Technical Progress and Its Social Consequences in the French Textile Industry

FOR SOME YEARS now industrial circles have been giving their attention to the social consequences of technical progress in the textile industry. The I.L.O. Textiles Committee placed this item on the agenda of two successive sessions, those of 1955 and 1958.[1] In its conclusions the Committee recognised that technical progress may pave the way for social progress, but only on condition that steps are taken to prevent or reduce certain dangers, especially the danger of unemployment for workers who become redundant.

The French textile industry is now going through a delicate phase of structural change and adaptation to technical progress. During the winter of 1964-65 the fairly widespread working of short time and certain collective dismissals due to the closing of establishments caused some concern. The difficulties of the industry have also been aggravated by the redistribution of world and European textile trade.

It may be worth recalling in this connection that, in the total number of persons employed, the French textile industry is the second largest in Europe. Geographically speaking, it is heavily concentrated in northern France. The changes of recent years have speeded up the shift to the Lille, Roubaix and Tourcoing region, where 73 per cent. of the workers in the textile industry are employed. This region processes wool, cotton, jute and flax and has the highest concentration of basic sectors, i.e. combing, spinning and weaving. The cotton industry is also established in Normandy (lower valley of the Seine) and in Eastern France (Vosges, Mulhouse and Belfort), while the Lyons region has long specialised in silk manufacture. Outside of these main textile regions there are a large number of small specialised centres throughout the country.

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[1] See I.L.O.: *Problems of productivity in the textile industry*, Report II, Textiles Committee, Fifth Session (Geneva, 1955) (mimeographed); and idem: *Effects of technological developments on wages and on conditions and level of employment in the textile industry*, Report III, Textiles Committee, Sixth Session (Geneva, 1958) (mimeographed). See also: "Labour problems of modernisation in the textile industry", in *International Labour Review*, Vol. LXXXI, No. 6, June 1960, pp. 527-556.

It was towards 1950 that the French textile industry first launched a determined campaign to achieve greater productivity. At the present time manufacturers are mainly concerned with modernising their equipment and finding the finances to do so, discovering new markets and solving various social problems.[1]

Recent changes in the French textile industry

Between the end of 1951 and the end of 1963, as a result of associations, mergers, regrouping and closures, the number of textile undertakings (excluding handicraft concerns) fell from 11,520 to 6,483. These figures include hosiery and artificial and synthetic textiles. Total employment (wage and salary earners) dropped from 532,000 to 402,000 during the same period.

The number and capacity of the machines in operation have also changed greatly. In the spinning of combed wool there were nearly 1,800,000 spindles working at the end of 1951, compared with only 754,000 in 1963; in the same years in the spinning of carded wool there were 775,000 and 380,000 spindles; in cotton spinning 7,600,000 and 4,300,000 spindles; in wool weaving 32,000 and 12,500 looms; and in cotton weaving 130,200 and 86,000 looms.

Investment

Between 1954 and 1963 investments varied a good deal from one section of the industry to another. Table I shows how they evolved in the woollen and cotton sections of the industry, apparently under the influence of the level of economic activity specific to each section.

TABLE I. INDICES OF INVESTMENTS AT CONSTANT PRICES [1] IN THE WOOLLEN AND COTTON INDUSTRIES, 1954-63
(1954=100)

Year	Wool	Cotton	Year	Wool	Cotton
1954	**100**	**100**	1959	73.6	109.0
1955	98.5	99.2	1960	113.9	99.7
1956	103.5	102.6	1961	128.4	104.2
1957	118.1	159.9	1962	144.6	115.3
1958	101.5	145.4	1963	164.5	106.6

[1] The investments have been converted into 1963 constant prices by adjusting the figures for previous years in inverse proportion to the price index of the large French manufacturers. This is an approximation but has a definite comparative value.

[1] The information in this article is drawn from a study by an employers' research organisation, Syndicat patronal textile de Roubaix-Tourcoing, Bureau des normes: *Etude sur l'évolution de l'industrie cotonnière, 1954-1963* (Dec. 1964) (mimeographed).

A feature worth noting is the increase of investments in the woollen industry from 1960 on, which coincides with the considerable economic development of the industry. The process is reversed in the cotton industry, where the repercussions of the loss of overseas markets seriously hampered the efforts of the undertakings to mobilise the necessary capital.

In 1963 investments amounted to approximately 2,330 francs per operative in the woollen industry and 1,700 francs per operative in the cotton industry.

