

REPORT
OF THE
Indian Tariff Board

ON THE
GRANT OF PROTECTION TO THE
PAPER AND PAPER PULP INDUSTRIES



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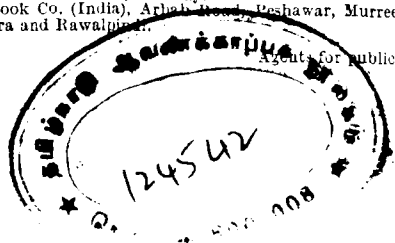
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PRELIMINARY.

The period of protection afforded to the Paper Industry for certain classes of paper by the Bamboo Paper Industry (Protection)

Act of 1932 expires on the 31st March, 1939.

Terms of Reference. The Government of India in their Resolution No. 202-T. (1)/36, dated the 11th December, 1937, have requested the Tariff Board to re-examine the question of the protection enjoyed by the Paper and Pulp industries and to report what protective measures (if any) should be continued after the 31st March, 1939. The terms of the Government of India Resolution are as follows:—

“ The protection afforded to the Paper and Paper Pulp Industries by the Bamboo Paper Industry (Protection) Act, 1932, will determine on the 31st March, 1939. A subsidiary enquiry into the question of classification of paper for tariff purposes was held by the Tariff Board in 1935, and the action taken upon the Board's recommendations having resulted in a not inconsiderable extension of the range of protection previously enjoyed by the Indian paper making industry, the Government of India decided to review the necessity or desirability of maintaining the extra measure of protection which was fortuitously afforded by the imposition of the revenue surcharge of 25 per cent. in 1931. This matter has accordingly been enquired into departmentally, but, owing to the complicated nature of the data to be examined and in view of the imminence of this further enquiry by the Tariff Board into the whole question of protection to the Industry, the Government of India have taken no action in regard to the surcharge.

“ 2. The Tariff Board is now requested to re-examine the question of the protection enjoyed by the Paper and Paper Pulp Industries in India and to report what protective measure (if any) should be continued after the 31st March, 1939.

“ 3. If the Tariff Board is satisfied during the course of its investigations that the revenue surcharge on the paper protective duties is no longer justifiable it will be at liberty to make its recommendations in this behalf in advance of its main report.

“ 4. In making its recommendations the Tariff Board will take all relevant considerations into account including those stated in parts (b) and (c) of the Resolution adopted by the Legislative Assembly on the 16th February, 1923.

“ 5. Firms or persons interested in the paper making industry or in industries dependent on the use of paper who desire that their views should be considered by the Tariff Board should address their representations to the Secretary to the Board ”.

2. The Tariff Board entered upon its duties on December 13th, 1937, and issued a Press Communiqué in the terms of the Government of India Resolution calling upon all firms and persons interested to submit written representations not later than the 25th January, 1938. Two questionnaires were issued, one for manufacturers and the other for paper importers and traders and other persons interested in the industry. Copies of these questionnaires were sent to Provincial Governments, Chambers of Commerce and other associations likely to be interested and replies were asked for by 31st January, 1938. Extensions of the period within which replies should be submitted were given when requested and the Board continued to receive original or supplementary representations until April.

3. We started on tour on December 13th and after short visits to Bombay and Poona to inspect paper mills and gather some preliminary information, halted at Madras to receive any oral representations that might be offered and to hold discussions with the Provincial Government and Customs officials. We next proceeded to Calcutta, inspecting a paper mill on the way. In Calcutta and its neighbourhood we inspected the four most important mills at present manufacturing paper. We also recorded evidence from six paper mills, the Paper Makers' Association, the Paper Importers and Paper Traders' Associations and the Collector of Customs between February 2nd and 20th, and had the advantage of a discussion with the Provincial Government.

From Calcutta we proceeded to Lucknow, where we inspected a mill and recorded evidence and also discussed certain matters with representatives of the Provincial Government. From Lucknow we visited Dehra Dun, inspected the Paper Section of the Forest Research Institute and recorded evidence from the officers concerned. Our next tour, after a short halt in Delhi, was to Kathiawar in connection with another enquiry, but the opportunity was taken to inspect a paper mill near Ahmedabad. Proceeding in turn to Bombay and Poona we completed our inspection and the record of evidence from witnesses not examined elsewhere.

4. The case for the continuance of protection for the Industry was presented partly by the Indian Paper Makers' Association to which most of the existing and new mills under construction belong, but mainly by individual mills who had their own special points of view put forward. We have to acknowledge the readiness of all concerned to put all the facts and figures which we required before us without reserve.

In the enquiry of 1931 the continuance of protection was opposed by both the Paper Importers and Paper Traders' Associations. On this occasion the two Associations have stated that in present conditions they do not object in principle to the continuance of protection provided that the measure of protection is not excessive.

Chambers of Commerce and similar bodies have in general supported the claim.

5. We have found it advisable to adopt an arrangement of our Report somewhat different from that followed by the Tariff Board of 1931. Beginning with a preliminary survey of the progress made by the industry, we deal in succession with Raw Materials, Manufacture, Qualifications for protection, Measure of Protection and conclude with some supplementary proposals.

Unless otherwise stated, figures for raw material, pulp and paper should be taken to be on an 'air dry' basis, *i.e.*, containing 10 per cent. of moisture. The moisture content varies according to atmospheric conditions in different periods of the year and may be higher or lower than 10 per cent., which is the average figure adopted by previous Tariff Boards, and seems to us reasonable.

In referring the question of the continuance of protection to the Paper Industry to the Tariff Board, the Government of India stated that it was open to the Tariff Board to submit recommendations relating to the revenue surcharge on the protective duties in advance of its main report. We submitted our preliminary report on 31st March, 1938, but the decision of the Government of India had not been announced before the completion of our main report.

6. We desire to acknowledge the services rendered to us by our Secretary Rai Sahib H. C. Sen, whose long experience of Tariff Board enquiries has been of great value and of Mr. Amrit Lal Sahgal, B.A., I.L.B., A.C.A., R.A., whose expert knowledge as a Chartered Accountant has facilitated the statistical part of our work.

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Report

on the

Grant of Protection to the Paper and Paper Pulp Industries.

CHAPTER I.

The Paper Industry in India.

1. The manufacture of paper in India is an old established industry. The first paper mill, the Bally Mills on the Hooghly, now defunct, was started as early as 1870, followed in 1879 by the Upper India Couper Paper Mills. By 1925, the year in which the question of protection for the industry was first considered, there were 9 mills in existence and two new mills were projected.

2. At the time when the first Tariff Board reported on the question of protection for the industry, there was a uniform revenue duty of 15 per cent. on all classes of paper. The principal indigenous material then used for manufacture was *sabai* grass. The Board found that with one exception the mills using grass could not establish a claim for the grant of protection under the conditions laid down by the Fiscal Commission, but considered that the possibilities of making paper from bamboo pulp, the manufacture of which was still in the experimental stage, were promising enough to justify some measure of protection, without a final commitment to the policy of protection. It, therefore, suggested the provision of financial assistance to mills prepared to experiment in the manufacture of bamboo pulp, and proposed a specific duty of one anna a pound on all writing paper other than chromo, marble, flint, poster, stereo and newsprint containing 65 per cent. or more of mechanical pulp.

3. The Government of India rejected the suggestion that financial assistance should be given to mills, but accepted the proposal for protective duties on certain classes of paper. The Bamboo Paper Industry (Protection) Act was passed in September, 1925, giving protection up to 31st March, 1932, to "Printing paper (excluding chromo, marble, flint, poster and stereo) all sorts containing less than 65 per cent. of mechanical wood pulp and to writing paper all sorts including ruled or printed forms and account and manuscript books and the binding thereof".

4. In 1927 the question whether the percentage of mechanical pulp should be calculated on the net fibre content of the paper or on the total weight was referred to the Tariff Board of 1927. Tariff Board. As a result of its recommendations an amending Act, Act XX of 1927, was passed which provided that the percentage of mechanical pulp should be calculated on the fibre content. The wording of the Schedule attached to the Act of 1925 was also amended so as to provide that printing paper containing no mechanical pulp should be liable to the protective duty and that in the case of ruled or printed forms (including letter paper with printed headings) and account and manuscript books and the binding thereof, if the protective duty was less than the revenue *ad valorem* duty, the *ad valorem* duty should be levied. The general *ad valorem* rate of revenue duty was at the time 15 per cent. When the general level of revenue duty was raised from 15 per cent. to 20 per cent. by the Indian Finance Act passed in March, 1931, no change was made in the *ad valorem* protective duty of 15 per cent. imposed on writing paper as an alternative to the specific duty of 1 anna a pound.

5. In November, 1931, the Indian Finance (Supplementary and Extending) Act 1931 imposed a surcharge of 25 per cent. on the existing revenue and protective duties levied on different classes of paper, thus raising the specific protective duty to 1 anna 3 pies per pound and the alternative *ad valorem* duty to 18½ per cent.

6. In March, 1931, the Government of India referred to the Tariff Board the question of how far the protective duties imposed by the Bamboo Paper Industry (Protection) Act of 1925 had achieved the purpose of developing the manufacture of paper from bamboo and whether it was desirable to continue protective measures beyond the 31st March, 1932. The Board found that there were ample supplies of bamboo available in India and Burma not only to supply the whole Indian demand for pulp but also to develop a large export trade. Difficulties in the mechanical treatment of bamboo had proved greater than was expected and had delayed the development of bamboo as a pulp making material, but very considerable progress had been made and further experiments were being undertaken. The quality of paper made from bamboo was regarded as satisfactory, considering that manufacture was still in the experimental stage. It also found that, though the expansion of the paper industry must be based mainly on bamboo, grass also occupied a recognised place in its development and for this reason recommended that no distinction should be made between the two in the application of proposals for assistance. As regards auxiliary materials, a considerable increase in the use of indigenous materials had occurred, and most of them were obtainable in India at economical prices. In the matter of imported wood pulp, it found that a large increase in its use by Indian mills had taken place for the reasons which it explained.

Its main recommendations were that the Paper industry satisfied the conditions laid down by the Fiscal Commission and that the existing protective duties on paper should continue for a period of seven years, but in order to further the development of bamboo pulp a duty of Rs. 45 per ton should be levied on imported pulp. The Board was not satisfied with the classification of printing and writing paper and recommended examination of the definitions according to trade usage by a conference at which all the interests concerned should be represented.

7. The main recommendations of the Tariff Board were accepted by the Government of India and the Legislature. The Bamboo Paper Industry (Protection) Act of 1932 continued protection for the classes of paper already protected at the existing rate, but raised the percentage of mechanical wood pulp qualifying paper for exemption from the protective duty from 65 to 70 per cent. and imposed a protective duty of Rs. 45 per ton on imported pulp, all duties being subject to the revenue surcharge imposed in November, 1931.

8. The Government of India, however, found themselves unable to accept the method of procedure suggested for the better definition of the different classes of paper included according to ordinary trade usage in the terms 'Printing' and 'Writing' paper, as used in the import Tariff Schedule. The definitions were therefore left unchanged, but it was decided to publish a new classification scheme based on the principle that the protective duty should be made applicable to all kinds of paper except those specified for exemption instead of specifying the kinds of paper to be protected and leaving all other kinds of paper subject to the revenue duty. A provisional scheme of classification was circulated to all parties concerned, but the views expressed were so divergent that the Government found it impossible to arrive at any satisfactory conclusion.

9. Some changes were made in the Tariff Schedule in consequence of the Ottawa Trade Agreement embodied in the Indian Tariff (Ottawa Trade Agreement) Amendment Act (XXV of 1932) and the Supplementary Amendment Act (VIII of 1933). The effect of these changes was to raise the standard rate of duty on some classes of paper subject to revenue duty to 30 per cent. with a preferential rate of duty of 20 per cent. for articles which were the manufacture of the United Kingdom.

10. The Government of India having found no satisfactory solution of the classification problem, decided in 1935 to refer the matter to the Tariff Board. The Board in its report dealt exhaustively with the history of the different schemes of classification of paper adopted or proposed since 1925 and with the principles on which a revised classification could be based. It explained the difficulties of a purely

scientific classification and arrived at the conclusion that the scheme proposed by the Government of India in 1932 had no compensatory advantages against the difficulty of arriving at an exhaustive enumeration of the exempted kinds of paper and other disadvantages. It examined other alternative schemes, but found them to be impracticable, and finally arrived at the conclusion that there was no option but to fall back on the existing scheme which had at least the merit of being familiar to the trade and the Customs Department. Some slight modifications in the scheme were suggested, but the Board considered the devising of a more acceptable classification had better be left for a fresh statutory enquiry, since its terms of reference precluded an extension or restriction of the protection granted to the industry by the Legislature.

11. The main recommendation of the Tariff Board was accepted by the Government of India, but it was decided to defer legislation on such modifications of the Tariff Schedule of paper as required legislative sanction. The Tariff Schedule appended to the Indian Tariff Act XXXII of 1934 as it stood on last March, 1938, is as follows:—

Item No.	Name of article.	Nature of duty.	Standard rate of duty.	Preferential rate of duty if the article is the produce or manufacture of		Duration of protective rates of duty.
				The United Kingdom.	A British Colony.	
43	Wood Pulp	Protective	Rs. 56-4 per ton	..	..	March 31st, 1939.
44	Paper, including chrome, marble, flint, poster and stereo printing paper; articles made of paper and papier mache; paste-board, millboard and carboard, all sorts other than straw-board.	Preferential revenue.	30 per cent. <i>ad valorem</i>	20 per cent. <i>ad valorem</i> .	..	
	Tariff value—					
	Packing and wrapping paper—		Rs. A. P.			
			per lb.			
	Machine-glazed pressing		0 1 8			
	Manilla, machine-glazed or unglazed, and sulphite envelope		0 1 11			
	Kraft and imitation kraft		0 2 2			
44 (1)	Printing paper (excluding chrome, marble, flint, poster and stereo), all sorts which contain no mechanical wood pulp or in which the mechanical wood pulp amounts to less than 70 per cent. of the fibre content.	Protective	One anna and three pies per lb.	..	..	March 31st, 1939.
44 (2)	Printing paper, all sorts not otherwise specified which contain mechanical wood pulp amounting to not less than 70 per cent. of the fibre content*, and strawboard, all sorts.	Revenue	25 per cent. <i>ad valorem</i> .	..	..	
	Tariff value—		Rs. A. P.			
			per cwt.			
	Strawboards (not lined)		4 12 0			

* Under Government of India, Finance Department (Central Revenues), Notification No. 33, dated the 22nd June 1935, as amended subsequently, new-sprint papers, containing Mechanical Wood pulp amounting to not less than 70 per cent. of the fibre content is liable to duty at the following rates:—(i) Unglazed.—Rs. 1-8-0 per cwt. and (ii) Other sorts.

Item No.	Name of article.	Nature of duty.	Standard rate of duty.	Preferential rate of duty if the article is the produce or manufacture of		Duration of protective rates of duty.
				The United Kingdom.	A British Colony.	
44 (3)	Writing paper— (a) Ruled or printed forms (including letter paper with printed headings) and account and manuscript books and the binding thereof. (b) All other sorts	Protective	One anna and three pies per lb. or 18½ per cent. <i>ad valorem</i> , whichever is higher.	..	..	March 31st, 1939.
44 (4)	Trade catalogues and advertising circulars imported by packet, book, or parcel post.	Protective	One anna and three pies per lb.	..	..	March 31st, 1939
44 (5)	Paper money	..	Free	..	..	..
44 (6)	Newspapers, old, in bales and bags— Rs. A. P. per cwt. Tariff value— Old newspaper in bales and bags 4 8 0	..	Free	..	..	..
45	Stationery including drawing and copy books, labels, advertising circulars, sheet or card almanacs and calendars, Christmas, Easter and other cards, including cards in booklet forms; including also waste paper but excluding paper and stationery otherwise specified.*	Revenue Preferential Revenue	25 per cent <i>ad valorem</i> . 30 per cent <i>ad valorem</i>	..	..	..
45 (1)	Books printed, including covers for printed books, maps, charts, and plans, proofs, music, manuscripts, and illustrations specially made for binding in books.	..	Free	..	..	..
45 (2)	Prints, Engravings and Pictures (including photographs and picture post cards) on paper or cardboard.†	Revenue	50 per cent <i>ad valorem</i> .	..	..	..

* Under Government of India, Finance Department (Central Revenues), Notification No. 33, dated the 22nd June, 1935, as amended, subject to the proviso that the goods are not imported from outside India, within which travel is to be stimulated and are not primarily intended to advertise the services of any private tourist agency, are exempt from payment of import duty.

† Under Government of India, Finance Department (Central Revenues), Notification No. 33, dated the 22nd June, 1935, wall picture and diagrams such as are ordinarily used for instructional purposes are exempt from payment of import duty.

12. Such in outline has been the course of events affecting the Paper industry since protection was first granted in 1925. We shall next proceed to consider the progress of paper industry made by the industry since 1930-31 as shown in the following Table:—

CHAPTER I.

TABLE I.

Year.	No. of mills working.	QUANTITY OF PULP USED.				PAPER INCLUDING BOARDS BUT EXCLUDING OLD NEWSPAPERS, OTHER KINDS OF PAPER AND NEWS-PRINTING PAPER.						Grand Total.
		Indi- genous.	Per cent.	Imported.	Per cent.	Indian.			Imported.			
						Protected.	Not pro- tected.	Total.	Protected.	Not pro- tected.	Total.	
1931-32	8	17,571	46.67	20,081	53.33	35,738	1,820	40,558	12,393	29,781	42,177	82,735
1932-33	8	17,718	45.26	21,434	54.74	35,370	4,847	40,217	11,490	43,992	57,082	97,299
1933-34	8	21,867	52.21	20,016	47.79	38,151	5,507	43,658	13,005	37,378	50,383	94,041
1934-35	8	23,126	53.95	19,757	46.05	40,084	4,517	44,601	11,163	44,789	55,952	100,553
1935-36	9	30,288	61.57	18,615	38.43	42,839	5,260	48,099	12,096	59,096	71,192	119,291
1936-37	9	35,374	70.82	10,976	23.68	43,364	5,167	48,531	11,840	53,283	85,123	113,654

A new mill named the Gujrat Paper Mills, Limited, situated near Ahmedabad began manufacture in 1935-36. The Punjab Paper Mills Company which was in liquidation in 1931 was taken over by a new company and restarted manufacture in April, 1937, under the name of Shree Gopal Paper Mills, Limited. On the other hand, the Andhra Paper Mills which manufactured a small quantity of paper in 1930-31, ceased to work and is now in process of reconstruction.

Thus the number of mills actually working in 1937-38 was 10. There has been no marked increase in the paper making capacity of the mills, but, except in 1932-33, there has been a steady improvement in the total output. The increase in manufacture is most marked in the case of printing paper. The output of writing paper has fluctuated to some extent but has slightly increased since 1931. In the case of other classes of paper there have been variations in the quantities manufactured from year to year, but no considerable increase except Badami paper.

13. The most important change that has occurred since 1930-31 is the increase in the production of indigenous pulp as compared with the quantity of foreign pulp imported. Progress in the production of indigenous pulp. The quantity of bamboo pulp used has increased in six years from 5,228 tons to 19,281 tons; of grass pulp, from 9,049 to 11,510 and of pulp made from other indigenous materials from 5,992 to 7,919. On the other hand the quantity of imported pulp used has decreased from 20,081 tons to 10,976 tons in the same period.

The increased use of indigenous pulp is due in part to improvements in the processes of manufacture, but mainly to the stimulus given to internal production by the imposition of the protective duty of Rs. 45 per ton (increased by the revenue surcharge to Rs. 56.4 per ton) following the recommendation of the Tariff Board of 1931 which considered the duty necessary to 'make it worthwhile for a paper mill to manufacture the pulp it requires from bamboo rather than to import pulp'. The object of the duty may be considered to have been in some measure fulfilled. Incidentally the imposition of the duty and the recent rise in the price of imported pulp have forced mills, who do not make pulp from bamboo or grass, to use increased quantities of other indigenous materials such as waste paper, rags and hemp.

14. Important new developments in the industry are now in progress. Apart from the reconditioning of two mills which had ceased manufacture, four new mills are under construction and expect to begin manufacture before the end of 1938. Three of them propose to use bamboo or bamboo and grass as their principal material for the manufacture of pulp, one in Orissa, one in Bihar and the third in Mysore State. The fourth mill, located at Saharanpur in the United Provinces, will use grass only. One of

the new mills is designed to manufacture 'kraft' wrapping paper, an interesting new departure. Other paper mill projects are, we understand, under consideration, but have not advanced far enough to enable us to forecast which of them is likely to materialise as a concrete scheme, except a company in Hyderabad State which, we are informed, is likely to be floated before the end of 1938.

CHAPTER II.

Raw Materials.

15. The raw materials of the Paper making Industry have been classified by previous Tariff Boards under the two main heads of

Primary and auxiliary materials. (a) primary materials, *i.e.*, the materials out of which pulp is made, such as bamboo, grass, waste paper and rags, and (b) auxiliary materials, *i.e.*, the chemicals and other materials used in the preparation of pulp and the manufacture of finished paper. We propose to follow the same classification.

(i) Primary materials.

