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THE COTTON INDUSTRY OF BLACKBURN.*

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THE first duty which I have to perform is to thank you for the great honour you have paid me in electing me as your President for the next twelve months. It is an honour which has come to me somewhat early, for I have only been a member of the Society of Medical Officers of Health for seven years. As many of you know, our Branch had its inception in the North-Western Association of Medical Officers of Health, which was the first society of this kind to be founded in the provinces after the passing of the Public Health Act of 1875. In 1888 this Association became the North-Western Branch of the Incorporated Society of Medical Officers of Health, which has frequently supported many important Public Health measures. When I read the long roll of illustrious men who have filled the office of President of this Branch, I am even more sensible of the great honour of having my name added to the list. Many of these can now actually see successful results of their work, and are still rendering most valuable help not only to our own Branch, but to the Public Health service of the country. In support of this statement it is only necessary to mention such former Presidents as Sergeant, Hope, Niven, Vacher, Garstang, Wheatley, Berry, Wilkinson, and Barlow. Many other names might be mentioned, but I have limited this list to men who are still active members of our Branch, and without whose help we could not maintain our position as one of the most important Branches of the Incorporated Society.

* Presidential Address, October 26th, 1906.

My second duty is more difficult than my first, viz., the delivery of a Presidential Address. In spite of the numerous fields of enquiry and potentialities of certain Public Health measures, it is not easy for a Medical Officer of Health who is engaged in much routine work continually, and whose duties and responsibilities tend to increase rather than diminish, to carry out much original work, and so offer the results of such, in preference to a mass of well-known facts and opinions. However, I have chosen a subject about which much has already been said, but which is always full of interest, affecting as it does the lives of a large proportion of the population of many towns in Lancashire.

My reasons for selecting this subject are three :—

1. That the cotton industry, especially the weaving branch, is the staple trade of Blackburn.
2. That very marked improvements have resulted in the health and conditions of work of cotton mill operatives during recent years.
3. That very useful mortality statistics of these operatives have been compiled with great care since 1891, i.e., a complete period of fifteen years.

These three headings will now be considered seriatim.

I. THE COTTON INDUSTRY OF BLACKBURN.

I believe that a Medical Officer of Health should know the conditions under which the citizens of his town are employed, in order that he may calculate and interpret death-rates, etc., with accuracy and interest.

Blackburn is one of the most northern of the various Lancashire districts which play an important part in the industry, and this town also takes the lead probably in the whole world with regard to its importance as a manufacturing town.

The classes of goods made are chiefly of a plain character, principally shirtings, mulls, jaconettes, and their sub-varieties. Other Lancashire towns, such as Oldham and Stockport, are more especially concerned with spinning.

In 1901 a larger number of cotton-mill operatives were employed in Blackburn than in any other borough in the United Kingdom. In that year 38,551 cotton-mill operatives were employed, representing about 38 per cent of the total population from the age of 10 upwards. This number consisted of 14,518 males and 24,033 females. Of the total number of cotton operatives about 70 per cent were employed in weaving, 18 per cent in winding and warping, 6 per cent in spinning, and 5 per cent in carding.

The climatic conditions favour the weaving industry of Blackburn. The average rainfall varies from 35 to 38 inches, and the relative humidity averages from 84 to 86 per cent.

At the present time there are 128 cotton mills in Blackburn, 86 engaged in weaving and 42 in spinning, containing 74,157 looms, and 1,238,584 spindles. Moreover, several new mills are being erected at present.

A brief description of cotton manufacturing, which is divided into spinning and weaving, or manufacturing, strictly so-called, may be of interest to those who are not acquainted with it.

The various processes:—mixing, blowing, carding, drawing, roving, and spinning, are included under the head of cotton spinning.

Cotton manufacture includes the processes of winding, warping, sizing or tapping, and weaving.

I have brought a number of samples showing the effect upon the cotton at certain stages from the raw material to the finished cloth.

The raw cotton arrives at the mill from the United States, Egypt, Brazil, and India, in large packages or bales, each weighing from 150 to 800 lb. In the heaviest bales the cotton is very tightly pressed together by hydraulic pressure, and held by iron bands, while in the smaller bales it is loosely kept together by twigs or ropes. It is graded as being better or worse according to the amount of impurity, such as leaf, sand, soil, etc. The quality of the yarn depends on the staple and grade of cotton, which it is desirable should be regular and even running.

