

APPENDIX 1

(Referred to in paragraph 1)

**The Reference made by the Board of Trade**

The Monopolies and Restrictive Practices Acts 1948 and 1953, as amended by the Restrictive Trade Practices Act 1956

**Reference to the Monopolies Commission  
Flat Glass**

Whereas it appears to the Board of Trade that it is or may be the fact that conditions to which the Monopolies and Restrictive Practices (Inquiry and Control) Act 1948 (hereinafter called 'the Act of 1948'), as amended by the Restrictive Trade Practices Act 1956, applies prevail as respects the supply of flat glass:

1. Now, therefore, the Board of Trade in pursuance of section 2 (1) of the Act of 1948, as so amended, hereby refer to the Monopolies Commission for investigation and report the matter of such supply.

2. The Commission shall as respects such supply investigate and report on whether conditions to which the Act of 1948, as so amended, applies in fact prevail, and, if so, in what manner and to what extent.

3. The Commission, if they find that the conditions in question prevail, shall also investigate and report on—

- (1) the things which are done by the parties concerned as a result of, or for the purpose of preserving, those conditions; and
- (2) whether the conditions in question or all or any of the things done as aforesaid operate or may be expected to operate against the public interest.

4. In this reference 'flat glass' means cast, rolled or figured glass, including wired glass; sheet or window glass; float glass, polished plate glass, including polished wired glass; toughened or laminated safety glass.

D. R. SERPELL

*A. Second Secretary of the Board of Trade.*

Dated this 2nd day of July 1965.

APPENDIX 2  
(Referred to in paragraph 4)

**Principal Sources of Evidence**

British Indestructo Glass Ltd.  
British Motor Holdings Ltd.  
The Flat Glass Association  
Ford Motor Company Ltd.  
National Sheet Glass Merchants' Association  
Pilkington Brothers Ltd.  
Emile Regniers & Co. (London) Ltd.  
Triplex Holdings Ltd.

Evidence was also obtained from other suppliers of safety glass, importers of flat glass, users and trade associations, from certain Government Departments, from the British Standards Institution, from a large number of distributors and from architects.

## APPENDIX 3

(Referred to in paragraphs 16, 17, 58, 107 and 192)

### Manufacturing Processes

#### Raw Flat Glass

1. The main raw materials used in glass manufacture are sand, soda ash, dolomite and limestone, to which other ingredients may be added to produce the properties desired. The materials are weighed and mixed mechanically and a proportion of 'cullet', or broken glass, is added to the mixture. The mixture is then fed into a melting tank in which it is subjected to temperatures varying from 1,200 degrees C. to over 1,500 degrees C. in different parts of the length of the tank. In the final stage of the melting process, the glass is cooled to a temperature at which its consistency is suitable for forming. A glass melting tank may be as large as 120 ft. long by 35 ft. wide and 4 ft. in depth, and may contain up to 1,200 tons of molten glass.

2. In modern methods of flat glass manufacture, each type of glass is made by a continuous process. The raw materials are fed into one end of a tank furnace, melted, refined, cooled and drawn or cast from the other or working end of the tank in the form of a continuous ribbon. A tank normally operates with minor interruptions for the natural life of the furnace, which may be as long as five years.

#### Sheet glass

3. In the manufacture of sheet glass, the molten glass passes from the tank into a drawing kiln, from which it is drawn as a vertical or horizontal ribbon. Where manufacture is by the vertical process, there are a number of such drawing kilns to each tank—usually four or five.

4. The basic difficulty of this process is that the ribbon tapers off (or 'waists' away) unless some means is found to maintain its width. Various methods of solving this problem are in current use on both the Fourcault and Pittsburgh vertical processes and on the Libbey-Owens horizontal process. The process used by Pilkington is a modified and improved version of the Pittsburgh process. This process is started by lowering a 'bait' (in this case an iron grille) into the molten glass. Glass adheres to the bait, which is then slowly raised, drawing behind it a sheet of glass. The width of the ribbon is maintained by drawing it past coolers, after which its edges are gripped and cooled by rollers to prevent subsequent 'waisting'. The ribbon, or sheet, then passes through a cooling box from which it is drawn up a tower between rollers; during this part of the process the bait is cracked off and the sheet is further cooled. The continuous ribbon of glass can then be cut off into lengths and the edges trimmed. In sheet manufacture the thickness of the glass is determined by the temperature in the kiln, the speed of drawing, the skill of the operator and the accuracy of the machine. Glass of less than 1.2 mm. thickness cannot easily be made by the process described above.

### **Cast, rolled, figured and wired glasses**

5. The continuous flow process used in making cast and rolled glasses consists basically in delivering molten glass from a tank to be nipped between a pair of casting rollers, which shape the glass to the required width and thickness. Contact with the water-cooled casting rollers brings the temperature of the glass down to a 'near-set' state and the ribbon then passes through a horizontal lehr where it is annealed, after which it is cut to size. By engraving the polished surface of one or both rollers, patterns can be imprinted on either side of the ribbon. The original type of cast glass is rough cast plate. In this case, the lower roller bears a fine ribbed pattern, the function of which is to conduct heat away from the surface of the glass after forming. Due to the cooling effect of the rollers, the glass is not fire polished and takes the imprint even of the top, nominally smooth, roller. For figured rolled and cathedral glasses a more formal pattern is engraved into the casting rollers. Deeply imprinted patterns are grouped under the heading of figured rolled glasses, whereas shallow patterns are known as cathedral glasses.

6. In the production of wired glass by the modern method, a sandwich technique is used. Wire mesh is applied on top of a thin ribbon of glass and a second ribbon is flowed on top of the wire. The sandwich is then compressed to the required thickness by passing it between patterned casting rollers. Pilkington supplies wired glass in three alternative patterns of mesh, viz., square, diamond or hexagonal, although the hexagonal is in process of being withdrawn.

### **Polished plate**

7. Polished plate is produced by grinding and polishing rough cast plate (see paragraph 5). After passing between casting rollers and through the annealing lehr, the ribbon is fed, without interruption, into a machine in which both surfaces of the glass are ground simultaneously. After grinding, the glass is cut into plates and the ground surfaces are polished to give clear undistorted vision. The grinding and polishing process may also be applied to wired glasses. Pilkington regards the manufacture of plate glass as an obsolete process and no longer makes it.

8. A complete polished plate production line comprising the tank, lehr, twin grinder and continuous polisher is roughly 1,400 ft. long. A disadvantage of such a highly integrated system is that it is less flexible than the discontinuous methods previously used and, once the production line has been stopped, it is a long and expensive operation to restart it.

### **Float glass**

9. In the manufacture of float glass, conventional raw materials are mixed and then melted in a furnace. Molten glass passes from the furnace to the float bath where it floats on molten tin. Heat applied from above melts out any irregularities in the glass, which is free to conform to the perfectly flat tin. As the ribbon passes through the float bath, the heat is reduced until the glass is sufficiently hard to be fed onto the rollers of the lehr without marking its under surface. The thickness of the glass is determined by the control of the physical forces and chemical condition to which the glass is subjected while it floats on the tin surface.

10. The float process eliminates the time-consuming grinding and polishing operations required to produce polished plate glass, thereby reducing the length of the production line by about half, and also eliminates losses due to ground-off glass. In terms of capital cost, a float plant is considerably less expensive than a new twin grinder plate manufacturing plant.

### **Safety Glass**

#### **Toughened glass**

11. Raw glass for toughening is sample inspected on arrival at the factory, interleaved with paper to prevent scratching and packed onto trucks ready for despatch to the production departments. All processing of the glass, such as cutting to shape and size, edge-work or drilling of holes to take fixtures, must be carried out before it goes through the toughening process, as toughened glass shatters if the outer surface is penetrated. At this stage, the glass is washed and again inspected.

12. In the production of flat toughened glass, the glasses are suspended in the toughening furnace on tongs. Curved toughened glass may be produced either by die bending or by sag bending. In the die bending process, the glass is curved by being pressed between male and female dies which close on it after it is withdrawn from the furnace. In the sag bending process, which is capable of producing only simple curves, the flat glass is placed horizontally on a steel skeleton ring mould and loaded into the furnace; as the glass softens, it sags until its edges rest on the rim of the mould.

13. The glass is heated in the furnace until it becomes soft, but not viscous, and virtually free from stress. It is then swiftly withdrawn from the furnace and cooled, or quenched, by jets of compressed air. During the final inspection, glasses are checked for size and for surface and edge quality. They are then subjected to a test blow by an automatic hammer and examined with a polaroid strain-viewing apparatus to see that the stress has been put in by the toughening process.