16. (a) *Bamboo* — Both the Tariff Board of 1925 and the Tariff Board of 1931 found that the supplies of bamboo in areas where the other conditions were favourable for exploitation were sufficient to meet the needs of all the paper mills in India and to leave a surplus from which an export trade in pulp could be developed. Apart from Assam and Chittagong, seven areas were specified as having been subjected to regular survey, one in Orissa, two in Madras and one in Bombay, from which the estimated yield of bamboo was 291,000 tons, and three in Burma from which the estimated yield was 1,661,000 tons. The following Table shows the estimated quantities of bamboo available in seven provinces and two Indian States in India. No estimate of the quantity available in Burma is available beyond that given in 1931.

TABLE II.

Province.	Tons.	Predominant species.
I. Bengal —		
Chittagong Hill Tracts Kasalong Reserve.	100,000*	<i>Melocanna bambusoides</i> and other species.
II. Assam —		
(a) Cachar Division . . .	10,000	} <i>Melocanna bambusoides</i> .
(b) Sylhet Division . . .	20,900	
III. Bihar —		
Palamou Division . . .	9,000	<i>Dendrocalamus strictus</i> .
IV. Orissa —		
(a) Sambalpur Division . . .	26,154	<i>Dendrocalamus strictus</i> .
(b) Barpahal Division . . .	24,271	Iditto.
(c) Angul Division . . .	18,000	Iditto.
(d) Puri Division . . .	..	<i>Bambusa arundinacea</i> .
(e) Ganjam Division . . .	3,000	<i>Dendrocalamus strictus</i> .

* Old estimates.

(11)

TABLE II—contd.

Province.	Tons.	Predominant species.
V. Madras--		
(a) Reckapalli Hills (Upper Godavari Division).	20,957	<i>Dendrocalamus strictus</i> .
(b) Papikonda Reserve (Lower Godavari).	5,710	Ditto.
(c) Ramapuram Range (Kollegal) .	17,000	Ditto
(d) Papanasani Forests (Tinnevely)	25,000	<i>Ochlandra brandisii</i> .
VI. Bombay--		
(a) Dangs (Surat)	10,000	<i>Dendrocalamus strictus</i> .
(b) Kanara	145,000*	Ditto.
VII. Central Provinces--		
Raipur, Balaghat, Chanda, Nagpur, Wardha, Seoni, Bhandara, Melghat, Nimar, Betul, Bilaspur and Saugor Divisions.	27,545	<i>Dendrocalamus strictus</i> .
VIII. Hyderabad State	25,000	Ditto.
IX. Travancore State	25,000	<i>Ochlandra brandisii</i> .
X. Mysore State	50,000 50,000	<i>Dendrocalamus strictus</i> . <i>Bambusa arundinacea</i> .
TOTAL .	612,537	

* Old estimates

It will be observed that the quantity of bamboo available from surveyed areas in India exceeds 600,000 tons against an estimate of 291,000 tons in 1930-31. Additional supplies are obtainable from unsurveyed areas for which no estimates are available. Assuming that 2-38 tons of bamboo on an average are required to make a ton of paper, the quantity of bamboo at present required by mills is about 40,000 tons. There is, therefore, an ample margin of reserve supply available for an extension of bamboo pulp manufacture. In Burma, where supplies of bamboo are even more abundant, no paper mills have as yet been established.

The advantage of bamboo as a raw material in comparison with wood is that the cutting rotation is on average 4 years as against 60 years for most species of wood. A disadvantage is that when bamboos seed, they die, and in any given area the supply may be curtailed for a period of 10 years. Bamboos seed 'gregariously' or 'sporadically' and the degree of sporadic seeding varies. Recent investigations indicate that the seeding of bamboos is more gradual than was at one time thought and does not extend to all species simultaneously. Further, the dead bamboo stems remain suitable for the manufacture of pulp for a considerable time which tests have proved to be at least four years. The danger of a shortage of bamboo in any given area in consequence of seeding is not, therefore, considered serious.

The following species have been tested and found suitable for the manufacture of pulp:—

1. *Dendrocalamus strictus* (salia).
2. *Melocanna bambudoides* (muli).
3. *Ochlandra brandisii* (eta).
4. *Bambusa arundinacea* (daba).
5. *Bambusa polymorpha* (kyanthaungwa).
6. *Cephalostachyum pergracile* (tinwa).
7. *Dendrocalamus hamiltonii* (kokwa).
8. *Dendrocalamus longispathus* (orah).
9. *Bambusa tulda* (mitenga).
10. *Teinostachyum dulooa* (dolu).
11. *Orytenanthera auriculata* (kaliserri).
12. *Orytenanthera nigrociliata* (bolangi).

The 'eta' reed is considered the best. It is at present used by only one small mill in Travancore State, but there are possibilities of its use in the adjoining areas of Madras in connection with a new Hydro-electric scheme. There are variations in the yield of pulp from the other species, but the differences are not so great as to call for special mention.

Excluding the mill in Travancore, there are at present four mills making pulp from bamboo in Bengal. Their supplies of bamboo are drawn from Bengal, Assam, Bihar and Orissa. Two mills, in order to reduce the cost of transport, are obtaining increased supplies from Bengal itself; the bamboos are slightly inferior in quality, but their use is justified by their comparative cheapness. There appears to us to be a danger that in time these local supplies may be cut out, since there is no systematic regeneration of the felled areas. Some propaganda work by means of leaflets has been carried out with the assistance of the Provincial Government to encourage the planting of bamboo by ordinary cultivators, the results of which are still to be known. As estimate supplied by the Forest Research Institute, Dehra Dun, suggests that the prospects of growing bamboo as a commercial crop are doubtful, but the question, in our opinion, is important enough to deserve much fuller investigation. Supplies are, in the opinion of the mills, adequate for the requirements of both established and new mills, but the increased demand may necessitate the tapping of more distant areas. At present the areas which mills have been able to obtain on lease appear to be adequate, and with systematic regeneration on approved lines no shortage of supply need be feared. Supplies are obtained partly from contractors and partly by departmental working.

17. The Tariff Board of 1925 expected that the cost per ton of air dry bamboo would not fall below Rs. 40 per ton. In 1931 the cost was estimated at Rs. 38 per ton. Price of raw bamboo. air dry for the purpose of calculating the cost of manufacture of bamboo pulp. The

four mills now using bamboo have been able to obtain their supplies at prices between Rs. 14-11 and Rs. 22 per ton delivered at mill. They regard their present costs as the lowest they are likely to reach, because the increased demand may ultimately force them to go further afield for their supplies, thus increasing the cost of delivery at mill. New mills, favourably located for the supply of bamboo, expect to obtain their requirements at prices ranging from Rs. 15 to Rs. 17 per ton delivered at mill and, in one case, at a special concession rate of Rs. 12, but they point out that the lower price of bamboo will be more than offset by the cost of coal and chemicals which have to be transported for long distances.

For the purpose of calculating the cost of manufacture we propose to take Rs. 17 per ton as a fair average figure for the cost of bamboos per ton delivered at mill.

18. (b) *Grass* is the second most important indigenous material used in India. The species hitherto used for the making of pulp is 'sabai' grass (*Pollinidium angustifolium*) which is grown mainly in the United Provinces, Bihar, Orissa and the Punjab. The available supply was estimated by the Tariff Board of 1931 at 50,000 tons per annum, apart from a considerable quantity in Nepal, no estimate of which was available. Among other species so far tested are munj (*Saccharum punja*), ulla (*Anthistiria gigantea*), dab (*Desmostachya cynosuroides*), bulwa (*Eragrostis elegantula*), khar (*Vetiveria zizanioides*), kans (*Saccharum spontaneum*) and botha (*Andropogon schoenanthus*), but none of them have so far been used on a commercial scale. 'Ulla' is considered the most promising, but experiments conducted at the Forest Research Institute so far have given conflicting results on its pulp yield. Two mills are at present experimenting on its use but the results are not yet available. It is hoped that if it is found suitable, any deficiency in pulp yield will be compensated by its comparative cheapness in price, large quantities being available within reasonable distances and little demand existing for its use for other purposes.

At the time of the 1931 enquiry, three mills in Bengal were using grass as their principal raw material. One of these mills is now using bamboo only and the other two partly bamboo and partly grass. Their requirements for grass have thus been considerably reduced and can be met from Bihar and Orissa without the necessity of going so far afield as the United Provinces or Nepal. One mill has succeeded in reconditioning the area under its control in Bihar and so materially improving the supply from 64,000 to 320,000 maunds. Both mills are satisfied that sufficient quantities of grass will be available to meet their requirements even if any of the new mills use grass in addition to bamboo, which is as yet uncertain.

The supply of grass available in the United Provinces is now available for the grass mills located in this area. One established mill which until recently was using considerable quantities of imported pulp, is now concentrating on the use of grass and has

considerably increased its requirements from the Eastern Circle. A reconstructed mill located in the Punjab on the borders of the United Provinces hoped to obtain its supplies from the Western Circle of the United Provinces and from the Punjab States. But it happens that a new mill under construction at Saharanpur in close proximity has obtained the lease of the grass area in the Western Circle. The Punjab mill is therefore, forced to obtain the bulk of its supplies from Nepal at a distance of nearly 500 miles, the cost of transport of which is consequently high. The Government of the United Provinces doubt if the supply of grass in the Western Circle will prove adequate for two mills, the supplies in the Eastern Circle being required for the mill located at Lucknow. If, however, the experiments in the use of 'ulla' grass prove successful, the situation will be considerably improved. Further, we understand that a proposal is under consideration for the systematic planting of sabai grass in waste lands to meet the increased demand. Experiments by the Forest Department in the Kheri district have shown that sabai grass can be grown profitably as a commercial crop on land which would otherwise be waste. Expenditure in the first year is estimated at Rs. 49 per acre and Rs. 5 per acre in the second and subsequent years, representing the cost of weeding. In favourable years yields of 64 maunds an acre have been obtained in an area of 60 acres. Taking 50 maunds per acre as an average yield and a price of Re. 1 to Re. 1.8 per maund, it is estimated that costs should be recovered in the fourth or fifth year and a net return of Rs. 12 to Rs. 15 per acre obtained in subsequent years.

19. The Tariff Board of 1925 estimated that the cost of grass delivered at mill would not fall below Rs. 50 per ton. By 1931 the cost had been reduced slightly below this figure. The cost given by mills varies from Rs. 32 to Rs. 39 per ton delivered at mill. The average figure is Rs. 35 per ton which we consider reasonable and not likely to be further reduced, taking into account the increased competition for the available supply in the United Provinces. Since the suitability of other grasses has yet to be proved, it would be unsafe to forecast any reduction in cost by their use as supplementary to sabai grass.

In considering the availability of sufficient quantities of raw material for the manufacture of pulp we are in agreement with the view of the Tariff Board of 1931 that no distinction need be drawn between bamboo and grass, bamboo being itself a species of grass. Bamboo is the principal material on which the future of the Paper industry mainly depends, but grass as a constituent of paper has a recognised value and will continue to be used in conjunction with other materials as a necessary ingredient in the manufacture of certain classes of paper for which special bulk or tensile strength is required, just as Esparto grass is used by a particular class of mills in the United Kingdom. It is probable that, with improvement in the quality of bamboo pulp, mills which

can obtain supplies of both bamboo and grass, will to some extent substitute bamboo pulp for grass pulp on account of its relative cheapness. But in the United Provinces and the Punjab, where adequate supplies of bamboo are not available, grass will continue to be chief raw material. In our opinion there is a definite place for both bamboo and grass mills and we see no reason why grass mills should be unable to operate economically allowing for the fact that there is a demand for paper manufactured mainly from grass.

20. (c) *Subsidiary materials*.—(1) Waste paper and paper cuttings are used as an ingredient in the manufacture of cheaper classes of paper to a small extent by bamboo and grass mills and to a greater extent by other mills. The quantity used was 5,908

tons in 1936-37. Supplies are obtained by mills through contractors mainly from large towns where sufficient quantities are available for the collection of different qualities. White paper and paper cuttings are in most requirement. Coloured papers are sorted out from the white and used for the manufacture of inferior papers such as badami and brown packing. The price of waste paper varies generally from Rs. 32 to Rs. 75 per ton for inferior qualities and from Rs. 80 to Rs. 150 per ton for superior qualities delivered at mill.

(2) Pulp made from rags, mill cuttings, tailors' cuttings, hemp rope, jute, old gunny bags and waste material from textile mills is used in the manufacture of some qualities of paper. The quantity used in 1936-37 was 8,868 tons. Supplies of rags are obtained usually through contractors. Rags are obtained in three or four different qualities of which tailors' cuttings are the best. The material is sorted according to quality, the better kinds being used as an admixture in pulp for the manufacture of superior classes of paper. The lowest price of old rags white or coloured is from Rs. 30 to Rs. 80 per ton. Better qualities sell at from Rs. 120 to Rs. 240 per ton and the price of bleached new tailors' cuttings may sometimes exceed Rs. 300 per ton delivered at mill. The price of old hemp rope is given at Rs. 45 to Rs. 55 per ton, but better qualities fetch as much as Rs. 110 per ton delivered at mill. Old gunny bags can be bought at prices varying from Rs. 15 to Rs. 38 per ton delivered at mill.

Rags and hemp rope and other paper making materials are sometimes exported, mainly from Bombay and Calcutta: exports in 1936-37 were 1,604 tons, offset by an import of 306 tons admitted duty free.

These subsidiary materials have not hitherto received as much attention as they deserve. In the United Kingdom and other foreign countries wastepaper, rags, etc., are a raw material of great importance to some classes of mills. The collection of the material is a highly organised business. There is a large range of recognised qualities for which regular price quotations are published.

The demand for wastepaper, rags and similar material is likely to increase in India with the opening of new mills. Competition for the available supplies will become keener and prices may be expected to rise. As the trade becomes more highly organised, the collection and sorting of the material according to quality may be expected to provide a not inconsiderable amount of employment for the poorer classes of the population especially in large towns from which the bulk of the supplies will be drawn.

21. (d) *Wood*.—In most countries which make pulp, wood of the coniferous variety is the principal material used. In India forests of coniferous trees—pine, spruce and fir—are available in the Himalayas, but difficulty of extraction and lack of transport facilities, have hitherto stood in the way of the utilisation of wood for the manufacture of chemical pulp. It is doubtful if use can be made of spruce and fir on account of the inaccessibility of the areas in which they grow except in Kashmir State. The possibilities of using pine wood are more promising. We understand that a proposal for the erection of a mill using pine and silver fir wood from Kashmir State is under consideration, a new development which may prove of considerable importance.

It has also been suggested that hard woods of the broad leaved species can be used for the manufacture of mechanical pulp. 17 varieties, which are believed to be available in sufficient quantities, have been selected for trial in a small experimental plant recently put up in the Forest Research Institute at Dehra Dun. At the time of our inspection of the Institute mechanical pulp was in actual process of manufacture from pine wood (*pinus longifolia*), but testing was still in the experimental stage.

22. (e) *Other materials*.—Bagasse, the fibre of sugarcane remaining over after crushing, is at present used as fuel in sugarcane factories. It is used in America as material for the manufacture of boards and wrapping paper and has recently been put on the 'free' list for import into the United Kingdom. Tests are in progress at the Forest Research Institute, Dehra Dun, as to its suitability for the manufacture of insulation and press boards in a recently installed experimental plant. Other fibres tested at the Institute are linseed, straw and sun-hemp sticks for the manufacture of strawboards, and flax tow for the manufacture of better classes of paper, but none have as yet been tried by paper mills.

23. (f) *Imported pulp*.—The question of the use of imported pulp by Indian paper mills was considered at length by the Tariff Board of 1925 and 1931. The criticism was made that if it was necessary to import so large an amount of raw material, the claim of the industry for protection on the criteria laid down by the Fiscal Commission was considerably weakened. The contention of the mills was, firstly, that some quantity of imported pulp was essential for the manu-

ufacture of certain classes of paper, and secondly, that it was necessary to keep a reserve of imported pulp as a stand by in case of a shortage of indigenous material or a breakdown in pulp manufacturing plant.

Wood pulp is imported either as bleached pulp ready for admixture with bleached indigenous pulp or as unbleached pulp which requires bleaching along with other material. The chief qualities imported are bleached sulphite pulp, and easy bleaching and unbleached strong sulphite. Small quantities of special kinds of pulp such as aspen and kraft pulp are imported for special lines of paper. One mill imported a small quantity of mechanical pulp as an experiment, but found its use uneconomical.

The following Tables show (1) the total quantities of pulp made from indigenous materials and of imported pulp in each year from 1931-32, (2) the quantities and proportions of different kinds of pulp used by companies in each year from 1931-32 so far as available:—

TABLE III.—*Quantities of pulp made from indigenous materials and of imported pulp used.*

Years.	Bamboo pulp used.	Grass pulp used.	Pulp of other indigenous materials used.	Total.	Imported pulp used.
	Tons.	Tons.	Tons.	Tons.	Tons.
1931-32	5,228	9,049	3,291	17,571	20,081
1932-33	5,429	9,632	2,657	17,718	21,121
1933-34	6,721	11,377	3,769	21,867	20,016
1934-35	9,225	11,340	2,561	23,126	19,731
1935-36	14,441	12,280	3,507	30,288	16,615
1936-37	19,281	11,510	4,583	35,374	10,976

TABLE IV.—*Statement showing the quantities of different kinds of pulps used in Indian Mills from 1931-32 and the percentage of each to the total quantity of pulp used.*

	Bamboo pulp.	Grass pulp.	Pulp of other indigenous materials.	Per cent.	Imported Pulp.	Per cent.
	Tons.	Tons.	Tons.		Tons.	
1. 'A' Mill—						
1931-32	2,515	41,533	..	..	3,541	58.47
1932-33	2,478	42,773	..	..	3,188	56.27
1933-34	2,352	42,310	..	..	3,198	57.90
1934-35	3,168	53,115	..	..	2,792	46.85
1935-36	4,747	70,497	..	..	1,942	29.03
1936-37	4,834	71,609	..	..	1,909	28.31
2. 'B' Mill—						
1931-32	118	1,223	633	6.59	5,544	57.75
1932-33	129	1,417	815	7.40	5,562	50.52
1933-34	92	1,084	832	7.63	4,415	40.48
1934-35	267	2,247	573	5.30	4,197	38.79
1935-36	2,289	19,394	1,090	9.50	1,894	16.50
1936-37	2,947	25,536	1,239	10.80	1,152	9.80
3. 'C' and 'D' Mills—						
1931-32	2,595	5,743	280	1.57	9,277	51.84
1932-33	2,822	5,128	327	1.90	10,144	55.70
1933-34	4,302	28,773	539	2.06	9,570	47.33
1934-35	5,790	35,557	218	1.03	9,518	45.15
1935-36	7,406	40,076	191	0.55	10,096	42.58
1936-37	11,500	55,230	217	0.45	5,984	26.09
4. 'E' Mill—						
1931-32	..	..	2,381*	96.43	252	9.57
1932-33	..	..	1,985*	80.23	366	19.77
1933-34	..	..	2,908*	68.00	1,125	32.00
1934-35	..	..	2,770*	51.98	1,635	48.02
1935-36	..	..	2,346*	68.06	1,109	31.94
1936-37	..	..	2,559*	78.21	713	21.79
5. 'F' Mill—						
1931-32	..	..	..	No figures available.	..	..
1932-33	..	..	..	..	..	..
1933-34	..	..	..	..	..	..
1934-35	..	..	..	..	..	..
1935-36	..	..	..	..	..	..
1936-37	..	..	..	..	..	..

* Including grass.

The reduction in the use of imported pulp is marked in the case of all established companies but one. This company increased its proportion of imported pulp in the period 1931-32 to 1936-37 owing to difficulties in its grass pulp plant. These difficulties have been overcome and in 1937-38 the company reduced the use of imported pulp to small proportions. We are informed that other companies have made further reductions in the use of imported pulp in 1937-38. Owing to the high price of imported pulp, companies which do not manufacture bamboo or grass pulp have used increased quantities of rags, wastepaper and other subsidiary materials. The total quantity imported fell to below 10,000 tons.

24. The following Table shows the average price paid for Price of imported different qualities of imported pulp in each year from 1931-32:—

TABLE V.—*C.i.f. prices per ton of imported pulp.*

Quality of pulp.	1931-32 c.i.f. price per ton.	1932-33 c.i.f. price per ton.	1933-34 c.i.f. price per ton.	1934-35 c.i.f. price per ton.	1935-36 c.i.f. price per ton.	1936-37 c.i.f. price per ton.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Easy Bleaching Sulphite	10 4 2 to 13 9 1	9 1 0 to 12 8 11	8 11 9 to 10 19 2	9 5 2 to 10 2 4	8 14 4 to 10 6 6	9 4 0 to 10 0 7
Strong Sulphite	10 2 6 to 12 8 7	8 12 6 to 11 7 9	8 5 0 to 10 9 1	8 19 4 to 9 9 1	8 13 6 to 10 4 10	8 18 4 to 9 8 10
Bleached Sulphite	12 10 0 to 14 9 11	12 2 6 to 14 16 6	11 6 3 to 14 9 10	10 15 0 to 12 8 9	10 17 3 to 12 7 7	11 18 4 to 12 14 9
Unbleached Sulphite	9 13 9	8 11 0	8 11 10	9 8 1	8 10 0	8 13 9

The imposition of the protective duty of Rs. 45 per ton recommended by the Tariff Board of 1931, increased by the revenue surcharge to Rs. 56.4 per ton, has proved effective in attaining the object in view, which was to force mills to increase the production of pulp from indigenous materials and gradually restrict the use of imported pulp. Raw material in the form of bamboo, grass and subsidiary materials is available in sufficient quantities for the requirements of mills in existence or projected and there are possibilities of bringing into use chemical or mechanical pulp made from wood.