The first process is mixing (this was formerly done by hand, but machinery is now used extensively). The cotton is now generally placed into a machine which breaks up the large lumps of cotton, causing the heavy dust to fall out. The cotton then passes on to the exhaust, or first scutcher, through a long pipe or grated trunk. This machine breaks up the cotton still more, the dust being extracted by the powerful fans of the machine. The cotton leaves this machine in the shape of a lap, or roll, and is passed into an intermediate or second scutcher, and then to a finisher or third scutcher, leaving each in the shape of a lap or roll. The air of the blowing room is usually not very dusty, owing to the influence of the fans with which each machine is provided, but when the machines or scutchers are being cleaned large quantities of dust arise. In this process the attendants are adult males.

The next process is called carding. This is the last of the cleaning processes, and it is here that the fibres are combed parallel, in order to

facilitate the formation of a thread. This process and the cleaning of these machines produce much dust. Men and boys are employed on these machines.

By the drawing, slubbing, intermediate and roving processes, the thickness of the thread is gradually diminished, so as to prepare it for spinning. Females are employed for these processes, and where the floors are wooden, boots and stockings are discarded. If these processes were carried out in a room by themselves very little dust would be given off, in fact, nothing but fluff. But in general practice, the carding, drawing, etc., are carried on in one room. This subjects the females engaged on the drawing processes to the dusty atmosphere of the card room.

Spinning.—In spinning the thread is drawn out to the required thickness, or counts; the fibres are twisted to give the required strength, and a suitable cop, or spool, is formed, from which the thread may be drawn without undue breakages or waste of material. There are two kinds of yarn produced, twist and weft. The twist is the yarn which forms the warp or lengthway substance of a cloth. The weft is that which intersects the twist and forms the transverse portion of the cloth. Male labour is employed in the mule spinning rooms and female labour on the ring spinning frames.

The cotton manufacturer receives his material, now called yarn, from the spinner in the shape of cops, which are transferred by the winders to bobbins, and further by warpers or beamers to beams.

A custom is growing up of the winding and warping being done by the spinners, especially in the case of ring yarn, and the manufacturer then receives the twist on beams.

As many as 500 bobbins may be wound on one beam. Winding and warping are performed by females.

The next process is the sizing, by means of which the threads are strengthened for weaving and the required weight is imparted to the warp. Such substances as flour, China clay, farina, sago, magnesium chloride, muriate of zinc, are used in the preparation of size. Adult males are employed in this process.

The drawing-in, or looming, consists of attaching healds and reeds to the warp. This is very fatiguing for the eyes, especially when artificial light is used, as a small hole is focussed at a distance of $1\frac{1}{2}$ to 2 feet from the head. It is a common thing to see drawers-in, who are generally males, wearing spectacles.

The foregoing processes culminate in weaving, in which the twist and weft are interlaced to produce a firm texture. Weaving is carried

on in a shed, on a ground floor, and there may be as many as 1,000 looms in one shed. The work of weaving is carried out by both sexes, from half-timers to elderly people, but the female element predominates. Warmth and moisture are required to obviate brittleness of the threads.

There appears to be some danger in the custom of weavers sucking the weft through the shuttle when the thread breaks, or on replenishing the shuttle. This custom would seem to favour the production of sore throats and bronchitis, and also phthisis, if the shuttle became infected with tubercle bacilli of a sufferer from that disease; but as the shuttles are not changed from loom to loom, the latter would probably only affect employées at the same machines.

Various devices have been placed upon the market which would avoid the necessity of putting the shuttle to the mouth; but I understand that many of the workers do not care to use them, or, in their own words, "they can't be bothered." Also many of these devices necessitate extra grooving of the wood, shorten the life of the shuttle, and add to the initial cost.

In connection with this mention of shuttles, and as Blackburn is one of the principal centres for shuttle-making, it is very interesting at this point to refer to an important investigation by Professor Harvey Gibson, of Liverpool, last winter respecting poisonous wood used in shuttle making, and in which he attributed illness from which certain workers in this trade had been suffering, to the absorption of an alkaloid discovered by him in a wood imported from the Congo. The alkaloid was extracted from the sawdust, and tested in its chemical and physiological aspects. Briefly, the result of numerous experiments showed that the alkaloid was a cardiac poison, inducing a gradual slowing of the heart-beat and diminution of vigour in the contractile tissue of the heart, that its effect was cumulative, finally producing a cessation of the beat under long exposure to its influence.

