, as lagging and as an insulator of heat. Research is necessary to ascertain known uses, and to discover new uses, and should be supplemented by propaganda to spread the knowledge thus acquired.

(Chapter IX, pages 58-59.)

31. Scheme for Marketing Mica

The Committee recommends the constitution of a Mica Marketing Control Board for the whole of India, consisting mainly of trade members, to control the export trade in mica. This Board will fix standards and minimum prices. Export of mica will be confined to registered exporters, and may be either against 100 per cent. letter of credit or on consignment to the exporter himself for sale by his office abroad. Differences between the exporter in India and the purchaser abroad shall be reported to the Board and may be settled only with the consent of the Board. Disciplinary action will be taken by suspension or cancellation of registration, and/or by forfeiture of the whole or a portion of a 5 per cent. security deposit to be made on the invoice value of all exports. The Board will also be empowered to forbid dealings by registered exporters with a foreign purchaser who does anything to defeat the Scheme. Dealings, outside the restrictions regarding standards and minimum prices, in special mica and in mica classified according to special systems of classification will be permitted subject to certain conditions.

(Chapter X, pages 67-69 and Appendix VII, pages 134-137.)

32. Mica Mining Classes

Mica Mining classes, staffed by the Inspectorate of Mica Mines, should be established at Kodarma for training the mine managers required under recommendation No. 5 above. The pupils must be either matriculates, not less than 19 years of age and physically fit, or literate persons who have worked as mine manager, assistant mine manager or shift-boss for at least five years in a mica mine and are recommended by their employers for admission to the classes. The theoretical classes will last for six months, and will be followed by practical work as shift-boss or assistant manager or manager in a mica mine for two years in the case of matriculate students and one year in the case of literate students with previous mining experience. In addition, matriculates admitted to the

classes must undergo a practical training for six months in a mica mine under an approved manager before being admitted to the theoretical classes. If found necessary, separate mica mining classes may be established in the Madras area.

(Chapter XI, pages 71-73.)

33. Wages

(a) An attempt should be made to increase the wages of labour in the industry both on the mining and on the factory side. On the mining side, the increase should be connected with the length and continuity of the service rendered. On the factory side, some connection should be established between the pay obtained by an individual worker for a particular period and the quality of the work turned out by him during that time.

(b) In fixing minimum prices under the Marketing Control Scheme due weight should be given to the need for paying adequate wages to the labour.

(Chapter XII, page 74.)

34. Housing Accommodation

On the mining side, there is need for the provision of suitable housing in central areas, combined with good communications and means of transport to and from the mines. This should come out of the general welfare fund, and persons who are in a position to understand the needs of the labouring classes should be associated with the designing, locating and construction of the houses.

(Chapter XII, page 75.)

35. Mines Maternity Benefit Act, 1941 (XIX of 1941)

The Act should be strictly enforced and the services of the Inspectorate of Mica Mines should be utilised for this purpose.

(Chapter XII, page 75.)

36. Employment of Children and Adolescents

(a) On the mines side, the hours of labour for adolescents, that is to say, persons not less than 15 but less than 17 years of age, should be limited to eight hours in one day and their employment should be restricted to the less strenuous forms of labour.

(b) On the factory side, the Employment of Children Act, 1938 (XXVI of 1938), prohibiting the employment in a mica factory of a person who has not completed his twelfth year, should be enforced as early as is practicable. Occupation for the children released by the enforcement of this Act should be made by the establishment of central schools, maintained by Government or from a general welfare fund, where the children will be instructed and looked after during the factory hours. The hours of instruction should be at least three to four, and some time should be given to work of the sort now done by children in the factories. The children attending the schools should be given one light meal during the day.

(Chapter XII, pages 77-78.)

37. Regulation of the Mica Factories

The mica factories should be regulated by a special Act on the lines of the Central Provinces Unregulated Factories Act, 1937 (C. P. Act XXI of 1937), primarily applicable to factories employing fifty workers in one day. Working hours should be kept at 54 in the week, and the scale of penalties should be Rs. 500 as in the Factories Act, 1934 (XXV of 1934). The employment of children not less than 12 and less than 16 years of age should be made subject to a certificate of fitness, and their hours of work limited to five hours per day, except in the case of children not less than 15 and less than 16 years of age certified as fit to work as adults. Hours of employment for adult men and women should be not more than nine hours a day. The Provincial Government should be empowered to apply the Act to a factory employing not less than twenty workers per day; and in exercise of this power the provisions of the Act regarding the keeping of registers of workers and the submission of returns should

be applied to mica factories employing less than fifty but not less than twenty labourers in one day. The Act should include a provision corresponding to section 30 of the Factories Act, 1934, requiring notice to be given to the authorities of certain accidents.

(Chapter XII, pages 78-79.)

38. The Workmen's Compensation Act, 1923 (VIII of 1923)

This Act should be made applicable to all mica mines and factories.

(Chapter XII, page 79.)

39. The Payment of Wages Act, 1936 (IV of 1936)

This Act should be applied to all mica mines and factories employing not less than twenty labourers in a day.

(Chapter XII, page 79.)

40. Silicosis

(a) An enquiry should be made by properly qualified officers into the existence of silicosis in the mica industry, both in the mines and in the factories.

(b) Dry power drilling should be forbidden in the mica mines.

(c) Every person before he is employed as a driller for power drilling in the mica mines, must be medically examined and declared to be fit for this employment. This may be enforced by means of a system of medical certificates renewable within a certain period, or by a touring medical staff equipped with a travelling X-Ray outfit, which will examine labourers sought to be employed as drillers.

(Chapter XII, pages 79-82.)

41. Height of Drives

A minimum height of 4½ feet may be prescribed for drives in mica mines.

(Chapter XII, page 82.)

42. Drunkenness

Licensed liquor and toddy shops should be kept outside the mica mining areas. In the factory areas the local Mica Warden should be consulted by the Excise authorities in the location of such shops.

(Chapter XII, page 82.)

43. Gambling

Attention is drawn to the evil caused by the gambling facilities afforded by carnivals visiting the factory areas.

(Chapter XII, page 82.)

44. Scale of Fees for Proprietor's Certificates, Miner's and Dealer's Licences, and Prospector's Permits

	Bihar		Madras and Rajputana	
	Initial	Annual	Initial	Annual
	Rs.	Rs.	Rs.	Rs.
Prospector's certificate or miner's licence.	250	100	50	25
Dealer's licence	100	50	50	25
Prospector's permit	25	25 (renewal)	10	10 (renewal)

(Chapter XIII, pages 84 to 85.)

45. Mica Wardens and Mica Warden's Boards

(a) The administration of the new mica legislation should be placed in the hands of Mica Wardens and Mica Warden's Boards. There will be separate Wardens and Warden's Boards for the Madras and Bihar areas. The Boards will consist of representatives of licensed miners and registered proprietors, pure dealers, mica labour and the Provincial Government. *Ex-Officio* members will be the Chief or the Senior Inspector of Mica Mines, the Senior Geologist in the belt, and the Mica Warden. The last will be the *Ex-Officio* Chairman of the Board. For Ajmer-Merwara, there will be only a Mica Warden assisted by an advisory committee representing licensed miners and registered proprietors, and labour, and appointed by the Provincial Government. If the Rajputana States are willing to come into the scheme, a Board may be constituted on the lines of the Boards for Bihar and Madras.

The Boards will exercise the power of granting licences and proprietor's certificates and of suspending and cancelling these licences and certificates. The Inspectorate of Mica Mines, operating in the belt, will work under its general control and subject to its criticism. It will be empowered to demarcate the Protected Zone and to extend the limit of possession of mica therein to Grade No. 5, if necessary. It will have the power to fix the selling centres for crude mica. On a reference by the Mica Warden, it may prohibit the use of a particular godown, or refuse to allow the endorsement of a particular agent on a licence or proprietor's certificate. It will also have the power to raise from No. 5½ to No. 5 the grade of mica which splitting contractors and home splitters may carry without a pass. Appeals against the Board will lie to the Provincial Government. The Mica Warden's Board will be the governing body for the Mica Mining Classes.

The Mica Warden will exercise the right of granting or refusing prospecting permits. He will be entitled to inspect stocks and accounts of mica both at factories and at mines. He will exercise the powers of an Inspector of Mines under the Indian Mines Act, 1923. He will be entitled to inspect factories and, in the event of the application to mica factories of the Factories Act, 1934, or of a special Act on the lines of the Central Provinces Unregulated Factories Act, 1937, he will be an Inspector for the purposes of that Act. He will be the general administrative officer of the Board and will have the power to initiate or sanction prosecution for offences against the mica law, and to direct withdrawal of a prosecution initiated or sanctioned by him. He will also be given a limited power of imposing fines, recoverable as criminal fines for contraventions of the mica law. Besides this, the Board may delegate to him some or all of its own powers to be exercised by him in accordance with general instructions laid down by the Board.

(Chapter XIII; pages 85 to 87.)

46. Cancellation of licences and Proprietor's Certificates

The liability for cancellation should be confined to a repeated conviction for an offence connected with mica on facts raising an implication of moral turpitude; provided that a conviction, against which an appeal does not lie, will not be taken into account for this purpose. Further, if a licensee or registered proprietor, whose licence or certificate has been suspended on two previous occasions, commits an act for which his licence or certificate is liable to suspension, the Mica Warden's Board should be empowered to cancel the licence or certificate.

(Chapter XIII, pages 86 to 87.)

47. Collection of Statistics Relating to Mica

(a) Returns, in the form given in Appendix IX, relating to all descriptions of mica from the stage of recovery at the mines and mine dumps to sale and export, and in the form given in Appendix X, relating to employment of labour

in mica mines and factories, should be submitted at half-yearly intervals to the Director, Geological Survey of India. Necessary help for the preparation of these returns should be given to the miners by the Inspectors of Mica Mines, and to the factory owners by the Mica Warden. The Director, Geological Survey of India, should be authorised to verify the individual returns, when necessary, through his own officers or through the local Mica Wardens or the Inspectorate of Mica Mines.

(b) Figures relating to the export and import from India of ground mica and of micanite should be collected by the agency which now collects particulars of exports and imports for the official trade returns.

(Chapter IX, page 53 and Chapter XIII, pages 89 to 90.)

48. Criminal Penalties and Procedure

(a) Penalties for contraventions of the new mica legislation may be on the scale of those provided in the Bihar and Orissa Mica Act, 1930. Of the new offences, the possession of mica of grades larger than the permitted grades within the Protected Zone, the sale of *bima* mica, and the sale of crude mica outside the permitted centres, should be punishable with a maximum imprisonment of one year, with or without fine.

(b) Offences against the new mica legislation should be triable exclusively by a first class magistrate. If this is considered impracticable, all offences against the mica law punishable with imprisonment and contraventions of the mica law by failing to keep correct accounts should be made triable by a first class magistrate.

(Chapter XIII, page 90.)

49. Nature of Legislation Giving Effect to the Committee's Recommendations

As far as possible the legislation should be enacted by the Central Legislature.

(Chapter XIII, page 90.)

50. Mica Splittings

In order not to endanger India's pre-eminence as a producer of mica splittings, the price of mica splittings should not be forced so high that it will pay a country which has cheap labour to import mica for splitting and re-export.

(Chapter XIV, page 94.)

51. Medical Facilities, Public Health, Communications, Education and Labour Welfare

(a) If possible, mica interests in Madras and Ajmer-Merwara should be given some representation on the Local Bodies responsible for medical facilities, public health, communications and education.

(b) In Bihar these duties may be entrusted to a Mica Mines Board constituted on the model of the Board for the coal mining areas under the Hazaribagh Mines Board Act, 1936 (Bihar Act III of 1936). It should consist of the Mica Warden, the Chief Inspector of Mica Mines, the senior Geologist, three representatives of miners and registered proprietors, three representatives of mining labour, one District Board member and the Assistant Director of Public Health, Chota Nagpur. The Mica Warden should be the *Ex-Officio* Chairman of the Board.

(c) Medical facilities should be improved. In particular,

(i) an improvement in the public hospitals at Kodarma and Giridih in the matter of equipment and funds is urgently called for;

(ii) facilities for X-Ray and bacteriological examination should be provided in at least one of these hospitals;

(iii) new dispensaries should be provided at Kalichedu and in the Shaw mine area in the Madras belt: and

(iv) motor ambulances should be located at Kodarma, Giridih, Gudur and Ajmer for bringing patients from the mica mines to the hospitals for treatment.

(d) Welfare funds, raised by a levy upon exports of mica, should be administered in the Bihar area by the Mica Mines Board and in the Madras and Ajmer-Merwara areas by the Mica Warden with the help of his committee acting as an advisory committee.

(Chapter XIV, pages 100 to 101.)

52. Central Mica Committee

The Mica Marketing Control Board will act as a Central Mica Committee to watch the interests of the Mica industry.

(Chapter XIV, page 101.)

53. Research

The Mica Marketing Control Board, with the addition of the Director, Scientific and Industrial Research, and the Director, Geological Survey of India, and of such other co-opted members as may be considered necessary, will be responsible for the conducting of research. For this purpose the Board will have a technically qualified Chairman and a technically qualified Secretary. It will arrange not merely for original investigation for new uses for mica and its by-products and new methods of dealing with mica and preparing it for the market, but also for the ascertainment of results already achieved in other countries, and the publication of these results and the results of original research to associations and individuals in India likely to make use of the information.

(Chapter VI, page 37, Chapter IX, pages 52 to 53, 57 and 58 to 59, Chapter X, page 60 and Chapter XIV, page 101.)

54. Electric Power

The Committee draws attention to the immense benefit which the mica industry would get from the supply of electric power for running the mines.

(Chapter XIV, page 102.)

55. Manufactured Mica

It is desirable that negotiations should be taken up with the Government of the United States to induce them to bring the tariff on imports of manufactured and partly manufactured mica into line with that on other imports of mica.

(Chapter XIV, pages 102 to 103.)

56. Royalty on Mica Mining Leases in Government Land in Madras

In place of the present system, the Committee would recommend an assessment at seven annas per maund of crude mica removed from the pit head to the factory, subject to a minimum royalty or dead rent, and supplemented by a special royalty on waste mica removed from the pit head for sale, grinding or other use.