14. For windscreens, the glass is now usually differentially toughened, the quenching stage of the toughening process being modified to produce, in the event of breakage, a zone of coarser fragmentation in front of the driver's eyes. Triplex makes two types of 'zone toughened' glass, viz. 'wide zone', in which the whole vision area is evenly stressed so that it breaks into comparatively large particles, and 'zebra zone', in which the vision area is non-uniformly stressed so that vertical bands in it will break into comparatively large particles, separated by other bands of smaller particles.

#### **Laminated glass**

15. All glass used for laminating is inspected for defects on arrival at the factory before being prepared for despatch to the production departments. It is then cut to shape, washed and dried. In flat laminated production, glass then passes direct to an air conditioned assembly room, but in curved laminated production it must first pass to the bending furnaces.

16. In the production of curved glasses, it is not practicable to bend the finished laminate in the furnace as the plastic interlayer decomposes at a much lower temperature than the bending temperature of glass. The two

glass components must therefore be bent as a pair and kept as a pair throughout the laminating process. To prevent them from fusing together in the bending furnace, they are separated by a fine infusible powder. For simple curves, the glasses are subjected to a process of sag bending (see paragraph 12). Complex curves may necessitate the use of hinged moulds and careful control of the furnace heating elements by a skilled operator. Once the desired shape has been achieved, the mould passes from the bending zone to the annealing zone of the furnace from which the glass emerges, after gradual cooling, free from stress.

17. The interlayer, usually polyvinyl-butyril (commonly called 'vinal'), is a tough transparent plastic material which is stable, does not discolour and does not require edge sealing. It is first subjected to a drying process to reduce its moisture content, as the degree of moisture in the interlayer can seriously affect the fracture characteristics of the glass in which it will ultimately be incorporated. The dried interlayer is next cut to shape in an air-conditioned room. At this stage the vinal plastic is comparatively soft and would go solid if a parting agent was not used. It is therefore dusted with finely powdered bicarbonate of soda, which must be removed by washing before glass and vinal are assembled.

18. The vinal emerges from the end of the washing belt into the assembly room where both vinal and glass are inspected for cleanliness. The assemblies of glass and interlayer leave the assembly room and pass between a series of heaters and rollers to achieve preliminary adhesion. At this stage, the laminate is only partly transparent and adhesion is not complete. The laminate is subjected to further heat and pressure in an autoclave, from which it emerges perfectly transparent and with full adhesion. With the exception of stock sizes, which are kept or sold to be cut down for small orders, the edges of the laminated glass are then ground down or polished according to end use.

APPENDIX 4

(Referred to in paragraphs 28, 80, 127 and 132)

Statistics of Sales, Imports and Exports

Pilkington Brothers Limited: Net Sales of Reference Type Goods

Year ended 31st March	Product	Total home sales*		Sales to Triplex	Sales to own works for processing (including toughening)	Export sales	
		sq. ft. '000	£'000	% total home sales by quantity†	% total home sales by quantity†	sq. ft. '000	£'000
1961	RAW GLASS						
	Float/plate	44,762	7,122	37.1	12.0	40,085	6,037
	Sheet ...	262,300	7,040	12.0	0.9	61,316	1,831
	Cast glasses	95,769	4,256	—	0.8	23,944	1,121
	'Vitrolite'	2,182	364	—	0.9	223	43
Total ...	405,013	18,782			125,568	9,032	
	TOUGHENED	4,200	1,551	—	2.0	175	112
1962	RAW GLASS						
	Float/plate	47,024	7,568	36.4	9.2	25,280	3,749
	Sheet ...	271,521	7,541	11.5	0.7	70,728	2,060
	Cast glasses	97,069	4,470	—	0.8	17,978	847
	'Vitrolite'	1,873	303	—	0.7	156	29
Total ...	417,487	19,882			114,142	6,685	
	TOUGHENED	3,340	1,330	0.1	1.7	245	112
1963	RAW GLASS						
	Float/plate	49,412	8,050	35.6	9.8	35,057	4,878
	Sheet ...	276,532	8,005	13.2	0.8	77,369	2,371
	Cast glasses	93,384	4,513	—	1.0	17,674	814
	'Vitrolite'	1,735	279	—	0.3	132	23
Total ...	421,063	20,847			130,232	8,086	
	TOUGHENED	3,554	1,428	1.1	1.7	340	143
1964	RAW GLASS						
	Float/plate	52,222	8,278	37.0	9.0	38,372	5,308
	Sheet ...	315,456	9,577	15.2	1.0	70,934	2,245
	Cast glasses	102,547	4,959	—	1.1	17,561	827
	'Vitrolite'	1,764	277	—	0.2	205	34
Total ...	471,989	23,091			127,072	8,414	
	TOUGHENED	3,369	1,311	0.3	3.2	539	234
1965	RAW GLASS						
	Float/plate	77,381	10,516	50.2	7.1	45,506	6,328
	Sheet ...	313,172	9,400	9.1	1.3	78,826	2,605
	Cast glasses	107,403	5,220	—	1.6	22,701	1,071
	'Vitrolite'	1,665	258	—	0.1	263	42
Total ...	499,621	25,394			147,296	10,046	
	TOUGHENED	4,079	1,471	1.5	4.4	772	371

Year ended 31st March	Product	Total home sales*		Sales to Triplex	Sales to own works for processing (including toughening)	Export sales	
		sq. ft. '000	£'000	% total home sales by quantity†	% total home sales by quantity†	sq. ft. '000	£'000
1966	RAW GLASS						
	... Float/plate	85,503	11,127	55.0	5.5	33,321	4,664
	Sheet ...	283,867	8,536	2.1	2.0	65,215	2,028
	Cast glasses 'Vitrolite'	99,830 1,265	4,816 201	— —	1.7 0.1	21,155 300	955 46
	Total ...	470,465	24,680			119,991	7,693
	TOUGHENED	3,174	1,254	5.6	2.9	789	378
1967	RAW GLASS						
	... Float/plate	83,899	11,070	56.9	5.0	41,505	5,690
	Sheet ...	294,894	9,003	1.0	1.8	54,655	1,705
	Cast glasses 'Vitrolite'	102,309 1,001	5,180 179	— —	1.6 0.1	20,837 438	999 67
	Total ...	482,103	25,432			117,435	8,461
	TOUGHENED	2,624	1,040	0.3	3.6	754	407

\* Home sales include sales to the Republic of Ireland and the Channel Islands.

† The percentages of total home sales given in respect of the sales to Triplex and to own works are not directly related to the figures of net total home sales shown in the table as they are calculated upon gross figures.

### Triplex Safety Glass Company Limited: Net Sales of Reference Goods

	Year ended 30th June								9 months ended 31st March		Year ended 31st March				
	1961		1962		1963		1964		1965 (annual rate)		1966		1967		
	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	
<b>TOUGHENED</b>															
Flat ... ..	15,087	2,405	14,923	2,367	15,990	2,512	18,996	2,926	19,085	2,948	17,219	2,822	13,501	2,349	
Curved ... ..	11,634	3,483	11,915	3,654	16,736	4,975	22,429	5,952	24,794	6,203	25,672	6,554	25,750	6,750	
Together ... ..	26,721	5,888	26,838	6,021	32,726	7,487	41,425	8,878	43,879	9,151	42,891	9,376	39,251	9,099	
Television ... ..	196	35	452	78	378	62	512	84	251	41	22	3	—	—	
<b>Total</b> ... ..	<b>26,917</b>	<b>5,923</b>	<b>27,290</b>	<b>6,099</b>	<b>33,104</b>	<b>7,549</b>	<b>41,937</b>	<b>8,962</b>	<b>44,130</b>	<b>9,192</b>	<b>42,913</b>	<b>9,379</b>	<b>39,251</b>	<b>9,099</b>	
<b>LAMINATED</b>															
Flat ... ..	942	253	909	248	879	246	879	255	903	256	935	272	931	305	
Curved ... ..	1,261	1,025	1,550	1,323	1,338	1,239	1,655	1,512	1,599	1,478	1,676	1,596	1,802	1,823	
Together ... ..	2,203	1,278	2,459	1,571	2,217	1,485	2,534	1,767	2,502	1,734	2,611	1,868	2,733	2,128	
Television ... ..	180	75	227	56	150	42	244	76	123	39	31	10	—	—	
<b>Total</b> ... ..	<b>2,383</b>	<b>1,353</b>	<b>2,686</b>	<b>1,627</b>	<b>2,367</b>	<b>1,527</b>	<b>2,778</b>	<b>1,843</b>	<b>2,625</b>	<b>1,773</b>	<b>2,642</b>	<b>1,878</b>	<b>2,733</b>	<b>2,128</b>	
AIRCRAFT ... ..	N/A	498	N/A	725	N/A	561	N/A	781	N/A	558	N/A	576	N/A	662	
GOGGLES ... ..	N/A	24	N/A	21	N/A	27	N/A	38	N/A	33	N/A	33	N/A	37	
<b>GRAND TOTAL*</b> ... ..	<b>29,300</b>	<b>7,798</b>	<b>29,976</b>	<b>8,472</b>	<b>35,471</b>	<b>9,664</b>	<b>44,715</b>	<b>11,624</b>	<b>46,755</b>	<b>11,556</b>	<b>45,555</b>	<b>11,866</b>	<b>41,984</b>	<b>11,926</b>	
SALES TO PILKINGTON for export as percentage of value of TSG's total sales of reference goods ... ..	%		%		%		%		%		%		%		
	1.9		2.9		1.6		1.7		2.1		1.3		1.0		

N/A = Not available.