In the following Chapter we shall consider how far the indigenous materials in use have proved satisfactory and economical in the manufacture of paper and to what extent it is still necessary for mills to rely on supplies of imported pulp.

(ii) *Auxiliary materials.*

25. Auxiliary materials consist of the chemicals required for the processes of manufacture of pulp, of the bleaching materials required in the bleaching process and of the chemical and other materials required in the conversion of pulp into paper consisting of 'loading' and 'sizing' materials. A list of the materials used is given in Appendix 'A'.

The principal Indian materials in use are Magnesite, Lime, China Clay, Rosin and Alum. The principal materials which are imported are Sulphur, Caustic Soda, Soda Ash, Saltecake, Bleaching Powder and Dyes.

The following Table shows the total quantities of Indian and imported auxiliary materials used from 1931-32:—

TABLE VI.—*Total quantities of Indian and imported auxiliary materials used.*

Year.	Indian. Tons.	Imported. Tons.
1931-32	13,347	6,947
1932-33	14,320	6,566
1933-34	16,081	9,046
1934-35	16,495	8,170
1935-36	19,433	9,938
1936-37	21,221	11,998

Though the total quantity of Indian material used has increased, the proportion to imported material has remained much the same.

It is agreed that there has been an improvement in the quality of most Indian materials used which are regarded as, on the whole, satisfactory, if not always equal in all respects to similar imported materials. There appears to be no probability of the replacement of some imported materials such as sulphur and dyes, which are not available in India, but the quantity of these materials used is inconsiderable. In regard to bleaching materials, one company is manufacturing its own bleach partly from Indian material and other companies could do the same. A company has recently been floated for the manufacture of caustic soda and chlorine near Calcutta with the special object of supplying Indian paper mills. Soda ash will also be manufactured by the company at a second factory in Northern India. Another company is, we understand, likely to manufacture caustic soda and bleaching powder in South India. For this reason paper mills are hesitant about the erection of bleach making electrolytic plant, as it may prove more economical to purchase in India from the new companies. When these companies are in a position to produce, it may be expected that the imports of the materials they are able to supply will decrease.

26. Our general conclusion as to the availability of sufficient quantities of raw material for the industry is in agreement with the conclusions of the Tariff Boards of 1925 and 1931, that the supply of bamboo is adequate for both present and future requirements. The supply of 'sabai' grass for mills operating in North India is at present limited but is capable of improvement, and the possibilities of utilizing other kinds of grass have not as yet been adequately explored. In any case, though grass is a useful material in the production of some classes

of paper where bulk and tensile strength are desirable, it cannot be considered a raw material indispensable to the development of the industry. No estimate can be formed of the supplies of wastepaper, rags and other subsidiary raw materials, but with an increased demand due to the opening of new mills it seems probable that the business of collecting waste material may develop on the lines of wastepaper and rag industries in the United Kingdom and foreign countries and so increase the available supply of material which would otherwise be treated as waste.

The imposition of the protective duty on imported wood pulp has had the effect of reducing its use by 44.9 per cent. in comparison with 1930-31 and a further reduction seems probable with the development and improvement of bamboo and grass pulp producing plants. As regards auxiliary materials consisting mainly of chemicals, the use of Indian materials has increased by 59 per cent. in the period 1931-32 to 1936-37 and is capable of further expansion, so soon as newly formed chemical companies begin the production of material not at present available in India.

The first condition laid down by the Fiscal Commission for the grant of protection to the Industry may therefore be considered to have been fulfilled, an abundant supply of raw material sufficient to meet the requirements of internal consumption for all classes of paper except those made from mechanical pulp. The suitability of Indian varieties of trees other than pine and spruce or fir for the manufacture of mechanical pulp has yet to be proved. Nor can we be certain that if they are found to be suitable they will be available in sufficient quantities in concentrated areas to justify the erection of mills for the manufacture of mechanical pulp. We doubt if the spruce and fir available in the Himalayas can be utilised on a commercial basis on account of their inaccessibility except in Kashmir State. The possibilities of the manufacture of pulp from pine are more promising, though the quantity available in accessible areas is confined to the United Provinces.

But even if the Indian industry is unable to meet the demand for cheap classes of paper made from mechanical pulp, the remaining classes of paper, the total demand for which may be estimated at 90,000 tons, constitutes a wide enough field for the development of an industry sufficiently large to be considered of national importance.

27. We have also considered the question of the establishment of an export trade in bamboo pulp. So far the question has not assumed any practical importance because

Possibility of export mills have not been able to produce sufficient or pulp.

pulp to meet their own requirements, and until 1937 the price at which chemical wood pulp was available in the world market rendered competition impracticable. The position is now changed. A material reduction has been made in the cost of production of bamboo pulp and the world prices of pulp have risen to a level at which there is a possibility of bamboo pulp entering the world market. A company in Trinidad is already

producing such pulp for export to the United Kingdom, and though it is too early to judge of its success, since it has been operating for less than a year, the fact of its existence is significant. If Indian bamboo pulp can be produced sufficiently cheaply to compete with chemical wood pulp, a market for it may be found in Australia, New Zealand and Japan, all of which countries import considerable quantities of chemical pulp, even if export to Europe is found to be impracticable. If pulp is to be exported, it will have to be dried and pressed into sheets, the form in which imported pulp is received. The cost of treatment has been roughly estimated at Rs. 20 a ton.

CHAPTER III.

Manufacture.

28. At the time of the Tariff Board enquiry in 1931 the manufacture of pulp from bamboo, on which the question of protection for the Paper Industry mainly depended, cannot be considered to have emerged from the experimental stage. The Board, for want of other information, had to base the estimate of the costs of manufacture on the experience of a single mill, the India Paper Pulp Company located at Naihati near Calcutta. The position has now changed. In addition to the India Paper Pulp Company, the Titaghur Paper Mills Company is manufacturing bamboo pulp at both its mills and the Bengal Paper Mill Company is using a proportion of bamboo pulp in addition to grass. We are, therefore, now in a position to make a comparison of cost and to arrive at an estimate of what the cost should be in a representative mill of an average capacity.

Another important development is that while previous Tariff Boards have found that paper could be made from bamboo pulp without the admixture of wood pulp, imported wood pulp was up till 1931 the most important ingredient in paper manufactured by Indian mills. In the India Paper Pulp Mill, the quantity of bamboo pulp used was less than half the quantity of imported pulp. As a result partly of improvements in the process of manufacture of bamboo pulp, but mainly of the imposition of a protective duty of Rs. 45 per ton on imported pulp (increased by the revenue surcharge to Rs. 56.4 per ton) the proportion of imported wood pulp used has been very considerably reduced. Bamboo may now be considered the staple material out of which Indian paper is made. Grass pulp is made in two mills in addition to bamboo pulp and is the principal material used by two other mills. Other subsidiary indigenous materials such as rags and wastepaper are used to some extent by all the mills and to a large extent by two mills which do not make bamboo or grass pulp. In short the bulk of the pulp required by mills is made from bamboo or grass pulp supplemented by other indigenous materials and imported pulp is no longer essential in the sense that ordinary printing and writing paper cannot be made without its admixture.

The following comparative Table shows the progress made since 1931-32 by the three principal Companies who manufacture paper from bamboo or bamboo mixed with grass:—

TABLE VII.

	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1936-37.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
" A " Mill—						
Bamboo pulp .	41.53	43.73	42.10	53.15	70.97	71.69
Imported pulp .	58.47	56.27	57.90	46.85	29.03	28.31

(24)

TABLE VII—contd.

	1931-32.	1932-33.	1933-34.	1934-35.	1935-36.	1936-37.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
" B " Mill—						
Bamboo pulp .	1.23	1.17	0.84	2.47	19.94	25.30
Grass pulp .	34.43	40.91	51.05	53.44	54.06	52.92
Pulp of other indigenous material .	6.59	7.49	7.63	5.39	9.50	10.89
Imported pulp .	57.75	50.52	40.48	38.79	16.50	9.89
" C " & " D " Mills—						
Bamboo pulp .	14.50	15.05	21.28	27.46	31.24	50.15
Grass pulp .	32.09	27.35	28.73	26.36	25.63	22.81
Pulp of other indigenous material .	1.59	1.90	2.66	1.03	0.55	0.95
Imported pulp .	51.81	55.70	47.33	45.15	42.58	26.07

29. In the preceding Chapter we have dealt with the cost of raw material delivered at mill. We shall now proceed to consider Manufacture of pulp the cost of manufacture of pulp beginning from bamboo. with bamboo.

The first stage in manufacture is the crushing or chipping of the raw bamboo into a form suitable for the subsequent processes. This mechanical treatment is necessary in order to disintegrate the fibre and render it accessible to the chemical reagents employed in the process of digestion. The experience of the four mills, who at present manufacture pulp from bamboo, is that crushing in a series of rollers is more satisfactory than chipping the bamboo in chipping machines. One company which is at present using chipping machines is discarding them in favour of crushing machines. On the other hand, another mill which is in process of reconstruction proposes to continue the chipping method which it employed in 1931 with an improved type of chipper.

The next process is the digestion or cooking of the disintegrated fibre which is the chemical process by which the various substances other than cellulose are dissolved. These substances consist mainly of pectins and lignins in several forms. Two processes are in use which may be described as the acid process and the alkali process.

30. In the acid or sulphite process employed by one Company, the chemicals used in the preparation of the acid liquor are sulphur and magnesia which in combination form magnesia-sulphite. The acid liquor is pumped into the digesters loaded with the bamboo chips by the direct overhead method and the temperature slowly raised by the admission of steam under pressure. The digesters consist of a mild steel shell lined with acid resisting brick and are of different capacities. After the cooking is completed, the contents of the digester are blown off into a ' blow pit ' from which the spent liquor carrying the non-cellulose material is drained leaving the bamboo pulp behind. It is theoretically possible to

recover a proportion of the chemicals carried over in the relief gasses evolved from the digester, but no recovery plant has yet been installed on account of technical difficulties.

31. The alkali process may be subdivided into two, the soda process in which the principal chemical used is caustic soda, and the sulphate process, an improvement on the soda process, in which sodium sulphide is mixed with a small proportion of caustic soda. One mill only uses the soda process and is contemplating a change to the sulphate process.

The application of the chemicals used can be made in more than one way. The 'fractional' and the 'cascade' methods, descriptions of which are given in the Tariff Board Report of 1931, are those at present in use in India. The average total period of cooking is 14 to 15 hours including washing of the pulp.

The mills using the alkali process have special plants for the recovery of chemicals. The percentage of recovery effected has an important bearing on the cost of pulp manufacture.

32. After the digestion or cooking process is completed and the pulp drawn off from the digesters, the next stage is washing and straining to remove impurities. The pulp is then pumped into a concentrator where the water is extracted and the concentrated pulp passed to a storage chest ready for the process of bleaching.

One company has an electrolytic bleach making plant for the production of bleach. Other companies buy their bleaching material. The material is at present imported, but two companies, one in Bengal and another in Madras, have been formed for the manufacture of the chemicals required and are likely to be in operation within two years.

33. In comparing the cost figures put in by the four mills which at present manufacture bamboo pulp the difficulty arises that as the process of manufacture of pulp and paper is continuous many cost items are common to both. The allocation of proportions of common items such, for example, as power and fuel and overhead charges must necessarily be arbitrary and consequently is not precisely the same in all cases. There is the further difficulty that the four mills do not employ the same process of manufacture and use different proportions of raw material. If, for example, a mill uses a comparatively high proportion of wastepaper, the cost of production is decreased though the realised price will be lower. A comparison of costs must, therefore, be subject to reservations.

In 1924-25 the works cost of manufacture of one ton of air dry unbleached pulp based on the experience of one mill was Rs. 227.47. By 1930-31 this figure had been brought down to Rs. 196.65. The following Table shows the estimated works cost

of four mills as given by them for unbleached air dry pulp in 1936-37, the latest year for which complete figures are available:—

TABLE VIII.—*Unbleached air dry pulp.*

	A	B	C	D
	Rs.	Rs.	Rs.	Rs.
Works cost	133.45	105.79	127.563	126.181

The average of the four mills is Rs. 123 in round figures, a reduction of Rs. 73 per ton on the 1930-31 figure.

34. The estimated amounts spent on improvements relating to the manufacture of pulp since 1930-31 in round figures have been Rs. 10 lakhs by A mill, Rs. 11 lakhs by B mill, Rs. 12 lakhs by C mill and Rs. 14 lakhs by D. Mill.

The main improvements in A mill have been the installation of new strainers, new digesters and a complete new acid plant and important alterations to the power and water supply plants.

In B mill the expenditure incurred has been mainly on the development of the sulphate process of manufacture, the installation of a massively constructed crusher, new digesters, up-to-date strainers, bleaching towers and a sulphate recovery plant in addition to the improvement of power and water supply plants.

In C and D mills expenditure has been incurred mainly on the installation of the bamboo pulp plant, bamboo crushing and chipping machines, new digesters, strainers and bleaching towers and the extension of the Electrolytic Bleach Making Plant in C mill to meet the increased requirements of both mills. Important extensions and improvements in the power plant have also been effected to meet the requirements of increased production.

In the case of all four mills the additions and modifications of plant have necessitated extensions or alterations of buildings.

Apart from the reduction in the cost of raw material, various economies have been effected in the use of chemicals, power and fuel, labour and supervision and repairs and maintenance. But a final solution of the problem how bamboo pulp can be manufactured in the most satisfactory and economical manner for different qualities of paper has by no means been reached.

'A' Mill has installed an experimental digester for further experimental work on a semi-commercial scale. A new bamboo crusher in course of erection is expected to improve the disintegration of pulp and reduce the percentage of loss which at present is admittedly high, partly because the mill has been using up old stocks of bamboo. Improvements in the process of cooking and bleaching by new methods are also under consideration which it is hoped may result in economies in the expenditure on chemicals and the consumption of coal. An immediate saving in the cost of manufacture of Rs. 25 per ton is expected but a forecast of ultimate savings is at present difficult to make.

In the case of 'B' Mill, no special modifications of plant are in contemplation. The cost of manufacture is already relatively low and no further immediate savings are forecasted.

In 'C' Mill the eventual substitution of the sulphate for the soda process is expected to effect economy in manufacture. In both 'C' and 'D' mills the present 'recovery' plants are admitted inadequate and unsatisfactory and the percentage of recovery abnormally low in comparison with standard percentages. Probable savings in chemicals and in the consumption of coal are estimated to amount to Rs. 9.4 per ton. Deducting savings in the cost of manufacture expected from the rectification of admitted defects, the average cost of manufacture would amount to Rs. 111 per ton.

35. It is a matter of considerable difficulty to forecast what further reductions in the cost of manufacture are possible in the next few years. As regards raw material the cost has already been brought down to a level at which it will be difficult to effect further economies. Though the supplies of bamboo available are adequate for the requirements of existing mills in Bengal, the opening of new mills will increase the general demand for bamboo. There is no danger of a shortage, but it is possible that some mills may have to go further afield for part of their supplies as a result of which the cost of transport will increase. On the whole, we are inclined to doubt if any further reduction in the cost of raw material is possible.

On the question of power and fuel, it has been pointed out to us that the price of coal has increased by Rs. 2 to Rs. 3 per ton in 1937-38, and that the inevitable increase in the cost of power must raise the cost of production in spite of economies effected by electrification consequent on the installation of improved power plants. We have also been informed that the present tendency in the price of chemicals is in the upward direction. It should, however, be mentioned that the opening of two mills for the manufacture of material required for bleaching may in two or three years time enable mills, which at present buy their bleaching material from abroad, to obtain their supply more cheaply in India. It is, of course, impossible to say what the level of prices will be in the next few years. The present rise in the price of coal and chemicals may be only temporary, but it would be unsafe to forecast any reduction in price below the 1936-37 level.

As regards the question of general efficiency, it may be said on behalf of the mills that India has been the pioneer in the manufacture of bamboo pulp and has not had the advantage of the experience of other countries. The properties of bamboo as a raw material for the manufacture of pulp are not precisely the same as those of wood extracted from trees of the coniferous variety since bamboo is a species of grass and not a species of wood. Though the manufacture of bamboo pulp has emerged from the experimental stage, it has not yet reached the level of mechanical and chemical

efficiency attained in the manufacture of wood pulp based on the experience of many countries over a long period of time. From this point of view it may be said that the room for improvement in the manufacture of bamboo pulp of different qualities suitable for different kinds of paper is still considerable.

36. Taking together established mills and new mills who will use bamboo or grass as their raw material, 6,000 tons may be assumed to be the capacity of an average mill. In a mill of this capacity, assuming that Rs. 17 per ton is the cost of bamboo and that 2.27 tons of bamboo are required to make a ton of pulp, the works cost per ton of bamboo pulp may be estimated at Rs. 111.

We shall deal with the question of overhead charges in a later section. Assuming the capitalised value of a mill of 6,000 ton capacity in present conditions to be Rs. 680 per ton and allocating overhead charges in the proportion of 60 to the manufacture of pulp and 40 to the conversion of pulp into paper, as estimated by the three companies in a joint memorandum submitted to us, average overhead charges per ton of pulp may be taken to be Rs. 33. As thus calculated the total cost of air dry unbleached bamboo pulp may be estimated at Rs. 144 per ton.

37. Until comparatively recent years grass was the principal indigenous material from which pulp was manufactured in India and is still of definite importance. Two of the mills which now manufacture bamboo pulp continued in 1936-37 to manufacture pulp from grass in one case in the proportion of 2 to 1 and in the other case in equal proportions. Two other mills use grass as their principal indigenous material and a third mill has recently experimented in the manufacture on a small scale.

The grass is first dusted and then loaded into digesters. The process of digestion or cooking of grass is carried out in one operation at a constant pressure with sodium hydroxide either by the direct overhead or by the 'fractional' system. The pulp after digestion is broken up, strained, washed and bleached.

38. The works cost of manufacture per ton of air dry unbleached pulp was estimated to have fallen from Rs. 256.93 in 1924-25 to Rs. 156.97 in 1930-31 in the case of one mill and from Rs. 214.53 in 1924-25 to Rs. 183.84 in 1930-31 in the case of a second mill. The same two mills have supplied us with estimates of the cost of manufacture in 1936-37 amounting to Rs. 145 and Rs. 148 per ton respectively. These two mills use both grass and bamboo in the manufacture of paper. Two other mills which use grass only have supplied cost estimates. One mill, which has recently renovated its pulp plant, estimates the total cost of bleached pulp approximately at Rs. 208. Deducting the cost of bleaching the cost will be Rs. 184. The estimated cost of grass is high and should be capable of reduction. We do not think that its total cost should exceed that of the other two

mills. The second mill has given the total cost of bleached pulp as Rs. 251-13, but failed to supply us with details in time for our consideration. The estimate is so high in comparison with the estimates supplied by other mills, that we are unable to accept the figures.

Assuming that Rs. 35 per ton is the cost of grass and that 221 tons of grass are required to make a ton of pulp, the works cost per ton of unbleached grass pulp may be estimated at Rs. 140. Allowing Rs. 33 for overhead charges, the total cost of air dry unbleached grass pulp may be estimated at Rs. 173 per ton.

29. *Wastepaper and paper cuttings.*—Wastepaper and paper cuttings are used for admixture with other pulp for the manufacture of cheaper qualities of paper. The proportion used by mill varies according to the qualities of paper manufactured. In mills which use mainly bamboo or grass pulp the proportion per ton of paper made varies from below one per cent. to over 6 per cent. and has, on the whole, tended to increase slightly. In mills which do not use bamboo or grass pulp the proportion is higher.

The process of manufacture is to sort the paper by hand and pulp it in mechanical rotary pulpers. Heavily coloured papers are sometimes boiled in rotary digesters with a weak solution of caustic soda.

Rags (including lamp, jute and canvas).—The proportion of pulp made from rags in mills which use mainly bamboo and grass pulp is very small and is below one per cent. per ton of paper. The rags and similar materials are sorted, cut into small pieces and dusted. They are then boiled in rotary digesters in a caustic soda solution at a low pressure. After boiling the materials are washed and bleached.

No attempt has been made to estimate the cost of manufacture of pulp from the different subsidiary materials used in bamboo and grass mills. The quantity is so small that the allocation of general charges is a matter of difficulty. One mill, which manufactures paper mainly from rags and wastepaper, has estimated the works cost of bleached pulp made from rags at Rs. 198-66 per ton and the total cost including overheads at Rs. 229-37. These figures are comparatively high, because the cost of power and fuel at the mill is above the average, as it is unfavourably situated for the supply of coal. Improvements in the power plant and other alterations which have been carried out should enable the mill to manufacture more cheaply.

40. Having concluded our examination of the production of pulp from different raw materials, we pass to the manufacture of paper. Manufacture of paper from pulp. After completion of the process of bleaching, the bleached pulp is passed to the beating house. If imported bleached pulp is used, it is added at this stage. The process of beating is of great im-

portance since the quality of the paper made depends largely on the attainment of the correct degree of consistency in the pulp. The length of time required for beating depends on the nature of the material from which the pulp has been made. Speaking generally, the beating house plant in use at mills is old and somewhat out of date. Most mills are alive to this defect and are installing or about to instal more modern equipment with a larger capacity.