The wood was known as "yellow-grey box."

The chief wood-working processes in shuttle-making are: (1) Sawing the logs across; (2) cutting the blocks to length; (3) dressing up the edges; (4) boring and tipping; (5) bodymaking (viz., sawing out the interior of the block); (6) turning so as to form a pointed end; (7) rubbing with sandpaper—known in Blackburn as "hustling."

All these are performed by machinery, with the production of much dust. The chief symptoms, as ascertained by Dr. Legge, complained of by the sufferers were, headache, feeling of sleepiness, running of eyes, running of nose, difficult breathing, nausea, and faintness. Two deaths were attributed to the dust of this wood. A conference with

representative manufacturers of shuttles was held in Blackburn on November 22nd, 1905, at which it was agreed that exhaust ventilation by hoods and ducts, so arranged as to catch the dust as near as possible to the point where it is produced, should be applied to the sawing, dressing up, boring, and sandpapering of the seasoned wood.

The above is an illustration of a brilliant piece of research work carried out by co-operation between a Professor of Botany and a Medical Officer of the Home Office in detecting the cause of poisoning from a form of industrial dust, indirectly connected with the cotton trade, and in the application of a successful remedy.

Many statements were made years ago to the effect that the conditions under which cotton operatives worked were very dangerous to health. In the Medical Reports to the Privy Council for 1861 the following statement appeared: "The great prevalence of pulmonary diseases among the inhabitants of Blackburn has not escaped the notice of the resident practitioners. Mr. Wraith, of Over Darwen, certifying factory surgeon and also parochial medical officer for that district of the Blackburn Union, had observed for more than twenty years the great prevalence of bronchitis and phthisis. He had especially noticed that operatives employed in the carding rooms suffered from these diseases, and he attributed the circumstances to their inhaling dust and fluff. In Dr. Grime's opinion, inhaling dust and fluff diffused through the atmosphere of the card rooms is the primary cause of the prevalence of pulmonary diseases among this class of operatives, being out of all proportion more frequent among those who work in card rooms than among other occupied persons."

In 1883 a report was prepared by direction of the Secretary of State by Dr. Bridges and Mr. Osborne, on "The Effects of Heavy Sizing in Cotton Weaving upon the Health of the Operatives Employed." Certain recommendations were made in this report.

In 1887 some very strong remarks were made by Dr. Stephenson, a former Medical Officer of Health for Blackburn, who stated that the high death-rate of the borough was due to a wholesale slaughtering of the inhabitants by effusing steam into the factories, and polluting the atmosphere with dense black smoke from the chimneys; and he recommended the entire cessation of steaming in sheds.

Many statements were made at this time which appear to have been exaggerated.

The Blackburn Corporation appointed a committee, who examined over 100 witnesses, and then concluded that ventilation in mills was inefficient, that the heavy steaming was injurious to the health of the

weavers, but that steaming, if lightly performed with proper attention to ventilation, was not injurious.

The Cotton Cloth Factories Act became law on August 30th, 1889, in which occupiers of weaving sheds where artificial moisture was produced were required to provide hygrometers, to keep records of temperature and humidity, and maintain the latter within certain limits to avoid unnecessarily raising the heat beyond 70° F., and to provide means for ventilating and carrying off dust.

II. IMPROVEMENTS IN CONDITIONS UNDER WHICH THE COTTON OPERATIVES OF BLACKBURN ARE EMPLOYED.

Very marked improvements have been effected by engineers in ventilating and humidifying apparatus during recent years.

Every effort is being made by manufacturers to comply with the requirements of the Factory and Workshop Act of 1901, which requires that the air of any room or shed shall not contain more than 9 volumes of CO₂ per 10,000, or not more than 5 volumes over the outside air. It seems quite practicable to conform to this standard, in spite of the suggestion from a Departmental Committee in 1902 that 12 volumes of CO₂ per 10,000 should be allowed when gas is not burning.

So much has been said regarding the ventilation and humidity of weaving sheds that I will confine my remarks on these two points to a few recent developments.

The method of ventilating which is being employed most frequently at present in the weaving sheds of Blackburn is a modification of the Plenum system. A 14-inch air propeller is fixed on a beam, with steel trunking fixed above and below the fan. As the air is brought in it strikes a cone-shaped dripper below the fan to distribute the air evenly without draught, in order to prevent condensation.