\* Total square footage does not include aircraft glasses or goggles, for which the quantities are small.

### Imports of Raw Flat Glass

	Plate		Sheet*				Total sheet*		Cast and rolled		Total imports	
			Not exceeding 4½mm.		Exceeding 4½mm.							
	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000
1950	3,668.6	357.7	4,124.1	86.8	3,236.0	155.5	7,360.1	242.3	468.5	44.3	11,497.2	644.3
1951	4,360.0	453.5	4,441.1	95.6	5,133.6	269.5	9,574.7	365.1	300.1	28.3	14,234.8	846.9
1952	1,846.2	216.0	2,303.3	44.9	3,453.4	177.6	5,756.7	222.5	303.8	36.1	7,906.7	474.6
1953	3,022.8	359.9	3,694.8	68.6	4,812.4	248.2	8,507.2	316.8	371.8	32.7	11,901.8	709.4
1954	3,572.6	411.2	4,290.0	82.4	5,117.0	273.2	9,407.0	355.6	458.5	48.3	13,438.1	815.1
1955	3,281.9	391.1	5,360.6	121.3	8,088.2	463.3	13,448.8	584.6	600.0	74.5	17,330.7	1,050.2
1956	3,299.3	389.4	4,918.0	135.2	6,825.7	452.9	11,743.7	588.1	752.1	83.4	15,795.1	1,060.9
66 1957	4,003.5	514.3	4,970.0	124.9	6,917.6	454.8	11,887.6	579.7	1,046.7	93.3	16,937.8	1,187.3
1958	7,036.7	956.6	6,449.7	169.9	8,330.0	540.4	14,779.7	710.3	1,262.2	123.4	23,078.6	1,790.3
1959	9,325.1	1,266.5	6,537.9	164.6	10,347.2	683.5	16,885.1	848.1	1,945.5	188.0	28,155.7	2,302.6
1960	9,049.1	1,314.5	8,836.1	229.3	13,774.5	922.2	22,610.6	1,151.5	2,729.4	268.7	34,389.1	2,734.7
1961	5,841.8	914.4	8,114.0	217.0	11,835.6	794.0	19,949.6	1,011.0	2,545.2	250.6	28,336.6	2,176.0
1962	6,054.0	952.5	11,106.4	292.9	18,201.4	1,198.2	29,307.8	1,491.1	2,611.7	236.7	37,973.5	2,680.3
1963	7,050.7	1,073.6	14,178.0	337.0	17,542.0	1,178.2	31,720.0	1,515.2	2,274.4	160.5	41,045.1	2,749.3
1964	8,042.6	1,307.2	23,462.8	618.9	18,657.7	1,305.2	42,120.5	1,924.1	3,171.2	251.8	53,334.3	3,483.1
1965	6,220.6	913.1	18,753.3	468.3	14,482.0	958.6	33,235.3	1,426.9	2,906.9	176.1	42,362.8	2,516.1
1966	6,795.3†	1,013.0†	17,777.5	398.3	14,264.8	893.5	32,042.3	1,291.8	3,429.2	207.8	42,266.8	2,512.6

\* Small quantities of sheet which are not separately distinguished in the statistics may have been excluded.

† Includes float.

Source: *Annual Statements of the Trade of the United Kingdom*  
Board of Trade Statistics Division

### Exports of Raw Flat Glass

	Plate		Float		Sheet*				Total sheet*		Cast and rolled		Total exports	
					Not exceeding 4½mm.		Exceeding 4½mm.							
	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000	sq. ft. '000	£ '000
1950	21,718.3	2,595.2			86,084.9	1,987.9	6,906.3	406.1	92,991.2	2,394.0	17,886.5	897.3	132,596.0	5,886.5
1951	20,450.9	2,644.4			92,117.2	2,417.9	5,491.8	316.8	97,609.0	2,734.7	24,915.9	1,280.8	142,975.8	6,659.9
1952	18,108.6	2,570.2			51,522.2	1,436.9	3,064.2	208.6	54,586.4	1,645.5	17,744.8	951.7	90,439.8	5,167.4
1953	25,514.3	3,623.1			53,120.7	1,486.6	2,254.3	183.1	55,375.0	1,669.7	17,261.0	1,000.4	98,150.3	6,293.2
1954	23,520.9	3,609.3			56,464.4	1,512.8	2,936.3	232.0	59,400.7	1,744.8	22,315.1	1,204.6	105,236.7	6,558.7
1955	39,683.4	6,383.3			67,161.2	1,847.5	4,206.1	295.8	71,367.3	2,143.3	24,751.0	1,359.6	135,801.7	9,886.2
1956	38,586.7	6,130.8			72,556.4	1,959.3	4,892.6	355.4	77,449.0	2,314.7	21,755.2	1,211.1	137,790.9	9,656.6
1957	32,852.5	5,164.7			53,043.2	1,486.4	3,760.1	281.6	56,803.3	1,768.0	21,845.6	1,217.2	111,501.4	8,149.9
1958	34,984.4	5,555.9			60,403.6	1,693.2	4,377.4	330.4	64,781.0	2,023.6	20,355.0	1,216.1	120,120.4	8,795.6
1959	38,256.8	6,064.3			79,111.2	2,256.6	8,118.1	564.6	87,229.3	2,821.2	21,770.4	1,276.2	147,256.5	10,161.7
1960	39,103.9	6,102.8			63,519.5	1,779.9	12,071.0	779.0	75,590.5	2,558.9	22,906.8	1,361.3	137,601.2	10,023.0
1961	27,302.2	4,217.1	1,994.5	291.4	53,095.7	1,531.8	7,956.6	585.6	61,052.3	2,117.4	22,201.4	1,263.1	112,550.4	7,889.0
1962	22,037.9	3,477.1	11,292.6	1,527.2	72,289.2	2,155.9	12,009.3	853.2	84,298.5	3,009.1	18,877.5	1,095.3	136,506.5	9,108.7
1963	14,413.4	2,277.2	22,270.2	2,966.3	51,283.1	1,605.6	13,817.2	973.4	65,100.3	2,579.0	14,046.1	748.1	115,830.0	8,570.6
1964	14,961.9	2,535.2	31,195.5	4,188.5	58,116.4	1,966.3	11,470.5	823.2	69,586.9	2,789.5	19,080.1	1,080.8	134,824.4	10,594.0
1965	9,378.4	1,746.9	28,955.8	3,890.3	55,642.3	1,773.9	11,473.9	828.3	67,116.2	2,602.2	19,660.6	1,071.1	125,111.0	9,310.5
1966	8,626.5	1,646.1	30,262.0	3,957.6	41,814.1	1,384.5	12,374.3	783.8	54,188.4	2,168.3	19,828.8	1,090.5	112,905.7	8,862.5

\* Small quantities of sheet which are not separately distinguished in the statistics may have been excluded.

Note: The figures given above do not include re-exports, which are very small.

Source: *Annual Statements of the Trade of the United Kingdom*  
Board of Trade Statistics Division

### Imports of Safety Glass

	In sizes or shapes ready for incorporation in motor vehicles		Other		Total
	sq. ft. '000	£ '000	sq. ft. '000	£ '000	£ '000
1957 ...	N/A	252.2	4.5*	17.0*	269.2
1958 ...	N/A	189.5	2.0*	8.5*	198.0
1959 ...	N/A	127.1	26.7	22.6	149.7
1960 ...	N/A	108.9	67.4	51.7	160.6
1961 ...	N/A	85.5	44.2	68.5	154.0
1962 ...	N/A	52.9	41.5	71.8	124.7
1963 ...	N/A	12.1	28.1	62.5	74.6
1964 ...	N/A	40.8	38.1	103.4	144.2
1965 ...	N/A	93.0	33.0	94.5	187.5
1966 ...	N/A	38.7	40.2	60.4	99.1

N/A = not available.