(Chapter XIV, page 103.)

57. Government Mica Staff in Madras

With the establishment of an Inspectorate of Mica Mines, the Government Mica Staff should confine itself to the assessment and realisation of royalty and to the protection of the interest of the Government as the owner of the mineral rights. The basis for the assessment of royalty should be the accounts kept by the mine owners, which should be open to check by properly authorised Government officers at all reasonable times. The prohibition against the removal of mica from the mine before its weighment by the Government Mica Staff and the deposit of the royalty assessed thereon should be removed.

(Chapter XIV, page 106.)

58. Finance

The expenditure arising out of our recommendations should be financed by an export levy of 6 per cent. on all exports of mica, supplemented by fees, fines and penalties, and contributions from Central and Provincial Government funds. Finance for the main items of expenditure will be provided as follows:—

(i) For the Mica Wardens and the Mica Warden's Boards, from fees, fines and penalties, supplemented by contributions from the Provincial Government.

(ii) For the Inspectorate of Mica Mines and the Mica Mining classes, from 1½ per cent. export levy, supplemented by contributions from the Central Government.

(iii) For labour welfare and the Mica Mines Board in Bihar, from 2½ per cent. export levy, supplemented by contributions from the Provincial and Central Governments and by Road Cess, and

(iv) For the Mica Marketing Control Board and Research, from two per cent. export levy, supplemented by contributions from the Central Government.

(Chapter XIV, pages 107 to 108.)

59. Some Suggestions for the New Mica Legislation, Based upon the Mica Control Order

(a) In the new mica legislation there must be certain provisions of a general nature applicable to the whole of British India.

(b) Certain new or modified definitions are necessary, namely, "waste mica", "manufactured mica", "mica dump", "splitter", "splitting contractor".

(c) The limit of possession without a pass by a splitting contractor or home splitter should be Grade No. 5½, with power to the Mica Warden's Board to raise it to Grade No. 5.

(d) Some provision is necessary to give time to a proprietor or prospector, whose certificate or permit has ceased to be in force or has been cancelled, to dispose of his mica.

(e) In addition to licensees and registered proprietors, accounts should be kept by the holders of prospector's permits. Further, the accounts should include particulars of manufactured mica.

(f) The exemption in the proviso to clause 15(1) of the Mica Control Order permitting the transport of mica without a pass should be confined to mica not above Grade No. 5½, with power to the Mica Warden's Board to raise the limit to Grade No. 5. It should apply to mica carried for home splitting, with a limit of quantity, say ten seers per person. The exemption is not necessary in the case of splitting contractors transporting mica from the godown of a licensee or registered proprietor.

(g) A common method should be provided for disposing of mica seized by the public authorities in the circumstances described in clauses 16 and 17 of the Mica Control Order.

(h) The power to make rules under the new legislation should be vested in the Provincial Government. Such rules should be made after previous publication.

(Appendix XI, pages 152 to 153.)

60. Control of Marketing and Disposal of Accumulated Stocks in Interim Period between Cessation of Operations by Joint Mica Mission and Implementing of Committee's Recommendations *

(a) The standards established by the Joint Mica Mission should be maintained, and the Mica Inspectorate should remain in existence for inspecting

* This recommendation was submitted to the Government of India on the 25th July, 1945, in an Advance Report called for by the Government.

exports of mica and enforcing the said standard. Apart from this restriction, the trade should be free and prices uncontrolled. The Mica Controller in Bihar and the Director of Industries in Madras should, where necessary, be the channel through which exporters in India and importers abroad can get into touch with each other. The expenditure should be met by an export levy on mica.

(b) For the disposal of stocks of mica accumulated by the operations of the Joint Mica Mission, a Standing Committee should be formed, consisting of three members from the trade in India and three members representing the Governments of India, the United Kingdom and the United States of America respectively. This Standing Committee will review the position every six months and give directions regarding the disposal of stocks.

(Appendix XII, pages 154 to 155.)

CHAPTER XVI

CONCLUSION

In conclusion we would like to place upon record our gratitude to the numerous firms, associations and individuals, who have helped us in the enquiry. Our terms of reference were wide, and we came to the task with no previous knowledge of the subject. What little we have achieved, therefore, has been possible only because of the readiness with which our requests for information have been met by most of those whom we have approached. Where so many have helped it is difficult to name all, but we feel that it would be wrong not to mention some whose assistance has been outstanding. Our Assessors Mr. Watson and Mr. Rajgaria gave us ungrudgingly of their time and experience in our tours in the three mica fields and in the discussions that followed. In addition, the former obtained for us from abroad valuable information which we could not have got in India, and the latter's advice, suggestions and criticism were found most useful in the final discussions. In the midst of his multifarious duties as Director of the Geological Survey of India, our technical adviser Dr. Dunn, besides deposing as a witness, took an extremely helpful part in the final discussions and assisted with his advice throughout the drafting of our Report. We would also acknowledge with thanks the considerable assistance which we have received from the Representative of the Bihar Government, Rai Sahib P. S. Prasad and from the Representative of Mica Labour, Mr. Bhattacharya. Finally, we would express our gratefulness for the very kind hospitality which we received wherever we went in the mica fields.

D. E. REUBEN, *Chairman.*

GURUSHARAN LAL, *Member.*

M. MD. ISMAIL, *Member.*

R. H. PRASAD, *Secretary.*

PATNA:

The 11th December, 1945.

APPENDIX I
DEPARTMENT OF LABOUR
RESOLUTION

New Delhi, the 23rd October 1944

No. MD-55.—In their Resolution No. MD-55, dated the 15th May 1944, the Government of India announced their intention of appointing a Mica Enquiry Committee to enquire into the immediate as well as the long-term problems of the mica mining industry. They have now decided to constitute the Committee as follows:—

Chairman

The Hon'ble Mr. Justice D. E. Reuben, I.C.S., of the Patna High Court.

Members

Lala Guru Sharan Lall, Gaya (Bihar).

M. Md. Ismail Sahib, Madras.

Secretary

Rai Bahadur Rai Hardatta Prasad.

The Committee will be assisted in their investigation by the following assessors and technical advisers who will not be required to sign the report but will have the right to submit their views to the Committee and to be present at all discussions:—

Assessors:—

Rai Sabe Pradhan Suryavarti Prasad, Inspector of Mica Accounts, Kodarma (representative of Bihar Government);

Mr. E. Watson, Domchanch and Mr. Chandmall Rajgaria, Giridih (representatives of Bihar Mica Miners and Dealers);

Mr. S. Y. Krishnaswami, I.C.S. (representative of Government of Madras);

Mr. D. Narayana Reddi, Gudur (representative of Madras Mica trade);

Mr. Ram Kumar Agrawala, Bhillwara (representative of the Rajputana Mica trade); and

Mr. Chapal Bhattacharya, Giridih (representative of Mica labour).

Technical Advisers:—

Director, Geological Survey of India; and

Director, Scientific and Industrial Research, or in his absence, another representative of the Directorate of Scientific and Industrial Research.

The Committee will enquire into and report on all problems relating to the mica industry and its present and future development including the following:—

(i) Immediate problems relating to the Mica Control Order, 1940 (both in regard to war production and long term policy) and the review of any orders that may have been passed by Government in connection with that Order;

(ii) The present system of marketing—both inland and abroad;

(iii) Standardisation of quality;

(iv) The extent to which alternative sources of supply may have jeopardised or are likely to jeopardise the position of this country as the principal supplier of muscovite mica;

(v) The extent to which other materials that may be used as substitutes for mica, may have displaced or are likely to displace mica from its uses in the industry;

(vi) Increased utilisation of mica in this country for the manufacture of finished goods;

(vii) Methods of development with special reference to the following:—

(a) Research.

(b) Conservation.

(c) Methods of mining.

(d) Methods of processing,

(e) Methods of marketing,

(f) Methods of meeting competition.

(viii) The desirability of setting up a suitable machinery whether by the appointment of a Central Mica Committee or otherwise to watch the interests of the mica trade and industry; and

(ix) Any other matter of importance as may be brought to the notice of the Committee.

The Committee will have its headquarters at Patna, but will tour in such mica mining areas as may be considered necessary and take evidence on the spot. The Committee will assemble early in November and report to the Government of India at the earliest possible date.

ORDER.—Ordered that this Resolution be communicated to all Provincial Governments and Chief Commissioners, the several Departments of the Government of India [including Financial Adviser, War and Supply and Secretary to the Governor General (Public), the Political Department, the Private and Military Secretaries to His Excellency the Viceroy and the High Commissioner for India].

Ordered also that the Resolution be published in the *Gazette of India* for general information.

D. L. MAZUMDAR, Dy. Secy.

APPENDIX II

LIST OF MEMORANDA RECEIVED

From whom received	Date of receipt
1. Mr. W. Kirby, Chief Inspector of Mines in India, Dhanbad	23-11-44
2. Mr. K. B. Sahay, M.L.A. (Bihar), Hazaribagh	1-11-44 16-11-44 26-11-44 11-12-44
3. Mr. N. Prasad, Assistant Mining Engineer, Stores and Purchase Section, Geological Survey of India, Jhumri Telaiya	1-12-44
4. Mr. Chapal Bhattacharya, Assessor, Giridih	2-12-44
5. Chrestien Mining Co., Ltd., Mica Mine Owners, Domchanch	4-12-44
6. Mr. E. Watson, Assessor, Domchanch	
7. Madras Mica Association, Gudur	9-12-44
8. Mr. Chandmall Rajgaria, Assessor, Giridih	10-12-44
9. Dr. Sir S. S. Bhatnagar, Director of the Council of Scientific and Industrial Research, Delhi	10-12-44
10. Dr. J. A. Dunn, Deputy Director, Geological Survey of India, Calcutta	10-12-44
11. MD. B. Sahana, Mica Miner and Secretary, Kodarma Mica Mining Association, Kodarma	10-12-44 22-12-44 3-5-45
12. Kodarma Mica Mining Association, Kodarma	10-12-44
13. Chatturam Horilram Ltd., Mica Miners & Exporters, Jhumri Telaiya	10-12-44 18-3-45 25-4-45
14. Mr. Karu Dusadh, M.L.A. (Bihar), Hazaribagh	10-12-44
15. Mr. D. Narayana Reddi, Assessor, Gudur	13-12-44
16. Mr. Jagannath Jain, Mica Merchant, Jhumri Telaiya	19-12-44
17. Rai Saheb P. S. Prasad, Assessor, Inspector of Mica Accounts, Kodarma	22-12-44
18. Bihar Chamber of Commerce, Patna	22-12-44
19. Shree Shambhu Mica Co., Mica Dealers, Jhumri Telaiya	26-12-44
20. Mr. U. R. Moseley, Chairman, Joint Mica Mission, Calcutta	30-12-44
21. Hakeem Ramzan Ali Shah, Ex-Mica-Miner, Jhumri Telaiya	7-1-45
22. Jaipur State, Jaipur	15-1-45
23. Rajputana Corporation Ltd., Mica Mine Owners, Jaipur	16-1-45
24. Seth Ramdeo Anandilal Poddar, Member of the Federation of Indian Chambers of Commerce, Bombay	3-2-45
25. Gudur Division Mica Workers Union, Gudur	10-2-45
26. Mr. P. Dasaratharami Reddi, Mica Mine Owner and Mica Merchant, Gudur	11-2-45
27. Mr. C. V. L. Narasimha Rao, General Manager, P. S. R. Mica Mines, Managing Agent, Kanakdhara Mica Mine and Managing Director of the Vijaya Mica Syndicate, Gudur	12-2-45
28. Srimati Saraswati Devi, M.L.A. (Bihar), Hazaribagh	20-3-45
29. Mr. Sripati Saran Prasad Singh, Mica Miner and Dealer, Domchanch, on behalf of the Mica Dealers, Hazaribagh District	21-3-45
30. Marwari Chamber of Commerce, Calcutta	29-3-45
31. Mr. M. R. Ahuja, India Government Trade Commissioner, Toronto, Canada	14-4-45
32. Mr. B. K. Sahana, Mica Mine Owner, Kodarma	22-4-45
33. Mr. B. Sen, Member of the Geological and Metallurgical Institute of India, Calcutta	24-4-45
34. Mr. W. Gilbert, Member of the Geological and Metallurgical Institute of India, Calcutta	24-4-45
35. Mica Trade Association, London	10-5-45
36. Mr. S. K. Kirpalani, C.I.E., I.C.S., India Government Trade Commissioner, New York	25-5-45
37. William Brand & Co., New York	25-5-45
38. Ford Radio and Mica Corporation, Brooklyn, New York	25-5-45
39. Gillespie Rogers Pyatt Co., New York	25-5-45
40. Rai Bahadur S. K. Sahana, Zamindar and Mica Mine Owner, Bankura	5-6-45

APPENDIX III

LIST OF MINES VISITED

Bihar

1. Khalaktambi Burhia Mine of Chrestien Mining Co. Ltd.
2. Tara Mine of Messrs. Jethmull Bhojraj.
3. Jorasimar—Burhia Mine No. II of Chatturam Horilram Ltd.
4. Jorasimar—Burhia Mine No. I of Chatturam Horilram Ltd.
5. Bhelua Mine of Chatturam Horilram Ltd.
6. Mainpahari Mine of Mr. Shibram Mahto.
7. Pokharia Mine of Ramjanki Estate.
8. Barasingha Mine of Indian Mica Supply Co.
9. Barasingha Mine of Mr. Tufani Singh.
10. Khudi Mine, Lachmipur, of Indian Mica Supply Co.
11. Kumbhiatari Mine of Indian Mica Supply Co.

*Rajputana**Jaipur State*

1. Bhojpura Mica Mine of the Garnet Mica Mining and Prospecting Syndicate.

Ajmer-Merwara

2. Ballad Mine of Ramnath Agarwala and Co.

Mewar State

3. Tonka Mine of Duduwala and Co.
4. Godas-Surya Mine of Seth Pushalal Mansingka.
5. Godas-Shib Bhandar Mine of Seth Pushalal Mansingka.
6. Mihari Mine of Mewar Mineral Co.