TABLE II. INDICES OF INVESTMENT, PRODUCTION AND PRODUCTIVITY IN THE WOOLLEN AND COTTON INDUSTRIES IN 1951, 1954 AND 1963

(1954=100)

Item	Woollen industry [1]			Cotton industry [1]		
	1951	1954	1963	1951	1954	1963
Number of operatives .	120	100	81	113	100	70.5
Production	91.7	100	130.5	94	100	111
Investment	—	100	164.5	—	100	106.6
Productivity	76	100	161.5	81	100	181.3

[1] All operations.

Table II shows the relationship between investments, on the one hand, and production and productivity, on the other. The level of investments depends on technical progress in the industry and on the degree of modernisation of equipment necessary to meet the growing competition that is making itself felt in the industry.

Technical and organisational changes in the cotton industry

During the past 20 years the French cotton industry had to cope successively with two kinds of difficulties:

(1) The need to make good the ground lost during the Second World War, whether in the form of wear and tear of equipment, dispersal of workers or failure to keep up with technical progress.

(2) The loss of a large proportion of overseas markets. This loss extended from 1956 to 1962 and resulted in a stagnation of production, since the increase in domestic consumption only gradually made up for the loss of foreign markets.

Technical innovations

In spinning the main effect of technical change has been increased machine productivity. This is the result of a number of factors, including: improvements in equipment, which is becoming increasingly automatic and operates at higher speeds; a higher rate of yarn production achieved by the improved preparation, under increasingly strict technical supervision, of the materials and by greater regularity in the roves; the reduction of manual operations, itself due to a decrease in the number of stoppages (breakage of roves, threads, etc.), to the considerable increase in the size of holders for the materials at all stages (cans, rove bobbins, spindles of spinning frames, etc.) and to the simplification of internal maintenance operations in the mills.

The same can be said of cotton weaving, where the speed of looms has increased, automatic looms have been improved and their use generalised, and the number of machine stoppages or process interruptions has decreased progressively. This is due not only to improvements in the looms but also, if not mainly, to better-quality yarn and better preparation of the yarn for processing.

Organisation of shift working

Actual working conditions have changed considerably. In spinning mills the trend in the number of spindle-hours in single-shift, double-shift or three-shift working is very revealing on this point, as can be seen from table III.

TABLE III. ORGANISATION OF SHIFT WORKING IN SPINNING MILLS, 1955, 1959 AND 1963

(Millions of spindle-hours)

Year	Single-shift working	Double-shift working	Three-shift working
1955	3 410	13 960	1 580
1959	1 250	13 450	3 520
1963	237	11 940	6 650

The single-shift system shows a tendency to disappear, while double-shift working shows a considerable decrease (15 per cent.). In the case of the three-shift system, the number of spindle-hours has more than quadrupled. This is due to the installation of improved and costlier machines.

Another characteristic feature of the changes that have taken place in the organisation of production is the fact that the work is shared by a steadily decreasing number of employees. For example the number of operatives in spinning mills dropped from 53,450 in 1955 to 47,088 in 1959 and 42,447 in 1963; the corresponding figures for salaried employees and supervisory staff of all kinds were 4,320, 4,252 and 3,491.

In weaving very similar changes are to be observed. Table IV shows the trend towards multiple-shift working. As regards the labour force, the number of operatives dropped from 66,600 in 1955 to 58,000 in 1959 and 49,400 in 1963; but the number of salaried employees and supervisory staff showed a considerable increase, from 7,640 to 8,540 and 8,600 in the same years. It should be added that automatic looms formed 57 per cent. of the working equipment in 1955, 59 per cent. in 1959 and 70 per cent. in 1963.

TABLE IV. ORGANISATION OF SHIFT WORKING IN WEAVING MILLS, 1955, 1959 AND 1963

(Millions of loom-hours)

Year	Single-shift working	Double-shift working	Three-shift working
1955	85.9	220.9	20.2
1959	57.2	242.0	29.6
1963	33.8	239.0	50.5

Buildings

Generally speaking, mill buildings in France have not changed in the past 30 years. In the spinning industry most of the buildings are solid constructions, with two or more floors and pillars. In the weaving industry, on the contrary, they are single-storey with shed-type roofs.

It is no easy matter to modernise these buildings, since most mills, in Northern France at least, are situated in urban areas in the midst of working-class districts. For this reason the most modern projects have involved the location of factories in the outer suburbs of the towns, in some cases even in the country districts. In a few cases spinning mills have been designed as single-storey buildings and in this way dependence on hoists has been eliminated and regular maintenance operations made easier.