\* Laminated glass only; other toughened glass in these years is not separately distinguished.

### Exports of Safety Glass

	In sizes or shapes ready for incorporation in motor vehicles		Other		Total
	sq. ft. '000	£ '000	sq. ft. '000	£ '000	£ '000
1963 ...	N/A	273.7	2,254.9	460.6	734.3
1964 ...	N/A	319.2	2,037.8	538.9	858.1
1965 ...	N/A	237.4	2,445.9	729.4	966.8
1966 ...	N/A	222.7	2,373.9	727.9	950.6

N/A = not available.

*Notes:*

1. Before 1963 exports of safety glass were shown under a composite heading which included other processed glasses.

2. The figures given above do not include re-exports, which are very small.

Source: *Annual Statements of the Trade of the United Kingdom*  
Board of Trade Statistics Division

## APPENDIX 5

(Referred to in paragraphs 25, 132, 238 and 264)

### Import Duties

1. The current rates of import duties applicable to flat glass are as follows:

	<i>Full</i>	<i>Commonwealth</i>	<i>EFTA</i>
RAW GLASS ... ..	15%	Free	Free
SAFETY GLASS consisting of toughened and laminated glass, shaped or not:			
A. In sizes and shapes ready for incorporation in motor vehicles	20%	13½% (Irish Republic Free)	Free
B. Other:			
1. laminated ... ..	17½%	Free	Free
2. toughened ... ..	20%	Free	Free

2. As a result of the 'Kennedy Round' tariff agreements, the full rates of duty will be reduced by successive steps during the period to 1st January 1972. The United Kingdom will make effective on 1st July 1968 a reduction of not less than 2/5ths of the difference between the present rates and the final rates agreed in the Kennedy Round and three further reductions of not less than 1/5th of the difference will be made on 1st January 1970, 1971 and 1972. The Commonwealth preferential rate of 13½ per cent will be reduced by similar stages to 7 per cent. The full rates that will apply from January 1972 and the maximum interim rates to which the United Kingdom is committed are as follows:

	<i>Current</i>	<i>From</i>	<i>From</i>	<i>From</i>	<i>From</i>
		1.7.68	1.1.70	1.1.71	1.1.72
RAW GLASS ... ..	15%	12%	10½%	9%	7½%
SAFETY GLASS consisting of toughened and laminated glass, shaped or not:					
A. In sizes and shapes ready for incorpora- tion in motor vehicles	20%	16%	14%	12%	10%
B. Other:					
1. laminated ... ..	17½%	14½%	13%	11½%	10%
2. toughened ... ..	20%	16%	14%	12%	10%

## APPENDIX 6

(Referred to in paragraph 21)

### Merchants' Associations

1. Some reference has been made in chapters 1 and 2 to the part played by associations of glass merchants in the organisation of the distributive trade. Further details about the two leading merchants' associations are given below.

#### (a) The Flat Glass Association

2. The original Plate Glass Merchants' Association, formed in 1909, was a confederation of local plate glass merchants' associations, many of which had been in existence for a number of years. It was reconstructed on a more representative basis in 1951 as the Plate Glass Association, and in 1964 the name was changed to the present style in recognition of the fact that the association had long been concerned with the flat glass trade as a whole. The primary object of the FGA is 'to encourage, promote and protect the home and export trade of the glass industry, and generally to watch over and protect the interests of glass merchants, glazing contractors, glass processors, and others engaged in or associated with the glass industry'. Its principal activities now comprise dealing with various aspects of industrial relations, representing the industry in negotiations with Government Departments, glass manufacturers and others, co-operative publicity and public relations, and general services to members. The association has at present some 350 subscribing members, many of whom operate one or more branches. Membership is limited to persons carrying on business in England, Wales, the Channel Islands and the Isle of Man. The FGA estimates that it represents about 90 per cent, measured by turnover, of the flat glass distributors in these areas who are of a type likely to qualify for membership.

3. Before 1959 the FGA had three categories of membership, viz. stock-holding members, who were entitled under the rules both to buy and resell stock sizes; processing members, who were entitled to buy stock sizes but not to resell them; and cut size members, of whom there were three classes. The members bound themselves to observe minimum price schedules which the association issued and to quote uniform conditions of contract. The discounts to be allowed on cut sizes to the various classes of cut size members and to non-members were determined in consultation with Pilkington, which co-operated with the association on an informal basis in maintaining its arrangements and entered into fidelity agreements with individual association members. The association registered its Constitution and Rules with the Registrar of Restrictive Trading Agreements in 1957; in 1959 it abandoned its price-fixing arrangements, with the related membership classification and the obligation on members to quote uniform conditions of contract. The amended Constitution included provision for the exchange of price information between members, but in August 1965 the rule covering this practice was suspended because it appeared from a judgment given in the Restrictive Practices Court that it might be a restriction within the meaning of the 1956 Act.

4. Applications for membership of the FGA are dealt with by the association's District Management Committees. Builders, plumbers, shopfitters and other consumers are not eligible for membership. Applicants who fail to receive approval at district level may appeal to the National Council. Under the membership rule introduced in 1959 when the Constitution was revised, an applicant had to satisfy the District Management Committee in his area that he was 'substantially engaged in the merchanting or processing or glazing of plate and other glasses' and was 'otherwise acceptable' in order to secure election. In August 1965 the rule was amended to require the applicant to satisfy the committee that 'being otherwise acceptable':

- (i) he has been established in trading in glass merchanting and glazing or glass merchanting and processing for at least two years, and
- (ii) has his own works and suitable delivery facilities and employs not less than five works personnel . . . , and
- (iii) that a reasonable amount of glass he has purchased is in clear glass of  $\frac{3}{8}$  inch substance or over'.

While this is a good deal more specific than the original rule, the membership qualification is still not precisely defined. The FGA maintains that it is desirable to retain some flexibility, since an applicant carrying on business in a country district should not be expected to achieve as large a turnover before qualifying for admission as one whose business is situated in a large town. The association claims that it now actively seeks to enlarge its membership by the inclusion of suitable businesses and that no applications are refused without good cause.

#### **(b) National Sheet Glass Merchants' Association**

5. The forerunner of the NSGMA was the National Sheet Glass Committee, formed in January 1942 on Pilkington's initiative, on which both manufacturers and merchants were represented. An agreement was drawn up between the merchant members and the manufacturers which provided, inter alia, that the merchants should purchase sheet glass only from Pilkington, except where the latter agreed otherwise, and should not resell it in stock sizes at prices below the manufacturer's tariff, and that Pilkington should supply members at a preferential discount. The objects of the agreement, which covered England and Wales, and subsequently Northern Ireland, were:

- (a) to safeguard the established position of the merchants as a channel of sale to building and other trades at a reasonable profit;
- (b) to secure to the manufacturers the opportunity to sell their output of sheet glass at reasonable prices;
- (c) to prevent the recurrence of the unsatisfactory conditions of the pre-war sheet glass market.

In December 1942 it was agreed that the functions of the committee should be taken over by an association of merchants which could represent them officially in dealings with the Government; the NSGMA was accordingly formed. The Constitution of the NSGMA, which was not formally adopted

until January 1944, provided that membership should consist of those merchants who were elected and who signed and remained parties to the agreement entered into by the National Sheet Glass Committee. In 1945, having first discussed the matter with Pilkington, the NSGMA introduced a new class of associate membership to cater for the smaller type of merchanting business which is unable to provide a full range of specialised services and may supply other building materials as well as glass. This involved drawing up an additional agreement with Pilkington on similar lines to the existing agreement with full members, to which associate members would become a party on their election. Associate members pay half the full annual subscription and are not entitled to vote at general meetings.

6. In February 1957 Pilkington terminated the two agreements with the NSGMA. The company said that it would continue to allow merchants' margins to members (although not undertaking to do so on a preferential basis) but warned the association that if any part of the margins were given away, this would be held to indicate that the margins were too large and Pilkington might then decide to reduce all merchants' margins. The NSGMA thereupon modified its Constitution to permit the Council to prescribe minimum prices for the resale of sheet in stock sizes, and to show that one of the objects of the association was to negotiate fair terms of supply from Pilkington, a monopoly supplier. The association thought that such a restriction could be defended under the Restrictive Trade Practices Act. However, in October 1959 it was advised that the Registrar proposed to initiate proceedings before the Restrictive Practices Court and, following discussions with the Registrar, the clause in the Constitution which permitted the Council to prescribe minimum reselling prices was deleted.