After beating the pulp is passed through the paper machine to emerge finally as paper. No special description of the final process is necessary as it is the same in all mills, though different types of machine are in use. Much of the machinery employed is comparatively old if not obsolescent, and improvement in the quality of paper is to some extent dependent on replacements by new and up to date plant. Two companies have recently installed new machines of the more modern type. Other companies have deferred replacing their machines pending the completion of the more urgent requirements of their pulp plant, but have the matter in view. Most mills have, however, effected a number of minor improvements such as the introduction of Bewoid sizing plants, calendering and super-calendering machines, new cutting and reeling machines, 'Guillotines' for trimming and splitting of paper in reams, and ruling machines. In the matter of power, the general tendency is to substitute electric drive for the machines, which should have the effect of improving efficiency. On the whole, mills must be considered not up to date in their paper making plant, but we realise that the first necessity was to concentrate on the extension and improvement of their pulp making plant, and that there was difficulty in carrying out improvements in all sections simultaneously.

41. In 1936-37 the costs of production of paper of the protected classes as given by the three principal companies were as follows:—

	TABLE IX.		
	A Mill.	B Mill.	C and D Mills.
	Rs.	Rs.	Rs.
Works cost	294-29	256-14	288-65
Overhead charges	77-51	72-52	70-13
Total	371-80	328-96	358-78

In a joint memorandum the three companies have given an estimate of the cost of production in an average bamboo mill as follows:—

	Rs.
Works cost of bleached pulp	140
Conversion	140
	280

Our estimate of the average cost of unbleached pulp is Rs. 111 per ton. Adding Rs. 20 as the cost of bleaching, the works cost of bleached pulp will be Rs. 131.

We accept Rs. 140 as a reasonable estimate of the cost of conversion which is lower than the figure taken by the Tariff Board of 1931. The 'spread' between the cost of pulp including overheads, and the final cost of paper does not seem to us excessive in comparison with the 'spread' in British or Continental mills, taking into consideration the fact that Indian mills manufacture a wider range of papers and losses are incurred in changing from the manufacture of one class of paper to another.

According to this calculation, Rs. 271 may be taken as the total works cost of finished paper in an average mill of 6,000 ton capacity. We desire to explain that the allotment of costs to the different stages of manufacture, pulp bleaching and conversion into paper is necessarily arbitrary, because the process of manufacture from raw bamboo to finished paper is continuous and an exact computation of cost items debitable to the different stages is not possible.

Overhead charges are calculated by the Companies on the basis of a capitalised value of Rs. 800 a ton, the figure adopted by the Tariff Board of 1931. In present conditions this estimate appears to us to be high. The capacity of established mills and mills under construction varies from over 11,000 tons to 3,000 tons per annum. A mill with a capacity of 6,000 tons may be considered an average mill. We have received varying estimates of what the block value of such a mill should be. Estimates supplied by the Companies who are constructing new mills, based largely on actual costs, have been of great assistance to us. On the information we have obtained we consider that the cost of construction of a fully equipped mill using the sulphate process, which is the process employed by two of the four established mills and the process which all new mills propose to use, may reasonably be estimated at Rs. 40-41 lakhs equivalent to Rs. 680 per ton in round figures.

42. In estimating the future works cost of an average mill we have first to determine what proportion of imported pulp is required in present conditions and what reduction in use of imported pulp is probable in the near future.

Foreign wood pulp is prepared by four different methods, one of which is mechanical and the other three chemical. Mechanical pulp is prepared by grinding wood of the coniferous variety under hydraulic pressure against the face of a revolving grindstone. The fibre is then washed and screened. 'Ground wood' thus produced contains all the wood substance, a part of which is not durable. The fibres are generally shorter and weaker than fibres prepared by the chemical process, having been broken in the process of manufacture. 'Ground wood' is used mixed with chemical fibres for newsprint, wall, cheap printing, manilla, tissue and wrap-

ping papers and for some kinds of boards. Mechanical pulp is not at present imported into India for use in mills.

The chemical processes are the sulphite, sulphate or kraft, and the soda, of which the sulphite and sulphate are the most important. The soda process is the oldest of the three processes, but has now been mainly superseded. Apart from its use for paper making, the best quality of bleached sulphite pulp is used in the manufacture of artificial silk. The sulphate or kraft process is a comparatively recent modification of the soda process, but has made a considerable advance in recent years.

For export purposes wood pulp is thickened sufficiently to allow it to be formed into sheets and folded into bundles or 'laps' which are pressed and baled by hydraulic process. The kinds of wood pulp most commonly imported in India are Easy Bleaching Sulphite wood pulp, Strong Bleachable sulphite wood pulp and bleached pulp. Special qualities of pulp such as aspen and kraft are imported in small quantities.

With the imposition of the protective duty on imported pulp and a reduction in the cost of indigenous pulp made from bamboo or grass, it has been more economical for mills to use indigenous pulp than imported pulp, but the pulp making capacity of mills has not hitherto been equal to their paper making capacity. Partly for this reason and partly because an admixture of imported pulp is considered at present necessary in the production of some classes of paper such as antiques, typewriting, and bank papers, all mills continue to use some quantity of imported pulp though the proportion has tended to decrease steadily. The quantity used in the four mills manufacturing paper from bamboo pulp or bamboo and grass pulp combined has fallen from 18,362 tons in 1931-32 to 9,045 tons in 1936-37 and to 7,608 tons in 1937-38.

There is general agreement among mills that there is room for further reduction in the use of imported pulp. One mill using bamboo and grass pulp as its main material had by 1936-37 reduced the proportion below 10 per cent. and made a further reduction in 1937-38. It is also agreed that, with further improvement in the quality of bamboo pulp, it should be possible ultimately to dispense with the use of imported pulp even in those qualities of paper for which an admixture of imported pulp is at present considered necessary.

There remains the question of how far it is necessary to keep a reserve of imported pulp as a stand-by in case of a temporary shortage of indigenous material or a breakdown of pulp making plant. We have examined mills on the question of the extent to which it is possible to keep a reserve of indigenous pulp against possible eventualities. So far they have not been able to manufacture pulp in excess of their requirements, so the matter has not, as yet, been seriously considered. It is thought that moist bamboo pulp might keep for a period of three months in good

condition, but would be likely to deteriorate if kept for a longer period. If pulp were required to be kept for long periods, the necessity would arise to dry and press it in the form in which foreign pulp is imported. No experiments have as yet been made on the keeping quality of bamboo pulp. The question, in our opinion, is deserving of investigation at the Forest Research Institute. For the present we must assume that a small reserve of imported pulp is still necessary as a stand-by.

The average proportion of imported pulp used by bamboo mills in 1937-38 did not exceed 20 per cent. By the end of a further period of protection this proportion should be reduced to 5 per cent. We shall assume an average of 12½ per cent. Other mills which use rags or waste paper as their main materials may require a higher proportion of imported pulp, but we do not consider ourselves justified in taking their requirements into consideration as the case for protection of the industry depends primarily on the use of bamboo and grass as raw material.

43. For the purpose of determining the protective duty on imported pulp the Tariff Board of 1931 took into consideration

the cost of manufacture of bamboo pulp by the India Paper Pulp Company which was at the time Rs. 196 per ton. As the cost of manufacture was considered high, a deduction of Rs. 10 per ton was made and Rs. 186 taken as a fair estimate of the works cost of manufacture. The cost of imported easy bleaching sulphite pulp was taken as £10 per ton c.i.f., Calcutta and on this basis a protective duty of Rs. 45 per ton was recommended. The cost of production of grass pulp was not taken into account, presumably because the cost of production of bamboo pulp was higher and, therefore, the protective duty proposed for bamboo pulp covered grass pulp as well.

The position is now changed. The cost of production of grass pulp is higher than the cost of production of bamboo pulp and consequently a protective duty based on the cost of production of bamboo pulp will not be sufficient to protect grass pulp. Assuming that some proportion of pulp other than bamboo pulp is necessary for the manufacture of paper, it is *prima facie* desirable that pulp made from indigenous raw materials, which cannot be utilised for any other purpose, should be used in preference to imported pulp. We, therefore, consider that we are justified in taking into consideration the cost of manufacture of grass pulp as well as bamboo pulp in determining the amount of protective duty required.

For the purpose of comparison between the cost of production of pulp and the price of imported pulp the correct criterion is not the works cost of production, but the total cost including overhead charges since the price of imported pulp includes both.

The following Table shows the course of prices of pulp from the beginning of 1936 till February 1938. These prices are c.i.f. prices

at ports in the United Kingdom and £1 a ton should be added for the freight to India to obtain the c.i.f. price Calcutta.

TABLE X.—Prices of pulp from January 1936—February 1938.

	Bleached Sulphate pulp.		Easy Bleaching Sulphate pulp.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
5th January 1936	10 0 0	10 15 0	7 15 0	8 0 0
21st February 1936	10 11 0	11 0 0	8 0 0	8 10 0
24th April 1936	11 10 0	12 0 0	8 10 0	8 12 0
5th June 1936	11 10 0	12 0 0	8 15 0	9 0 0
4th September 1936	12 0 0	12 10 0	8 15 0	9 0 0
9th October 1936	12 10 0	12 15 0	9 5 0	9 7 6
20th November 1936	13 0 0	13 10 0	10 0 0	10 10 0
25th December 1936	13 10 0	14 0 0	11 0 0	11 10 0
8th January 1937	14 10 0	15 0 0	11 10 0	12 0 0
29th January 1937	14 0 0	15 10 0	12 5 0	12 10 0
12th February 1937	15 0 0	15 10 0	12 10 0	13 0 0
19th February 1937	16 0 0	16 10 0	13 17 6	14 2 6
12th March 1937	17 0 0	18 0 0	15 0 0	..
2nd April 1937	17 10 0	18 10 0	16 10 0	17 10 0
21st May 1937	19 10 0	20 10 0	17 0 0	18 0 0
9th July 1937	19 10 0	20 10 0	17 10 0	18 10 0
3rd September 1937	19 10 0	20 10 0	17 10 0	18 10 0
17th September 1937	19 10 0	20 10 0	17 10 0	18 10 0
22nd October 1937	19 10 0	20 10 0	17 10 0	18 0 0
26th November 1937	19 10 0	20 10 0	17 10 0	18 0 0
17th December 1937	18 0 0	19 0 0	16 10 0	17 10 0
21st January 1938	18 0 0	19 0 0	16 0 0	17 0 0
28th January 1938	18 0 0	16 0 0	..	15 0 0
4th February 1938	15 10 0	16 10 0	14 0 0	14 10 0
11th February 1938	15 0 0	16 0 0	13 0 0	14 0 0
18th February 1938	15 0 0	16 0 0	12 0 0	13 0 0

It will be observed that fluctuations in prices have been wide. Quotations for easy bleaching pulp, for example, rose from £7-15 to £18-15 and later fell to £12. We understand that prices even lower than £12 have been quoted recently. By 1939-40 it is not improbable that a further fall in prices may have occurred, and it is possible that they may eventually recede to £9 a ton c.i.f. Calcutta since early in 1936 they were as low as £8-15. Taking a c.i.f. price of £9 a ton Calcutta and adding landing and other charges, the lowest price of imported pulp delivered at mill is Rs. 126 per ton. We have found that the average cost of production

of bamboo pulp is Rs. 144 per ton. The measure of protection required for bamboo pulp would be Rs. 18 per ton as against Rs. 47, the measure of protection required for grass pulp. Grass pulp is an important ingredient in the manufacture of paper, whether mixed with bamboo pulp, as in two mills in Bengal, or used by itself as in two mills in Northern India. If the protective duty were fixed as low as Rs. 18 per ton, there is a definite danger that mills using grass mainly or partially as their raw material would find it more economical to substitute imported pulp. The result would be a fall in the demand for grass which would throw a not inconsiderable number of persons out of employment who are engaged in its cultivation, collection and transport. There would also be a set-back to the cultivation of grass on waste land to which allusion has been made in the preceding chapter.

Another point has been raised that a low duty on imported pulp might lead to the establishment of mills designed to use imported pulp only, the capital cost of which would be low as no plant would be required for the manufacture of pulp. Competition from such mills, it is suggested, would adversely affect mills using bamboo or grass as their raw material. We have examined this aspect of the question and do not find that the danger is so serious as is supposed.

44. Taking all points into consideration, we do not think that it would be safe to fix the minimum rate of duty at anything less than Rs. 35 per ton, which is slightly above the mean between the duty required for bamboo pulp and the duty required for grass pulp. This rate is Rs. 21-4 per ton less than the present import duty of Rs. 56-4 per ton.

We have further to consider whether this rate of duty should be the same for all kinds of imported pulp. There is some variation between the prices of different kinds of unbleached pulp, but practical difficulties in Customs administration would arise if different rates of duty were imposed. On the other hand, bleached and unbleached pulp are distinguishable without any difficulty. The price of bleached pulp is £2 to £3 a ton higher than the price of unbleached pulp and on this ground some differentiation of duty is justified. Further, it is undesirable to favour bleached pulp at the expense of unbleached since this would discourage the manufacture of bleaching material in India. We would, therefore, recommend that the protective duty on imported pulp should be Rs. 35 per ton or 25 per cent. *ad valorem* whichever is higher. The duty should be calculated on an air dry basis for all kinds of imported pulp required in the manufacture of paper. The alternative *ad valorem* duty is not likely to affect the cost of production by mills using unbleached imported pulp, with a c.i.f. price of £10 per ton for easy bleaching pulp, the *ad valorem* duty would be less than the specific duty of Rs. 35 per ton. With a c.i.f. price of £12 per ton the *ad valorem* duty would be Rs. 40 which would increase the cost of production by not more than 10 annas per

ton, assuming that 12½ per cent. of imported pulp was used. If the c.i.f. price were higher than £12 which seems unlikely judging by the present trend of prices, any increase in the cost of production resulting from the *ad valorem* duty would in all probability be offset by an increase in the price of paper realised by mills, since a rise in the price of imported pulp may be expected to be accompanied by a rise in the price of imported paper.

As regards imported bleached pulp, assuming that its landed cost is higher than the cost of easy bleaching pulp by Rs. 40, the *ad valorem* duty with a c.i.f. price of £12 per ton for easy bleaching pulp would be Rs. 50, about Rs. 6 less than the present import duty. We are informed that mills who use bleached pulp do so as a matter of convenience. If the price of bleached pulp was high, a change to the use of unbleached pulp would make no material difference to them. Actually the quantity of bleached pulp used in 1936-37 was less than one fifth the quantity of unbleached pulp.

45. What the effect of the reduction in the duty on imported pulp will be on the cost of manufacture is the next point for determination. The present duty, including revenue surcharge, is Rs. 56-4 per ton. At this rate, assuming that 12½ per cent. of imported pulp is used, the extra cost of manufacture attributable to the import duty is Rs. 13 per ton. A reduction in the rate of duty to Rs. 35 will decrease the cost of manufacture by Rs. 4-6 per ton. We have estimated the works cost of manufacture at Rs. 268 per ton. Deducting Rs. 4-6 the future cost will be Rs. 264 per ton in round figures. Adding Rs. 7 for selling expenses, Rs. 4 for insurance and Re. 1 for rents, rates and taxes, the cost will be Rs. 276 per ton.

46. We shall now consider the question of overhead charges. In present conditions we have arrived at the conclusion that Rs. 680 per ton is a reasonable capitalisation figure. Overhead charges. Depreciation at an average rate of 6½ per cent. will amount to Rs. 42-5 per ton. For interest on working capital the Tariff Board of 1931 allowed 7½ per cent. In present conditions a rate of 5 per cent. is sufficient, which is 2 per cent. above the Reserve Bank rate. The average value of stocks may be taken as Rs. 10 lakhs. Interest on working capital will amount to Rs. 8 per ton. For managing agency and head office charges we adopt the figure given by the Tariff Board of 1931, Rs. 11 per ton which seems to us reasonable. The total of overhead charges thus calculated is Rs. 61-5.

47. For profit the Tariff Board of 1931 allowed a rate of 8 per cent. Conditions have now changed and the financial position of paper companies is more stable than it was in 1931. We think that a rate of 6 per cent. is a fair return on capital in present circumstances. At this rate profit will amount to Rs. 40-8 per ton. In the following

table we compare the fair selling price as estimated by us and as given by the Tariff Board of 1931 :—

TABLE XI.

	1931 estimate. Rs.	Present estimate. Rs.
Works cost	327	276
Overhead charges	73	61.5
Profit	64	40.8
Fair selling price per ton	<u>464</u>	<u>378.3</u>

CHAPTER IV.

Qualification for Protection.

48. The first condition laid down by the Fiscal Commission for the grant of protection to an industry is that it must possess natural advantages such as an abundant supply of raw material, cheap power, a sufficient supply of labour or a large home market.

Agreeing with the conclusions of previous Tariff Boards, we find that abundant supplies of raw material are available mainly in the form of bamboo and to a less extent in the form of grass for the requirements of the Paper Industry both to meet the demand of internal consumption and ultimately to develop an export trade in pulp, if other conditions are favourable. There are also possibilities of increasing the supply of subsidiary materials such as waste paper and rags and of utilising some species of wood for the manufacture of chemical or mechanical pulp.

49. As regards power, coal is available in Bengal, Bihar, Orissa, the Central Provinces and Hyderabad State. The development of hydro-electric schemes is in some provinces

Cheap power. and States likely to prove helpful to mills in supplying part of the power they require for electrification of their plant. In the case of mills situated at a distance from coalfields the cost of fuel is relatively high, but, on the whole, the Industry may be considered to have the advantage of cheap power.

50. As regards the sufficiency of labour supply, the labour required by the Industry may be classified under two heads, the

Supply of labour. labour employed in the collection of primary materials such as bamboo and grass, and the labour employed in the manufacture of pulp and paper. Not much information is available as to the labour employed in the collection of raw materials as the work is done mainly through contractors. There appears to be no difficulty in obtaining sufficient labour. As regards the labour required in the manufacture of pulp and paper, the following Table shows the labour employed in each year from 1931-32 :—

TABLE XII.

Year.	A Mill.	B Mill.	C & D Mills.*	E Mill.	F Mill.
Labour Force Employed.					
1931-32	710	1,420	2,670	512	713
1932-33	680	1,484	2,601	517	627
1933-34	690	1,546	2,676	498	731
1934-35	690	1,647	2,811	508	711
1935-36	730	1,699	3,060	598	733
1936-37	800	1,601	3,227	656	753

* The increase in the number of hands employed during recent years is largely due to the numbers employed in the renovation and reconstruction work.

In established mills the labour force has probably reached its maximum and may even decrease with the installation of labour saving devices in their plant. With the opening of new mills the total labour force employed in the Industry may be expected to increase by a third, but no difficulty in recruiting labour is foreseen though there may be a shortage of skilled and semi-skilled workmen until a sufficient number have been trained.

51. We have examined the labour conditions in mills. The following Table shows the prevailing rates of pay for different classes of skilled and unskilled labour:—

TABLE XIII.—Prevailing rates of pay for different classes of skilled and unskilled labour.

	Per month.	
	RS. A.	RS. A.
Head mechanic	80 0	to 150 0
Head shift mistries	40 0	„ 70 0
Fitters	26 0	„ 110 0
Turners and Planers	20 0	„ 97 8
Moulder	31 0	„ 90 0
Head carpenter	60 0	„ 80 0
Carpenters	19 0	„ 75 0
Head electrician	60 0	„ 100 0
Assistant electrician	32 0	„ 70 0
Wiremen	65 0	„ 100 0
Motor men	18 0	„ 32 0
Oilers	20 0	„ 26 0
Tyndal (Head fireman)	40 0	„
Firemen	28 0	„ 32 0
Ash coolers	22 8	„
Acid plant men	27 0	„ 28 0
Chemical house coolies	21 12	„ 22 12
Washing plant coolies	22 8	„ 27 8
Digester house fitters and assistants	28 0	„ 70 0
Senior beatermen	60 0	„
Junior beatermen	45 0	„ 50 0
Assistant beatermen	30 0	„ 36 8
Beater coolies	21 0	„ 25 0
Machinemen	17 0	„ 70 0
Head Cutter man	34 8	„ 50 0
Cutter men	21 0	„ 40 0
Head Finisher	50 0	„ 100 0
Finishing checkers	40 0	„ 45 0
Finishers	34 0	„ 44 8

Three companies have provident fund or pensions schemes for all their employees and another company is introducing a scheme in 1938. As most of the labour employed in mills is permanent and not seasonal, we consider that all mills should have provident fund or pension schemes.

52. Housing accommodation is provided by mills for their superior staff and generally for part of skilled and unskilled labour employed. We are informed that many employees prefer to live in their own houses if they are within a reasonable distance of the mills. One company is constructing new cooly lines at one of its mills and has further extensions in view: at its second mill it has so far not been able to acquire the land required as the neighbouring areas are already built over. Another company has set aside a considerable sum for the extension and improvement of quarters. New mills, we find, are alive to the importance of providing adequate quarters for their staff.

53. Water supply appears to be generally sufficient and some steps have been taken to improve the drainage of cooly lines.

Other amenities. Five companies employ their own doctors and have small hospitals or dispensaries attached to their mills. Another mill makes a contribution to the medical institutions of the Municipality within the limits of which it is situated. One company has incurred a considerable outlay on anti-malaria measures which has improved the health of its workers and other persons resident in the neighbourhood.