In any case recent years have witnessed the disappearance of pulley and belt transmission, the considerable improvement of lighting and colour, a reduction in the area occupied for a given output, and an

endeavour to simplify materials-handling operations in the existing environment, which though very often antiquated, sometimes lends itself to substantial alteration both within workshops and in inter-storey transport. Air conditioning is becoming general and is a beneficial addition to all these measures.

The consequences of these improvements are both social and technical and are helping to rejuvenate the industry.

Future productivity of the cotton industry

Over the next ten years the cotton industry will continue to raise its productivity, probably along the following lines. Efforts will be made to simplify handling operations between the successive stages of converting raw cotton into yarn and woven material.

(1) As regards equipment, several operations (opening, beating, carding; throstle frames, winding, etc.) will be mechanically linked, all intermediate transfer operations will be mechanised and automated, and high-speed automatic looms without shuttles will be introduced.

(2) In the case of materials, process interruptions will be systematically reduced, and research on raw materials and on their suitability for spinning, their strength and their consistency at all stages of processing will continue.

(3) So far as operatives are concerned, simplification will result in a reduction of the manual operations required, while greater stress will be laid on new factors of skill, responsibility, regularity, quality and conscientiousness; this will make it possible to raise the status of manual workers (grade and wages) considerably, quantity being replaced by quality.

(4) In the case of supervisory staff, there will be a slow but steady increase in the proportion of intellectual preparatory and checking operations at all levels of processing.

These factors are inter-connected and, with each technical advance, may gain or lose in relative importance or find new lines along which to develop.

Lastly, assertions that labour productivity has now reached its maximum are not borne out by the facts. Statistics show that labour productivity is still increasing every year by 3 to 4 per cent. for all operatives, including general services. With a great many technical advances making their appearance every year, no limit can be set on this trend.

The increase in labour productivity is illustrated by table V, the figures in which have been calculated for the entire French production.

TABLE V. GENERAL TRENDS OF LABOUR PRODUCTIVITY IN COTTON SPINNING AND WEAVING IN 1951, 1954 AND 1963

A. Spinning

Year	Total production of yarn in tons (and average metrical count)	Man-hours (millions)	Spindle-hours (thousand millions)	Indices (1954=100)	
				Over-all labour productivity [1]	Spindle productivity
1951 . . .	263,200 (39.2)	123.9	20.9	93.2	96.3
1954 . . .	286,500 (40)	125.6	21.9	100	100
1963 . . .	286,000 (37.6)	72.5	18.8	173	116.3

B. Weaving

Year	Total production of cotton textiles in tons	Man-hours (millions)	Loom-hours (millions)	Indices (1954=100)	
				Over-all labour productivity [1]	Productivity per loom-hour
1951 . . .	206,000	173.7	395	82.3	92
1954 . . .	217,600	151	383.8	100	100
1963 . . .	232,800	96.7	323.1	167.1	127

[1] These indices, derived from the tables published each year by the industrial organisations, have been calculated fairly roughly on the basis of the tonnages and corresponding man-hours, and are therefore open to a certain amount of criticism since, in the spinning industry, man-hours include hours spent in twisting, the number of which varies from year to year for a given production of spun goods. Despite this, however, they do represent an over-all movement that has persisted since 1951. No doubt this movement has been more pronounced since 1954, i.e. since the arrival of modern equipment. While the effects of automation were already considerable in cotton spinning, the introduction of automatic looms can be seen to have had a marked effect on labour productivity in weaving also.

Social changes in the cotton industry

Changes in employment

Since output rose comparatively little during the period under review, increased productivity in the cotton industry has been reflected by a very substantial reduction in personnel. The figures for the entire French textile industry show an over-all reduction of 24 per cent. between 1951 and 1963. During the same period the number of employees in the cotton industry fell from 146,000 to 89,000, a reduction of 39 per cent.

Although there has been a substantial reduction in the number of operatives, however, owing to the increasingly technical nature of the work the ratio of monthly-paid employees (supervisory staff, engineers, technicians, foremen and salaried employees) to operatives has increased

considerably: in cotton spinning the proportion of these employees in the total labour force rose from 6.2 to 8.4 per cent. between 1951 and 1964, while in cotton weaving it rose from 10.6 to 14.7 per cent. in the same period.

It is believed that these trends will become more pronounced, especially as the work in this type of industry becomes increasingly technical. Although the ratio of monthly-paid employees to other categories is still small, the substantial increase in the percentage of clerical employees and supervisory staff during the period 1951-64 is very significant in this context.