7. The amended Constitution introduced in 1957 lays down that 'Members are such Sheet Glass Merchants as shall be elected by the Council'. The association says that effectively the decision as to whether an applicant is acceptable for membership depends on whether he is a genuine merchant of sheet glass. Each applicant is therefore required to give a description of his business, with particulars of the length of time for which the business has been established, the quantity of sheet glass sold in various forms and the quantity of sheet glass purchased. On the basis of this information the Council decides whether the applicant should be offered full or associate membership. In assessing the answers given, it takes into account the area in which the applicant serves (e.g. whether it is a country district or a densely populated urban area) and the extent to which he is buying for his own use in another capacity (such as glazing contractor or processor).

8. The NSGMA's present activities include discussions with Pilkington regarding the adequacy of glass supplies and merchants' margins, as well as the discussion of other problems that arise between buyer and seller, such as delivery times and breakages in transit. Its general purpose is to maintain the status of merchants and the quality of their service, and to represent them in discussions with Government Departments and Public Authorities. The NSGMA has at present some 375 full members and smaller numbers of branch members and associate members. The NSGMA believes that it covers more than 95 per cent of the sheet glass merchants in England, Wales and Northern Ireland who do a genuine wholesale trade.

APPENDIX 7

(Referred to in paragraphs 80, 85, 127, 209, 230, 232, 256, 257, 258, 263, 264, 267)

**Profits as Percentages of Capital Employed :  
Comparative Figures**

**A. Replacement cost basis**

	(1) Pilkington reference- type goods (home and export) %	(2) reference goods only %	(3) all goods %	(4) Triplex reference goods only %	(5) UK manu- facturing industry average %	(6) Manufacturing industry indices selected companies per Economist Intelligence Unit: median %	(7) upper quartile %
1960 ...	16.3	17.8	{ See col. (11) and note 6 }	16.9	13.1	N/A	N/A
1961 ...	4.6	7.9		20.2	11.1	N/A	N/A
1962 ...	11.1	15.4	18.0	24.7	9.9	13.4	20.4
1963 ...	9.7	14.3	22.9	31.9	10.8	12.1	18.1
1964 ...	16.1	19.3	15.3	19.1	12.0	14.4	20.1
1965 ...	8.0	11.8	16.0	17.0	11.5	14.9	20.7
1966 ...	10.6	14.5	N/A	17.2	N/A	13.4	18.9
<b>AVERAGE:</b>							
6 years to							
1965 ...	10.9	14.3	N/A	21.6	11.3	N/A	N/A
7 years to							
1966 ...	10.9	14.4	N/A	20.7	N/A	N/A	N/A

**B. Historic cost basis**

	(8) all goods %	(9) Pilkington reference type goods (home and export) %	(10) reference goods only %	(11) all goods %	(12) Triplex reference goods only %	(13) UK manu- facturing industry average %	(14) Manufacturing industry indices The Times 300 companies median %	(15) upper quartile %
1960 ...	20.8	32.3	34.0	19.7	24.9	16.6	N/A	N/A
1961 ...	9.8	10.4	15.1	21.3	29.4	14.0	N/A	N/A
1962 ...	15.0	20.6	26.7	{ See col. (3) and note 6 }	36.1	12.6	N/A	N/A
1963 ...	14.5	17.7	23.9		49.4	13.5	N/A	N/A
1964 ...	16.6	25.4	29.9	32.2	14.7	14.2	19.7	
1965 ...	10.3	12.7	17.8	N/A	27.6	13.9	14.3	18.3
1966 ...	N/A	N/A	N/A	N/A	26.9	N/A	N/A	N/A
<b>AVERAGE:</b>								
6 years to								
1965 ...	14.2	19.6	24.2	N/A	33.2	14.2	N/A	N/A
7 years to								
1966 ...	N/A	N/A	N/A	N/A	32.0	N/A	N/A	N/A

**Notes and comments**

1. N/A=not available.

2. The figures in columns (1), (2), (3), (4), (8), (9), (10), (11) and (12) relate to financial years ended 31st March in the calendar years following those opposite which they are shown, except that the figures for Triplex

(columns (3), (4), (11) and (12)) opposite the years 1960 to 1963 relate to financial years ended the subsequent 30th June, while those opposite 1964 relate to the nine months ended 31st March 1965. Thus the average figures for Triplex in the last two lines of each part of the table cover periods which are three months short of six years and seven years respectively. The figures in columns (5) and (13), relate to calendar years; as to those in columns (6), (7), (14) and (15), see note 9 below.

3. The primary purpose of our accountancy investigation of Pilkington and Triplex was to obtain details of sales, costs, profits and capital employed in relation to reference goods. In the case of Pilkington it seemed relevant to extend our detailed examination to cover all reference-type goods made in the United Kingdom, that is to say flat glass made here for export as well as for the home market. For these purposes transfers of flat glass from Pilkington to Triplex and from Pilkington's raw flat glass works to other Pilkington works for conversion into non-reference goods have been treated as sales by Pilkington. In the event, we made these calculations upon three different bases, namely (a) *the historic cost basis*, (b) *a replacement cost basis* in accordance with our own normal accounting practice, and (c) *a replacement cost basis varied* to take account of certain objections to (b) which were made by the companies. Both companies co-operated in producing all these calculations but both had reservations about the calculations under (a) and (b). Under (a) the average capital in each year includes fixed assets valued at historical cost, less depreciation at the annual rates of wear and tear allowed by the Inland Revenue for tax purposes, while profits are arrived at after charging such depreciation. The cost of capital work in progress is excluded. Under (b) the average capital includes fixed assets on a revalued, or estimated replacement cost, basis (except for land which is valued at cost) and profits are arrived at after charging the additional replacement charge or depreciation calculated at company's rates; the cost of capital work in progress is excluded. In the case of Pilkington, which has not revalued its fixed assets for the purposes of its financial accounts, the revaluation and the additional replacement charge were calculated by applying certain Economist Intelligence Unit indices to original cost in the year of purchase, with depreciation on a straight line basis over the estimated life of the assets. In the case of Triplex, whose fixed assets (with a few minor exceptions) were revalued as at 2nd July 1962 for the purposes of its financial accounts, the same principles have been applied to the values determined in 1962. Under (c) the same principles are applied as in (b), except that (i) land is revalued by methods similar to those used for other fixed assets, though no charge is made for depreciation, and (ii) the cost of capital work in progress is included in the capital employed.

4. With regard to (a) (*the historic cost basis*), both companies objected that this did not provide 'a realistic yardstick' of costs and profits for our purpose. In general we accept that a replacement cost basis is more satisfactory for many purposes, and we have, in fact, evolved for comparison our own indices of average profits of manufacturing industry on a replacement basis. The historical cost of fixed assets can, however, be determined with more certainty than their 'replacement cost' at a particular point of time, and for this reason we think it an advantage to obtain and

record the figures on the historic cost basis as a check upon those calculated on a replacement cost basis. In any event, the relation between Pilkington's profits on reference goods and on the whole of its United Kingdom business can only be expressed on the historical cost basis (see note 6). The figures in columns (9), (10) and (12) are the results of our calculations on the historical cost basis.

5. With regard to (b) and (c) (*the replacement cost bases*), we have followed, under (b), our own normal practice in regard to the two matters disputed by the companies. So far as land is concerned, it is not a wasting asset requiring to be replaced, and its current market value, which depends largely on its location, has little bearing on any comparisons we wish to make with manufacturing industry generally. For these reasons our indices of profits of manufacturing industry on the replacement basis are calculated after revaluing all fixed assets except land and, in principle, we do not accept that Pilkington's or Triplex's figures should differ in this respect. So far as the cost of capital work in progress is concerned, the view of Pilkington and Triplex is that, since any industrial concern normally has some capital assets in course of construction, the capital invested in earning its current profits is understated if the cost of capital work in progress is excluded on the ground that it is not yet contributing to the profits. While this aspect of the matter would, no doubt, be of interest to a prospective investor, we are more concerned to establish the profits earned by the assets in use. Inasmuch as we have not been able to exclude capital invested in such work in progress in calculating our indices for manufacturing industry, we acknowledge nevertheless that to do so in the particular instance is to some extent anomalous. On the other hand, in Pilkington's case, the amount of capital work in progress is probably high as compared with industry generally. However this may be, having made the alternative calculations under (b) and (c), we found that the differences between them were not enough to be of material significance in relation to the issues involved in this report; for convenience, therefore, we used the figures which were approved by Pilkington and Triplex (basis (c)) in discussing their profits with them. The figures in columns (1), (2) and (4) are, accordingly, the results of the calculations on replacement basis (c). The average figures by the two methods of calculation over the whole seven-year period examined were:

	Pilkington		Triplex
	reference-type goods (home and export)	reference goods only	reference goods only
	%	%	%
Basis (b) ... ..	11.6	15.4	24.1
Basis (c) ... ..	10.9	14.4	20.7

In the case of Pilkington the differences are due almost entirely to the different treatment of capital work in progress. In the case of Triplex they are due mainly to the different methods of valuing land, though in the later years examined the treatment of capital work in progress is of equal significance.