Most mills make contributions to schools in their vicinity. One mill has a primary school of its own and has classes for adults to teach reading and writing. Two other mills propose to build schools. Some mills have provided sports grounds and clubs for recreation.

We have inspected the quarters for the superior staff including apprentices and cooly lines provided by mills and find that they are generally satisfactory, though there is room for improvement in some cases. We consider that all mills should arrange to house at least half the permanent labour they employ.

On the whole, labour conditions may be considered not unsatisfactory. There have been occasional strikes, but we are satisfied that the treatment of labour has been generally fair.

54. Assuming that imports *plus* internal production taken together represent consumption, the following Table shows the quantities of paper consumed in 1936-37 classified under the principal heads, distinguishing between protected and unprotected classes of paper, between paper

and boards and between paper proper and articles made out of paper:—

TABLE XIV.

	General imports.	Imports on Government account.	Indian production.	Total.
	Tons.	Tons.	Tons.	Tons.
<i>Protected Papers.</i>				
Printing paper (excluding chromo, marble, flint, poster and stereo) containing no mechanical pulp or in which the mechanical wood pulp amounts to less than 70 per cent. of the fibre content.	4,538	251	28,744*	33,533
Writing paper	7,302	237	14,620	22,160
TOTAL PROTECTED	11,840	488	43,364	55,692
<i>Unprotected Papers.</i>				
1. Paper including chromo, marble, flint, poster and stereo.	1,433	..	..	1,433
2. Articles made of paper and papier mache	2,049	..	..	2,049
3. Packing and wrapping paper—				
(a) Machine Glazed Pressings . . .	476	..	..	476
(b) Manilla Machine Glazed or unglazed and sulphite envelopes.	1,881	..	586	2,467
(c) Kraft and imitation kraft . . .	8,627	..	..	8,627
(d) Brown wrappings other sorts . .	324	..	1,515	1,839
(e) Fancy including embossed papers .	48	..	..	48
(f) Other sorts	6,852	..	854	7,706
4. Printing paper all sorts not otherwise specified which contain mechanical wood pulp amounting to not less than 70 per cent. of the fibre content—				
Litho	90	7	..	43,598
Newsprintings	36,749			
Others	835			
Other sorts	5,917			
5. Blotting paper	277	..	161	438
6. Stationery including drawing and copy books, labels, advertising circulars, sheet or card almanacs and calendars, Christmas, Easter and other cards, including cards in booklet forms: including also waste paper and stationery not otherwise specified.	222	96	1,969†	2,287
TOTAL UNPROTECTED	65,780	103	5,167	71,050
TOTAL PROTECTED AND UNPROTECTED	77,620	591	48,531	126,742
7. Pasteboard, millboard and cardboard .	10,156	928	..	11,084
8. Strawboard	13,456	..	..	13,456
8 (a). Manufactures of‡ pasteboard, millboard and cardboard.	639	..	..	639
TOTAL BOARDS	24,251	928	..	25,179

* Including badami and coloured printing.

† Classified by Director General of Commercial Intelligence as other kinds.

‡ Indian Paper Makers' classification.

TABLE XIV—contd.

	General Imports.	Imports on Government account.	Indian production.*	Total.
	Tons.	Tons.	Tons.	Tons.
9. Trade catalogues and advertising circulars imported packet, book or parcel post.	3,528	..	..	3,528
10. Books printed, including covers for printed books, maps, charts and plans, proofs, music, manuscripts and illustrations specially made for binding in books.				
11. Prints, engravings and pictures (including photographs and picture postcards) on paper or cardboard.				
12. Paper money	54,730	..	..	54,730
13. Old newspapers				
GRAND TOTAL	160,129	1,519	48,531	210,179

* As statistics of Indian production are not available they are omitted.

With the assistance of protective duties Indian mills have gradually captured the greater part of the market for protected classes of writing and printing paper, but foreign paper was still imported to the extent of 12,000 tons in 1936-37. On the other hand, Indian mills produced over 5,000 tons of unprotected classes of paper in competition with foreign paper, such as cartridge paper, packing and wrapping paper and blotting paper. We shall deal with claims for the extension of protection to some of these classes of paper in the following chapter. Since mechanical pulp is not as yet produced in India, no question of competition with imported printing paper containing 70 per cent. mechanical pulp at present arises. Catalogues, books, prints, etc., paper money and old newspapers may also be left out of account. The total market for Indian paper may be estimated at about 90,000 tons, taking protected and unprotected classes of paper together, but excluding newsprint against an output of about 48,000 tons in 1936-37.

55. Between 1929-30 and 1936-37, consumption increased by 6,656 tons, an annual average increase of 951 tons. Consumption

in future may fluctuate from year to year in accordance with the effect economic conditions may have on the purchasing power

of the population, but over a period of years may be expected to increase with the spread of literacy and the growing demands of educational institutions. It is difficult to estimate the rate of increase, but it is likely to be higher than in the period 1929-30 to 1936-37 unless any abnormal circumstances intervene. We think the average annual rate of increase during the next few years may be estimated at 1,500 tons per annum, distributed over the protected and unprotected classes of paper in the proportion of

62 and 38. On this calculation the demand for protected classes of paper may be expected to have risen to 57,000 tons by 1940-41 and of unprotected classes of paper to 35,000 tons, a total of 92,000 tons. By 1940-41 the capacity of established mills may be expected to have increased to 63,900 tons. The capacity of new mills under construction or definitely projected is estimated at 31,700 tons. The total capacity of Indian mills may thus be estimated at 95,600 tons, but it is unlikely that they will be in a position to manufacture to their designed capacities. Assuming an output of 80,000 tons, and allowing for the fact that three mills are designed to manufacture paper mainly of the unprotected classes, the production of protected classes of paper may exceed the demand by some 7,000 tons, but the total production will fall short of the total demand by 12,000 tons, taking protected and unprotected classes together.

56. The following Table shows the average prices realised by mills:—

TABLE XV.—Average net realised price ex-mills per lb.

—	1931-32.	1932-33.	1933-34.	1934-35.	1936-36.	1936-37.	1937-38.
	A. P.	A. P.	A. P.	A. P.	A. P.	A. P.	A. P.
A . . .	3 1-77	3 1-53	2 11-46	2 10-77	2 11-28	2 11-57	3 1-69*
B . . .	3 0-74	2 11-38	2 9-82	2 8-32	2 8-35	2 8-46	2 9-46†
C . . .	3 2-54	3 1-46	2 11-16	2 10-32	2 10-64	2 10-87	3 1*
D . . .							
E . . .	2 8-04	2 7-87	2 4-57	2 4-22	2 3-53	2 3-26	2 4-42‡
F . . .	3 5-44	3 2-67	3 1-42	2 11-81	3 0-17	3 0-28	3 1-94†

* For 9 months of 1937-38.

† For calendar year 1937.

‡ For all months of 1937-38.

It will be observed that the general trend of prices was downwards until 1934-35 when the lowest level was reached. In 1935-36 and 1936-37 there was a slight recovery. The figures of 1937-38 are incomplete, but they indicate a general improvement in prices ranging from 1 pie to over 2 pies per pound.

For purposes of comparison we give statistics of c.i.f. prices for wood free white printing paper, the most important protected class of paper which is imported. There are considerable differences in the quality of this class of paper. Japanese and Continental white printing paper imported into India is generally inferior in quality

and cheaper than British made paper, the difference in price being about £2 per ton:—

TABLE XVI.—C.i.f. price of white printing paper.

	Lowest. £ s. d.	Highest. £ s. d.
1935-36	16 15 0	20 10 0
1936-37	15 10 0	21 0 0
1937-38	24 17 6	29 10 0

There was a pronounced rise in prices during 1937, but from December 1937 the market took a downward turn which continued till March, 1938. The latest prices are, however, still well above the level of 1936. We have ascertained that Indian mills have not increased their prices to the extent that the rise in the price of imported paper justified and that the margin between the two has widened to about 5 pies per pound against the usual margin of two to three pies per lb.

57. During the period under review the policy of the mills belonging to the Indian Paper Makers' Association or working in conjunction with it has been to combine for the purpose of price fixation and for the allotment of contracts with the Central and Provincial Governments, which represent 20 to 25 per cent. of their total production, according to an agreed arrangement among themselves. This combination has enabled the mills to maintain prices at a level slightly below the level of prices quoted for imported paper of similar quality. We are informed that Indian mills have been able to secure a predominant share in the Government contracts either because the prices quoted by them were lower than the prices quoted for imported paper or because their quality of paper was more satisfactory than the quality of imported paper, judged by the prescribed specifications.

The fact that mills have been able to rely on an assured market for so large a proportion of their production is an important consideration. We are informed that in 1937-38 they were so busy with Government contracts that at times they were unable to promise supply to ordinary purchasers under four to six months. In 1939-40 competition for contracts from new mills may be expected to reduce the proportion of Government contracts obtained by individual mills, but mills will continue to have an assured market for a not inconsiderable part of their production, assuming that the Central and Provincial Governments will continue to give preference to Indian paper, if the price and quality are comparable to the price and quality of imported paper.

So far the production of Indian paper has been less than the demand even for protected classes of paper. Prices have therefore been regulated by the price of imported paper and mills have been able to combine among themselves to prevent the cutting of rates below an agreed level. With an increase in the capacity of

existing mills and the opening of new mills, production of protected classes of paper as we have shown may by 1940-41 be expected to exceed the demand. We understand that most of the new mills have joined the Paper Makers' Association and may for a time combine with the old mills to control price levels, but it is inevitable that internal competition should eventually influence the rates at which different classes of paper will be sold. We do not, therefore, consider that there is any serious danger of a combination among mills being able to maintain prices at an artificial or excessive level.

58. The Tariff Board of 1931 found that the average price realised by the three principal companies in the period 1924-25 to 1930-31 was Rs. 472 per ton. The average price realised by the same three companies in the period 1931-32 to 1936-37 was Rs. 411 per ton, a reduction of Rs. 61 per ton.

Rs. 464 was the fair selling price estimated by the Tariff Board of 1931 but the realised price was Rs. 53 per ton lower than the estimate in spite of the fact that the measure of protection has been 1 anna 3 pies per lb. against 1 anna per lb. recommended by the Tariff Board owing to the imposition of the revenue surcharge of 25 per cent. on protective duties. Complete figures for the year 1937-38 are not available, but, so far as we have been able to ascertain, the average realised price of these three companies increased to Rs. 420 per ton. On the whole the burden on the consumer has been considerably less than the Tariff Board of 1931 expected.

59. Industries most directly affected by the prices of protected classes of paper are the Printing and Publishing trades. News-

The Printing and Publishing trades. papers are not affected by the protective duties in so far as they use paper containing 70 per cent. mechanical pulp for their daily publications, but they are affected to the extent to which they use better kinds of printing paper of the protected class for their weekly or annual publications and for jobbing work. We are informed that the paper used is partly Indian and partly imported.

The following Table shows the number of printing firms working and the number of newspapers issued and the number of books published, English and Indian, from 1930-31:—

TABLE XVII.—*Number of Printing Presses at work and number of newspapers, periodicals and books published compiled from the Statistical Abstract for British India.*

Years.	Printing presses.	Newspapers.	Periodicals.	Books.	
				English.	Indian.
1928-29	6,102	1,695	2,960	2,556	14,427
1929-30	6,385	1,693	3,057	2,335	13,935
1930-31	6,520	1,768	2,760	2,353	14,074
1931-32	6,646	1,743	2,893	2,441	13,132
1932-33	6,756	1,659	2,847	2,709	13,580
1933-34	6,937	1,748	3,268	2,623	14,140

Apart from the publication of books, we are informed that any increase in the price of paper consequent on the grant of protection to the industry has not affected the printing industry to any appreciable degree except in the matter of label and calendar printing. In the period under review the number of printing presses has increased from 6,102 to 6,937.

In regard to the publication of books, the evidence we have received is conflicting. One firm of publishers in Bombay have stated that the cost of paper has not affected the number of books published and has supplied us with figures in support of its contention. Even if first impressions of books intended for circulation in India are made in England, second and subsequent impressions are made in India. A publishing firm in Madras, on the other hand, has stated that even if a first impression of a book is made in India, second and subsequent impressions are usually made in England and that there has been a definite diversion of publication from India to England. Other evidence we have received supports the conclusion that the cost of paper has adversely affected the publishing trade in India. It is significant that since 1931-32 the number of books in English published in India has shown little increase and the number of books in Indian languages published has actually decreased.

The suggestion has been made that books, which are at present admitted free, should be subjected to revenue, if not protective, duties in order to encourage the publication of books in India and so indirectly increase the quantity of Indian paper used. This suggestion has been strongly opposed on the ground that a tax on books is a tax on knowledge and under the Tariff Schedules of nearly all countries books are admitted free of duty.

Apart from this consideration, the benefit to the Paper industry is indirect and problematical. Even if more books were printed in India, it does not necessarily follow that Indian paper would be used. We do not consider it necessary to pursue the matter further.

A representation has been made to us on behalf of printers in regard to catalogues. Advertising circulars imported in bulk, *i.e.*, otherwise than by parcel, book, or packet post are subject to a revenue duty. It has, however, been ruled that catalogues imported in the form of books are exempt from Customs duty under item No. 45(1) of the Tariff Schedule regardless of the nature of the contents. Under this ruling advertising circulars, if imported in bulk in the form of loose sheets, pay a revenue duty, but if the sheets are fastened together so as to form a book they pay no duty even if imported in bulk. We are informed that according to Customs practice if four or more sheets are fastened together they are treated as a book. This anomaly appears to us to deserve consideration.

In addition to books, printed sheets intended to be bound into books in India are admitted free of duty. The Tariff Board on the classification of paper considered the question whether printed

existing mills and the opening of new mills, production of protected classes of paper as we have shown may by 1940-41 be expected to exceed the demand. We understand that most of the new mills have joined the Paper Makers' Association and may for a time combine with the old mills to control price levels, but it is inevitable that internal competition should eventually influence the rates at which different classes of paper will be sold. We do not, therefore, consider that there is any serious danger of a combination among mills being able to maintain prices at an artificial or excessive level.

58. The Tariff Board of 1931 found that the average price realised by the three principal companies in the period 1924-25 to 1930-31 was Rs. 472 per ton. The average price realised by the same three companies in the period 1931-32 to 1936-37 was Rs. 411 per ton, a reduction of Rs. 61 per ton.

Rs. 464 was the fair selling price estimated by the Tariff Board of 1931 but the realised price was Rs. 53 per ton lower than the estimate in spite of the fact that the measure of protection has been 1 anna 3 pies per lb. against 1 anna per lb. recommended by the Tariff Board owing to the imposition of the revenue surcharge of 25 per cent. on protective duties. Complete figures for the year 1937-38 are not available, but, so far as we have been able to ascertain, the average realised price of these three companies increased to Rs. 420 per ton. On the whole the burden on the consumer has been considerably less than the Tariff Board of 1931 expected.

59. Industries most directly affected by the prices of protected classes of paper are the Printing and Publishing trades. Newspapers are not affected by the protective duties in so far as they use paper containing 70 per cent. mechanical pulp for their daily publications, but they are affected to the extent to which they use better kinds of printing paper of the protected class for their weekly or annual publications and for jobbing work. We are informed that the paper used is partly Indian and partly imported.

The following Table shows the number of printing firms working and the number of newspapers issued and the number of books published, English and Indian, from 1930-31:—

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1929-30	6,385	1,693	3,057	2,335	13,935
1930-31	6,520	1,708	2,760	2,353	14,074
1931-32	6,646	1,743	2,893	2,441	13,132
1932-33	6,756	1,659	2,847	2,709	13,580
1933-34	6,937	1,748	3,208	2,623	14,140

Apart from the publication of books, we are informed that any increase in the price of paper consequent on the grant of protection to the industry has not affected the printing industry to any appreciable degree except in the matter of label and calendar printing. In the period under review the number of printing presses has increased from 6,102 to 6,937.

In regard to the publication of books, the evidence we have received is conflicting. One firm of publishers in Bombay have stated that the cost of paper has not affected the number of books published and has supplied us with figures in support of its contention. Even if first impressions of books intended for circulation in India are made in England, second and subsequent impressions are made in India. A publishing firm in Madras, on the other hand, has stated that even if a first impression of a book is made in India, second and subsequent impressions are usually made in England and that there has been a definite diversion of publication from India to England. Other evidence we have received supports the conclusion that the cost of paper has adversely affected the publishing trade in India. It is significant that since 1931-32 the number of books in English published in India has shown little increase and the number of books in Indian languages published has actually decreased.

The suggestion has been made that books, which are at present admitted free, should be subjected to revenue, if not protective, duties in order to encourage the publication of books in India and so indirectly increase the quantity of Indian paper used. This suggestion has been strongly opposed on the ground that a tax on books is a tax on knowledge and under the Tariff Schedules of nearly all countries books are admitted free of duty.

Apart from this consideration, the benefit to the Paper industry is indirect and problematical. Even if more books were printed in India, it does not necessarily follow that Indian paper would be used. We do not consider it necessary to pursue the matter further.

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sheets were imported in order to evade the duties on paper and arrived at the conclusion that, while no change in classification was necessary, the situation should be watched and if the privilege of free import was found to be abused suitable action should be taken. There is no exact information as to the quantity of printed sheets imported since they are included in the Customs returns with 'other kinds of paper'. So far as we have been able to ascertain, the quantity is not large and has not shown any tendency to increase. If a duty on printed sheets were imposed, it is doubtful if it would make any appreciable difference to the amount of Indian paper consumed. A possible result would be that instead of sending printed sheets for binding into books in India publishers abroad would do more binding at Home and less in India. The stoppage of imports would not in that case benefit the Paper industry, but would adversely affect the book binding trade in India.

60. We shall next consider how far an improvement in the quality of Indian made paper can be considered to have justified the policy of protection. As in 1931 the main production of Indian mills has consisted of writing paper, chiefly creamlaid and wove, white printing paper and so-called

badami paper which is used extensively in Government and Railway company offices and by the Marwari community for account books.

One bamboo mill concentrates mainly on the production of superior kinds of paper made with a furnish of bamboo or bamboo and chemical wood pulp. Other mills, using bamboo and grass pulp, in addition to ordinary writing and printing paper, produce a fairly high proportion of badami paper which contains an admixture of waste paper and is consequently cheaper in price. Mills using waste paper and rags as their main material manufacture mainly the cheaper lines of paper, including badami and wrapping paper.

The Controller of Stationery who makes purchases of paper on behalf of the Central Government, some Provincial Governments, State Railways and one Company-owned railway has supplied us with an interesting report on the quality of different classes of Indian paper, his purchases of which amount to about 20 per cent. of their total production. Purchases are made according to standard specifications and both Indian mills and firms in England are invited to tender. Samples of paper are tested according to the grammes per square metre, breaking length in inches, fold and ash content. The following Table compares the results of the tests on Indian White Printing paper in 1931-32 and 1936-37:—

TABLE XVIII.—*White Printings.*

Year.	'A' MILL.				'B' MILL.				'C' & 'D' MILLS.				'E' MILL.				'F' MILL.			
	G. S. M.	B. L.	Fold.	Ash per cent.	G. S. M.	B. L.	Fold.	Ash per cent.	G. S. M.	B. L.	Fold.	Ash per cent.	G. S. M.	B. L.	Fold.	Ash per cent.	G. S. M.	B. L.	Fold.	Ash per cent.
Minimum specified limit.	74	3,000 metres	30	15% (Max.)	73.6	3,204	73	2.8	73.6	4,149	73	4.1	73.6	3,610	39	1.8	73.6	3,204	25	3.9
1931-32	73.6	3,204	137	8.0	73.6	3,944	73	2.8	73.6	4,149	73	4.1	73.6	3,610	39	1.8	73.6	3,204	25	3.9
1936-37	73.6	4,684	164	5.6	73.6	4,848	112	3.7	73.6	5,054	226	1.7	73.6	3,903	89	5.7	73.6	4,191	30	2.2

Since 1935 the four principal mills, by agreement, are supplying the Controller with information as to the 'furnish' of different qualities of paper, which, on test, have proved to be reasonably accurate. The three main classes of paper produced by Indian mills are white printing paper, creamlaid writing paper and so called 'badami' paper. The proportion of each class produced by different mills varies. One mill, for example, which manufactures paper from bamboo pulp, produces 26.29 per cent. of white printing against 47.65 per cent. of creamlaid writing paper. In the case of another mill using both bamboo and grass the proportion of white printing paper is 36.73 against 13.43 of creamlaid writing paper. This mill manufactures a considerable quantity of the cheaper class of paper. In the case of a third company the proportion of white printing paper is 43.19 and the proportion of creamlaid writing paper 26.28. In another mill, which uses grass as its raw material, the proportion is almost equal.

In the opinion of the Controller there has been a marked and very satisfactory improvement in the quality of Indian paper. Points to which he has drawn special attention are the improvement in Antique Laid, Typewriting and Azure laid papers through an admixture of rags in the furnish, the better quality of Imitation Art paper, and the improvement in the colouring of coloured printings. Among unprotected classes of paper the quality of Indian blotting paper has been found to be satisfactory. Indian manilla paper is now produced of a sufficiently good quality to enable the controller to dispense with the purchase of imported manilla. Defects in manufacture previously noticed such as specks and blemishes due to the presence of foreign matter and variations in thickness have been to a great extent remedied, though in the case of two mills there is room for improvement. Sheets of paper are generally better cut and less torn than before.