Madras

1. Shaw Mine of Krishna Mining Co.
2. Tellabadu Mine of Mr. S. Pitili Reddi.
3. Turimannu Mine of Mr. S. Pitili Reddi.
4. Subharayudu Mine of the Raja of Venkatagiri.
5. Sitarama Mine of Mr. D. Narayana Reddi.
6. Kalyana Rama Mine of the Poor House Trust.
7. Tallupur Mine belonging to Messrs. V. Sanjivapu Naidu and D. N. Reddi.

Travancore State

1. Little Flower Mica Mine of Mr. J. T. Moraes.

APPENDIX IV

LIST OF FACTORIES VISITED

Bihar

1. Chatturam Horilram Ltd., Jhumri Telaiya, Kodarma.
2. Messrs. S. K. Sahana & Sons, Kodarma.
3. Mr. Bhola Modi, Domchanch.
4. Mr. Narain Das, Domchanch.
5. Factory of Contractor of Premier Mica Co. Ltd., Domchanch.
6. Factory of Indian Mica Supply Co., Giridih.
7. Mr. Baijnath Sharma, Giridih.
8. Rai Bahadur Rameshwar Nathani, Giridih.
9. Messrs. Sona Ram Lekha Ram, Giridih.
10. Oriental Mica Produce Co., Giridih.
11. Splitting Godown of Indian Mica Supply Co., Giridih.

*Rajputana**Jaipur State*

1. The Garnet Mica Mining and Prospecting Syndicate, Diggi.

Ajmer-Merwara

2. Messrs. Raghunath Agarwala and Co., Beawar.

Mewar State

3. Messrs. Duduwala and Co., Bhilwara.
4. Seth Pushalal Mansingka, Bhilwara.
5. Mewar Mineral Co., Kankrauli.

Calcutta.

1. Micanite Factory of Messrs Rajgarhia Brothers Ltd., Salkia, Howrah.

Madras.

1. Factory of Shaw Mine.
2. Factory of Tellabadu Mine.
3. Factory of Subharayudu Mine.
4. Factory of Sitarama Mine.
5. Factory of Kalyana Rama Mine.
6. Factory of Tallupur Mine.
7. Factory of Srikalyana Rama and Co., Gudur.
8. Factory of Nityakalyani Syndicate, Gudur.
9. Factory of Continental Export and Import Co., Gudur.
10. Factory of Premier Mica Co., Gudur.
11. Factory of Standard Mica Co., Gudur.

APPENDIX V

LIST OF WITNESSES EXAMINED

1. Mr. Beni Prasad Jajodiya, Director, Rajputana Corporation Ltd., Jaipur.
2. Dr. G. Dessau, State Geologist, Jaipur.
3. Lt. K. C. G. Heath, Mining Engineer, Mica Production Section, Geological Survey of India, Ajmer, Rajputana.
4. Mr. B. Bhargava, Assistant Mining Engineer, Mica Production Section, Geological Survey of India, Ajmer, Rajputana.
5. Mr. Raghunath Agarwala, Proprietor of Raghunath Agarwala and Company, Beawar.
6. Mr. Kanti Chandra Vyas, General Manager, Labh Chand and Company, Kekri.
7. Mr. Kanmal Karnawat, Mica Mine Owner, Kekri.
8. Mr. Phoolchand Bilania, Representative of Inder Chand Rajgarhia and Sons, Ajmer and Kekri, Mica Mine Owners.
9. Mr. Basudev Sahay of Rajasthan Mines Ltd., Beawar.
10. Mr. Murlimanohar, Representative of Firm Chotmal Bhanwar Lal, Kabra, Kekri, Mica Mine Owners.
11. Mr. J. K. Soneji, Mica Mine Owner, Ajmer.
12. Mr. Shiam Sunder Lal of Firm Beharilal Shamsunder Lal, Kekri and Nasirabad.
13. Mr. Ladu Lal Kataria of Nasirabad, Mica Mine Owner.
14. Mr. Gordhan Lal Rathi of Nasirabad, Mica Mine Owner.
15. Major N. Wood Taylor, Mining Engineer of Seth Pushalal Mansingka of Bhilwara.
16. Mr. Damodar Lal Agarwal, One of the proprietors of Seth Pushalal Mansingka Firm.
17. Mr. I. M. Marwa, Mining Engineer of Duduwala and Co.
18. Mr. O. L. Joshi, Mining Engineer and Geologist of Mewar State, Udaipur.
19. Mr. Srigopal Mohta, Proprietor of Mewar Mineral Company.
20. Mr. P. V. Chandrashekharam, Mining Engineer of Mewar Mineral Company.
21. Mr. U. R. Moseley, Chairman, Joint Mica Mission, Calcutta.
22. Mr. K. Ramasastrulu Nayudu, General Manager of Krishna Mining Company.
23. Mr. K. Punnaiah, Manager, Shaw Mine.
24. Mr. D. Narayana Reddi, Mica Mine Owner and Assessor.
25. Mr. M. B. D. Krishna Prasad, Mica Mine Owner, Tallupur.
26. Mr. D. Venkatarama Reddi, Manager, Kalayanarama Mine and Managing Director, Nitya Kalyani Syndicate Ltd.
27. Mr. P. V. Raghava Reddi, Managing Director, Continental Mica Co.
28. Mr. D. Bennet, Manager of Pattabhi Rama Mine.
29. Mr. E. V. Narasa Reddi, Mica Miner and Exporter, of the Standard Mica Company, Gudur.
30. Mr. Kota Reddi, Secretary, Madras Mica Association.
31. Mr. C. V. L. Narsimha Rao, Mica Mine Owner and Managing Agent of Kanakdhara Mica Mine.
32. Mr. C. R. Rao, Managing Proprietor of Premier Mica Company.
33. Mr. P. Dasaratha Rami Reddi, Miner and Proprietor of the Oriental Produce Company.
34. Mr. R. Bharadwaj, General Secretary, Gudur Mica Workers Association.
35. Mr. D. J. Reddi, Mica Miner and Exporter, Gudur.
36. Mr. P. Mannatharao Nayudu, Huzur Sheristedar, Collector's Office, Gudur.
37. Mr. T. A. Verghese, Collector of Nellore.
38. Dr. M. S. Krishnan, Geologist, in charge of Madras Survey Party, Geological Survey of India.
39. Mr. U. C. Lall, General Manager of Chaturam Horilram Ltd.
40. Mr. D. B. Sahana of Messrs. S. K. Sahana and Sons, Secretary, Kodarma Mica Mining Association.
41. Mr. Baijnath Sharma of Giridih, Mica Miner and Dealer.
42. Mr. G. Samanta, Mica Miner and Dealer.
43. Mr. Rameshwar Prasad Pande, Mica Dealer, Domchanch.

44. Mr. C. E. Miller, Mining Engineer, Zone Manager of Chrestien Mining Co. Ltd.
45. Mr. N. N. Sirkar, Proprietor, Chota Nagpur Mica Syndicate, Kodarma, and President, Kodarma Mica Mining Association.
46. Rai Bahadur L. N. Sukhani, Mica Miner, Jhumri Telaiya, and President, Bihar Industries Association, Mica Section.
47. Mr. Sripati Saran Singh, Mica Miner and Dealer, Domchanch.
48. Mr. N. C. Chowdhury, Honorary Secretary, Mica Factory Owners Association, Giridih.
49. Prof. S. K. Bose, Officiating Principal, Indian School of Mines, Dhanbad.
50. Dr. Sir Cyril S. Fox, Ex-Director, Geological Survey of India.
51. Mr. V. S. Jabbi, Inspector of Mines, Dhanbad.
52. Mr. Nageshwar Prasad, Assistant Mining Engineer, Stores and Purchase Section, Geological Survey of India, Kodarma.
53. Mr. N. G. Chatterjee, Senior Inspector of Mines, Dhanbad.
54. Mr. A. B. Moitra, Assistant Field Officer, Geological Survey of India, Giridih.
55. Mr. Budh Singh, Mica Merchant, Giridih, Managing Director of Hazaribagh Mica Mining Company Ltd.
56. Mr. Manzoor Elahi, Mica Miner, Giridih.
57. Mr. Chandreshwar Prasad of Masnodih, Zamindar, Proprietor's Certificate Holder.
58. Mr. Raghunandan Ram, Mica Dealer, Giridih.
59. Mr. Badri Narayan Sah, Mica Miner, Mirzagunj, District Hazaribagh.
60. Mr. B. K. Sahana, Mica Mine Owner, Kodarma.
61. Mr. Kedarnath of Masnodih, Proprietor.
62. Rai Saheb B. C. Mukherjee, Sub-Divisional Officer, Araria, Ex-Inspector of Mica Accounts, Kodarma.
63. Mr. A. Hasan, Inspector of Mica Accounts, Giridih.
64. Mr. Sital Pande, Mica Factory Worker, Domchanch.
65. Mr. Sukkar Ram, Mica Factory Labourer, Domchanch.
66. Mr. Satya Narain Misra, Inspector of Police, Bhagalpur.
67. Mr. Nand Lal Singh, Inspector of Police, Chaibassa.
68. Dr. J. A. Dunn, Director, Geological Survey of India.

APPENDIX VI

SYNOPSIS OF THE PROPOSED MICA SYNDICATE

Who will be Members of the Mica Syndicate?

Membership of the Mica Syndicate shall be open to all such persons or firms as hold a valid mica miner's or mica processor's (Dealer's) license from the Provincial Government.

Members shall be divided into two classes:—

(a) Full Members, (b) Associate Members.

Definition and qualification of Full Members and Associate Members:—

(a) Those licensed mica miners who supply all their mica direct to the Syndicate shall be Full Members.

(b) Associate Members shall be sub-divided into 3 categories.

(i) Such licensed mica miners as supply their mica to Full Members or licensed processors and not to the Syndicate.

(ii) Such licensed processors as supply their mica only to the Syndicate.

(iii) Such licensed processors as supply their mica only to the Full Members.

Admission fee for members:—

(a) Full members:—Admission fee	Rs. 5,000
(b) Associate members:—Admission fee	1,000

Who will manage the affairs of the Mica Syndicate?

For managing the affairs of the Mica Syndicate, there shall be a "Committee of Management" or "Board of Directors", which shall consist of not less than 17 nor more than 21 members of which 4 shall always be *ex-officio* as per details hereunder:—

(a) Ten representatives of Full Members elected by Full Members.

(b) Three representatives of Associate Members—one from each sub-class (i), (ii) and (iii) elected by members of each sub-class.

(c) One representative of the Government of Bihar—*Ex-officio*.

(d) Two representatives of the Bihar Legislature—*Ex-officio*.

(e) One nominee of the Federation of Indian Chambers of Commerce and Industry.

Provided always that (a) the number of Full-Member-representatives or Directors may be raised up to a maximum of 13 if 75 per cent. of the Full Members so decide in their meeting duly constituted after clear 15 days' notice, and (b) that the number of representatives of Associate Members shall not exceed three at any time.

Representatives holding special Technical qualification

The Committee of Management may co-opt as an additional representative or Director one such person holding such special technical qualifications as may be beneficial to the interests of the industry but such appointment shall be within the maximum number of 21 fixed for the committee of management.

Ex-officio Directors not to pay admission fees

Representatives or Directors on the committee of management under heading (c), (d), (e) and additional Directors holding special technical qualifications shall not be required to comply with the clause requiring payment of Admission fee for membership of the Syndicate.

Quorum.—Seven representatives or Directors present in person shall form the quorum for a meeting of which one must be at least an *ex-officio* member.

Meetings.—Ten clear days' notice shall be served on each representative or Director for a meeting of the committee of management. For emergencies 48 hours' notice shall be sufficient. Such notice may be given by hand or express telegram.

Vote.—(a) Each Full Member shall have one vote in his own constituency.

(b) Each Associate Member shall have one vote in his own separate constituency.

Election of Directors.—(a) Representatives or Directors of Full Members on the committee of management shall be elected by the Full Members in a special meeting of such members only.

(b) Representatives or Directors of Associate Members on the Committee of Management shall be elected by the associate members of each such class in special meetings of their own sub-class respectively.

Period of office of the Directors on the Committee of Management

The representatives or Directors of the Full and Associate members shall hold office for one year for the first time when they shall all retire at the next Annual General Meeting. Fresh elections will then be held of Directors from the two classes of members and the office of such directors shall be limited to two years. A retiring Director shall be eligible for re-election.

Representatives or Directors on the Committee of Management elected by Full Members shall be whole-time Directors, officers of the Syndicate and they shall be in-charge of the conduct of affairs of the Syndicate under the general control and supervision of the Committee of Management. They shall receive such remuneration and allowance as the Committee of Management may decide (but subject to the approval of the Provincial Government).

The Mica Syndicate shall purchase all Bihar mica :—

The Bihar Mica Syndicate shall purchase all mica produced in Bihar by its members—Full or Associate—and no member shall sell any mica to any body else except to a member of the syndicate or to the Syndicate itself.

The Syndicate shall set standards of qualities of all mica :—

For the purpose of facilitating the purchase of all mica offered to the syndicate and for the purpose of facilitating the sale and export of mica to all or any part of the world without the Syndicate having to maintain a factory for reprocessing on its own account, the Syndicate shall fix up standards of qualities of all mica, in consultation with the chief element in the mica industry possessing experience of foreign trade, and samples of such standard qualities shall be kept and maintained in the office of the syndicate. Members of the Syndicate shall have the option of making similar standard samples out of their own mica for their own guidance.

Inspection of the mica offered by members to the Syndicate :—

1. The Syndicate shall appoint such number of Inspectors or Examiners of mica for the purpose of examining the mica offered to the Syndicate by its members.
2. The Inspectors or Examiners shall be persons having sufficient practical experience of mica factories which were manufacturing mica for export. They may be employees of members, who on appointment, shall become the employees of the Syndicate and who shall have to relinquish lien on posts in their previous employers' factories.
3. The pay and prospects of the Inspectors shall be fixed by the Committee of Management.