6. Pilkington and Triplex also submitted that, whatever indices might be used for comparison (see note 9 below), it could not be proper to isolate a part of the business of each company, for the purposes of such a comparison. Each company therefore submitted figures of profits as percentages of capital employed in respect of its total activities in the United Kingdom, derived from its annual financial accounts. Neither set of figures is, we understand, compiled precisely upon any of the bases described above. Since, however, Pilkington has not revalued its fixed assets in its financial accounts its figures are, roughly speaking, on the historic cost basis and are shown as such in column (8), but as profits have borne a replacement charge, in addition to depreciation as calculated on the historic cost basis, the profit rates are somewhat understated. Triplex's figures for 1960 and 1961 also are on a roughly historical basis and are shown as such in column (11); but from 1962 onwards they are based on the revaluation of fixed assets made in that year and are therefore shown in column (3).

7. Since we are primarily concerned with the profits earned on the goods covered by our reference, we have no doubt that it is proper for us to isolate those profits. But we accept that it is also relevant to look at the results of the companies concerned as a whole and we have used the figures submitted for that purpose.

8. The indices of profits of United Kingdom manufacturing industry shown in columns (5) and (13) are the Commission's calculations; the methods of calculation have been described in previous reports\*.

9. Pilkington and Triplex submitted that it was not appropriate to draw comparisons between their own profits on reference goods and the average profits of manufacturing industry. Their arguments were that

- (i) the Commission's indices reflect the average performance of companies of widely diverse activities, including both high and low earners;
- (ii) Pilkington and Triplex would each expect a higher than average reward for reasons which are set out in paragraphs 209 and 231;
- (iii) the Commission's indices cover the whole trade of the companies concerned, including their export trade, on which the average profit margin may well be low;
- (iv) any large business has some areas of activity which are more successful than others and, for each company, the area covered by the reference is on the whole the most successful.

For these reasons Pilkington and Triplex not only submitted figures covering the whole of their businesses (see note 6 above) but also put forward alternative criteria with which, they said, their own figures could be compared. The criterion originally selected was a set of figures derived from the results of the companies falling within *The Times* index of 300 largest companies (see columns (14) and (15) for the 'median' and 'upper quartile' figures†). It

\* See, in particular, *Colour film: a report on the supply and processing of colour film (1966-67)*, HC 1; HMSO, April 1966, appendix 7.

† The selected companies being assembled in order of the magnitude of their profits (as percentages of capital employed), the 'median' is the figure for the company at the middle of the range, and the 'upper quartile' the figure for the company falling halfway between the middle and the top.

was suggested that these figures should be compared, in the first place, with the results for the whole of Pilkington's and Triplex's businesses, although Pilkington's figures and also Triplex's for the earlier years were on the historic cost basis and Triplex's later figures on a replacement basis, while the figures for *The Times* 300 companies were available for two years only (1964 and 1965) and were likely to be preponderantly on the historic cost basis though there would be a number of exceptions. Pilkington subsequently asked The Economist Intelligence Unit Limited to select companies which had revalued their fixed assets and submitted figures based on this selection (see columns (6) and (7) for the median and upper quartile figures). We have not examined in detail the methods of calculation of either of these sets of figures, but such information as we have suggests that they are, in some respects, less scientifically prepared than our own indices (e.g. profits are related to capital at the end of the financial year and not to average capital during the year) and rather approximately related to the calendar years to which they are assigned. Pilkington's and Triplex's arguments based on the comparisons drawn from these figures are set out in paragraphs 209 and 232.

10. The comparisons we make between profits on reference goods and the average profits of manufacturing industry are not founded upon the assumption that this average or any other particular level is the proper level for the monopoly suppliers concerned. Our purpose is rather to place the profits earned on reference goods in some general perspective before we form any judgment upon them in the light of all the evidence and arguments; and in forming this judgment we take full account, among other things, of such arguments as those set out in (i) to (iv) of paragraph 9 above. We regard our own indices of average manufacturing profits as the most suitable yardstick for this limited purpose. But we pay regard also to the yardsticks submitted by Pilkington and Triplex as indications of the level of profits earned by other successful companies.

## APPENDIX 8

(Referred to in paragraphs 59, 162, 163, 182, 184, 191, 195, 196, 205, 215, 221, 229 and 252)

### **Observations of Importers, Smaller Suppliers of Safety Glass, Distributors and Others**

1. We summarise below the principal observations received in the course of the inquiry. Our summary is based on evidence submitted by 16 importers, 15 smaller suppliers of safety glass, two merchants' associations, over 90 individual distributors (including merchant/glaziers, merchant/processors and safety glass stockists), five associations of users, some 100 individual users and 12 architects. Insofar as the views expressed by these witnesses may be critical, directly or by implication, of the Pilkington group, they have been brought to the attention of the group, which has taken account of them in stating its own case (see chapter 6 and, in certain cases, footnotes to this appendix).

#### **Importers**

2. The importers have told us that the demand for imported glass arises in the main because merchants prefer to have an alternative source of supply and because there are certain purposes, such as mirror manufacture and toughening, for which imported glass, particularly Belgian sheet, is considered by some users to be more suitable than British glass. Demand is also said to arise because overseas manufacturers supply patterns and types not available from Pilkington and, to a lesser extent, because of the need to supplement supplies when there is a shortage of particular types of British glass. It is generally agreed that glass imported from Western Europe sells on quality rather than price. One importer has said, nevertheless, that Belgian sheet and float glass is sold in the United Kingdom at lower prices than in Europe because the Belgian manufacturers are reluctant to give up a market which was once very important to them.

3. A large importer has said that, although Pilkington has taken much of his market since the 1939-45 war, there is nothing unfair in its competition; there has been no suggestion from any of his customers that Pilkington might refuse to supply them if they purchased imported glass. On the other hand, a distributor who handles only Russian glass supplied to him under a special import arrangement, has alleged that there is difficulty in selling this glass, although it is substantially cheaper than glass from other sources and of adequate quality, because many potential customers have been given to understand that their supplies from Pilkington might be jeopardised if they bought the Russian glass.

#### **Smaller suppliers of safety glass**

##### *British Indestructo Glass Ltd.*

4. In evidence submitted to us before its acquisition by Triplex, BIG alleged that it had been placed at a disadvantage when it started the production of curved toughened glass by the terms exacted by Pilkington for the settlement of a dispute over an alleged infringement of patents held by

Pilkington and St. Gobain\*. The dispute arose in 1949 when BIG installed a new type of furnace for bending and toughening, the use of which was vitally important to the company's production. The company also said that, on occasion, British engineering concerns had refused to construct furnaces for BIG on the ground that similar contracts had been undertaken in the past for Triplex†; an appeal to Pilkington for assistance in this connection some years ago is said to have met with a direct refusal because, so Pilkington explained, of its connection with the Triplex companies.

5. Recurrent delays in delivery by Pilkington were said to have caused the temporary suspension of laminated production in November 1957 and May 1965. In recent years, however, the stimulus of Belgian competition had been sufficient to ensure prompt delivery by Pilkington, and latterly the company had been satisfied with the delivery service it received both from Pilkington and its Belgian supplier.

6. BIG contended that Pilkington appeared to have resisted the use of sheet as a windscreen material to preserve this market for plate and float. It said that the quality of Belgian sheet compared favourably with the quality of British sheet, and that  $\frac{3}{16}$  inch sheet which passed the BS optical tests for windscreens was obtainable from Belgian suppliers but not from Pilkington.

7. BIG said it bought both sheet and float glass at lower prices from Belgian sources than from Pilkington, suggesting that the inference to be drawn from this was that either Pilkington charged too much or the production costs of the Belgians were lower because of better manufacturing methods. The company maintained that before its revision in 1966 the quantity rebate scheme applied by Pilkington to safety glass manufacturers gave Triplex an advantage because the maximum rates were set at purchasing levels easily attainable by Triplex but not by BIG, even if it were to buy all its raw glass requirements from Pilkington.

8. Triplex's prices for some curved glasses, for which there was no alternative source of supply, were considered to be unduly high. BIG also contended that Triplex's loyalty rebate was undesirable as it prevented competition.