Since 1935 new tests have been instituted as to the durability of Indian paper with different furnishes. The general conclusion of the Controller is that papers made from bamboo or grass, whether these materials are used singly or in admixture with each other or with chemical wood pulp, not only possess satisfactory initial strength but also retain sufficient durability. Another point of interest is that paper made from bamboo or grass pulp has a superior opacity to paper made from chemical wood pulp. Paper made with an all bamboo pulp furnish appears to be satisfactory in quality, but in the case of one mill it was noticed that paper made from bamboo mixed with chemical wood pulp had not sufficient strength.

The following Table shows the average price per ton of Indian paper purchased by the Controller:—

TABLE XIX.—Average price per ton of Indian paper purchased by the Controller of Stationery.

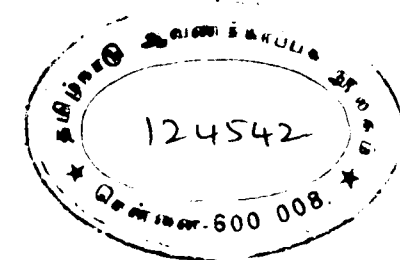
	Average price per ton. Rs.
1931-32	461

TABLE XIX—contd.

	Average price per ton. Rs.
1932-33	480
1933-34	456
1934-35	432
1935-36	429
1936-37	419
1937-38	422
1938-39	453

It will be observed that from 1932-33 till 1936-37 the average price of Indian paper fell continuously. The average contract price for 1938-39 has risen by Rs. 31 per ton from Rs. 422 to Rs. 453 owing to the general rise in prices. At the prices Indian mills have quoted imported paper has been unable to compete and purchases of foreign paper are now negligible in quantity and confined to some special qualities.

The opinion of importers on the quality of Indian made paper is not unnaturally less favourable, though improvement in some kinds of paper is admitted. Their main criticism is that though Indian mills can turn out satisfactory paper there is a lack of uniformity in the quality and some of the paper put on the market is inferior. Other witnesses we have examined agree generally as to the improvement in quality though they differ as to the extent of the improvement. The samples of paper from different mills we have examined confirm the opinion of the Controller of Stationery that the general standard of paper made by Indian mills is, on the whole, satisfactory though there is still room for improvement in some cases. The modernisation of plant recently effected by established mills will enable them to produce better paper, and an increase in competition consequent on the opening of new mills with up to date equipment is likely to raise the general standard.



CHAPTER V.

Measure of protection.

61. In considering whether a case has been established for the continuance of protection to the industry and if so what the measure

Fluctuations in the of protection should be and to what classes prices of imported of paper protection should extend, we have article. been confronted with more than one difficulty. In the period 1931-32 to 1935-36 the general tendency of world prices of paper was in the downward direction but without any violent fluctuations. In the second half of 1936 owing to the increased demand for wood pulp and the operations of combines of pulp manufacturers, a rise in the price of paper began, which became marked in 1937, and reached its peak in the middle of the year. Thereafter a recession in prices occurred but the general price level at the end of March, 1938 was still well above the level prevailing in 1935-36.

The problem, therefore, arises for consideration whether the recent rise in prices is a temporary phase due to special circumstances of a transient nature, or whether the level of prices will be permanently maintained above the level which prevailed in the period between 1931-32 and 1936-37. For this purpose we have examined official publications supplied to us by the High Commissioner for India relating to the United States of America and Canada and such statistical or other information as was available in regard to the position in European countries.

The United States of America is the chief wood pulp producing country in the world. Its production is one fifth of the total world output, followed by Canada, Sweden, Germany, Finland and Norway in the order named. In the United States internal production in 1936 was estimated at 5½ million tons, but imports still amounted to 2¼ million tons. Exports, which were 4 per cent. of production, were mainly of sulphite pulp to Japan, but these have recently decreased owing to disturbed conditions in the Far East. Imports have increased in the last ten years owing to the depletion of stands of spruce and fir, but it is thought possible that if wood pulp from Southern pine, which has so far been used in making sulphate kraft pulp for the manufacture of brown wrapping papers, container board and similar products, can be utilised for the manufacture of white paper, imports may decrease.

In Canada, the second largest pulp producing country, it has been estimated that the forests of wood suitable for pulp making are being depleted at the rate of upwards of four billion cubic feet per annum and afforestation has not made much progress.

In European countries it does not appear that the consumption of wood generally exceeds the reproduction of timber. In the Baltic countries—Norway, Sweden and Finland—scientific forestry has ensured that reproduction of timber should be at least equal to consumption.

Since 1932 the world production of pulp has increased rapidly. It is estimated that the pulp producing capacity of the principal countries in America and Europe at the beginning of 1936 was 12,031,900 short tons of sulphite and sulphate pulp. This capacity was expected to expand by 435,570 tons in 1936.

Production is estimated to have been slightly below consumption in 1933 and slightly higher in the following three years. In the latter part of 1937 owing to the general retrocession of business activity the demand for paper decreased and pulp making companies were working to little more than half their full capacity in the United States and Canada.

Wood pulp, in addition to its use in the manufacture of paper, has been in increasing demand for the manufacture of rayon yarn and staple fibre. World production in thousands of pounds is estimated to have increased from 443,465 in 1929 to 1,303,165 in 1936. Japan and the United States are at present the largest producers. Increasing quantities of cellulose from wood are also required in the manufacture of cellophane, certain lacquers, plastics and finishes.

As regards the paper industry there is a growing demand for fibre containers made out of boards. Attention has also been drawn to the use of paper in the production of articles of household use such as paper towels, napkins, facial tissues, drinking cups, plates, etc.

World prices of all kinds of pulp fell sharply after 1929, recovered somewhat in 1933, rose markedly after the middle of 1936 and were still higher in the middle of 1937. Since then there has been some recession in prices, but the level remains above the level prevailing between 1929 and 1936. The rise in prices is due in part to the operations of pulp making companies in America and Northern Europe who combined to raise the general level of pulp prices and agreed not to reduce their selling limits below a fixed figure. This agreement will, it is understood, be operative during 1938.

The probable trend of prices in future years is uncertain. Against an increased capacity for the production of pulp must be set an increasing demand for cellulose in the manufacture of rayon yarn and staple fibre. On the whole, even if the price of pulp should recede further, it would seem improbable that it will fall to the level prevailing before 1936, but the position is admittedly uncertain and no one is prepared to make any confident prediction as to the trend of prices beyond 1938.

62. In view of the general uncertainty as to the course of future prices the three principal paper making companies have placed

Difficulties of a sliding scale of import duties. before us a joint memorandum in which it is suggested that protection should be granted to the industry on a sliding scale dependent on the average price of wood pulp which determines the price of imported paper. If, for

example, the average price of easy bleaching and strong sulphite pulp c.i.f. United Kingdom ports were £9, the lowest c.i.f. price of imported varieties of protected paper at Calcutta would be £19 and the difference between this and the estimated fair selling price would represent the amount of protective duty required. According to the companies' calculations, the amount of protection required would be 1 anna 1 pie when the average price of pulp was £9, 1 anna when the average price was £10 and so on. With an average price of £14 for pulp, no protective duty would be required if the revenue duty were 20 per cent. *ad valorem*. In order to meet the objection that there is lag in changes of paper prices behind changes in pulp prices they suggest that 6 months notice of any alteration in duty should be given which would be a long enough period for importers to adjust new contracts. This scheme, it is claimed, would obviate the danger of underprotection or overprotection to the industry.

A sliding scale of protective duties has undoubtedly some advantages when prices are subject to wide variations but as the Importers' Association have pointed out, is open to a number of objections. Protection to industries has always been granted by the Legislature for a definite term and on a fixed basis. It is true that in the case of the Sugar industry, for example, provision was made for a review of the amount of protection required during the course of the protective period, but this review was made by a Tariff Board and any variation in the rate of duty normally requires the sanction of the Legislature. Provision is made under Section 4 of Act XXXII of 1934 for executive action by the Governor General in Council for the increase or reduction of protective duties after such enquiry as he thinks necessary, if he is satisfied that any particular duty has become ineffective for the purpose of securing the protection intended to be afforded, but this power of varying the amount of duty is exercised only in special circumstances as, for example, when the currency of a foreign country has been depreciated to such an extent as to give an unfair advantage. A power to vary the amount of duty from year to year without a specific enquiry stands on a different footing.

It appears to us that the main objection to the proposal is the feeling of uncertainty it will create. In the case of the Paper industry protection has so far been given to two classes of paper only, writing and printing paper, and not even to the whole of these classes, since those kinds of paper which are not manufactured in India are excluded. An arrangement under which some kinds of paper would be subject to a variable protective duty and other kinds to a fixed revenue duty is not desirable.

It has been pointed out to us by importers that if a duty is reduced they are forced at once to reduce the price of paper to the same extent even though they may have contracted for supply on the basis of the previous duty. The proposal that changes in the rates of import duty should be announced six months in advance would not entirely get over the difficulty, since contracts are

sometimes run for longer periods than six months. The mere announcement of a change of duty would probably at once result in a reduction of internal prices even though the reduction in duty was not to be effective till six months later. Alterations in the rates of Customs duty usually come into force from the date of announcement, and any long postponement of the date from which the change of duty is to become effective will give rise to various difficulties, including a loss of Customs revenue. If, for example, it was announced that the rate of duty would be increased in six months time, there would be a rush to import paper during this period, stocks would accumulate, and a rise in internal prices, which the increase in the protective duty was designed to attain, would be postponed for a considerable period, at the end of which a change in the world price of wood pulp might necessitate another variation in the rate of protective duty.

On the whole, the difficulties and dangers of a sliding scale of protective duties seem to us such that we cannot recommend the adoption of the scheme in spite of its superficial advantages. We are, however, fully aware of the difficulty of fixing a specific rate of protective duty for a long period at a time when wide fluctuations of prices have occurred and when no one can forecast at what level prices are likely to be stabilised.

63. Except for representations by the Printing and Publishing industry, it has not been contended on behalf of any responsible association in the present circumstances of the industry that the withdrawal of the protective duty is desirable in the general interests of the country. Both importers and traders have expressly stated that they do not oppose the continuance of protection for a reasonable period at a reasonable rate for the present classes of protected paper. Such Chambers of Commerce and similar Associations as have replied to our questionnaire have supported the continuance of protection either at the level of 1 anna 3 pies per lb. or at the level of 1 anna per lb., the rate recommended by previous Tariff Boards. Some of them have recommended the extension of protection to new classes of paper such as wrapping paper.

In our opinion the time is not yet ripe for the withdrawal of protection to the industry. As we have shown in earlier chapters, though bamboo as a pulp making material has passed the experimental stage, it cannot yet be considered to have attained the stage of maturity. It is only within the last three years that bamboo pulp has been produced on a considerable scale and its manufacture is confined to four mills. There is room for considerable improvement in the quality of bamboo pulp for the production of the classes of paper at present made wholly or partially from bamboo pulp, and its suitability for the manufacture of new classes of paper such as kraft has yet to be tested on a commercial scale. Another important point for consideration is the possibility of the manufacture of chemical or mechanical pulp from species of wood

available in India. We do not foresee any probability of the manufacture of newsprint containing a high percentage of mechanical pulp on a commercial scale in the near future, though we would not rule out the ultimate possibility, but chemical or mechanical pulp could be used as an admixture in the production of cheaper classes of paper which are already protected and of some unprotected classes of paper such as wrapping and packing.

The effect of the withdrawal of the protective duty would be serious for established mills and still more serious for new mills. It would be difficult for established mills to continue experimental work on the improvement of bamboo pulp and the probability is that they would be forced back to some extent on the use of imported pulp, presuming that the protective duty on imported pulp were removed, the logical consequence of the removal of the protective duty on paper. As regards grass mills as we have shown elsewhere, the removal of protective duties on imported pulp would result in the substitution of imported pulp for grass pulp. Considering the comparatively high cost of grass pulp, it would not be possible for grass mills to survive if the protective duties on paper were removed unless they used imported pulp in considerable quantities.

As regards new mills, they have come into existence on the assumption that protection will be continued to the industry. We have pointed out to them that protection was not guaranteed to the industry beyond March 1939. They contend that protection once granted to other industries has not been withdrawn on the expiry of the period or periods for which protection was originally granted, and that therefore they were justified in counting on its continuance. If protection were removed, it would be difficult for them to compete either with imported paper or with the paper manufactured by established mills, who with their long experience are in a position to produce more cheaply.

So far as we can judge, the removal of protection would result in the closing of some at least of the new mills and probably two or three of the established mills, and in the curtailment of production of those which survive, because they would find it difficult to compete with imported paper except in markets in which they enjoy a definite freight advantage.

Our conclusion is that the removal of protective duties at the present stage of development of the industry would be premature. It would arrest the progress of bamboo pulp manufacture if not cause a definite set back, and so defeat the object for which protection was first granted to the industry, and necessitate the substitution of imported pulp for pulp made from grass and other indigenous materials. A further period of protection is, in our opinion, essential for the full development of bamboo as a raw material for the manufacture of pulp suitable to most classes of paper, but we see no reason why ultimately the industry should not be able to stand without the assistance of protection, provided that action is taken to prevent unfair competition through the dumping of paper at unremunerative prices.

We recommend that the further period of protection should be for seven years.

64. Before deciding what the measure of protection should be, it is advisable first to consider whether the scope of protection should be extended to new classes of paper.

Question of protection to new classes of paper.

In estimating the validity of claims for the extension of protection, it is not, in our opinion, enough to advance the argument that a particular kind of paper which is not protected can possibly be made in India. What we have to consider is whether such paper can be made in a quality which will be reasonably satisfactory to the public and at a price which will not impose an unduly heavy burden on the consumer. Obviously the most satisfactory test is whether such paper has actually been produced in competition with imported paper.

65. A claim has been advanced for the protection of cartridge paper. Cartridge paper is a special class of paper suitable for drawing, but some kinds of cartridge paper are suitable for printing or writing upon—

“offset” cartridge, for example, which is used in “offset” printing. As cartridge paper is not separately specified in the Customs returns the extent of the imports cannot be precisely determined. The Tariff Board on the classification of paper, as a compromise between the views of manufacturers and importers, recommended that white or coloured cartridge paper of a substance below 18" × 22", 24 lbs. per 500 sheets or 85.2 grammes per square metre be classified as printing paper and so subjected to the protective duty. This arrangement appears to have worked satisfactorily. Indian mills claim that, apart from cartridge paper suitable for printing or writing upon, they are manufacturing a satisfactory quality of drawing cartridge. This claim is disputed by the importers and traders who state that Indian drawing cartridge will not stand erasure if rubbed with India rubber, an important consideration; as the paper is largely used in educational institutions. If Indian mills can produce a quality comparable to the imported article we think that they would be in a position to compete in markets where they enjoy a freight advantage without the assistance of protection, and that until the quality is improved the claim for protection cannot be substantiated.

66. A claim has been advanced for the protection of Poster paper which is imported in increased quantities for use by Cinema

Companies. Poster paper contains a proportion of mechanical pulp. It is machine glazed on one side and rough on the other. One company which possesses a M.G. machine tried the manufacture of M.G. paper on a small scale but found it impossible to produce cheaply enough to compete with the imported article. We do not consider that any mill could produce Poster paper sufficiently cheaply without the use of mechanical pulp, which is not at present produced in India and the import of which is difficult for technical reasons. We find that the time has not yet come for its protection.

67. Blotting paper of satisfactory quality is now produced by one mill and purchases have been made by the Controller of Stationery in preference to imported blotting paper on its merits. As Indian blotting paper can compete with foreign blotting paper without the assistance of protection and the total quantity imported is below 300 tons, there is no strong case for the extension of protection to it.

68. The most important claim for the extension of protection is for the protection of 'kraft' packing paper. One of the new mills under construction is designed to manufacture kraft paper to a capacity of 6,000 tons. In the manufacture of kraft pulp the process of digestion is longer and the chemical treatment less drastic.

The company have estimated the works cost per ton at Rs. 308 including loss of fibre in conversion. Supplies of bamboo will be obtained from near Sambalpur in Orissa at an estimated cost of Rs. 16-8 per ton delivered at mill. It is expected that 2-90 tons of bamboo will be required to manufacture one ton of kraft paper. The works cost includes freight to Calcutta which should be deducted. The cost of power and fuel appears to be high as consumption of coal is taken as 6 tons per ton of finished paper, but should not exceed 4 tons. Rs. 6-8 should be deducted on this account. Making this adjustment the works cost should not exceed Rs. 288 per ton.

The block capital required is estimated at Rs. 48 lakhs but this figure seems excessive in comparison with the estimates of other bamboo mills whose machinery will be practically the same. We have elsewhere estimated overhead charges at Rs. 61-5 per ton on a capitalised value of Rs. 680 per ton. Adding Rs. 61-5 to the works cost of manufacture the total cost per ton will be Rs. 349 without profit.

The c.i.f. price of Scandinavian kraft paper in February, 1938 is given as £22-10 per ton. Kraft paper pays an *ad valorem* duty of 30 per cent. with a preferential duty of 20 per cent. for the manufacture of the United Kingdom. As almost all kraft paper is imported from Scandinavia and other foreign countries 30 per cent. *ad valorem* may be taken as the usual rate of duty. The landed price may be taken to be Rs. 300 per ton. The Company expect that the quality difference between their product and imported kraft paper will be Rs. 35. This we are unable to judge as the paper has not yet been made.

The company is itself not certain of success in the manufacture of kraft paper and has so arranged its purchase of plant that, if the manufacture of kraft paper is a failure, the manufacture of ordinary paper can be substituted. Further, its full production cannot be expected to be more than two-thirds of the total consumption in India. Kraft paper is used by consumers who require packing paper of special strength. A rise in price due to the imposition of a protective duty will affect many industries. We cannot recommend the extension of protection to this class of paper-

unless we are satisfied that it can be manufactured in a satisfactory quality at a reasonable price.

69. A representation has been received by us for the protection of sand paper on behalf of Messrs. Krishnalal Thirani and Company, Limited, which is about to begin manufacture. The Company has supplied us with their estimate of the cost of production which amounts to about Rs. 6-1 per ream of 22 lbs. Some items of the estimate appear to be high and according to calculations we have made should not exceed Rs. 5-8 per ream. Imports are stated to be partly from the United Kingdom at a preferential rate of duty of 20 per cent. *ad valorem*, but mainly from Italy at a 30 per cent. *ad valorem* rate of duty. The landed price of Italian sand paper is reported to be about Rs. 3-8 per ream. The amount of protective duty required would be Rs. 2 per ream or 60 per cent. *ad valorem*. We are informed that sand paper is mainly used for polishing purposes, for cleaning walls and in tanneries. The extent of the imports is not known as the figures are not shown separately in the Customs Returns.

The representation of the Company was received so late that it has not been possible for us to make full enquiries. All that we can say is that the possibility of manufacture at a reasonable price is not unpromising. As sand paper has not as yet been actually manufactured we cannot be sure what the quality will be. We are not, therefore, in a position to recommend the extension of protection for sand paper at the present stage.

70. On the evidence before us we do not feel justified in recommending the extension of protection to any new class of paper.

Further enquiry suggested. On the other hand, with the opening of new mills, the capacity of production by Indian mills will exceed the demand for protected classes of paper assuming that they are able to capture the whole of the market. On this ground it is desirable to encourage the manufacture of classes of paper which are at present unprotected, of which the most important is wrapping and packing paper. The prospects of the manufacture of kraft paper are sufficiently promising to justify a further enquiry when the new mill has had a sufficiently long experience of manufacture to be able to present figures of the cost of production and to demonstrate that the quality is satisfactory. We recommend that this enquiry be held towards the end of 1939 by which time sufficient data will be available, as the mill expects to begin manufacture in 1938. The enquiry may review the other new classes of paper for which protection has been claimed including sand paper and any new claim that may be advanced in the interval.

We attach much importance to this recommendation because our enquiry has taken place in a period of transition when new developments in the industry are impending. If protection is to be continued, it is advisable that it should be extended to other classes

of paper which Indian mills are capable of manufacturing satisfactorily at a price which will not put an unfair burden on the consumer. The further enquiry we have recommended is therefore, in our opinion, essential.

71. Having decided that we are not justified in recommending the extension of protection to any new classes of paper we return to the question of the amount of protection required for the classes of paper already protected.

The usual practice in determining the measure of protection is to compare the fair selling price of the Indian industry with the landed price of imported goods less import duty and take the difference as the measure of protection required. Agreeing with the Tariff Board of 1925 the Tariff Board of 1931 found this method of procedure difficult to apply in the case of the Paper industry. In the opinion of both Boards the varieties of paper in the market were so numerous that it was impossible to determine the classes of imported papers which were precisely comparable with Indian made paper. It was therefore decided to adopt the average realised price of the mills as the more suitable criterion for fixing the measure of protection. An incidental advantage of this procedure was stated to be that it discounted the railway freight advantage enjoyed by the mills in upcountry markets.

We have experienced the same difficulty as previous Tariff Boards in selecting classes of imported papers which are precisely comparable with Indian made papers. We therefore propose to adopt the same procedure and take the average realised price of the mills as our main criterion. We have, however, checked the figures with the average contract prices of paper supplied by mills to the Central Government as given by the Controller of Stationery. These purchases amount to 20 per cent. of the total production of mills and are mainly of the protected classes of paper, the prices of which are competitive with quotations from firms in England.