Skill composition of the labour force

How should one view the changes in the classification of operatives due to the modernisation of equipment and of methods and techniques? In France operatives are classified for general purposes in a number of categories defined by the Minister of Labour in 1945: two categories of labourers (M_1 and M_2), two categories of semi-skilled workers (OS_1 and OS_2) and three categories of skilled workers (P_1, P_2 and P_3).

Over and above these recognised categories, to which almost all operatives are assigned by collective agreements, there are certain categories of " highly skilled " workers (HQ) whose skill indices range from 170 to 190 and over. The technicians come in at this point, though there is no clearly defined demarcation; as a matter of fact, there are operatives with an index of 200 and technicians (monthly-paid) with an index of 180.

After many joint discussions, the collective agreements classified the relevant workers in these categories during the period 1945-46. Since then, for the most part, the situation has remained unchanged, though the relative number of workers in each category has undergone constant change under the influence of modernisation, and sometimes owing to such factors as manpower shortages.

In the textile industry it was thought necessary at the time to keep a much more detailed system of grading than that just described. It was therefore abandoned in favour of a system involving the allocation of a number of points to each category, in which the various skills are distributed over a scale extending from 100 to 170 points, the gaps in some cases being as small as half a point. These skill categories were used to draw up the scales of guaranteed minimum wages for the various jobs. To obtain the minimum wage for a particular category it was sufficient to determine the value of 100 points (basic labourer).

Since then the classification has become somewhat less systematic, as a result either of the conclusion of agreements prescribing an agreed sum for each category or by the introduction in the basic wage of a fixed portion, the skill indices applying only to the remainder.

This increased flexibility marks a new trend in wages, a trend generally apparent in high-wage countries [1] towards a certain narrowing of differentials resulting from increased productivity, which naturally favours the lowest-paid workers.

In the 20-year period from 1943 to 1964 this narrowing of the range of guaranteed remuneration amounted to 10 per cent. between the lowest (100 points) and the highest category of operatives (170 points). On the average the reduction in differentials between actual wages has been more marked, though there have been unavoidable variations due to successive periods of inflation and stabilisation.

The main conclusion to be drawn from the foregoing remarks is that, despite all the other changes, the scales thus defined have remained fairly stationary over the past 20 years and that the more detailed they were the less likely they were to adjust themselves to technical changes.

For some years now, the workers' organisations have been calling for a review of the grading system, which they consider obsolete and even detrimental to recruitment in the textile industry. Some attempts have been made to review the system, but it is too early to say what the outcome will be, since opinions as to the real changes in grading are anything but clear and precise. In fact they are often contradictory.

Specialists fall into two apparently conflicting schools of thought with respect to the effects of modernisation of plant on conditions of work. Some believe that skill demands do not vary with the number of machines operated; all that increases is workload, which is rewarded by an increase in actual earnings. Others believe that if one and the same person has to operate an increasing number of machines, which may even be of different makes, that person must display the following qualities in a higher degree than in the past: self-control, knowledge of the job, a sense of responsibility, regularity of attendance, presence of mind, orderliness and method. Opinion appears to be swinging in this direction and some regional reviews of the grading system, though still very limited in scope, tend to endorse the latter view.

This question has been investigated at Roubaix-Tourcoing, where vocational training experts have evaluated the changes in the distribution of grades, with the results set out in table VI.

The changes which are thus expected are already reflected in the actual wages. They are considerable for the first three categories, owing to the modernisation of methods and equipment. These are the largest categories of operatives in the textile industry. It is too soon to make forecasts for the years after 1973 owing to the magnitude of the technical changes expected, including the fusion of several stages of production into a single process.

[1] This phenomenon, which is also noticeable in the developing countries, is less marked in France than elsewhere. See H. GÜNTER: " Changes in occupational wage differentials ", in *International Labour Review*, Vol. LXXXIX, No. 2, Feb. 1964, pp. 136-155.

TABLE VI. CHANGES IN THE SKILL COMPOSITION OF THE TEXTILE LABOUR FORCE IN 1953, 1959, 1963 AND 1964, AND ESTIMATES FOR 1973

(Percentages)

Skill categories	1953	1959	1963	1964 [1]	1973 [2]
M_1+M_2	15.5	18.5	23	18.5	12.8
OS_1	43.4	39.4	34.4	35.1	29.1
OS_2	17.6	18.8	23	26.1	34.7
P_1	8.4	7.9	5.7	6.4	8.3
P_2	12.1	12.1	9.6	9.7	10.6
P_3 and over . . .	3	3.3	4.3	4.2	4.5
All categories . .	100	100	100	100	100

[1] Estimates after review in progress. [2] Estimates taking technical probabilities into consideration.