#### *Other suppliers*

9. A few witnesses who have referred to delays in deliveries from Pilkington have attributed them to heavy export demand, to unusually large home demand or to the favouring of Triplex. However, one has said there has usually been a reasonable explanation for such delays and has remarked that Pilkington has taken long-term steps to increase production. A few suppliers have commented on the fact that sheet in thicknesses of more than  $\frac{3}{16}$  inch was not available from Pilkington before 1965.

10. One witness has made the criticism that Pilkington supplies cut sizes only to full inch dimensions whereas Belgian glass is supplied to fractional

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\* See paragraph 160.

† Triplex has explained in this connection that furnaces made for the company necessarily incorporate a great deal of know-how which cannot easily be patented; for this reason it is normally Triplex's policy to bind such outside contractors not to undertake work of a similar kind for anybody engaged in the manufacture of safety glass.

dimensions if required\*. Another has said that he gets considerable help from Pilkington with regard to the sizes of plate glass he should take in order to minimise cutting losses.

11. Pilkington's interest in safety glass is considered by two tougheners to have an adverse effect on the prices at which glass is supplied for toughening. One of them, who has been unable to ascertain what discount Pilkington would allow him, would not expect Pilkington's price to be competitive as it competes with him, through Triplex, in the domestic appliances market.

12. One of the smaller safety glass manufacturers has expressed anxiety about the possible effects of the Triplex/BIG merger on supplies of raw glass from Pilkington. He assumes that Pilkington will 'naturally' give preference to its own companies. Another has said that the Pilkington group can at any time take all his business by price cutting, pointing out that the group could use the BIG plant to extend its activities. A third does not think that his supplies of raw glass or his activities will be affected in any way by the merger.

## **Distributors**

### *Merchants' associations*

13. The FGA considers that Pilkington meets the demand for glass very well; it cannot recall any shortage in recent years that has been sufficiently severe to cause a cut-back in production by glass-using industries. It is said that demand is not easy to forecast and that there are seasonal fluctuations caused by builders' sudden demands for glass during the autumn and winter. Pilkington is said to heed complaints about any work delayed by a shortage of glass and to take steps to ensure that glass is made available to allow that work to continue.

14. The FGA regards the present distribution system as satisfactory and thinks it is likely to be improved as a result of new manufacturing techniques and of changed methods of distribution which are being discussed with Pilkington. Merchants are said to welcome the introduction of lehr-end sizes which will enable them to keep smaller stocks and to turn them over more rapidly. The association is confident that, although the supply of lehr-end sizes has increased merchants' costs initially, it will assist in keeping down the cost of the end product to the consumer.

15. The FGA considers that merchants' margins (i.e. the differences between Pilkington's stock size terms to merchants and its published cut size tariff) are satisfactory, apart from the margin on wired glass, which is said to be inadequate. It has emphasised, however, that these margins are only theoretical, since much of the margin is subsequently lost as a result of fierce competition between merchants.

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\* In reply to this criticism Pilkington says that it has long been convinced of the necessity of developing automatic cutting, both because of the scarcity of skilled cutters and in order to reduce labour costs. At present automatic cutting is practicable only for cutting to full inch dimensions, but the company is confident of being able to supply fractional sizes eventually. In any case, as most glass supplied to safety glass manufacturers has to be re-cut to shape, this is regarded as 'an ideal trade' for automatic cutting to full inch dimensions.

16. The FGA has expressed the view that the invention of float glass and the steady improvement in its quality has been of great value to the trade and to the country.

17. The NSGMA considers that the range of sheet glass is adequate and believes that the price of British sheet glass is substantially below the prices for glass which is freely available to its members from the Continent. The NSGMA has also said that merchants' margins for sheet glass would be adequate but for the fact that they are eroded by competition between merchants.

*Individual distributors to the general trade*

18. There was little comment by individual merchants on Pilkington's monopoly position. Two have said that there is nothing dictatorial in Pilkington's attitude to its customers; two others think that Pilkington exercises too much control over the United Kingdom flat glass trade, one suggesting that it should be compelled to relinquish any financial interest it has in glass merchanting.

19. A few merchants have drawn attention to the fact that Pilkington has only recently made available the full range of thick drawn sheet, one making the point that Pilkington was years behind the West European manufacturers in introducing thick sheet and allowed them to dominate the British market for this substance.

20. There is a good deal of comment on unsatisfactory deliveries. About a third of those who commented have had occasional difficulties in obtaining supplies, which are said to occur because of manufacturing difficulties, increases in export demand, and fluctuations in domestic demand. One merchant has suggested that Pilkington should keep larger stocks of glass at its depots, particularly of types not in common use; others have said that deliveries by Pilkington are not as reliable as deliveries of imported glass.

21. The general level of flat glass prices is considered to be reasonable, it being remarked that they have been more stable in recent years than those of many other materials. One witness has expressed the view that the prices charged by Pilkington in the home market are 'cheaper than those prevailing in Europe, USA and Canada'. There is, however, fairly wide dissatisfaction with the margins obtained by merchants, which are said to be reduced by excessive competition between merchants. In this connection there has been some criticism of merchants' buying terms for certain types of glass, particularly wired, cast and figured glasses. Several witnesses have said that it is difficult for merchants who are not members of the FGA or the NSGMA to obtain a direct account with Pilkington, or that Pilkington supplies non-members on less favourable terms than members. Other criticisms are to the effect that, on the one hand, a merchant who has made an outstanding contribution to the development of an efficient distribution trade is not adequately rewarded for his services, being allowed no more than the standard maximum discount for which any merchant of reasonable size can qualify; and that, on the other hand, Pilkington is slow to adjust its discounts to merchants whose trade is declining, with the result that a failing business which does not provide modern facilities can continue to compete on a profitable basis with more progressive businesses.

22. No merchants have made any adverse comments on the quality of British glass. Two have said that its quality is equal to, or compares favourably with, that of imported glass, and another that British horticultural glass is superior in quality to the Russian product.

23. Several merchants have said that the flat glass trade is well organised, that the service given by Pilkington is satisfactory, or that their relationship with the manufacturer is good. One, who otherwise comments favourably, has suggested that communications between Pilkington's manufacturing and sales sides could be improved, and another that Pilkington, because it has so large an output, has little incentive to give service on comparatively minor matters, which are nevertheless important to the customer.

#### *Safety glass stockists*

24. One or two Triplex stockists have expressed satisfaction with the service, quality and prices obtained from Triplex, and no adverse comments have been made on these matters. A number of Triplex stockists object, however, to the fact that Triplex replacement glasses for certain models are now available only from the main dealers of the motor manufacturers concerned and at a lower discount than would be obtained if Triplex was the supplier. It is the experience of some stockists that deliveries from these sources are sometimes unreliable and incorrect.

25. Commenting on the recent merger between Triplex and BIG, some stockists have expressed the fear that, following the merger, BMH and Ford may adopt the practice, hitherto confined to Rootes and Vauxhall, of requiring supplies of replacement glasses for BMH and Ford models to be channelled through their own spares organisations. It is generally considered that, if outlets for the supply of replacement glasses were to be further restricted in this way, the stockists' service to the industry and the public would be seriously impaired. A number of stockists hold the view that the removal of BIG's competition will have an adverse effect on prices and is not in the interests of the trade or the general public; a few have said that the 'extremely high quality standard' at present enjoyed by all users of Triplex safety glass is not likely to be reduced as a consequence of the merger.

#### **Architects**

26. Most of the architects who commented are reasonably satisfied that the British glass industry takes account of modern architectural needs, and that Pilkington offers a comprehensive range of types and thicknesses of glass, although one has suggested that if there were more than one domestic source of supply, Pilkington might be induced to develop glass in a more progressive manner. There have also been a few more specific criticisms: it has been said, for example, that the range in glazing sizes in 32 oz. sheet and  $\frac{3}{16}$  inch plate is limited, that the range of figured glasses is constantly being narrowed, and that white glass of glazing quality is not made in the United Kingdom.

27. One architect has said it is often difficult to obtain information from Pilkington, and another that leaflets distributed by Pilkington to architects' offices do not give adequate details of the type of glass available in some

thicknesses, e.g. thick drawn sheet; in contrast with this, the view has been expressed that Pilkington makes a real attempt to serve its customers, and particularly architects, by extensive research and development.