Method of Inspection :—

1. All mica offered by a member to the syndicate shall have to be transported by the member concerned to the Syndicate godown at specified places.
2. Inspections of the mica shall be made by Inspectors in the Syndicate godown and no representative of the member offering the mica shall be allowed to be present during the inspections.
3. Results of the Inspections shall be communicated to the offering member within 24 hours of the Inspection.
4. In case a lot of mica is passed and accepted, the syndicate shall make payment of the Basic price within 7 days of the passing of the mica.
5. In case a lot of mica is considered to be sub-standard and not acceptable, the member whose mica is rejected shall have the option of appealing against the decision of the Inspectors to the Committee of Management who will depute 3 of the Directors to re-examine the mica in the presence of the supplier member or his representative and the decision of these 3 Directors shall be final. If the mica rejected belongs to a member who has a director in the Committee of Management, such director shall not be included among the 3 Directors deputed for re-examining the mica.
6. If the decision of the Appellate Board goes against the supplying member, such member shall cause his mica to be removed from the syndicate godown within 48 hours.

Basic Prices :—

1. The Committee of Management shall fix a schedule of Basic prices for all qualities and sizes of mica to be paid to members for mica supplied and passed.
2. In fixing such basic prices the Committee of Management shall have to take into account the cost of production, the cost of export, the extent of demand of mica in the world markets, the extent of competition expected from other producing areas, and such other factors as may be available and worth considering.
3. These basic prices shall be reviewed every three months or earlier if special circumstances so demand.
4. In fixing basic prices, the Bihar Mica Syndicate may consult the other Provincial Mica Syndicate, in view of the desirability of eliminating mutual competition by fixing reasonable basic and foreign prices for similar or relative qualities of mica.

Sale and Export prices :—

1. The Committee of Management shall fix sale or export prices for all grades and qualities of mica. This schedule of price may be made just elastic enough to allow a little margin in cases of extreme necessity, specially for stocks of mica kept in the syndicate's foreign stocks.

2. The sale or export prices shall be binding on the Directors in charge of sales and on officers in charge of foreign stocks except to the extent of elasticity permitted by the Committee of Management.

3. Prices for special requirement of special customers shall be fixed by the Directors in charge of Sale and Export and Director in charge of Foreign Offices jointly.

Enquiries for special materials and orders for these special varieties :—

(a) Enquiries for special materials will be attended to by the Directorates of Sale and Export and Foreign Offices and Agencies. They will fix the quotations.

(b) Orders for special lines will be divided between firms capable of handling such lines but if by dividing the orders the business becomes not so paying as it could be if the entire order were handled by one firm, the order shall not be divided, but other orders of special nature when available shall be given to other members so that there might be no preference of one over the other. So far as practicable every attempt will be made to place special orders of equal value with members competent to undertake the special jobs.

(c) Orders for manufactured mica may be secured by firms direct from consumers, but for the purpose of manufacturing such orders, the mica shall have to be purchased from the Syndicate at its schedule prices. This system will continue so long as the Syndicate does not have its own manufacturing department for executing such orders.

Capital

It is my opinion that for the purpose of carrying on the business of the Syndicate, working capital of one crore of rupees may be sufficient. The mica purchased by the Syndicate will be exported to the world consumer at regular intervals and their sale proceeds would always be coming back to the syndicate at correspondingly frequent intervals. Hence a very large capital may not be necessary except in periods of utter slump when perhaps the Syndicate may have to keep huge stocks in hand. But when such a contingency will arise, the Syndicate will also have the power of ordering members to reduce production and this will be easily enforced by stopping the purchase of such grades and qualities of mica as may have no market at the moment. The Syndicate will be doing no more or less than what every large individual company is doing at present, or has to do by force of circumstances in slump periods.

Where will the Capital come from to start with?

Since the mica industry has remained unorganised from its inception up to this day, it is the duty of the Provincial Government to set it on a sound footing by helping in the establishment of the marketing organisation. This help would be best given in the form of a capital loan of one crore of rupees which the Government can easily raise for this purpose. This loan may carry a reasonable interest, say 3 p.c., and it may be repayable within a period of 20 to 30 years, the interest being payable every 6 months or every 12 months.

How will the capital loan be repaid?

The capital loan may be repaid in one of the following ways :—

1. Each full member supplying mica to the Syndicate shall contribute 4 p.c. of the value of each lot of mica supplied by him to the Syndicate towards capital account. Such sums shall be deducted out of the payments for mica to be made by the Syndicate and credited to the capital account of each contributor. These deducted amounts shall be repaid to Government every six months or every year, as Government may agree.

If this scheme be acceptable, it should be made clear that the capital amount paid by the members shall only bear an interest or what may be called a cumulative fixed Dividend of 4½ per cent. on the amounts paid up.

The deductions will cease after sufficient money has been contributed to repay the loan.

Alternative Scheme :—

If members do not like to allow any deduction for the accumulation of money for capital loan repayment, the other way to do this would be by setting apart 4 to 5 lacs of rupees (i.e., an amount equal to 5 per cent. of the total export of mica made by the Syndicate) out of the profits made by the company, besides the amount for payment of the interest on the loan advanced by Government. As for example, if the loan be one crore of rupees, the annual interest would be Rs. 3 lacs at 3 per cent. and a further amount of Rs. 4 lacs or 5 lacs for the payment of the capital i.e., Rs. 7 to 8 lacs be set apart out of the profits of the Syndicate.

The Syndicate will surely make sufficient profits being the sole exporters of Bihar Mica. Thus the whole capital loan can be repaid in 20 or 25 years out of the profits of the Syndicate. There will still be some balance left to carry on the other development activities of the Syndicate every year till the loan is liquidated.

Taking into account the total value of mica exports for 19 years from 1921 to 1939 which is Rs. 16,40,04,619 the annual average value comes to Rs. 86,31,823. This is the annual value

when there was cut-throat competition amongst the numerous Indian exporters. With one body as the sole exporter, it is reasonable to expect that the price Bihar will get in post-war periods for its mica will be at least 50 per cent. higher if not still more as compared with the prices ruling the normal prewar periods. Naturally, therefore, I do not apprehend that there will not be sufficient profits out of which the loans could be repaid under this scheme.

As a matter of fact this alternative scheme of paying the capital loan is preferable, as it will leave the Syndicate under no special obligation of any class of members. The Syndicate will remain a purely public company over which the Provincial Government also will have a controlling hand since they made it practicable by lending the capital to start with.

Associate Members

In what form of mica they may deal? Their liability to submit returns :—

1. Associate mica miner members shall be entitled to sell their mica to full members or to licensed processors in any form. But they will have to inform the Syndicate in prescribed form the quantity of mica sold to a full member or processor and the value of such mica received by the miner Associate.

2. Associate processor members shall not be allowed to sell mica in crude or Bima form to any Full Member. They must process any crude mica they may have bought and then sell them.

Each associate processor member shall supply to the Syndicate proper returns in prescribed form the form, quantity and value of mica bought from a miner associate.

Profits of the Syndicate

How and for what they will be spent?

The profits made by the Syndicate will be spent for the following, among other, purposes :—

1. Payment of such sums as may be needed to repay capital loans advanced by Government or any other Bank or body.
2. Payment of interest on the capital loans mentioned above.
3. Provision for Research Work.
4. Creation of Reserve Fund.
5. Distribution of Bonuses to different grades of members in such proportion and on such basis as may be decided by the Committee of Management each year (and approved by the Provincial Government).

Special Powers of the Syndicate

The Syndicate will be a legally constituted body under a Provincial Law entitled to exercise the following powers :—

- (1) The power of recommending to the licensing authorities whose licenses for mining or processing may be granted or rejected.
2. The power of recommending the cancellation of licenses for serious breaches of the Syndicate's rules and for offences for which convictions may have been ordered.
3. The power of recommending cancellation of licenses in cases where the applicant's antecedents and conduct appear to be extremely unsatisfactory to 80 per cent. of total number of members of the Committee of Management.
4. The power of prescribing the places where a licensed processor will have his godown or place of business.
5. The power of creating a prohibited zone round certain mining areas where processors shall not be permitted to open godowns.
6. The power of appointing Inspectors to visit mines for the purpose of getting the mines improved where such improvement be necessary.
7. The power of deputing mines Inspectors to go and observe the working of the mines of members.
8. The power of ordering members to close or reduce work of certain mines, the output of which may be not in demand at any specified time.
9. Power of demanding Returns from the members and prescribing rules and regulations for observance by the members.
10. Such other general powers as may be necessary to exercise a general control over the members of the Syndicate.
11. The Syndicate shall be the only legally authorised body to export whatever mica is produced in Bihar from any part in India and no Bihar mica shall be sent out of the Province except by the Mica Syndicate, the only exception being made in the case of orders for manufactured mica [See page 131 above]

There will be the following Departments :—

1. Department of Purchase and Inspection.
2. Department of Export.
3. Department of Foreign Offices and Agencies.
4. Department of Mines Development, Research, Control of Production and Development of Internal Industries.
5. Department of General Office and Co-ordination.

All the above departments will be under the charge of whole-time Directors assisted by such staff as may be necessary. Further details regarding the management would be more appropriately settled by the Committee of Management who are charged with the conduct of the business of the Company.

Audit

There will be a permanent paid Internal auditor who will be appointed with the approval and consent of the Provincial Government. His duty will be to regularly check and scrutinise the accounts so that the financial position of the Syndicate be always available to the Directors and the Government.

The final annual audit of the accounts shall be done by a firm of auditors to be approved by Government of Bihar.

General Remarks

I have tried to draw up a general outline of the kind of Syndicate I had in mind for the mica trade so long as mica has no internal demand and it continues to be an industry almost exclusively dependent for its existence on the mercy of foreign buyers. A strong centralised marketing organisation for each producing unit separately is not only highly desirable but is the only remedy for the cure of all the maladies of the mica industry.

A co-operative marketing organisation necessarily involves the surrender of some of the long cherished rights of the individual members asked to join common organisation. It may perhaps mean even some temporary disadvantage to some of the members but such disadvantages have to be overlooked for the benefit of the larger interest of the industry, the nation and the ultimate greater advantage of the member himself. If only the different firms for once give up the mutual distrust and jealousies which have been rampant amongst them for many a year and all start with a new spirit—a spirit of good-will and co-operation—I feel confident that this scheme of the Syndicate will be unqualified success and all the evils of the mica industry will in course of time disappear. Mica theft or mica piracy will not prove profitable to those who engage in it. At the same time, however, this scheme will give no shelter to those who may be cherishing happy dreams of a monopolistic control over the mica industry. This scheme will bring about a democratic control of the business and instead of a drastic control of the recalcitrant elements in the business by Government officers, it provides for putting them under the control of their own colleagues in the industry who will form the Committee of Management.

The more important function of the Syndicate would be to encourage Research work and to make attempts to set up electrical manufacturing concerns in this province and the country to create a home market for mica for a considerable portion of its output and specially for the large hills of waste lying in Bihar.

APPENDIX VII

DRAFT SCHEME FOR THE CONTROL OF THE EXPORT OF MICA FROM INDIA

1. The export from India of mica of any description shall be subject to the control of the Mica Marketing Control Board.

2. (i) The Mica Marketing Control Board shall have its office at Calcutta, and shall be composed as follows:—

Government Members	From Bihar	. . . . .	1
	From Madras	. . . . .	1
	From Ajmer-Merwara	. . . . .	1
Trade Members	From Bihar	. . . . .	11
	From Madras	. . . . .	5
	From Rajputana	. . . . .	3
			<u>22</u>

(ii) There shall be at least one meeting of the Board in each calendar year.

3. The President of the Board shall be a trade member elected by the members.

4. The Government members shall be nominated by the Governments concerned.

5. The trade members shall be appointed in the manner described below:—

(a) Each of the five biggest registered exporters in Bihar and the two biggest registered exporters in Madras shall nominate one trade member.

(b) The remaining trade members for Bihar and Madras shall be elected by the registered exporters of Bihar and Madras respectively.

(c) Each of the two biggest registered exporters in Rajputana shall nominate one trade member, provided that, if the total value of the exports made by such an exporter during the three previous calendar years is less than Rs. 10,000, he shall not be entitled to make a nomination. In the absence of one or both such exporters qualified to make a nomination, the corresponding nomination or nominations shall be made by the biggest or the two biggest registered miners in Rajputana.

(d) One trade member for Rajputana shall be elected by the registered Rajputana exporters and miners.

NOTE.—(1) The size of an exporter shall be measured by the total value of the exports made by him during the previous three calendar years. For this purpose, sales for export made during World War II to the Director, Geological Survey of India or to the Joint Mica Mission shall be regarded as exports.

(2) The size of a miner in Rajputana shall be measured by the aggregate value of his output of mica during the last three calendar years as valued for realising royalty.

6. (i) Each registered exporter of Bihar or Madras, as the case may be, shall be entitled to vote in the election of a trade member representing his province, if he has been registered as an exporter of that province for at least three complete years and the total value of his exports during the three previous calendar years is not less than Rs. 10,000:

Provided that, in the case of an election held within three years of the commencement of the registration of exporters, it shall be sufficient if the exporter has been registered as an exporter of the province from before a date to be fixed by the Provincial Government, and the total value of his exports during the three previous calendar years is not less than Rs. 10,000.

(ii) A registered exporter or miner of Rajputana shall be entitled to vote in the election of a trade member for Rajputana if the total value, during the previous three calendar years, of his exports in the case of former, and his output of mica as valued for the realisation of royalty in the case of latter, is not less than Rs. 10,000:

Provided that an exporter, who is also a miner, shall not be entitled to a separate vote in each of these capacities.

(iii) No person shall be nominated or elected as a trade member who is not qualified to vote at an election for the appointment of a trade member.

7. (i) The term of the appointment of the first elected President of the Board and of the Government members shall be three years.

(ii) Approximately one-third of the trade members shall retire in each year, in the following rotation:—

At the end of the first year—

Three members for Bihar,

One member for Madras,

One Member for Rajputana;

At the end of the second year—
 Four members for Bihar,
 Two members for Madras,
 One member for Rajputana;

At the end of the third year—
 Four members for Bihar,
 Two members for Madras,
 One member for Rajputana;

and their places shall be filled up by election or appointment, as provided above.

(iii) The rotation of retirement of the trade members shall be decided by the drawing of lots after the election of the first President.

(iv) After this, the term of appointment of each trade member shall be three years.