We have also compared the realised prices with the landed price of imported paper of the protected class, so far as comparison is possible. The railway freight advantage enjoyed by mills in upcountry markets situated in Central and Northern India is offset by the railway freight disadvantage in Bombay and South India and may therefore be left out of account. Indian paper usually sells at 2 pies per pound less than imported paper which may be taken to be the difference of quality. Making this adjustment some kind of comparison is possible between the prices realised by mills and the landed prices of imported paper.

The average price realised by mills using bamboo or bamboo and grass as their main raw materials for protected classes of paper was in 1936-37, 2 annas 10·3 pies a pound or Rs. 400 a ton. This is lower than the average contract price for paper purchased on behalf of the Central Government which was Rs. 419 a ton.

Deducting the protective duty of Rs. 175 the landed price of imported paper of similar quality would be Rs. 225. The esti-

mated fair selling price is Rs. 381. The difference between the two figures is Rs. 156 per ton.

The average c.i.f. price of imported wood free white printing paper at the beginning of 1936-37 was £18·10 per ton and the landed price, including landing charges at Rs. 6 per ton, Rs. 253. The difference between this figure and the fair selling price of Rs. 381 is Rs. 128. Adding Rs. 23 for difference in quality, the amount of protective duty required would be Rs. 151 per ton.

We shall now consider what the measure of protection would be on the basis of the prices prevailing in March, 1938. As the financial year of most paper making companies closes on the 31st March, we have been unable to obtain complete information as to the realised prices in 1937-38. Indian mills were not able to take full advantage of the rise in the prices of imported paper because contracts with the Central and Provincial Governments were already settled on the basis of 1936-37 prices. The average price of paper for contracts made by the Controller of Stationery was Rs. 422 per ton, only Rs. 3 higher than the price for 1936-37. Mills were able to increase prices for the ordinary consumer, but they did not do so to the full extent that the rise in the price of imported paper warranted. So far we have been able to ascertain, the price of protected classes of paper was raised by about 3 pies per lb. The average price realised by two companies which manufacture mainly protected classes of paper was Rs. 434. The average contract price for 1938-39 with the Controller of Stationery which is based on 1937-38 prices has increased from Rs. 422 to Rs. 453 per ton equivalent to nearly 3 pies a pound.

For purposes of comparison we shall next consider the c.i.f. price of wood free white printing in April, 1938. The lowest price touched was £22 per ton. Adding Rs. 6 per ton landing charges, the landed price less duty would be Rs. 300. The difference between this figure and the fair selling price of Rs. 381 is Rs. 81. Adding Rs. 23 for difference of quality the protective duty required would be Rs. 104.

It would, however, be unsafe to assume that import prices will be maintained at this level. In view of the recent downward trend of prices, the probability is that the level of prices will fall further by April, 1939. Nor can we leave out of account the possibility of competition from cheap Japanese paper, imports of which are likely to increase when conditions in the Far East become more settled. Japanese wood free white printing paper was quoted as low as £15·10 per ton c.i.f. Bombay in the early part of 1936-37.

Taking all points into consideration, we propose to take the average price realised in 1936-37 and 1937-38 by two companies, which manufacture mainly protected classes of paper, namely 3 annas 0·28 pies per lb. or Rs. 423 per ton as the equivalent of the import price. We have left out of account the figures of the third company as a considerable proportion of its production consists of low grade paper. Deducting the duty of Rs. 175 per ton, the price of imported paper may be taken as Rs. 248. The difference

between this figure and the fair selling price of Rs. 381 is Rs. 133 per ton. The measure of protection required may, therefore, be taken as 11 pies per pound. This protective duty is 1 pie per lb. less than the measure of protection recommended by the Tariff Board of 1931 and 4 pies per lb. less than the present protective duty, including revenue surcharge of 1 anna 3 pies per lb., a reduction of approximately 27 per cent. If, however, the price of wood free printing paper should fall below £18 per ton c.i.f. we recommend that action should be taken under Section 4 (1) of Act No. XXXII of 1934 to prevent the protective duty being ineffective.

72. We shall now state the probable effect of our recommendations on the financial position of the different classes of mills.

Effect on financial position of companies. On our calculations established mills using bamboo or bamboo and grass as their main raw material for the manufacture of pulp should be able to realise the fair selling price we estimated. In 1936-37 one company operating two mills paid dividends on its ordinary and deferred shares at 65 per cent. The Company points out that the ordinary shares of the company were written down by 75 per cent. in 1925 and that on the original value of the shares a dividend of 65 per cent. is equivalent to 16½ per cent. The second Company paid a dividend of 25 per cent. in 1937 on its ordinary shares. The dividend of the third company was 6 per cent. As the prices realised in 1937-38 were higher, the margin of profit of all three companies should be larger.

The two mills using grass as their main raw material for the manufacture of pulp are situated in the United Provinces and the Punjab. Their costs of manufacture will be higher than the cost of bamboo mills, but they enjoy a freight advantage in North India which should enable them to earn a reasonable profit. One of the companies increased its rate of dividend from 5½ per cent. in 1936 to 7 per cent. in the first half of 1937 and to 8 per cent. in the second half. The other company has only recently started manufacture.

The position of mills who do not use either bamboo or grass as their raw material, will be less easy. One old established company has not been able so far to pay a dividend exceeding 4 per cent. and in some years has paid no dividend at all. It has, however, effected improvements which should reduce the cost of manufacture and realised higher prices in 1937-38. This company and another company, which began manufacture in 1935-36, will benefit by the reduction in the duty on imported pulp, since the proportion they use is generally higher than in other mills.

As regards mills under construction or reconstructed mills, four mills will use bamboo as their main material for the manufacture of pulp and two mills will use grass.

We have compared the estimates of the cost of manufacture as given in the prospectuses issued by new companies and as given in their written and oral representations to us. One Company, which proposes to use bamboo as raw material, in its prospectus

estimated the cost of production of writing paper at Rs. 200-225 per ton and the profit at Rs. 80 per ton after providing for all contingencies, assuming a realised price of Rs. 360 per ton. In their written representation they have estimated the works costs at Rs. 337. This figure includes Rs. 70 on account of sales organisation and Rs. 20 for income-tax. Excluding the income-tax item and allowing Rs. 13 for sales expenses, which is the average figure under this head in the estimates submitted by other mills, the works cost would be Rs. 260. They have estimated their overhead charges at Rs. 72 and if we accept this figure, the total cost of production would amount of Rs. 332 per ton.

A second company which proposes to use bamboo as its raw material in its prospectus gave the total cost of production as Rs. 250 per ton and the expected net selling price as Rs. 350. In their representations to us they have revised their estimate and given a figure of Rs. 387 as their cost of production which appears high, as they expect to obtain bamboos at the rate of Rs. 12 per ton.

A third company using grass as its raw material in its prospectus estimated the cost of production at Rs. 300 without allowing for depreciation and other charges, and the expected selling price as Rs. 410. This company worked for 9 months in 1937 during which period the works cost was estimated to be Rs. 380 per ton without allowing for overheads.

A fourth company which proposes to use grass as its raw material has given the cost of production without overheads as Rs. 270 in its prospectus. If Rs. 72 is allowed for overheads, the total cost of production would be Rs. 342. This company made no formal representation to us.

The costs of production in figures stated in the prospectuses issued by new companies are distinctly low. Some of the figures subsequently given by the companies' representatives in their oral or written representations are on the high side. We do not expect that their actual costs of production will exceed those of established mills, when they are in a position to manufacture to their full capacity. Their machinery will be of the most modern type which, with efficient management, should enable them to produce paper at a price comparable with the cost of production by established mills and, as their block capital is comparatively small, the incidence of overhead charges should be lower.

73. Finally, we have to consider whether any change is necessary in the classification of paper as given in the Tariff Schedule to ensure that the measure of protection proposed will be effective.

There is unanimous agreement among manufacturers, importers, traders and Customs Collectors that the classification recommended by the Tariff Board of 1935 has, on the whole, worked very satisfactorily. The changes proposed did not necessitate any immediate alteration in the Tariff Schedule, but were effected by

executive instructions to Customs officials defining the kinds of disputed papers which should be considered to fall under the protected or unprotected classes. In effect, however, the range of protection was extended because certain kinds of paper which were previously regarded as falling under the unprotected class were, as a matter of Customs practice, included in the protected class. Such recommendations of the Board as required legislative sanction were deferred for future action when convenient.

Following the issue of orders by the Government of India on the recommendations of the Board in May, 1936, a few disputes as to the classification of paper arose, but none have occurred since the early part of 1937. The two main difficulties in Customs administration are firstly, the determination of the fibre content of paper, *i.e.*, whether paper contains more than or less than 70 per cent. mechanical pulp, and, secondly, the determination of the degree of 'sizing' in paper, *i.e.*, whether paper with a high mechanical pulp content, which is ordinarily used for printing and so liable to a revenue duty, is sufficiently hard sized to be suitable for writing and therefore to be classed as writing paper liable to the protective duty.

In regard to the fibre content of paper, the test employed is the 'Spence and Krauss', a description of which is given in the Tariff Board report of 1935. It is agreed that this test has worked satisfactorily. In border line cases Customs officials are authorised to allow a 5 per cent. margin and a further 5 per cent. at their discretion if they are satisfied that the order placed by the importer was genuinely for paper containing not less than 70 per cent. mechanical pulp. In disputed cases a further test by what is known as the Phloroglucinol method can be carried out in laboratory attached to the Central Board of Revenue.

The question of the 'sizing' of paper is much more difficult. The test applied at Customs Houses is the rough and ready 'writing test'. If, when the paper in dispute is written upon with a standard kind of pen and a standard kind of ink, the ink spreads on the surface, the paper is treated as printing paper and, if it does not spread, as writing paper. The criticism has been made that the test is not scientific and too dependent on personal factor, but none of the witnesses examined have been able to suggest a better test. A number of tests have been invented in other countries, but none of them are considered suitable for Indian conditions where variations of temperature and humidity are wide at different periods of the year. In practice it is admitted that the writing test has worked reasonably well and that the number of disputed cases has been small.

A point raised by manufacturers is that casing paper, *i.e.*, wrapping paper glazed on both sides is used as account book paper. This is disputed by the importers and traders, who state that casing paper is ordinarily used as wrapping paper or packing and very rarely, if at all, as writing paper. It is impossible to get over the difficulty mentioned by previous Tariff Boards that almost all

kinds of paper can be written on or printed on, whatever their main use is. On the evidence before us we consider that casing paper is correctly classified as wrapping paper and that its use for account book purposes is exceptional and to a very limited extent which cannot justify its classification as writing paper.

We have given the most careful consideration to the question whether a more scientific and simpler scheme of classification can be devised and have examined a number of witnesses. Importers, manufacturers and Customs officials are in agreement that, if the scope of protection is not to be extended to new classes of paper, there is no advantage in changing the scheme of classification recommended by the Tariff Board of 1935, and that any change would be likely to give rise to new difficulties. The existing scheme is now well understood by all parties and its general suitability is to be judged by the circumstance that no disputes have arisen during the last twelve months and comparatively few even when the scheme was first introduced. Every alternative that can be suggested has, so far as we can see, some objection and any change even if theoretically possible would create new uncertainties and fresh complications. We, therefore, recommend that the scheme of classification recommended by the Tariff Board of 1935, as now interpreted in Customs practice, should be allowed to continue, in the main unchanged.

One point of detail relating to so-called badami paper has, however, arisen which requires consideration. The Tariff Board of 1935 found that hard sized paper having a mechanical wood pulp content of not less than 70 per cent. was being imported as printing paper, though intended to be used and actually used as writing paper. It, therefore, recommended that white and buff or badami paper above substance 26.6 grammes, when hard sized suitable for writing upon, should be treated as writing paper subject to the protective duty. This recommendation was accepted by the Government of India, who issued executive instructions that hard sized white and buff or badami mechanical paper should be treated as writing paper. Buff and badami papers were defined as papers in the manufacture of which no dyes or pigments have been added, but this definition was subsequently omitted as it was found that badami paper, even if white, might contain some dye or pigment.

It has been brought to our notice that hard sized paper similar in substance to ordinary badami has been imported coloured otherwise than white and buff or badami, as for example pink, in order to escape the protective duty. Our attention has been specially drawn to a specification of paper in a tender notice issued by one Provincial Government in the following terms:—

"Item 7. Tinted News Printing 554 tons, maximum substance 74 G.S.M. Minimum substance 63 G.S.M. Specification—Item No. 7 Tinted News Printing—This is to be either cream, pale blue, or pale pink or other pale tint but not buff, badami, or white, should be of good standard quality containing not less than 65 per cent. mechanical wood, reasonably free

from specks, and sufficiently sized and glazed. Should also be suitable for writing on with ink. Maximum ash limit 15 per cent."

Doubts have been raised as to whether hard sized paper suitable for writing purposes, if tinted in the shades specified, would be subject to the protective duty and Customs officers whom we have consulted hold different views.

It appears to us anomalous that a class of paper suitable for writing upon should be classed as printing paper subject to revenue duty merely because it is tinted a different shade though similar in substance to paper liable to the protective duty coloured white, buff or badami. To meet this difficulty we suggest that for the words 'except white and buff or badami above substance 26.6 grammes per square metre' in the draft schedule at page 21 of the report on the Classification of paper for tariff purposes be substituted the words 'except white and buff or badami and other hard sized mechanical papers above substance 26.6 grammes per square metre'.

We have carefully considered the other changes in wording proposed by the Tariff Board of 1935 in its draft schedule. In all cases we consider that the reasons given for the proposed changes are sound and need no restatement.

74. The Tariff Schedule, if our recommendations are accepted, will read as follows:—

Item No.	Name of article.	Nature of duty.	Standard rate of duty.
43	Wood pulp	Protective . . .	Rs. 35 per ton or 25 per cent. <i>ad valorem</i> whichever is higher.
44	Writing papers		
	(a) ruled or printed forms (including letter paper with printed headings) and envelopes made of writing paper and account and manuscript books and the binding thereof.	Protective . . .	11 pies per lb.
	(b) All other sorts	Protective . . .	11 pies per lb.
44 (1)	Printing paper excluding stereo and all coated papers but including art paper, all sorts which contain no mechanical wood pulp or in which the mechanical wood pulp amounts to not less than 70 per cent of the fibre content.	Protective . . .	11 pies per lb.
44 (2)	Printing paper, all sorts, not otherwise specified, which contain mechanical wood pulp amounting to not less than 70 per cent of the fibre content.	Revenue . . .	
44 (3)	Papers, including all machine glazed papers, stereo, all coated papers except art paper, all deep blue papers, all unglazed thin news up to substance 35.5 gramme per square metre except white and buff or badami and other hard sized mechanical papers above substance 26.6 grammes per square metre, all sorts not otherwise specified.	Preferential revenue	
44 (4)	Paste board, millboard and cardboard, all sorts other than strawboard.	Preferential revenue	

Item No.	Name of article.	Nature of duty.	Standard rate of duty.
44 (5)	Strawboard, all sorts	Revenue.	
44 (6)	Trade catalogues and advertising circulars imported by packet, book or parcel post.	Free.	
44 (7)	Paper money	Free.	
44 (8)	Newspapers, old, in bales and bags	Revenue.	
45	Articles made of paper and papier mache; stationery including drawing and copy books, labels, advertising circulars, sheet or card almanacs and calendars, Christmas, Easter and other cards, including cards in booklet forms; including also waste paper but excluding paper and stationery otherwise specified.	Preferential revenue.	
45 (1)	Books, printed, including covers for printed books, maps, charts and plans, proofs, music, manuscripts, and illustrations specially made for binding in books.	Free.	
45 (2)	Prints, engravings and pictures (including photographs and picture post-cards) on paper or cardboard.	Revenue.	

75. We would recommend that the nomenclature of the Act extending the period of protection to the industry should be changed.

Change in nomenclature of Act. India Act No. VI of 1932 which follows the wording of Act No. XXV of 1925 and Act No. XX of 1927 is called the Bamboo

Paper Industry (Protection) Act and the object is stated to be the fostering and development of the bamboo paper industry in British India. While we consider that the case for the protection of the Industry depends mainly on the use of bamboo as raw material, we have recommended that grass and other indigenous material should be recognised as playing an important, if subsidiary, part in the development of the industry. We would, therefore, suggest that, if our recommendation for the extension of protection to the Industry is accepted, the amending Act to extend the period of protection be named the Paper Industry (Protection) Act and the object of the Act be declared to be the fostering and development of the use of indigenous material such as bamboo and grass in the manufacture of paper in India, so that grass may be recognised as an important ingredient in the manufacture of paper as both the Tariff Board of 1931 and ourselves have found.

Supplementary proposals.

78. Considerable progress has been made in the training of apprentices on both the manufacturing and engineering sides of the mills. In 1931 mills were not altogether satisfied with the class of men recruited as apprentices as several threw up their appointments because they found the work exacting. There is general agreement that there has been an improvement in the young men more recently recruited, very few of whom have fallen out except for unavoidable reasons such as ill-health. Apprentices are engaged usually after completion of their High School courses, but several have passed through the University Course as well. We are informed that in England training on the manufacturing side often begins at the age of 15 and that, speaking generally, the younger the apprentices begin, the better.

No important results requiring special mention have been obtained in the period since 1931, but recently the Institute has taken up three new lines of enquiry, the possibility of making

'kraft' paper for wrapping purposes from bamboo pulp, the suitability of different kinds of wood for the manufacture of mechanical pulp, and the possibility of making paper or boards from bagasse, the fibrous material of sugarcane remaining over after crushing which has hitherto been used only as fuel. The plant for experimental research has been recently installed and in some respects is still incomplete, so it is premature to draw conclusions from the experiments in progress.

80. Bamboo pulp has been produced in a form suitable for the manufacture of kraft paper and small quantities of paper have been turned out on the miniature paper machine in use. The pulp made compares favourably with samples of Swedish kraft pulp in respect of the breaking length and the burst factor. For want of apparatus it has not been possible to 'finish' the paper so as to make it comparable in all respects with imported 'kraft' but the tests so far made indicate that in strength 'kraft' paper made from bamboo should be in no way inferior to similar paper made from wood pulp. The results obtained have been promising enough to encourage a new company to undertake the manufacture of kraft paper in a mill which is already under construction and is expected to begin production in the course of a few months.

81. Experiments on the manufacture of mechanical pulp had begun only a few days before the date of our inspection. The wood under trial was pine (*pinus longifolia*) which is available in an area of the United Provinces accessible enough to render exploitation on a commercial basis possible. The pulp made from the pine wood under trial appeared to be not unsuitable in most respects but was defective in colour. Seventeen other varieties of trees of the broad leaves species have been selected for experiment from different parts of India.

82. The possibilities of 'bagasse' as raw material for the manufacture of paper or paper boards have recently aroused considerable interest. The experience of other countries indicates that bagasse is suitable for the manufacture of paper with an admixture of other pulp and can also be used in the production of boards of different kinds. The boards made at the Institute appear to be satisfactory in quality. Additional plant is required to test the possibility of making insulation boards.

83. The Paper Industry in India is growing rapidly in importance. Including new mills under construction, the capital invested may be estimated at Rs. 4.39 crores. The value of the annual output of paper is over Rs. 2 crores which is likely to be considerably increased in the course of the next two years when new mills come into operation. The expenditure in the

paper pulp section of the Forest Research Institute has averaged Rs. 25,000 during the last six years. This amount is, in our opinion, totally inadequate for present requirements of research and still less for future needs. The Institute is deficient in both equipment and staff. At our request an estimate has been prepared of what is considered necessary for immediate requirements amounting to Rs. 40,000 for non-recurring expenditure on equipment and additional accommodation, and Rs. 14,000 for recurring expenditure on additional staff, etc. (see Appendix B). This estimate appears to us to represent the minimum required.

As the industry enjoys the benefits of protection we consider that it may fairly be called upon to make some contribution to the cost of the paper section of the Institute. Voluntary contributions to a total of Rs. 4,000 have recently been made but are not, in our opinion, adequate. A cess of 4 annas a ton on the present output of 48,000 tons would yield Rs. 12,000 and an additional Rs. 10,000 when the mills under construction are working to their full capacity. A contribution on this basis would be no hardship and should be more than compensated by the benefit the industry will derive from systematic research on a more adequate scale. The Indian Paper Makers Association, whom we addressed on the subject, state that they object on principle to the levy of a statutory cess to finance work over which they have no control. They also point out that some mills have their own research departments. They recognise, however, that the value of the work at the Forest Research Institute would be enhanced and stabilised if the Institute were guaranteed a fixed income from the Paper industry for a period of years. If the mills are able to come to an agreement among themselves for a definite voluntary contribution of reasonable proportions for a fixed period, this method of procedure may be accepted. Otherwise we would recommend the levy of a cess on production. Any contribution made by mills should be in addition to the average expenditure already incurred from Central Revenues.