In any case it would be surprising if the increasing degree of technicality, which is reflected in an increase in the number of salaried employees, technicians, foremen and supervisory staff, were not accompanied by the progressive upgrading of operatives, in particular at the upper levels of skill.

Social measures of adjustment to structural change

The national collective agreement for the textile industry, dated 1 February 1951, which was amended by the agreements of 3 October 1962, 28 February 1963 and 27 February 1964, contains various provisions designed to facilitate the adjustments made necessary by technical changes.[1]

Vocational training

The undertakings and the workers' and employers' organisations, having regard, on the one hand, to the structure of the textile industry's labour force, which includes a fairly high percentage of semi-skilled workers and, on the other, to the need created by technological change for more highly skilled workers, have endeavoured to develop the systematic training of all young workers. In a recent agreement (dated 27 February 1964), in the chapter on apprenticeship, a clear distinction was established between two levels of training. The training of skilled workers

[1] For an account of previous measures see " Conditions in the French textile industry ", in *Industry and Labour* (Geneva, I.L.O.), Vol. XXIII, No. 11, 1 June 1960, pp. 406-409.

should, on the one hand, take the form of complete and methodical general instruction combining general physical, intellectual and moral education with the acquisition of theoretical and practical occupational skills and should, on the other, normally be attested by a certificate of proficiency (article 79). In the case of jobs which do not require such thorough training, trainees receive job initiation, which also combines general education with the acquisition of theoretical and practical occupational skills. A certificate, known as an " attestation of specialised training " may be issued in respect of this job initiation (for which model programmes have been drawn up by representatives of the employers and workers concerned). With a view to facilitating guidance and permitting better utilisation of the apprentice's capabilities in the textile industry, every effort is made during job initiation to provide multi-purpose technical training in the occupational branch (article 80).[1]

" The training of skilled workers, who are increasing in proportion owing to advances in the equipment used, has been considerably improved by the framing of programmes of study and examinations common to the entire textile industry, whereas not so long ago many certificates existed which had identical names but which corresponded to very different levels of actual skill.... This endeavour to standardise trade certificates gives their holders a better standing in the event of their having to change jobs, especially as textile instruction has become somewhat polyvalent due to the new openings now afforded by the mechanical engineering and chemicals industries." [2]

Measures to minimise the harmful social effects of technical progress

Article 78 of the agreement mentioned above provides that improvement of productivity in the industry should not, in principle, lead to dismissals. Where, however, dismissals cannot be avoided, appropriate measures should be taken to assist the workers affected by means of regional or local agreements, or agreements for particular undertakings or sectors of production, such as transfers, unemployment allowances, supplementary retirement pensions, etc. The measures proposed by the undertakings under these agreements should be the subject of prior consultation with the works committee or, failing that, with the staff

[1] It may be interesting to mention in this connection that the I.L.O. Textiles Committee adopted at its Seventh Session (Geneva, May 1963) a number of conclusions defining the principles for vocational training in the textile industry (*Official Bulletin* (Geneva, I.L.O.), Vol. XLVI, No. 3, July 1963, p. 404).

[2] J. NOUSBAUM : " Occupational mobility of manpower in the French textiles industry ", in *Supplement to the final report*, Joint International Seminar on Geographical and Occupational Mobility of Manpower, Castelfusano, 19-22 November 1963 (Paris, O.E.C.D., 1964), pp. 13-36.

delegates. Where an undertaking is unable to find alternative employment for displaced workers itself, the appropriate employers' organisation will participate in joint efforts to do so. If, despite these efforts, some displaced workers cannot be found work, they will receive special compensation equal to three months' wages.

Whenever the management of an undertaking foresees a substantial reduction of operations which may subsequently lead to dismissals it must, under article 57 of the agreement, inform the works committee, or the staff delegates, and consult them on measures to avoid this eventuality. The agreement also provides that the local employers' organisations must take such measures as are necessary to find alternative employment for the workers concerned.

The fluctuations in the level of business which are characteristic of the textile industry have sometimes caused undertakings to introduce temporary short-time working. Article 51 of the collective agreement, inserted following the agreement of 28 February 1963, provides for a scheme, financed by individual undertakings, to pay compensation in the event of partial unemployment.