### **Users of flat glass**

#### *Associations of users*

28. It is the general view of members of the Patent Glazing Conference that Pilkington's prices are very reasonable and have risen less than the prices of most other materials. The patent glazing trade as a whole is said to have an excellent relationship with Pilkington, but some members think that longer warning should be given of impending price increases in view of the fact that patent glaziers enter into fixed price contracts; it has also been suggested that Pilkington should accept greater responsibility for defects occurring in the glass after fixing. There is considered to be no advantage in using imported glass except on the rare occasions when special types not manufactured here are required. The Chairman of the PGC's Technical Committee has said that, so far as he is aware, there is no glass of technical and commercial significance that is available only from foreign sources; in his view, Pilkington is to be congratulated on the range of glasses it offers and on the efforts it makes to ensure continuity of supply of special glasses. The other associations from whom we received evidence are rather more critical. It is the consensus of opinion of over 20 branches of the National Farmers' Union in the glasshouse production areas that British horticultural glass is too expensive and is subject to frequent shortages. Imported glass is said to be considerably cheaper than British glass when supplied direct from an import agent but to be supplied at the same price when purchased from a merchant. One of the branch committees has commented on the poor service given by the home manufacturer, 'who did not seem concerned about horticultural users'. The British Furniture Manufacturers Federated Associations told us in June 1966 that many furniture manufacturers had complained that Pilkington had recently increased the price of  $\frac{1}{4}$  inch float glass after assurances had, as they understood, been given that the float process would enable its prices to be held stable for a considerable period\*. Two local associations of plumbers in the North of England, whose members undertake glazing, are agreed that there is strong competition among merchants, and both have said that plumbers find it difficult to compete for glazing contracts. One maintains that its members are at a disadvantage because Pilkington will not supply new plumber customers direct.

#### *Individual users outside the motor trade*

29. Some users think it desirable that there should be more than one domestic source of supply. It has been said, for example, that there is no effective curb on the prices charged by Pilkington, and that the existing limited competition does not provide a direct incentive for the manufacturer to improve production methods or, if they are improved, to pass on savings to the customer.

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\* Pilkington denies that furniture manufacturers were given any assurance on prices, but says that prices for  $\frac{1}{4}$ -inch float for the production of mirrors for the furniture trade have been held stable for many years, the increases made on two size brackets in May 1966 being the first since 1957 and 1962 respectively.

30. Very few comments have been made on quality and most of these are not critical. Although the quality of British horticultural glass is generally considered to be superior to that of glass of Russian or Polish manufacture, the latter is said to be adequate for its purpose.

31. In general, users appear to obtain their supplies without undue difficulty, although there have been a number of complaints of occasional shortages, particularly of sheet (attributed either to unusually large demand or to production difficulties), and of figured rolled and wired glasses, and of delayed deliveries of horticultural glass. There is said to have been a shortage of photographic glass in the latter half of 1964, when demand was high. We are also told that photographic glass in thicknesses from 0.7 mm. to 1 mm. is unobtainable in the United Kingdom. One witness has observed that sheet in thicknesses of more than  $\frac{3}{16}$  inch was not available from Pilkington before 1965.

32. A number of witnesses have expressed themselves reasonably satisfied with the prices they pay for British glass. One of these, who has tried alternative sources of supply, has found them to be uncompetitive. Several users have commented on the extent of competition since the 'rigid tariff prices were broken', but one has suggested that there is scope for more price competition than exists at present in the merchandising of glass. Two small glasshouse manufacturers think it unfair that they cannot buy direct from Pilkington on terms as favourable as those enjoyed by glass merchants. Some horticultural users have mentioned that horticultural glass imported from East Europe is cheaper than the British product, and one has remarked on the fact that no extra charge is made for Russian and Polish horticultural glass in non-standard sizes to which Pilkington applies the cut size sheet tariff. One or two maintain, however, that there is no price advantage unless the imported glass is bought in large quantities, and others have said that any saving gained by purchasing the cheaper Polish glass is liable to be off-set by breakages incurred in transit, which have to be borne by the purchaser. Comments on the service given by Pilkington have, in general, been favourable.

#### *Motor trade users of safety glass*

33. The motor trade generally appears to experience little difficulty in obtaining its requirements of safety glass. Ford told us before the merger between Triplex and BIG that it had confidence in Pilkington as a responsible supplier and did not regard the Pilkington/Triplex combine as presenting any significant threat to the raw glass supply position.

34. Ford considers that the general level of safety glass prices in the British market compares very favourably with the prices prevailing in other countries. BMH thinks, however, that Triplex has charged unduly high prices for some types of glass for which there was no alternative source of supply, and one small buyer has made a similar comment. We were told by both BMH and Ford that the effect of the revised quantity rebate scheme introduced by Triplex in July 1965 had been to make its prices uncompetitive in many cases with those of BIG (but this was before BIG increased its prices early in 1967). BMH objected to the 'loyalty' rebate operated by Triplex on the ground that it effectively prevented competition.

35. The service given by Triplex has been the subject of favourable comment, one motor manufacturer remarking that he receives excellent technical service from the company, whose manufacturing processes 'lead the world'.

36. We have sought the views of the motor trade on the merger between Triplex and BIG. The main motor manufacturers are not unduly worried that Triplex may abuse the monopoly position it now enjoys. Both BMH and Ford are confident that they have sufficient knowledge of world prices for safety glass and of the problems involved in safety glass manufacture to be able to resist the quotation of unreasonable prices by Triplex. Ford has told us that it is prepared to accept the assurances given by Triplex on cost, technical innovation, availability of supplies to meet the growing demand and general service; but in general it relies on its own bargaining strength and if Triplex were to exploit its position, which Ford considers 'extremely unlikely', the company could, it has said, purchase supplies from abroad or lay down its own glass plant in the United Kingdom. BMH thinks it impossible to safeguard against future eventualities, but has made the point that import duties should be at a level that would permit of safety glass being imported from Europe as a final curb on Triplex, should this be necessary. Some of the smaller motor trade users of safety glass have also suggested that if Triplex were to show any disposition to exploit the situation, this might be checked by a reduction in import duty, although others doubt whether their ability to import all of their requirements would be an adequate safeguard against abuse by Triplex. Some of the larger motor manufacturers other than BMH and Ford have told us that, if Triplex were to abuse its position as sole supplier, they could purchase safety glass from associated companies abroad or from Continental manufacturers, but that the cost would be higher.

37. Ford maintains that any savings it may expect to achieve on its future purchases of safety glass are due to its decision to purchase from a single source and the consequent economies of scale. These savings, it says, 'could have accrued from single sourcing, whether we had sold our interest in BIG or not'.

38. A few buyers have expressed satisfaction with Triplex's pricing policies and one of them is confident that Triplex will continue to offer very reasonable prices. Others, however, fear that, in the absence of competition, Triplex's prices are likely to rise. There has been no suggestion that the quality of Triplex's products might be impaired in any way by the elimination of BIG's competition; one buyer believes that the greater opportunities which now exist for 'rationalisation' and the sharing of know-how may lead to improvements which will benefit the industry as a whole.

## APPENDIX 9

(Referred to in paragraphs 207 and 260)

### Pilkington Brothers Limited

#### COMPARISON OF PRICE MOVEMENTS FOR TYPICAL PRODUCTS

Type of glass	Customer	Type of sale and footage category	Retail Price Index 1967 (1937 = 100)	Pilkington	
				1967 prices in relation to 1937 prices (1937 = 100)	1967 prices as % of Retail Price Index 1967
Sheet glass ... ..	James Clark & Eaton Ltd. ...	OQ 24 oz. stock sizes ... ..	351	248	71
Sheet glass ... ..	Farmiloe & Farmiloe Ltd. ...	24 oz. horticultural standard sizes	351	315	90
Thick sheet* ... ..	Triplex Safety Glass Co. Ltd.	$\frac{3}{8}$ in. to 5 ft. ... ..	351	238	68
Plate/float ... ..	Triplex Safety Glass Co. Ltd.	$\frac{1}{8}$ in. to 10 ft. ... ..	351	128	36
Plate/float ... ..	Triplex Safety Glass Co. Ltd.	$\frac{1}{4}$ in. to 10 ft. ... ..	351	146	42
Plate/float ... ..	James Clark & Eaton Ltd. ...	$\frac{1}{4}$ in. stock sizes to 75 ft. andlehr end sizes	351	199	57
Plate/float ... ..	James Clark & Eaton Ltd. ...	Standard sizes and works cut sizes to 6 ft.	351	207	59
$\frac{1}{8}$ in. white figured rolled and cathedral	James Clark & Eaton Ltd. ...	Stock sizes group 1 ... ..	351	206	59
$\frac{1}{4}$ in. wired cast (Hex) ... ..	Mellowes & Co. Ltd. ...	Cut sizes up to 50 in. wide ...	351	217	62

\* In 1967  $\frac{3}{8}$  in. thick drawn sheet had been superseded by 5.0 mm. float 'B'.

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