In winter the incoming air is heated by a copper coil, supplied with steam at high pressure, and fixed inside the trunk. The air leaves the shed by doors and other openings.

Improvements in ventilation are frequently being carried out in other parts of the cotton mill, such as the spinning and carding rooms.

There have also been distinct advances in methods of sizing. The fibre is now sized in an approved scientific manner, so that the size adheres more firmly, and this means less dust, as there is less disintegration of the sizing material.

Under Section 94 of the Factory and Workshop Act of 1901, it is enacted that the water used for the purpose of producing humidity in every cotton cloth factory shall either be taken from a public supply

of drinking water or other source of pure water, or shall be efficiently purified to the satisfaction of the inspector before being introduced in the form of steam into the factory, and all ducts for the introduction of humidified air shall be kept clean.

I believe that the Home Office now allow water to be used for this purpose, the oxygen absorption power of which is not greater than 0.5 grain of oxygen absorbed per gallon. This allows the use of ordinary canal water.

A firm is now placing upon the market an apparatus which is intended to obviate steaming in weaving sheds. It consists of a trough which is placed under the yarn near the beam. Pure water is supplied to the trough, in which a spiral brush revolves, causing the air locally to be moistened. The tests which have been made appear to be satisfactory as regards the amount of CO_2 present, but I do not know whether this method will come into general use as a substitute for the present method of humidifying the air of weaving sheds.

Warmed and ventilated cloak-rooms have been provided in many mills for the use of the weavers, in order that their outer garments may be dry when they go home.

Electric light has replaced gas in many of the mills, and its extension will undoubtedly further diminish impurities in the air of the rooms, while the great improvements in incandescent mantles have made the atmosphere much better in many mills continuing the use of gas.

Since 1903 extensive improvements have been carried out in the sanitary conveniences at many mills in the borough. The cost has ranged from £10 to £500 in single mills. Since the beginning of 1904, 227 water closets have been provided in lieu of privies, old iron trough closets, pails, etc., which frequently communicated directly with the rooms of the mill. The type recommended is the separately trapped, wash-down pedestal w.c., of white glazed earthenware, and automatically flushed. Care is also taken to disconnect the sanitary conveniences from the mill by the provision of an intervening ventilated space. Advantage has been taken of the exceedingly prosperous condition of the cotton industry to get this work carried out.

Corresponding with the improvements in the conditions of work, I have learned from several people who have had much experience that there has been an improvement in the habits and mode of living of cotton operatives in Blackburn. Formerly large numbers of workers went direct to the nearest public-house before going home to tea. Now I understand this is the exception rather than the rule. Instances of an overlooker tyrannizing over his subordinates, if they

did occur, are now unknown. There is no doubt that the home conditions generally of the people have improved concurrently, although there is still much to be desired in this respect.

Moreover, there are now distinct improvements locally in the scientific teaching of the various branches of the cotton industry, and most successful classes are held at the Blackburn Technical School, under the thorough guidance of teachers with high attainments.

III. THE COTTON TRADE MORTALITY STATISTICS OF BLACKBURN.

It is now possible for the first time to compare the death-rates of various workers in the cotton mills of Blackburn in detail for a complete period of fifteen years, namely from 1891 to 1905 inclusive. And here I wish to pay a high tribute to my predecessor in office, Dr. Wheatley, for his energy and originality in obtaining a trade census for Blackburn, and in placing these statistics upon a sound basis. He has thus made it possible to refute certain incorrect figures and statements regarding the unhealthiness of the cotton industry, particularly the weaving branch. As a whole, Medical Officers of Health have not availed themselves of opportunities for calculating the effect of various trades on the health of the workers in this way. Much excellent work still remains to be done along the line of occupational statistics, and this subject is well worthy of your future consideration. It is unnecessary to state before a meeting of Medical Officers of Health that very great care indeed is required in compiling these figures.

I have divided the fifteen years 1891 to 1905 into three quinquennial periods, namely, 1891 to 1895, 1896 to 1900, and 1901 to 1905. The death-rates in the first period have been calculated from the 1891 census, and in the third period from the 1901 census figures. In the second of these quinquennial periods, that is, from 1895 to 1900, the death-rates have been calculated on populations in the respective age-periods obtained from the mean of the 1891 and 1901 census figures. It is especially in an enquiry of this kind that a quinquennial census would be of the utmost value; but it has been recommended so often by leading Medical Officers of Health throughout the country, that one despairs of this important measure ever becoming law.