(v) If, for any reason a member of the Board ceases to be such during the currency of his term of appointment, the vacancy shall be filled up by election or nomination, as the case may be, for the remaining portion of the term of appointment.

NOTE.—Retired members shall be eligible for re-election or re-nomination, if they are otherwise qualified for appointment.

8. There shall be an Executive Officer of the Board, who shall be the Secretary of the Board and shall be entrusted with the day-to-day administration of the Board's work. In addition to the specific duties allotted to him by these rules, he shall perform such of the Board's duties as may be delegated to him by the Board, subject to general instructions prescribed by the Board.

9. (i) There shall be a Regional Committee for each of the three mica-producing areas to deal with questions immediately affecting that area.

(ii) Each Regional Committee shall consist of the Government member and the trade members of that area:

Provided that the President of the Board shall not be a member of a Regional Committee.

(iii) The Government member shall be the Chairman of the Regional Committee and shall exercise a casting vote in addition to an ordinary vote.

10. (i) When required, an Arbitration Committee shall be constituted to decide differences between the Regional Committees.

(ii) It will consist of

(1) the President of the Board and, in his absence, the Executive Officer of the Board.

(2) the three Government members of the Board, and

(3) one trade member of each Regional Committee nominated *ad hoc* by the Regional Committee.

(iii) The President of the Board and, in his absence, the Executive Officer of the Board shall be the Chairman of the Arbitration Committee.

(iv) The Chairman of the Arbitration Committee shall have only a casting vote.

11. (i) The Board shall prescribe the standards for mica block, splittings and condenser films and the extent of tolerance which may be allowed in applying its standards.

(ii) The Regional Committee for each particular area shall fix the minimum prices at which mica exported out of India from that area without passing through any other mica-producing area in India may be sold to purchasers outside India.

(iii) All mica exported from India shall be classified, graded and sorted according to the standards fixed and directions issued by the Board. No mica shall be sold abroad or exported from India at a price less than the minimum price fixed by the Regional Committee concerned.

12. Mica shall be exported from India only by registered exporters.

13. The Board shall maintain a staff of Mica Marketing Inspectors, consisting of as many officers, and stationed at such places, as the Board shall determine.

14. All mica, before export from India, shall be submitted, together with invoice papers in duplicate, for inspection by the Mica Marketing Inspector appointed for the purpose by the Board. Except that the name and the address of the consignee need not be entered, the invoice papers shall be filled up completely by the exporter before submission to the Mica Marketing Inspector.

15. If it appears from the invoice papers that the mica has not been classified according to the directions of the Board, or that the prices are not in accordance with the minimum prices fixed under the Scheme, the Mica Marketing Inspector shall refuse to grant an export certificate.

16. If the classification and the prices, as shown in the invoice papers, are found to be in order, the Inspectors shall inspect the mica, giving such tolerance as may have been

prescribed by the Board, and shall refuse the certificate of export if the consignment is sub-standard or super-standard.

17. If the prices and qualities are found to be in order, the Inspector shall sign each page of the invoice retaining one of the duplicates for purposes of record, and shall grant to the intending exporter an export certificate. At the same time, the Inspector shall seal the consignment with his seal, marking specially each case which he has inspected.

18. (i) At the time of passing a consignment for export, the Mica Marketing Inspector shall draw samples of it for future reference. Such samples shall be at least 8 oz. in the case of block and one pound in the case of splittings, and shall bear the scale of both the Inspector and the consigner.

(ii) Such samples shall be returned to the cosigner after the expiry of a reasonable time to be fixed by the Board, unless the Board for some special reason considers it necessary to retain the samples.

19. (i) Mica shall be exported from India in only two ways,

(a) against an irrevocable letter of credit from the foreign purchaser for the full invoice value negotiable against a complete set of shipping documents, or,

(b) by consignment to the exporter himself for sale in the foreign country through his own office abroad.

(ii) In the case of all exports, a deposit of 5 per cent. of the full invoice value shall be made in favour of the Board as a security for compliance with the requirements of the Scheme.

(iii) In the case of export to a foreign purchaser the security deposit shall be retained for six months from the date of export: Provided that the Board may at its discretion retain the deposit for such further period as it considers necessary.

(iv) In the case of consignment to the exporter himself for sale abroad the deposit shall remain until the consignment covered by the invoice in question has been disposed of.

(v) After the expiry of the above period, whichever period may apply, the security deposit or such portion of it as still remains with the Board shall be returned to the exporter.

(vi) Mica consigned to the exporter himself for sale through his office abroad shall be valued in the invoice at a fair valuation which shall not be less than the minimum prices fixed for the sale of mica from that area to a foreign purchaser.

(vii) Indian mica stored in a foreign country by a registered exporter for sale abroad shall not be sold at prices less than the minimum prices prescribed under the Scheme at the time of the sale for the sale of other mica exported from the same region.

(viii) Registered exporter holding stocks in a foreign country for sale abroad shall submit monthly returns of stocks and sales of mica to the Mica Marketing Control Board.

20. The Customs authorities shall not accept a consignment of mica for export unless—

(a) it bears the seal of the Mica Marketing Inspector,

(b) it is accompanied by an export certificate signed by the Mica Marketing Inspector, and

(c) it is accompanied either by a certificate of a bank to show that the security deposit has been duly made in favour of the Board, or by an undertaking by the bank that upon the presentation of the bill drawn under the letter of credit 5 per cent. of the invoice value will be retained at the credit of the Board as a security deposit under these rules.

21. (i) Any dispute between the exporter in India and the foreign purchaser shall be reported to the Board, and the consent of the Board shall be necessary to any settlement of the dispute arrived at between them. If the dispute is referred to arbitration in the country of the purchaser, the result of such arbitration shall be communicated to the Board as soon as information thereof is received by the exporter.

(ii) The Board shall be entitled to refuse its consent to a settlement which it considers to be *mala fide* and intended to defeat the provisions of the Scheme.

22. Special business, for example dealings in wrappers, condenser plates, and manufactured mica, shall not be governed by the provisions regarding standards and minimum prices. Such consignments shall, however, be liable to inspection by the Mica Marketing Inspectors, who shall be entitled to refuse the export certificate if the transaction does not appear to be a *bona fide* deal in special mica. The Board shall define clearly what shall be regarded as special business.

23. (i) An intending exporter, dissatisfied with the decision of an Inspector refusing an export certificate, may appeal to an authority appointed by the Board. The intention to appeal shall be intimated at once, and the consignment shall immediately be sealed with the seals of the Inspector and the intending exporter.

(ii) The appeal shall be filed within three days in the office of the appellate authority, and shall be accompanied by a deposit of Rs. 100, which shall be liable to entire or partial forfeiture in the event of the appeal being found to be frivolous.

(iii) The appeal shall comply with such other conditions as may be prescribed by the Board and, provided it does so, shall be disposed of in not more than one week.

24. With the permission of the Board, mica which is covered by the Board's schedule of standards and minimum prices may, for the purposes of a particular transaction or series of transactions, be classified according to a special method, e.g., by electrical or other objective tests. Such consignments shall be inspected by the Mica Marketing Inspector, who shall, by analysing a sufficient sample, compare the price of the consignment with the minimum price chargeable according to the Board's schedule of standards and prices. If the price of the consignment does not exceed by at least 5 per cent. the minimum price so calculated, the Inspector shall refer the matter to the Board, and the Board may withdraw its permission for special classification and refuse to allow the export of the consignment.

25. (i) Exporters shall be registered as such on the payment of an initial fee of Rs. 500 and an annual fee of Rs. 50. The register shall be in three parts, for exporters from Bihar, for those from Madras and for those from Rajputana.

(ii) There shall also be a register for Rajputana miners, who shall be entitled to registration therein on the payment of an initial fee of Rs. 100 and an annual fee of Rs. 10.

(iii) At the time of registration the exporter or the miner, as the case may be, shall nominate one person who will represent him for the purpose of appointment or election as a trade member, and for voting at the election of a trade member. The registered exporter or miner, as the case may be, shall be entitled at any time to change his nominee, provided that if the nominee is an elected trade member of the Board, he shall cease to be such and the vacancy shall be filled up by means of a fresh election.

26. (i) The Board shall have the authority to suspend, for a period not exceeding six months, the registration of an exporter who exports or attempts to export mica without complying with the requirements of the Scheme, or who attempts to defeat the Scheme by any means, e.g., by allowing a rebate on invoice prices.

(ii) A contravention of the above kind by a registered exporter, whose registration has on any previous occasion been suspended, shall render him liable to have his registration cancelled.

(iii) A registered exporter, whose registration has been cancelled, shall not be entitled to be registered again for the period of one year from the date of such cancellation. Re-registration after a third cancellation shall be at the discretion of the Board.

(iv) An application, which appears to the Board to be an attempt to renew in another name a cancelled registration contrary to the above provisions, shall be rejected by the Board, and it shall extend by another year the period for which the exporter is debarred from being re-registered.

(v) Instead of, or in addition to, suspending or cancelling the registration of an exporter, the Board may declare forfeited the whole or such part of the security deposit made by the exporter as it considers proper and, thereupon, the whole or the part of the security deposit, as may be the case, shall be forfeited to the Board.

(vi) Where the Board is satisfied that a foreign purchaser has acted in the manner calculated to defeat the purposes of the Scheme, the Board shall be empowered to direct that registered exporters shall not sell mica to the foreign purchaser in question and, thereupon, any registered exporter selling mica to such purchaser shall be deemed to have attempted to defeat the Scheme.

27. (i) In addition to fixing minimum prices as provided above the Regional Committee shall deal with such matters of regional interest as are allotted to it by the Board.

(ii) All decisions of the Regional Committee shall immediately be communicated to the Board and to the other Regional Committees.

28. (i) Any Regional Committee aggrieved by a decision of another Regional Committee shall within fifteen days of receiving intimation thereof inform the Board of its objection. At the same time it shall send intimation of its objection to the other Regional Committees.

(ii) On receipt of the objection the Secretary of the Board shall call a meeting of the Arbitration Committee to consider the objection.

(iii) The Board or the President of the Board may at their own instance call a meeting of the Arbitration Committee to re-consider any decision of a Regional Committee. Such action must be taken within fifteen days of receipt of intimation of the decision.

(iv) The decision of the Arbitration Committee shall be final and binding, and shall, for the purposes of the Scheme, be deemed to be the decision of the Regional Committee whose action was called into question.

29. The Board may, by general or special order, exempt from some or all the provisions of this Scheme the export of any mica, in crude, partly manufactured or fully manufactured form.

30. The Marketing Control Scheme shall be financed by a percentage levy on the value of all mica exports.

APPENDIX VIII

A REPORT ON THE OCCURRENCE OF SILICOSIS AMONGST THE MICA MINERS BY DR. A. RAHMAN,
ASSISTANT DIRECTOR OF PUBLIC HEALTH, CHOTANAGPUR CIRCLE, RANCHI.

The inquiry into the occurrence of silicosis was carried out by me on 21st May 1945 and again from the 4th to 6th June, 1945 in the Kodarma and Gawan Areas in the District of Hazaribagh. As it was desired that the facts regarding the extent of this disease should be placed as early as possible before the Mica Inquiry Committee for their consideration by the end of June, 1945, a hurried survey was made and for this the Mica Controller, Bihar selected a few mines belonging to the three important Companies. These selected mines were distributed over different localities in the mica bearing tracts of Bihar and were thought to be fairly representative in character.

2. The mica belt of Bihar is a hilly tract of country covered with jungles which at places are very dense. It occupies the northern portion of the District of Hazaribagh and small portions of the southern extremities of the Districts of Gaya and Monghyr. The mica belt is roughly 60 miles long and about 16 miles wide and contains nearly 1000 mines of different magnitude.

3. The industry has been in existence for a long time, but the mining methods are still crude and mostly manual. Recent developments in electricity necessitated an increase in the output of mica and this could be met by the introduction of machinery. In almost all the mines during the first year or two hand drills are used, but are subsequently replaced by machine drills as soon as the yield shows a better prospect. In most of the mines that I had the opportunity to inspect it was found that machine drilling was introduced in about the year 1931 but in all such cases it was the dry-drill that was installed.

4. The fact that dust concentration in the mines was a source of serious debility and in some cases a cause of death amongst the miners must have been noticed by most of the owners and managers of the mines, in consequence of which wet drilling was adopted by some of them. Although a few of the companies have now adopted the wet method in some of their mines, there are still a large number of them where the dry drilling is still being continued. The reason why wet drilling is not adopted as a universal method may be due to the fact that the managers and the proprietors of the mines were not in a position to realise the extent of damage caused by dry drilling. The drillers very frequently left their jobs and returned to their homes during the rains to look after their own fields. During this period of absence they either died or were sufficiently disabled for mining work. Those who could return to the mines seldom joined the companies where they were formerly employed. Such frequent changes could make a study of this problem hardly possible. The second reason for not adopting the wet method may be due to the fact that the progress of work with wet drill is usually slow as it frequently gets clogged and much valuable time is lost. This certainly is neither liked by the miners nor the mine owners. The third and perhaps the most potent reason against adopting the wet method is the extra cost involved in the installation consisting of pumping arrangements with long lengths of pipes and hose. In some cases even if a company can afford to bear the cost of installation, there is hardly water enough for pumping.

5. *Silicosis*.—It is the outstanding occupational disease with which the mica industry or any other industry which requires rock drilling is concerned. Its diagnosis is difficult without the help of X-rays. The disease is progressive and almost incurable. The progress can, however be arrested by only removal of the patients from the environments. A few drugs have been used for eliminating the silica deposits from the lungs, but the results are still far from satisfactory. The chemical composition and the size of the dust particles seems to have an important bearing as causative agent of the disease, but it is beyond the scope of this report. Further investigation on this line will be necessary.

6. *Method of investigations*.—For the purpose of this investigation with a view to determine the extent of this disease the following mines belonging to the three reputed firms were selected. The details with regard to the date of starting, method of mining and progress of work are given in appendix I to VII* of the report.

(1) Christien Mining Company Limited.

(a) Khalaktambi Mica Mines. (Kodarma zone in Reserve Forest).

(b) Jamunia Sarangi Mine. (Gawan zone).