We attach much importance to this recommendation because the usefulness of the Institute as at present equipped and staffed is altogether too limited in scope. Though bamboo pulp has passed the experimental stage, there is room for further improvement in its quality. In regard to grass, the possibilities of utilising other varieties, which grow in abundance in many parts of India, have not been sufficiently explored. But most important of all lines of investigation is the question of the manufacture of mechanical pulp from wood. Until mechanical pulp is made in India, there is no possibility of the industry capturing the market for cheap mechanical wood printing paper which was imported to the extent of 37,000 tons in 1936-37, representing 35 per cent. of the total amount of paper consumed in India. The future development of the industry and the possibility of competition with the cheaper lines of imported paper is largely dependent on the production of mechanical wood pulp.

84. Another important line of investigation which requires urgent consideration is connected with the manufacture of cellulose

from bamboo or wood pulp. Cellulose from wood pulp is used in many countries in the production of 'staple' fibre, rayon yarn, cellophanes, lacquers, plastics and finishes. In 1931 an investigation was in progress on the possibility of making artificial silk from bamboo pulp, but was subsequently held in abeyance. It seems to us unfortunate, considering the importance of cellulose in present conditions, that systematic investigation has not been continued. We understand that a sum of money has recently been set aside by the Cotton Cess Committee for experimental work on the manufacture of cellulose from other materials but not from bamboo or wood. We would suggest that the scope of the investigation be extended. Cellulose is the basic common material of both paper and artificial fibres. The possibility has to be envisaged of the formation of pulp manufacturing companies producing pulp from bamboo or wood which can be used either in the manufacture of paper or in the manufacture of staple fibres. From this point of view alone, apart from the wider aspects of the case with which we are not directly concerned, we suggest that the matter deserves the most serious consideration.

85. Another direction in which the usefulness of the Institute to the industry could be improved is by the periodical publication of statistical and technical information. Information Bureau. relating to the pulp and paper industries in other countries. We understand that for want of funds the Institute is unable to subscribe to as many foreign publications as is advisable, if its information on the world position of paper and pulp supplies, improvements in the process of manufacture, changes in standard practice and so on, is to be kept up to date. Nor are the results of experiments and tests conducted at the Institute made accessible as readily as they might be. An Information Bureau equipped with an up to date library would be a useful adjunct to the Institute. It would also appear advantageous to publish a monthly bulletin containing the results of research work in progress at the Institute and information of general interest to the industry, apart from answers to individual enquiries on technical matters.

86. Lastly, we desire to draw attention to the inadequacy of the accommodation and equipment available for the training of apprentices and periodical 'Refresher' courses for the younger employees of mills.

Training course for apprentices. With the opening of new mills applications for the enrolment of students for technical courses of instruction in paper making are likely to increase. As at present equipped and staffed, the Institute is not in a position to meet even the present demand.

87. We have endeavoured to obtain information about the production of handmade paper, a matter not touched upon in previous Reports.

The making of paper by hand was at one time the hereditary occupation of a number of families in many parts of India, but the industry has declined owing to the competition of machine-made paper. So far as we have been able to obtain information, handmade paper is now produced at four places in the United Provinces, at three places in Bombay, at one place in the Central Provinces, at one place in Madras and at six places in Hyderabad State. The total number of families employed probably does not exceed 200. One paper mill has recently taken up the manufacture on a small scale to meet a local demand.

The methods of production are primitive. The raw material used is mainly wastepaper and to a small extent hemp, jute and other fibres. Wastepaper is the easier material to work as it requires only to be soaked and kneaded to make pulp, whereas hemp or jute has to be pounded to disintegrate the fibre.

The pulp, after washing, is shaped in moulds and the sheets dried by sticking them on walls. Sizing material is then added and the sheets polished with smooth stones. A description of the process of manufacture as practised in Madras is given in Appendix C. In Hyderabad State, where the industry is believed to have been introduced in the reign of Aurangzeb, the process of manufacture is more elaborate. Hemp and wastepaper are used in the proportion of 40 to 60 and a better quality of paper obtained. 84 families are engaged in the industry.

The paper manufactured is mainly writing paper and to a small extent blotting paper. The defects are lack of uniformity in size, weight, thickness, finish and colour. The samples we have seen are not comparable with machinemade paper in texture or appearance. The writing paper made in Hyderabad State is, however, superior in quality and can be printed upon. It finds a market even in Bombay. The cost of production of Hyderabad paper is estimated at Rs. 6 per ream (*see* Appendix D) compared with Rs. 2-0-3 per ream the estimated cost of the inferior paper made in Madras. The annual value of the production is estimated at Rs. 25,000, of which H.E.H. the Nizam's Government purchased Rs. 15,000 worth.

Attempts have recently been made by the Governments of the United Provinces, Bombay and Madras to revive the industry. Tuitional classes under a trained instructor have been started in the United Provinces and a proposal is under consideration in Madras to send 10 students for training at Wardha in the Central Provinces. Encouragement is also given to the industry by Government purchases which have, we understand, been recently increased.

The production of handmade paper is not likely to expand to large proportions, because the demand is limited to those who prefer a handmade to machinemade paper, even though the quality may be inferior and the price higher.

The suggestion has been made that to encourage the industry pulp might be supplied from mills in barrels to cottage workers

for conversion into better classes of paper. The objection has, however, been raised that paper produced from millmade pulp cannot strictly be called handmade paper. The point appears to have been overlooked that the wastepaper, out of which handmade paper is mainly produced, may itself have been the product of a machine and possibly imported from abroad.

88. Pulp boards in small quantities are manufactured by paper mills out of wastepaper and other waste materials. A small mill in Bombay works intermittently in the manufacture of boards. Manufacture of washers for rollers in gin presses, using wastepaper and rags as raw material.

Experiments are being conducted at the Forest Research Institute, Dehra Dun, in the use of bagasse as material for the manufacture of insulation and press boards. A new mill under construction proposes to use bagasse for admixture with other raw material.

The manufacture of straw board is of growing importance. A mill located at Saharanpur in the United Provinces has increased its output from 1,970 tons in 1932 to 4,321 tons in 1937 and expects to produce 5,000 tons in 1938, and ultimately 7,000 tons. Two mills are working in Calcutta, the combined output of which is estimated at 3,500 tons. Another mill has recently begun manufacture near Delhi and a new mill is projected in Sind. The raw material used is wheat and rice straw, grass and other vegetable fibres. The straw board made is of satisfactory quality and is used in Government offices.

Imports of pasteboard, millboard and cardboard amounted to about 12,000 tons and of strawboard to over 13,000 tons in 1936-37. Pasteboard, millboard and cardboard all sorts are subject to a revenue duty of 30 per cent. *ad valorem* with a preferential rate of duty of 20 per cent. for the manufacture of the United Kingdom. Imports are mainly from Sweden, Germany, Netherlands, United Kingdom, Finland, Austria, Norway and Belgium. Strawboard is subject to a revenue duty of 20 per cent. *ad valorem*. Imports are mainly from Japan and Netherlands.

No claim has been made for the protection of board manufacture. The strawboard mill at Saharanpur is able to produce at a price which enables it to compete successfully with imported strawboard and has stated that it requires no protection. There appears to be no reason why Indian strawboard mills should not be able to meet almost the whole demand as soon as they are in a position to manufacture to their full capacity.

CHAPTER VII.

Summary.

- (1) The total consumption of paper including board in India increased from 82,735 tons in 1931-32 to 113,654 tons in 1936-37. The consumption of protected classes of paper increased in the same period from 48,131 tons to 55,204 tons. The output of Indian mills increased from 40,558 tons to 48,531 tons.
- (2) The number of mills working increased from 9 in 1931-32 to 10 in 1937-38.
- (3) In 1937-38 five mills were manufacturing paper from bamboo or bamboo and grass, two from grass, and three from rags and wastepaper.
- (4) One mill, which had ceased manufacture, is in course of reconstruction and four new mills are in course of erection. Of these five mills, four will use bamboo or bamboo and grass as their raw material, and one grass.
- (5) It is estimated that the total capacity of Indian paper mills will by 1940-41 have increased to 95,600 tons and their probable output to 80,000 tons.
- (6) The quantity of pulp manufactured from indigenous materials has increased from 17,571 tons to 35,374 tons. The quantity of imported pulp used has decreased from 20,081 tons to 10,976 tons. The proportion of imported pulp used by mills has fallen from 50 per cent. to 20 per cent. and is expected ultimately to fall to 5 per cent.
- (7) The quantity of bamboo available is sufficient for the requirements of existing mills and mills under construction or likely to be constructed. The average price of bamboo is Rs. 17 per ton.
- (8) The quantity of sabai grass available is limited and in one area is at present inadequate, but there are possibilities of improving the supply. There is also a possibility of utilising other varieties of grass. The average price of grass is Rs. 35 per ton.
- (9) The supply of subsidiary materials such as wastepaper and rags is adequate and is capable of expansion to meet the demand of new mills.
- (10) There has been fair progress in the use of Indian auxiliary materials such as china clay. Two new companies have been floated for the manufacture of bleaching material.
- (11) Important extensions and improvements of bamboo pulp plant have been carried out by mills to an estimated amount of Rs. 47 lakhs in the last six years.

- (12) There has been steady progress in the efficiency of manufacture of bamboo pulp, but there is still room for further improvement.
- (13) Machinery for the manufacture of paper from pulp is in some cases obsolescent and requires replacement.
- (14) The works cost of manufacture of unbleached bamboo pulp has been reduced from Rs. 196.65 per ton in 1930-31 to Rs. 133.45 per ton in 1936-37. The cost of manufacture of unbleached grass pulp has been reduced from Rs. 170.40 per ton to Rs. 147.
- (15) The future cost of manufacture of unbleached bamboo pulp is estimated at Rs. 114 per ton.
- (16) The future cost of manufacture of unbleached grass pulp is estimated at Rs. 173 per ton.
- (17) The future cost of manufacture of paper made mainly from bamboo or grass pulp is estimated at Rs. 337.5 per ton. With profit at 6 per cent. the fair selling price is Rs. 381.3 per ton.
- (18) The price of paper realised by mills decreased from Rs. 472 per ton in 1930-31 to Rs. 411 per ton in 1936-37.
- (19) The price of imported paper tended to fall in the period 1930-31 to 1935-36 but rose sharply in 1937. In the first quarter of 1938 the tendency was downwards, but the general level was above the average of the 1930-31—1935-36 period.
- (20) So far as information is available the price of paper realised by mills in the year 1937-38 was higher than in the preceding year, but the increase was less than the rise in the price of imported paper.
- (21) It is impossible to predict the future prices of imported paper with any certainty, but the tendency will probably be downwards.
- (22) We recommend that the present period of protection be extended by seven years from April, 1939.
- (23) We recommend that the measure of protection be fixed at 11 pies per pound, 1 pie less than the protective duty recommended by the Tariff Board of 1931 and 4 pies less than the present rate of duty, which includes a revenue surcharge of 3 pies.
- (24) The continuance of protective duty on imported pulp is recommended at a rate of Rs. 35 per ton or 25 per cent. *ad valorem* whichever is higher. This rate is Rs. 21.4 less than the present import duty of Rs. 56.4.
- (25) Important new developments in the industry are impending, but at this stage, for want of adequate data, we are unable to recommend the extension of protection to any class of paper not already protected.

- (26) We consider that the prospects of Indian mills being able to manufacture classes of paper not at present protected at a price which will enable them to compete with imported paper with the assistance of a moderate protective duty are sufficiently promising to require a further enquiry, which we recommend should take place at the end of 1939.
- (27) The classification of paper for the purpose of the Tariff Schedule recommended by the Tariff Board of 1935 has worked satisfactorily. We recommend that this classification be adopted for a new Tariff Schedule with some minor alterations.
- (28) We recommend that the nomenclature of the Act extending the period of protection be changed to the Indian Paper Industry (Protection) Act.
- (29) We find that reasonably rapid progress has been made in the Indianisation of the industry.
- (30) We recommend that the Paper Section of the Forest Research Institute, Dehra Dun, be extended and more adequately equipped.
- (31) We have enquired into the manufacture of handmade paper as a cottage industry and find that the possibility of its development is limited.
- (32) We find that the manufacture of boards, especially straw-board in India has made considerable progress. No protection for this branch of the industry is required.

G. T. H. BRACKEN,
President.

F. I. RAHIMTOOLA,
Member.

H. C. SEN,
Secretary.

BOMBAY,
7th May, 1938.

APPENDIX A.

Quantities of Auxiliary Materials used by Mills in 1936-37.

Auxiliary materials.	" A " MILL.		" B " MILL.		" C " & " D " MILLS.		" E " MILL.		" F " MILL.	
	Indian.	Imported.	Indian.	Imported.	Indian.	Imported.	Indian.	Imported.	Indian.	Imported.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1. Sulphur	..	1,466.77	..	..	..	76	..	..	..	..
2. Magnesite	1,100.07	..	..	..	..	..	..	..	..	..
3. Soda Ash ¹	..	..	..	..	..	..	..	6.5	..	2
4. Caustic Soda	..	..	..	1,002	..	1,791	..	23.9	..	37
5. Silicate of Soda	..	..	..	..	..	5	..	1.75	..	..
6. Sodium Sulphite	..	..	..	..	6	..	..	..	..	..
7. Hydrochloric Acid	..	..	..	..	17	..	..	..	..	..
8. Lime	..	..	3,787	..	7,768	..	..	..	679	..
9. Salt Cake	..	..	..	305	..	547	..	..	..	..
10. Salt	..	..	..	..	..	3,387	..	..	..	..
11. Sulphuric Acid	..	..	50	..	21	..	..	..	..	..
12. Bleaching Powder	..	1,197.40	..	954	..	94	..	24*	..	593
13. China Clay	..	..	1,290	..	2,340	..	..	105	151	..

* A certain quantity of Indian product is used.

Quantities of Auxiliary Materials used by Mills in 1936-37—contd.

Auxiliary materials.	"A" MILL.		"B" MILL.		"C" & "D" MILLS.		"E" MILL.		"F" MILL.	
	Indian.	Imported.	Indian.	Imported.	Indian.	Imported.	Indian.	Imported.	Indian.	Imported.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
14. Paperine	..	..	..	..	..	4	..	..	..	..
15. Rosin	192.23	..	179	..	582	..	111.79	..	88	..
16. Alum Ferrie	..	..	731	..	1,272	..	..	..	425	..
17. Alum Sulphate	..	..	..	16	..	..	..	132.65	..	..
18. Glue	..	..	..	..	3	..	..	..	..	..
19. Casein	..	..	..	..	11	..	..	..	..	1.51
20. Alkali	..	..	..	8	..	17	..	..	..	..
21. Beweld size	1	..	..	..	..	..	..	..	..	..
22. Starch	..	..	..	..	..	..	..	1.30	..	..
23. Gelatine	..	..	1	..	..	..	..	..	..	..
24. Potassium Ferrocyanide	..	..	..	..	..	..	..	..	..	..
25. Dyes	..	..	..	9	..	33.56	..	..	..	7.5
26. Katni clay and ochres	..	..	..	..	..	..	19.80	..	59	..
27. Sulphate of ammonia	331.09	..	..	..	..	..	..	..	..	..
28. Sodium Alminate	..	..	..	50	..	..	..	..	..	..

APPENDIX B.

Funds urgently required by the Paper Pulp Section of the Forest Research Institute.

Approximate cost.
Rs.

I. Machine and Plant—

Kraft investigation.

1. Bamboo crushing and feeding equipment 6,000
2. Jordan refiner 3,000

Mechanical pulp investigation.

1. Pulp thickener and pocket feeding equipment 3,500

Paper Machine equipment for above.

1. One pair special press rolls 2,500
2. Rotary screen 4,000

Laboratory equipment.

1. Testing apparatus (porosity, surface, etc.) 1,500
2. Apparatus for air conditioned rooms 3,500

II. If research on artificial silk is taken up, the following apparatus will be required immediately—

- Laboratory apparatus 3,000

III. Erection and fitting of above machines and supplying and fitting extra laboratory benches for new assistants 3,000

IV. Extension of existing laboratories for air conditioned testing room and laboratory for new assistants (including gas, water and light connections) 10,000

Total Rs. 40,000

Estimate of proposed extra expenditure for the Paper Pulp Section of the Forest Research Institute.

Rs.

- I. One Assistant for Mechanical pulp at Rs. 200 per mensem 2,400
- One Assistant for kraft at Rs. 200 per mensem 2,400
- One Assistant for bamboo and general work at Rs. 200 per mensem 2,400
- One record and Store keeper at Rs. 50 per mensem 600
- 4 khalassies at Rs. 12 per mensem 576
- One fitter at Rs. 40 per mensem 480
- Chemicals, apparatus, etc. 500
- Travelling allowances 1,000

	Rs.
Extra expenses on coal, water, electric current, etc.	500
Contingencies	144
Total Rs.	11,000
II. If research on cellulose and artificial silk is taken up the following extra funds will be required:—	
One Assistant on Rs. 200 per mensem	2,400
One khalassi on Rs. 12 per mensem	144
Chemicals, apparatus, etc.	456
Total Rs.	3,000

APPENDIX C.

Description of the process of manufacture of paper and pulp as practised in Madras.

The methods of manufacture followed at Amanjikarai are crude. Packing boards for the bookbinders and rough sheets of paper for use in Elementary schools for copy writing are produced. The raw material is wastepaper which is soaked in water in large brick tanks and allowed to soak for a day or two. When the material is sufficiently soft it is removed from the tanks and laid on the ground in a heap so as to allow water to drain off. Then the operator tramples on the heap with his legs until the mass becomes homogenous and soft like pulp. The pulp is then taken to pits in the floor of the paper making room where the lumps are thoroughly mixed with water and agitated with a bamboo stick. The frame on which the sheet is made consists of gauge of brass wire tied to a frame of bamboo sticks and over this another bamboo stick frame is placed. Holding the frame with both his hands the paper maker dips the sieve into the vat containing the paper pulp and lifts it as quickly as possible removing with the sieve some pulp and water. The water drains itself off as the sieve is lifted and placed on the vat with a stick underneath the sieve and over the vat in order to prevent the sieve from falling into the latter. The paper maker also presses the water out by placing a thick and rough cloth over the sheet and rolling over it a stick in order to enable the water to drain quicker. The whole mould is then inverted with the sheet on so that the rough cloth will be bottom most and then the sheet over it, then the wire gauze and finally the frame. The frame is removed and then the wire gauze leaving the cloth and the sheet over the pile of sheets made previously. When all these sheets are ready they are taken to a press and the water inside is slowly pressed out. As the pressure is released, each sheet is removed and left to dry in the open sun. When the sheet is dry, a brush is taken and thick conjee from boiled rice is smeared over the sheet and passed through a set of two rollers working under pressure. The second side is then smeared similarly with conjee and again passed through the rollers and then finally dried. The paper makers at Amanjikarai have also a cutting machine of crude design and the edges of the sheet are cut to the size required. The paper is then ready for the market.

2. The method of converting waste paper into pulp as followed at Amanjikarai is crude and one of the needs is to devise a cheap method of converting the wet and soaked wastepaper into pulp in a form of pug mill. As regards the raw material, proper sorting of the paper should be provided for. The wastepapers that are at present used are of various kinds and of different colours, and as these are not sorted, the resulting colour of the pulp is a dirty ash grey and it does not take any colour. If the cuttings could be sorted and the colours separated, each coloured waste could be manufactured into sheets of different colours and better prices would be realised. If a pug mill was introduced the resultant pulp would be more homogenous and the texture of the paper would therefore be better. Another defect in the manufacture is in the mixing of the pulp before the sheet is made. As the bamboo sticks in use do not give a uniform consistency, the sheets vary in thickness whilst a single sheet is often of different thicknesses. This difficulty could perhaps be overcome by designing a suitable paddle wheel for fixing at the bottom of the vat. Another defect is in the method of adding water and pulp to the vat whilst making the sheets. As every sheet is taken out, some quantity of pulp is removed from the vat along with the water that is in the sheet. One feature of the work at Amanjikarai is that the sheets are passed through rollers whereas in some hand paper making centres in other parts of India the polishing is done by rubbing the paper surface with a stone. The set of rollers in use is not, however, sufficiently strong and heavy to permit of a good polish being given to the paper. If the rollers were increased to five in number, the polish would be better provided that the quality of the pulp was improved and uniformly beaten or milled and ground into a uniform paste.

APPENDIX D.

Cost of making 9 reams of local handmade paper (size 17" x 27") containing 40 per cent. hemp and 60 per cent. wastepaper.

Item No.	Particulars.	Rs. A. P.
1.	Cost of 120 lbs. hemp	5 0 0
2.	Cost of 120 lbs. waste paper including cart hire	2 8 0
3.	Dusting and storing of raw material	1 0 0
4.	Caustic soda 2 per cent. on wastepaper and 5 per cent. on hemp	2 4 0
5.	Fire wood for boiling hemp with caustic soda	2 0 0
6.	Washing out caustic soda from hemp and wastepaper	0 4 0
7.	Pulping charges for hemp	8 0 0
8.	Pulping charges for wastepaper	3 8 0
9.	Bleaching and washing charges	4 0 0
10.	Paper making, i.e., vatman's wages	13 8 0
11.	Paper drying	1 4 0
12.	Rosin, soap and alum sizing	1 0 0
13.	Starching	3 12 0
14.	Glazing, cutting and packing	5 0 0
15.	Cart hire and sales expenses	1 0 0
Total cost of production		54 0 0

or O.S. Rs. 6 per ream.

The selling price of paper is from Rs. 6 to 7 per ream.

(All figures given are in Hyderabad Government currency and may be converted into British Indian Rupees by multiplying them 6/7.)