Instances of the difficulties caused by the long intercensal period at present existing are numerous. For example, in estimating the annual death-rates at Blackburn, between the ages of 15 and 25, amongst the various classes of cotton operatives from 1891 to 1900, the 1891 census figures must be used for each of those years. After the 1901 census the average of the two census populations may be

taken, but it is not possible to obtain the exact number of weavers at each age-period every year. Again, in the period 1889 to 1904 the death-rate from all causes amongst spinners was 12 per 1,000, and the total number of deaths at ages 25 to 35 was 80. The annual rate, however, for most of the individual years has generally been from 6 to 8 amongst spinners at ages 25 to 35, but the rate seems to have increased in later years.

This apparent increase may be due to the fact that the number exposed to risk has been calculated at too low a figure; for during the period 1889 to 1894 (six years), there were actually 37 deaths among spinners at ages 25 to 35, while from 1895 to 1905 (eleven years) there were 45 deaths. A study of the two census tables, 1891 and 1901 shows that while in 1891 there were 806 spinners at ages 25 to 35, in 1901 there were only 415 spinners at that age. In other words, there seems to have been a rapid decrease in the number of spinners at this age, which may possibly be due to certain changes in the methods of spinning. A quinquennial census would obviate difficulties of this kind to a great extent.

Also there is a difficulty in dealing with retired cotton operatives. Dr. Wheatley has pointed out that district registrars should ascertain more carefully the length of time a deceased cotton operative had not followed his occupation before death, so that a more accurate classification might be obtained. The figures for age-period "65 and upwards" are of less value than those for the other age-periods. Also the figures referring to weavers are more valuable than those referring to the other classes of cotton operatives, since they deal with much larger numbers.

I have prepared six tables as follows :—

Table I indicates the populations at the 1891 and 1901 census years, and also the mean between these two. All have been grouped in age-periods of 10 years, and also have been divided into the four main groups of cotton operatives, namely : weavers, spinners, winders and warpers, and card-room hands. A comparison may be made between these numbers and the total populations of the borough at the same age-periods.

Table II shows the distribution of weavers according to sex for the same periods.

Table III shows the average death-rates amongst the above four groups of cotton operatives in three quinquennial periods from 1891 to 1905, and also a comparison with the average deaths for the whole of the borough during the same periods. The only figures which I

have employed for detailed conclusions are those relating to weavers, as the figures for the other branches of the cotton industry are still somewhat small for anything except a general conclusion.

Table IV shows the average death-rates amongst male and female weavers from 1891 to 1905, and a chart accompanies this table.

Tables V and *VI* indicate respectively the deaths and death-rates from phthisis and other respiratory diseases amongst weavers from 1891 to 1905. Charts also accompany these tables.

TABLE I.
POPULATIONS AT 1891 CENSUS.

Age-Period.	Weavers.	Spinners.	Winders and Warpers.	Card-room Hands.	Borough.
15-25 ...	10,176	769	2,261	516	23,621
25-35 ...	5,467	806	1,531	581	19,739
35-45 ...	2,625	499	863	368	14,299
45-55 ...	1,253	216	387	184	10,076
55-65 ...	486	145	141	58	6,038
65 and upwards	125	46	46	13	3,521

MEAN POPULATIONS BETWEEN 1891 CENSUS AND 1901 CENSUS
(NOT INCLUDING THE EXTENSION OF NOV., 1901), BUT
INCLUDING THE RETIRED OPERATIVES TAKEN AT THE
1901 CENSUS.

Age-Periods.	Weavers.	Spinners.	Winders and Warpers.	Card-room Hands.	Borough.
15-25 ...	10,130	705	2,340	575	25,000
25-35 ...	5,799	607	1,600	500	20,461
35-45 ...	2,994	508	964	402	15,700
45-55 ...	1,329	274	489	196	10,926
55-65 ...	543	145	174	67	6,531
65 and upwards	204	64	69	27	3,857

POPULATIONS AT 1901 CENSUS, INCLUDING RETIRED OPERA-
TIVES, TAKEN AT 1901 CENSUS, AND THE EXTENSION OF
NOV., 1901.