(2) Messrs. Choturam Horilram Ltd.

(a) Tanhi Mica Mine (In Reserve Forest).

(b) Sotia Mica Mine (In Reserve Forest).

(c) Burhia Mica Mine (Jora Simar).

(d) Charkey Tilaya Mine.

(3) Indian Mica Supply Company Ltd.

(a) Barasingha Mine. (Dhab Area).

7. From the details furnished about the mines it will be evident that dry drilling is being carried out in almost all the mines except in the three mines Khalaktambi and Jamunia Sarangi of Chrestien Mining Co. Ltd., and Barasingha Mine of the Indian Mica Supply Co. Ltd. In the first named mine wet drilling was started in 1942 and in the other two since 1943.

8. Out of the 123 drillers working in the seven selected mines I could examine only 52. The rest of the drillers were not available as they had left for their homes in the neighbouring villages. Out of 52 drillers examined 16 were found to have worked as such for only a few months, a period too short to show any signs of silicosis or any respiratory troubles. From the general appearance these persons appeared to be healthy. The particulars of such cases were, therefore, not recorded.

9. The particulars that have been recorded in the case of those drillers who have worked for more than two years had to be elicited with some difficulty and coaxing as in spite of my attempt to allay their fears they were too reluctant to give out the truth even about their own health. The thought of incurring the displeasure of the employers was too prominent in their mind.

10. Valuable and reliable informations were gathered from Mr. S. C. Dutta, Manager of Khalaktambi Division and from Mr. Bijaikali Mukherjee, Manager of Barasingha Mines about occurrence of silicosis amongst the drillers. These two officers had sufficient experience of mining work and knew their staff intimately. These particulars have been recorded under case numbers 5 to 8 and 20 to 34.

11. It was very interesting to discuss the subject of silicosis with Mr. Chaudmull Rajgaria, the proprietor of the India Mica Supply Co., who gave histories of 4 cases of silicosis among the superior staff of the mine. He took a keen interest in the welfare of his staff and got them X-rayed at Ranchi. The four X-ray films received from him are being sent with his permission along with this report* for examination by the Committee. The films will show the extent of fibrosis of the lung and the damage stone dust can produce in the delicate lung tissue. At Kodarma I met and examined the three persons out of the four for whom the plates were available. The details of these cases have also been recorded under case numbers 1, 2, 3 and 4.

12. Dr. G. P. Tripathy, the Chief Medical Officer, Messrs. Choturam Horilram Ltd. stated that one Babu Havendranath Sinha formerly in the employ of the company as shift incharge in one of the mines showed symptoms of silicosis, but his immediate removal from the environments brought about an arrest of the disease (case No. 56).

13. On my way to Kodarma on the 3rd June, 1945 I had an opportunity to discuss the subject with Dr. H. Basu, the Civil Surgeon of Manbhūm who happened to be at Hazaribagh to give evidence in court. He related of a case of silicosis in one Mr. Nirmal Kumar Mitra who was in the employ of Chrestien Mining Co. Ltd. and received treatment from him when he was in-charge of Nawada Hospital as Assistant Surgeon (case No. 57).

14. Attempts were also made to obtain evidence of the disease from dispensary records. In April, 1944 while inspecting the Charky Tilaya Mines I examined the records of the dispensary at Tilaya attached to the mica factory and mines of Messrs. Choturam Horilram Limited. From the records it was not possible for me to detect any disease peculiar to the mica industry. During my last visit to Kodarma I tried to obtain clues to the occurrence of this disease, but I regret to say that due to the absence of the Medical Officer of Kodarma Hospital I was not successful. A second opportunity was, however, not available.

15. Messrs. Choturam Horilram Ltd. have provided a dispensary at Dubour and the Medical Officer, Dr. Jadubir Jha was good enough to furnish me with particulars of some important diseases. These are furnished below. It will be evident from the table that during the last four years the number of lung cases (Asthma and Bronchitis) were in no way negligible. Bronchitis, Asthma and pain in the chest are usually the early symptoms of silicosis. Dr. Jha further stated that the figures supplied by him, related to such cases as attended the dispensary from a radius of only 3 to 4 miles. The cases that occurred in the more distant mines were not properly recorded, though medicines for their treatment were supplied from the dispensary.

Cases treated in Dubour Dispensary

Disease	1941	1942	1943	1944
Asthma	5	9	...	11
Bronchitis	123	224	171	144
Malaria	330	707	673	854
Skin disease	372	152	92	196
Dyspepsia	90	486	464	101

16. During this hurried survey, I had also occasion to study the actual conditions under which some of the labourers had to work at the screening of mica splittings in the mica factories. This portion of the factory work was also very dusty and workers had to inhale fine mica dust during the 8 hours of their duty. Although no cases of lung trouble could be detected then as most of the workers at the screens were on their jobs for only a few months, I am of opinion that constant inhalation of mica dust will, in the long run, produce deleterious effect.

*Not forwarded by the Director of Public Health, Bihar.

17. *Synopsis of cases.*—It has been stated above that I could examine only 52 drillers during my investigation, but as 16 of them had worked for a few months only, their cases had not been recorded. The case of 36 drillers who worked for more than two years are given below. In addition to these, particulars were obtained from other sources about 21 cases who had shown symptoms of the disease. The symptoms described were those of early cases of Tuberculosis. Silicosis resembles Tuberculosis except that in the former there is no fever so long as Tuberculosis has not supervened.

I. The India Mica Supply Co. Ltd., Barasingha Mines where dry drilling was carried out from 1936 to 1942 and wet drilling since 1943.

Case No. 1.—Mr. V. K. V. Nambiar, aged 36 years, Mine Superintendent, carried out mining work since 1931, supervising dry drilling (in other mines of the Company) had cough in 1935 and blood in the sputum, was treated at Giridih taking 2 months rest. He had an attack of pneumonia in 1936. He is now better but gets occasional cough and a feeling of lethargy. His X-ray film is enclosed.

Case No. 2.—Mr. A. K. Menon, aged 30 years, joined mining work in 1934 as a shift incharge. After 3 years of work at dry drilling he got severe pain all over his chest and back with vomiting tendency which continued till he left underground work. He had evening rise of temperature, up to 101 degrees with perspirations during the night. He had cough but no blood in his sputum. He is now engaged on overground work and though he feels better, he does not look quite healthy. His X-ray film is enclosed.

Case No. 3.—Mr. Subodh Ranjan Roy, aged 32 years, joined the company in 1936 as a Shift Incharge. His first symptoms appeared after 9 months of underground work starting with pain in the chest with evening rise of temperature. Before he entered the Company's service he was in perfect health. On the day of my visit he was in bed with a rise of temperature. His X-ray film is enclosed.

Case No. 4.—Mr. Gyan Sinha, joined the company in 1937, suffered from cough and pain in the chest, and left work in 1944. He returned to his native home in the District of Manbhum where he is reported to be well. (Particulars obtained from Mr. Menon, case No. 2).

Case No. 5.—Alijan Mian, son of Gahan Mian of village Deotan P. S. Gawan (Hazari-bagh) after about 3 years of work as a dry machine driller, got an attack of cough and dyspnea, returned home and died of fever and cough. He was in perfect health when he joined the company. (Particulars obtained from Mr. B. K. Mukherjee, Barasingha Mine Manager).

Case No. 6.—Wali Mohammad, brother of Alijan Mian (case No. 5) was in good health when he joined as a driller, got the same symptoms as that of his brother after three years of work and died of fever and cough. (From B. K. Mukherjee).

Case No. 7.—Abdur Rahman, son of Ramzan Mian of village Deotan P. S. Gawan, worked as a dry machine driller for about three years, got cough, pain in the chest with a rise of temperature and died of Tuberculosis. (From B. K. Mukherjee).

Case No. 8.—Mahadeo Gope, son of Jago Gope, worked at the dry machine drill for about three years and died of symptoms similar to that of Tuberculosis. (Mr. Mukherjee's statement).

Case No. 9.—Kariman, aged 25 years, has been working in the company for 4 years. For 2 years he did hand drilling and for the last 2 years he is at the machine (wet drilling). He is in fairly good health and has none of the symptoms of silicosis.

Case No. 10.—Shahadat, brother of Kariman (case No. 9) worked in the Tharkatti Mines of the Indian Mica Supply Company Limited as a dry machine driller for about three or four years and died of fever and cough with blood in sputum. (Statement of Kariman, case No. 9).

Case No. 11.—Shyam Gope, aged 25 years, worked at hand drill for three years and at wet machine drill for the last two years. He is in good health.

Case No. 12.—Ali Hussain, aged 35 years has been working in the mine for about 10 years. He worked as an overground cooly for 5 years. He did dry drilling work intermittently for 3 years, working with the machine for 3 or 4 months at a time and then leaving it for some other type of work for about the same period. For the last two years he is working continuously at the wet drill. He has no complaints and is in good health.

Case No. 13.—Wahid Ali Mian, aged 30 years, working in the mine for the last 10 years. He is working at the wet machine drill for the last 2 years. He is in fairly good health.

Case No. 14.—Farid Mian, aged 20 years, working for 4 years in mine, but for last 2 years at wet drill. He is in good health.

Case No. 15.—Basharat Ali, aged 28 years, working in the mine for 10 years, but at the machine drill (wet) for the last 2 years. He is in good health.

II. Messrs. F. F. Chrestien and Company Limited, Puria Mine No. 2 (Khalaktambi Division) where dry drilling was done during 1942 and 1943 and then wet machine drilling.

Case No. 16.—Bangloo Bhuinyan, aged 30 years, worked with hand drill for 1 year and then with wet machine drill for about 2 years. He is in good health.

Case No. 17.—Sobran Dusadh, aged 32 years, was engaged as a cooly in the mine for 7 years, did dry drilling for 1 year in Puria Mine No. 1, suffers from weakness of the limbs, cough and fever. He is doing light overground work for the last 6 months and is slightly better.

Case No. 18.—Alauddin Khan, aged 40 years, belongs to North Western Frontier Province, worked as a dry driller for 8 years at Japla Cement Factory (overground work). He also worked at the dry drill inside mine for about 6 months at Puria No. 1, suffered from headache with pain in the chest and blood in sputum, accompanied with fever. He was sent to Domchanch Hospital where he remained for 1½ months. He has returned to the mine (underground) work and is doing wet drilling. He occasionally suffers from cough. His chest measurements, full inspiration and expiration were 35" and 34", showing deficient expansions. His general health is bad.

Case No. 19.—Akloo Bhuiyan, aged 40 years, is in the mine work for 15 years. He did hand drilling for 6 months only, but on account of pain in the chest, cough with blood in sputum and low fever, he was sent to Domchanch Hospital where he remained for 7 months. He has returned back to duty doing light overground work and occasionally wet drilling. He still suffers from pain in the chest.

Case No. 20.—Lal Bihari Singh s/o Girdhar Singh of village Khatangi, P. S. Rajauli (Gaya), did dry drilling for 3 or 4 years, suffered from cough and pain in the chest, returned home where he died of tuberculosis. (Particulars from Mr. S. C. Dutta, Divisional Manager, Khalaktambi).

Case No. 21.—Sohrai Rajwar s/o Sanichar Rajwar of village Khatangi, did 15 years of drilling both hand and dry machine and died perhaps of Tuberculosis. (From Mr. S. C. Dutta).

Case No. 22.—Birangi Bhuiyan s/o Jitan Bhuyan of village Khatangi, did dry machine drilling for about 4 years, returned home due to illness and died of Tuberculosis (Mr. S. C. Dutta).

Case No. 23.—Mahadeo Bhuyan s/o Narain Bhuyan of village Jamuni P. S. Rajauli, after about 5 years of work at dry machine drill, got fever and cough, and returned home and died of fever and cough. (From Mr. S. C. Dutta).

Case No. 24.—Kalia Bhuinyan, brother of Mahadeo Bhuyan (case No. 23) had symptoms similar to his brother and died of Tuberculosis. (Mr. S. C. Dutta).

Case No. 25.—Ganpatia Bhuyan, brother of Mahadeo (case No. 23). His case was similar to that of his brother, developing symptoms of tuberculosis after about 5 years of dry machine drilling.

Case No. 26.—Etwa Bhuiyan, also a brother of Mahadeo, got symptoms like that of his brother and died. He had also worked at dry machine drill for about 5 years. (Mr. S. C. Dutta).

Case No. 27.—Tepra Bhuyan s/o Doma Bhuiyan of Khatangi P. S. Rajauli, worked in one of the mines of the Company for 6 or 7 years and died of symptoms of Tuberculosis. (S. C. Dutta).

Case No. 28.—Dhamwan, brother of Tepra (case No. 27) died of symptoms similar to that of his brother. He worked at the dry machine drill for more than 5 years. (S. C. Dutta).

Case No. 29.—Perua, also a brother of Tepra, worked with his brother at the dry machine drill for about 5 years and died of symptoms of Tuberculosis.

Case No. 30.—Shama Bhuinyan of Shahpur (Sirdala) in the District of Gaya had worked at Dry drills for a number of years and died of cough and fever. (S. C. Dutta).

Case No. 31.—Kalia a brother of Shama (case No. 30) worked with his brother and died a few months after his brother's death of the same disease. (S. C. Dutta).

Case No. 32.—Ramlal also a brother of Shama worked with dry drill for more than 2 years and died in the same year in which his brother died. (S. C. Dutta).

Case No. 33.—Ram Kishun, a cousin of Shama belonging to the same village also died of tuberculosis after 3 or 4 years of work at dry machine drill. (S. C. Dutta).

Case No. 34.—Khubi Bhuinyan of Shahpur (Sirdala) also worked with dry drills for more than 5 years, got pain in the chest, cough with fever and died. (Mr. S. C. Dutta).

Case No. 35.—Guanan Bhuinyan, aged 30 years, worked for about 10 years intermittently at dry machine drill with periods of rest and employment in other types of work. About 3 years back he had cough with blood in sputum, pain in the chest, weakness of the limbs and fever. He remained at home for 2 years but returned to the mining work again, but is put on light duty. He is in good health now.

Case No. 36.—Jethua Bhuinyan, aged 32 years, worked with hand drills and for 1 year at dry machine drill, got pain in the chest with cough and blood in the sputum which still persists. He has occasional fever also. For the last one year he is engaged as a Sardar overground. His chest expansion was deficient. (Inspiration 33" expiration 32").

Case No. 37.—Budhan Bhuinyan, aged 25 years, did wet drilling only for 2 years. He has pain in the chest, but no cough. He is in good health.

Case No. 38.—Chamari Rajwar, aged 25 years, did hand drilling for a few years. He is now at the wet drilling for the last five months, has pain in the chest but appeared perfectly healthy.

Case No. 39.—Jethu Bhuinyan, aged 20 years, is at wet drill for about 2 years, has no cough, but occasional pain in the chest. He is in, fairly good health.

Case No. 40.—Yasin Mian, aged 25 years, did dry drilling work intermittently for about three years in Choturam Horilram Co. Ltd. He worked at the dry machine drill for a few months at a time with periods of employment on overground work. Now he is at wet drilling for last 1 year. He has no complaints and looks healthy.

Jamunia Sarangi Mines (Gawan Area of F. F. Chrestien Co. Ltd.)

Case No. 41.—Parmeswar Sahu, aged 30 years, is working in the mine for 18 years. He did 5 years of hand drilling and about 4 years of dry machine drilling. He is in perfect health.

Case No. 42.—Sukhi Chamar, aged 30 years, has been working in the mine for 12 years, 8 years at hand drill and 4 years at dry machine drill. He had severe cough about 2 years back. His chest expansion was deficient.

Case No. 43.—Hiraman Gope, aged 35 years, did hand drilling for 3 years and dry machine drilling for 5 years, has no complaints and is in good health. His chest expansion was good. (Inspiration 34" expiration 32").

Case No. 44.—Amrit Pasi, aged 25 years, did dry machine for 5 years. His chest expansion is deficient. (Inspiration 32" expiration 31"). But he appeared in perfect health.

Case No. 45.—Bhattu Barhi, aged 45 years, a sardar worked occasionally at hand and dry drills for more than 2 years and then supervised work for about 25 years but never suffered from cough or pains in the chest.

Case No. 46.—Huro Gope, aged 25 years, worked in the mine for 12 years, did dry machine drilling for 4 or 5 years. His chest expansion is good. (Inspiration 36" expiration 33"). He is in perfect health.

Case No. 47.—Loknath Koiri, aged 25 years, did 6 years of hand drilling and 4 years of dry machine drilling, has occasionally attack of pain in the chest and weakness of the limbs. His chest expansion was deficient. (Inspiration 35" expiration 34"). He is not in good health.

Case No. 48.—Bakar Mian, aged 25 years. He is working in the mine for 8 years, did 3 years of dry drilling. He is in fairly good health.

Case No. 49.—Bhargoo Gope, aged 28 years, is working in the mine for 10 years, did 5 years of dry drilling work. His chest expansion was good. (Inspiration 34" expiration 30"). He is in perfect health.

Case No. 50.—Bhattu Chamar, aged 33 years is working in the mine for the last 10 years, 2 years with dry machine drilling. He is in perfect health.

Case No. 51.—Barhan Pasi, aged 20 years is in the mine for 6 years, at dry drilling for the last 4 years. He occasionally gets cough and pain in the chest but gets well after a rest for one or two months. He is now in good health His chest expansion was good. (Inspiration 33" expiration 31").

III. Messrs. Choturam Horilram, Sotia Mines.

Case No. 52.—Bhikhwa a dry machine driller worked in the mine Shamsunia mine belonging to the company got tuberculosis after working at the dry machine drill for about 3 years. (Statement of Babu Gobardhan Mukherjee, Mine Manager).

Tanhi Mines :—

Case No. 53.—Bhadey Singh was engaged in dry drilling for last 3 years, got tuberculosis and died. (Mr. Shambhu Nath Chatterjee, Assistant Manager).

Case No. 54.—Paryag Rajwar, aged 25 years, did 3 years of dry machine drilling. He suffers occasionally from cough but gets well when he leaves work.

Case No. 55.—Mathura Rajwar, aged 30 years, did dry machine drilling for 2 years, but is in good health and has no complaints.

Burhia, Mines :—

Case No. 56.—Babu Harendra Nath Sinha was a shift incharge in Choturam Horilram Co. Ltd., was subjected to drilling dust, got cough and pain in the chest. He left the company and is now in good health. (Dr. G. P. Tripathy).

Case No. 57.—Babu Nirmal Kumar Mitra belonging to F. F. Chrestien Company Limited worked inside mine for a number of years, got symptoms of silicosis and received treatment at Nawada Hospital. (Dr. H. Bose, Civil Surgeon, Manbhum).

18. *Summary and Inferences.*—From the history of the cases given above it will appear that out of 57 cases examined or for whom particulars were obtained, 37 showed positive signs of silicosis. The remaining 20 cases who showed no symptoms of the disease have been classified according to the type of work they did.

5 Cases (Nos. 13, 14, 15 and 37)	Wet drilling only for 2 years or more.
3 Cases (Nos. 9, 11 and 16)	Hand drilling and wet drilling for 2 years or more.
1 Case (No. 38)	Hand drilling and wet drilling for 5 months only.
1 Case (No. 12)	Dry Machine drill for 3 years but intermittently and wet drilling for 2 years.
1 Case (No. 40)	Dry machine drilling for 3 years but intermittently and wet machine drilling for one year.
2 Cases (Nos. 41 and 43)	Hand drilling for more than 2 years and dry machine drill for more than 2 years.
6 Cases (Nos. 44, 46, 48, 49, 50 and 55)	Dry machine drill only for more than 2 years.
1 Case (No. 45)	Hand drill, dry drill for more than 2 years and supervising dry drill work.

From the above it will appear that all the drillers who worked at the wet machine drills showed no symptoms of the disease. Two cases (Nos. 12 and 40) did dry machine drilling for very short period at a time with intervening periods of rest and thus escaped. The case of 9 persons who did dry drilling for more than 2 years cannot be explained. Most of these people belong to the Jamunia Sarangi Mines of Gawan Area. It has been stated in the foregoing paragraphs that the size and the chemical composition of the stone particles have important bearing in the causation of the disease. In Gawan Area the character of the stone particles may be different. Further investigation on the above line is, therefore, necessary. Wherever dry drilling has been carried out and the drillers were exposed continuously to the stone dust, symptoms of silicosis have been noticed with ultimate death from tuberculosis. Mr. S. C. Dutta, Divisional Manager, Khalaktambi gave histories of cases with death amongst the drillers of the mine he was incharge. He further stated that he knew of many instances in village Doobour and Bishunpur where several families have been ruined as all the able-bodied men working in the mines with dry drills died of tuberculosis. I have personally seen the working conditions inside the mines with dry drills, followed by blasting and found that the high dust concentration in the blind wings or drives caused considerable discomfort. It is bound to prove injurious in the long run, if exposures are continuous.

19. *Recommendations.*—(i) The survey shows clearly that the dry drilling method of mining is positively injurious. The practice should be stopped as early as possible and if necessary by legislation. Wet drilling has already been started in some of the mines and is in progress for the last 2 years. The method no doubt appears to be an improvement over the dry one, but the result of the method are to be further studied.

(ii) In order to safeguard the health of the drillers amongst whom death rate appears to be high it will be necessary to have a strict medical examination of all persons employed for drilling work inside mines or for mica screening work in mica factories. Such a person should also be X'rayed before he starts service and again once a year for 2 years and then again every six months. If at any stage the X'ray films show increased hilar shadow or bronchial infections, the person should be asked to go on leave for at least six months. On return from leave another X'ray film should be taken and if no improvement is noticed he should not be allowed to do any drilling or screening work at all.

(iii) For the treatment of the miners a well-equipped hospital with sufficient number of beds and arrangements for taking X'ray films should be provided at Kodarma. The prevalent disease and the mining population in the whole of the mica belt should be kept in view while providing the hospital accommodations.

(iv) In some of the mines the miners have been using castor oil lamps which give out much smoke and soot. The use of electricity inside mines should be enforced, but this may be done after the war.

(v) During the investigation I noticed that the areas near about Kodarma were very malarious and epidemics of cholera also broke out almost every year. Hookworm disease is

also prominent in these mines as it is in other mines of the province. The general sanitation of the area including housing condition and water supply is bad and requires improvement. In some of the mines drinking water has to be carried for considerable distances in earthen pitchers or has to be transported through motor trucks. The sources from which the water is taken is liable to gross pollution. The formation of a Mines Board of Health therefore seems to be necessary.

20. Before I conclude I must express my grateful thanks to Mr. L. J. Lucas, the Mica Controller, Bihar for selecting for me the representative mines belonging to the three reputed firms and for providing facilities for my investigations. To Mr. E. Watson, the Director and to Mr. W. G. Richards of Chrestien Mining Co. Ltd. I am extremely grateful for giving me every possible help in carrying out the investigation. To Mr. Choturam and Mr. Chandmull Rajgaria I am very grateful for the opportunity they gave me to discuss the subject of Silicosis with them and for the facilities they provided me during my visit. I also acknowledge gratefully the help and assistance I received from Jani and Mr. A. N. Kalia, the Assistant Zone Managers of Chrestien Mining Company Limited and from Dr. G. P. Tripathy and Mr. H. K. Misra of Chotulal Company Limited and from Mr. V. K. V. Nambiar, Mine Superintendent of India Mica Supply Co.

APPENDIX IX

FORM OF HALF-YEARLY RETURN OF ALL KINDS OF MICA

Return of all kinds of Mica for the half-year ending.....

Name of Proprietor or Licensee or Prospector submitting return.....

Proprietor's Certificate No.....

Miner's Licence No.....

Dealer's Licence No.....

Prospector's permit No.....

(A) CRUDE MICA

Opening balance	Receipts				Total] crude mica (Cols. 1+5)	Issues			Closing balance
	From reported mines	From unreported mines	By purchase	Total receipt (Cols. 2+3+4)		Issued for cutting	Sold	Total issue	
1	2	3	4	5	6	7	8	9	10
M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.

(B) S. D. BLOCK

Opening balance	Receipts								Total S.D. Block (Cols. 11+19)
	From crude mica	From uparaballs	From mine dumps	From factory dumps	By purchase			Total receipts (Total of Cols. 12 to 18)	
					In the Province	In India outside the Province	Foreign		
11	12	13	14	15	16	17	18	19	20
M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.

(B) S. D. Block—contd.

Issues			Closing balance
For sorting, dressing and splitting	Sold	Total issue	
21	22	23	24
M.S.C.	M.S.C.	M.S.C.	M.S.C.

(C) UNOUT CHILLAS

Opening balance	Receipts			Total uncut chillas	Issues			Closing balance
	From crude mica	By purchase	Total receipt		For cutting, dressing and splitting	Sold	Total issue	
25	26	27	28	29	30	31	32	33
M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.

(D) CHILLAS OTHER THAN UNOUT

Opening balance	Receipts					Total chillas other than uncut	Issues			Closing balance
	From uncut chillas and block	By purchase			Total receipt		For sorting, dressing and splitting	Sold	Total issue	
		In the Province	In India outside the Province	Foreign						
34	35	36	37	38	39	40	41	42	43	44
M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	

(E) EXPORTABLE BLOCK, SPLITTINGS AND MANUFACTURED MICA

Description of Mica	Opening balance	Receipts				Total in hand (Cols. 46+50)	Issues						Closing balance	
		From S.D. Block	From Chillas	Purchased	Total receipt (Cols. 47+48+49)		Sales to Local Dealers		Sales for Indian consumption		Export			
							Weight	Value	Weight	Value	Weight	Value		
45	46	47	48	49	50	51	52	53	54	55	56	57	58	
	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	M.S.C.	Rs. a. p.	M.S.C.	Rs. a. p.	M.S.C.	Rs. a. p.	M.S.C.	
1 Sorted block (heavy stained & up)	}	...	}	...	}	...	
2. Chillas
3. Condenser Films
4. Condenser Plates (cut)
5. Wrappers (uncut)
6 Wrappers (cut)
7. Washers
8. Discs
9. Other cut and punched shapes
10. Sorted block, lower than heavy stained	}	...	}	...	}	...	
11. Splittings, book form
12. Splittings, pan packed
13. Loose splittings, 5½ and up
14. Loose splittings, 6—1st and 2nd.
15. Loose splittings, 6—3rd and lower			
16. Scrap Mica	}	...	}	...	}	...	
17. Other Mica

Note.—Values in Columns 53, 55, 57 to be given as indicated by brackets, namely the totals of Serials 1—9, 10, 11—15, 16, 17.

APPENDIX X

RETURN OF EMPLOYMENT OF LABOUR IN MICA MINES AND FACTORIES

Name of Proprietor, Licensee, or Permit Holder submitting the Return.....
 Proprietor's Certificate No.....
 Miner's Licence No.....
 Dealer's Licence No.....
 Prospector's Permit No.....

(A) MINES

Dates to which the return relates	Underground							
	Overmen & Sirdars		Miners		Skilled Labour		Unskilled Labour	
	Time rated		Time rated		Time rated		Time rated	
	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage
1	2	3	4	5	6	7	8	9
January, 194
July, 194
April, 194
October, 194

(A) MINERS—contd.

Open Workings

Overmen & Sirdars		Miners		Skilled Labour		Unskilled Labour		Women	
Time rated		Time rated		Time rated		Time rated		Time rated	
Number	Average daily wage	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage
10	11	12	13	14	15	16	17	18	19

Surface

Clerical & Supervising staff		Skilled Labour		Unskilled Labour		Women	
Time rated		Time rated		Time rated		Time rated	
Number	Average daily wage	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage
20	21	22	23	24	25	26	27

(B) FACTORIES

Dates to which the return relates	Sardars				Sickle Dressers				Sorters			
	Time rated				Time rated		Piece rated		Time rated		Piece rated	
	Male		Female		Male		Male		Male		Male	
	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage
28	29	30	31	32	33	34	35	36	37	38	39	40
January, 194
July, 194
April, 194
October, 194

(B) FACTORIES—*contd.*

Splitters								Packers	
Time rated				Piece rated				Time rated	
Male		Female		Male		Female		Male	
Number	Average daily wage	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage
41	42	43	44	45	46	47	48	49	50
...
...

Other Categories

Time rated				Piece rated			
Male		Female		Male		Female	
Number	Average daily wage	Number	Average daily wage	Number	Average daily wage	Number	Average daily wage
51	52	53	54	55	56	57	58
...
...

APPENDIX XI

COMMENTS ON SOME CLAUSES OF THE MICA CONTROL ORDER, 1940

(1) *Clause 1.*—This clause applies to the entire Province of Bihar certain provisions of a general nature, and restricts the other provisions to what are called “controlled areas”. A similar provision will be required for the proposed legislation and, if the law is to be effective, the general sections must apply to the whole of India. For instance, clause 17 provides that no person shall transport or remove any mica from any place in Bihar to any place outside Bihar unless he carries in respect of the mica an authorisation in form G, and clause 18 provides that any magistrate or police officer or any other person authorised in this behalf by the Provincial Government may seize any mica which he has reason to believe is being transported or removed in contravention of the provisions of clause 17. The provisions of these two clauses are effective so long as the mica which is being transported is within the borders of the Province of Bihar. Once it has got outside those limits, the person, in whose custody the mica is, is free to do what he pleases with the mica in spite of the particulars noted in the authorisation in form G, and no magistrate or police officer or other person will be entitled under the law to interfere. This necessity for the new law to be operative throughout India is an argument in support of legislation by the Central Legislature.

(2) *Clause 2, Definitions.*

(a) This clause does not define “waste mica”. A definition appears to be desirable. In the definitions of “block mica” and “mica dump”, the expression “refuse mica” is used. The term “waste mica” seems preferable.

(b) “Manufactured mica” is defined as meaning “mica in any form other than the form of crude mica, block mica, *chillas* or splittings”. To be complete this definition requires mention of “waste mica”. The definition, however, is merely negative and not very satisfactory. Hitherto, manufactured mica was exempt from the provisions of the special mica law [*vide* sections 4(2) (a) and 10(1) (b) of the Bihar and Orissa Mica Act and clauses 4(2) (a) and 10(1) (B) of the Mica Control Order]. Now it is intended to bring manufactured mica under control; see, for example, our proposals regarding marketing and the submission of returns. Hence, a better definition appears to be desirable.

(c) “Mica dump” is defined as meaning “any collection of mica refuse or of material containing mica”. Perhaps, it would be better to define it as a collection of refuse consisting wholly or largely of mica.

(d) “Splitter” is defined as “a person who is employed by a splitting contractor to split block mica”. A splitter may be employed by a licensee or by a registered proprietor, and the splittings may be prepared from *chillas* as well as from block. The definition, therefore, seems to require modification. Judging from the exemptions in clause 4(2) (c) and the proviso to clause 15(1), the intention seems to be to define a home splitter.

(e) “Splitting contractor” is defined as “a person who receives block mica from a mica manufacturer for the purpose of splitting such block mica”. Perhaps a better definition would be, “a person who receives block mica and/or *chillas* from a licensee or registered proprietor for preparing splittings therefrom by means of splitters”.

(3) *Clause 4(2)(c).*—This clause exempts from the necessity of a pass the possession by a splitting contractor or splitter of splittings, *chillas* or block mica of Grade No. 5 or less. According to our recommendations, the exemption should extend only to Grade No. 5½ or less, and the Mica Warden’s Board should be empowered to extend it, where necessary, to Grade No. 5. Further, the exemption should apply only to block, *chillas* and splittings in the possession of the splitting contractor or home splitter in the due course of their business.

(4) *Clause 4(3).*—Where a licence ceases to be in force or is cancelled, this clause gives the licensee time to dispose of his mica. Similar provision is necessary for a proprietor or a prospector, whose certificate or permit has ceased to be in force or has been cancelled.

(5) *Clause 10.*—This clause relates to the keeping of accounts by licensees and registered proprietors. Accounts should also be kept by the holders of prospector’s permits. Further, the accounts should include particulars as to manufactured mica.

(6) *Clause 15(1).*—The proviso to this sub-clause permits a splitting contractor or splitter without a pass to remove from any place in the occupation of a licensee or registered proprietor, other than a mica mine or a mica dump, *chillas* or block mica of Grade No. 5 or less. The grade, according to our recommendations, should be 5½ or below, with power to the Mica Warden’s Board to raise the limit to Grade No. 5. So far as splitting contractors are concerned; there is no reason why they should not carry a pass covering mica which they are removing from the godown of the licensee or registered proprietor. Further, it should be clear that the exemption applies only in favour of mica carried for home-splitting. We would suggest, also, that there should be a limit of quantity, say ten seers per person, of the amount of mica which may be carried without a pass under this proviso.

(7) *Clauses 16 and 18.*—These two clauses provide different methods of disposing of mica seized by public authorities. It would appear to be simpler to provide a common method of disposal in both these cases.

(8) *Clause 24.*—This clause empowers the Controller, with the previous approval of the Commissioner, to delegate any of the powers or duties conferred or imposed on him by this Order to any magistrate of the first class. The clause appears to be unnecessary.

(9) *Clauses 8, 9, 13, 14 and 22.*—These clauses deal with diggers, a class of persons who formerly used to prospect for mica. In view of our recommendations regarding prospector's permits, these provisions are no longer required.

(10) *Power to make rules.*—Provision for this purpose was not necessary under the Mica Control Order. It will be necessary in the new legislation. We think, it would be most convenient to vest this power in the Provincial Government. As was provided in the Bihar and Orissa Mica Act, the rules should be made after previous publication.

APPENDIX XII

ADVANCE REPORT

With reference to the disposal of surplus mica stocks, this Committee has been asked by the Government of India to advise, in advance of its general report, whether any control of the marketing of mica is necessary after the Joint Mica Mission stops purchasing mica and, if so, the nature of the control and the extent to which it should operate in regard to existing stocks.

2. Very recently the Joint Mica Mission has assured the trade in India that Governmental stocks of mica will be disposed of in consultation with the Government of India and with due regard to the post-war needs of the mica industry.* The Committee understands that a similar assurance has been given to the mica trade in the United Kingdom by His Majesty's Ministry of Supply, and that the policy of His Majesty's Government is to dispose of its stocks "in an orderly fashion without upsetting ordinary trade". It appears, therefore, to be fully recognised that the disposal of mica stocks accumulated by the Allied Governments by their purchases during the war must be so managed that the mica industry is not prejudicially affected. This necessarily follows from the fact that the stocks were built up in conditions in which the producers in India were compelled to sell their product to a purchaser, who besides having the monopoly of purchase was in a position to fix the price at which the mica changed hands. As this conclusion is accepted, it is unnecessary to stress the reasons in support of it.

3. Independently of the present reference, the Committee had already considered whether any control of marketing will be necessary after the Joint Mica Mission ceases its purchases and before the report of this Committee is implemented. It appeared to the Committee desirable that, in order not to lose the benefit of the standardisation introduced by the Joint Mica Mission, and in order to make easier the adoption of such new standards as might later be decided on in accordance with the recommendation of this Committee, the Mission standards should continue. For this purpose, the Mica Inspectorate should remain in existence and the organisation should be financed by an export levy on mica. This Inspectorate would inspect all exports of mica, and refuse export licences for any consignments which are either sub-standard or super-standard. Apart from this control, trade should be free and prices uncontrolled. The Mica Controller in Bihar and the Director of Industries in Madras should, where necessary, be the channel through which exporters in this country and importers abroad can get into touch with each other.

4. On that occasion the Committee deliberately refrained from considering the question of the disposal of accumulated stocks as it understood that this problem was being dealt with by the Government of India. On re-examining the problem from this point of view, there does not appear to the Committee to be any reason to modify the conclusions previously arrived at. All that is necessary in addition is the laying down of some principle for the disposal of stocks, or the establishment of some agency for this purpose.

5. The Committee finds itself hopelessly handicapped in laying down any principle of disposal. In order to do this it must know, *firstly* what the stocks are likely to be when the Mission ceases to operate and, *secondly* what the demand for mica is likely to be from then onwards. There are many uncertain factors on which the first point depends. When the Mission procurement will cease is still a matter for speculation, and the Mission does not feel able to tell the Committee even approximately what the stock is likely to be. Similarly, it is not possible to know the second point. For several years mica has been passing through new channels to feed new demands created by the war. The necessity for war purposes will continue, though perhaps not to the same degree of intensity. At the same time trade will be resumed through normal channels for civilian needs. It is unlikely that, in these circumstances, a forecast can be made with any accuracy regarding the nature and extent of the demand for mica.

6. The resumption of purchase for ordinary civilian needs after a long period of stoppage, in addition to the demand for military purposes that still remains, may result in a demand which the producers in India may find it difficult or impossible to cope with. In such circumstances, the surplus demand may be met from the accumulated stocks, which may be quickly liquidated in this manner. This is one possibility.

7. The figures of stock accumulated in India up to the 30th June, 1945, as reported to the Committee by the Joint Mica Mission, indicate that the accumulations are likely to consist mainly of splittings. As regards the position abroad, there is a big accumulated stock in the United States of America in the Stock Pile. This consists of 5,000,000 lbs. of splittings and 1,000,000 lbs. of block. By an Act of Congress this accumulation cannot be liquidated until three years after the State of Emergency has ended. Unless a change of policy leads to an amendment of the Act of Congress, the Stock Pile mica does not enter into the immediate problem. Regarding other accumulations abroad, the Committee has before it only conjectures made by the Trade in India from the inquiries of intending purchasers abroad relative

* Joint Mica Mission Circular No. 80, dated the 2nd July, 1945.

to transactions in mica subsequent to the expected early withdrawal of the Joint Mica Mission. The conjectures are that there is very little accumulation abroad, either in Government or in private hands. If this conjecture is correct, the problem is likely to be mainly one of disposing of large stocks of splittings. On this assumption, a method of disposal has been suggested to the Committee which appears to it to provide a way of disposing of stocks without seriously affecting the normal trade. It proceeds on the basis that the export of splittings will bear to the export of block a higher proportion than was the case before the war. In that case the surplus above the pre-war proportion may be supplied from the accumulated stock. For the first six months after the cessation of the operations of the Joint Mica Mission, trade will be allowed to proceed along normal channels. At the end of this period the figures of the exports of block and splittings will be compared. If the quantity of splittings exceeds the normal pre-war proportion, the authority controlling the accumulated stock will be authorised to release for sale during the next six months the amount of this excess. The position will be reviewed again after every succeeding period of six months. The success of this method will depend on the demand for splittings being very considerable as compared with that for block. This is a second possibility.

8. There are other possibilities, but it will serve no useful purpose to consider them without any relation to the probable facts at the time the problem is likely to arise.

9. The above suggestions, however, are conjectural. It is clear that the method most suitable for disposing of stocks equitably to the parties concerned can only be decided on when all the determining factors are known, and this should be done in consultation with all the parties. This Committee, therefore, recommends the formation of a Standing Committee consisting of three members from the trade in India and three members representing the Government of India, the Government of the United Kingdom and the Government of the United States respectively. The three trade members may be chosen by the Kodarma Mica Mining Association, Kodarma, the Bihar Industries Association (Mica Section), Patna, and the Madras Mica Association, Gudur, each of these associations nominating one member. This Standing Committee will review the position every six months and give directions regarding the disposal of stocks. This is the second of the two methods suggested in paragraph 4 above.

10. To avoid any misunderstanding, the Committee wishes to make it clear that its proposal for continuing the Joint Mica Mission standards independently of any other control over marketing is purely an *ad interim* arrangement. The Committee would be very unhappy to see it become permanent, without a proper consideration of the whole problem in the light of the Committee's recommendations on the subject in its general report.

APPENDIX XIII

REPORT OF MR. CHANDMALL RAJGARIA, ASSESSOR, MICA ENQUIRY COMMITTEE, ON THE MICA DEPOSITS OF TRAVANCORE STATE

Mica mining in Travancore State has been conducted off and on for about 50 years, but it is being done a bit regularly only since the year 1935. The average production of mica per year for the past four years is about 20,000 lbs. of sickle dressed block.

I visited the mine belonging to Mr. J. T. Moraes, who is the only lessee of the State working the phlogopite deposit. The mine (Little Flower Mica Mine) is situated near Ponnalur, at a distance of about 60 miles from Trivandrum.

In this mine phlogopite occurs with pyroxenite in the country rock of Garnetiferous Gneisses. The concentration of phlogopite in the vein is very rich, and on account of the water being very near the surface the entire mass of pyroxenite is completely decomposed. As a matter of fact it can be said that mica occurs in clay, which has made the mining side of the problem extremely difficult. Fortunately, abundance of timber in the forest nearby has solved working difficulties to a considerable extent.

Mr. V. Mahadevan, the State Geologist, gives technical assistance to the lessee, and under his guidance the method applied by the lessee for mining seems to be quite a sensible one.

Sickle dressing is done at the pit head and, since the industry is still in the stage of infancy, processing of mica at the pit head is not at all efficient, and in consequence there is a considerable amount of waste in sickle dressing.

The State has granted a lease for 15 years without any condition of renewal after the expiry of the lease. 5 per cent. of the sales value is charged by the State as royalty.

Considering the difficult conditions under which the mine has to be worked, the cost of production is very high and, with the prices paid by the Joint Mica Mission, the producer can hardly make any profit.

The following are the prices paid by the Joint Mica Mission :—

	Rs.	A.	P.	
No. 7	0	12	0	per lb.
No. 6	1	0	0	„
No. 5½	1	8	0	„
No. 5	2	8	0	„
No. 4	4	4	0	„
No. 3	4	12	0	„
No. 2	6	4	0	„
No. 1	7	0	0	„

The State Geologist assured me that if, for the healthy development of the industry, the Mica Enquiry Committee suggests any addition or alteration in the policy of the State in connection with royalty, or any other matter, the State will be only too glad to consider it.

In addition to phlogopite, there are muscovite deposits in the State which are not being worked. Considering the richness of the phlogopite deposit which I have personally inspected, I think it can safely be said that, if efforts are made to develop this industry in Travancore State, there are very encouraging future possibilities.