Age-Periods.	Weavers.	Spinners.	Winders and Warpers.	Card-room Hands.	Borough.
15-25 ...	10,213	655	2,442	647	26,693
25-35 ...	6,202	416	1,692	433	21,451
35-45 ...	3,394	522	1,075	446	17,296
45-55 ...	1,418	340	596	209	11,908
55-65 ...	653	146	211	76	7,197
65 and upwards	284	84	93	42	4,228

TABLE II.
POPULATION OF MALE AND FEMALE WEAVERS AT THE
1891 CENSUS.

Age-Periods.	Males.	Females.
15-25	3,472	6,704
25-35	1,669	3,798
35-45	983	1,642
45-55	617	636
55-65	272	164
65 and upwards ...	101	24

MEAN POPULATION OF MALE AND FEMALE WEAVERS
BETWEEN 1891 CENSUS AND 1901 CENSUS (NOT INCLUDING
EXTENSION OF NOV., 1901), BUT INCLUDING THE RETIRED
WEAVERS TAKEN AT 1901 CENSUS.

Age-Periods.	Males.	Females.
15-25	3,170	6,960
25-35	1,737	4,062
35-45	1,117	1,877
45-55	658	671
55-65	352	190
65 and upwards ...	142	62

POPULATION OF MALE AND FEMALE WEAVERS AT THE 1901
CENSUS (INCLUDING THE RETIRED WEAVERS AND THE
EXTENSION OF NOV., 1901).

Age-Periods.	Males.	Females.
15-25	2,900	7,313
25-35	1,832	4,370
35-45	1,266	2,128
45-55	708	710
55-65	434	219
65 and upwards ...	184	100

TABLE III.
AVERAGE DEATH-RATES AMONGST COTTON OPERATIVES
FOR THE YEARS 1891-1895.

Age-Period.	Weavers.	Spinners.	Winders and Warpers.	Card-room Hands.	Average Death- Rate for whole of Borough.
15-25 ...	4'3	7'5	4'8	4'2	4'9
25-35 ...	6'4	7'7	8'6	7'9	7'1
35-45 ...	11'9	13'2	12'5	12'5	14'2
45-55 ...	14'0	34'2	25'8	21'7	23'7
55-65 ...	53'2	48'2	42'5	34'5	48'5
65 and upwards	187'2	278'2	186'9	230'7	113'5
1896-1900.					
15-25 ...	3'7	3'7	5'4	3'1	4'2
25-35 ...	4'9	7'2	6'1	4'0	6'3
35-45 ...	9'6	10'2	10'8	7'9	12'3
45-55 ...	15'3	23'3	21'6	16'3	20'0
55-65 ...	38'6	23'4	35'6	23'9	45'0
65 and upwards	155'9	193'7	139'1	37'0	107'3
1901-1905.					
15-25 ...	2'7	2'7	2'6	2'8	3'7
25-35 ...	3'9	7'7	4'7	2'3	5'6
35-45 ...	6'9	6'9	5'9	5'8	9'5
45-55 ...	13'7	22'3	10'7	16'2	19'2
55-65 ...	34'6	42'4	20'8	15'8	38'9
65 and upwards	106'3	121'4	55'9	19'0	100'7

TABLE IV.
AVERAGE DEATH-RATES OF MALE AND FEMALE WEAVERS
FOR THE YEARS 1891-1895.

Age-Periods.	Males.	Females.
15-25	6'1	3'4
25-35	7'3	6'0
35-45	14'0	10'7
45-55	19'1	9'1
55-65	69'1	26'8
65 and upwards ...	196'0	150'0
1896-1900.		
15-25	4'6	3'3
25-35	6'2	4'3
35-45	12'1	8'1
45-55	23'7	7'1
55-65	43'7	29'4
65 and upwards ...	204'2	45'1
1901-1905.		
15-25	2'9	2'5
25-35	4'2	3'8
35-45	7'4	6'5
45-55	16'1	11'2
55-65	39'6	24'6
65 and upwards ...	129'3	64'0

TABLE V.
NUMBERS AND AVERAGE DEATH-RATES FROM PHTHISIS
AMONGST WEAVERS DURING THE LAST THREE QUIN-
QUENNIAL PERIODS.

1891-1895.

Age-Periods.	Number.	Death-Rate.	Average Phthisis Death-Rate for the Borough.
15-25	54	1'0	1'1
25-35	57	2'1	1'9
35-45	28	2'1	2'4
45-55	7	1'1	1'9
55-65	6	2'7	1'5
65 and upwards	0	0'0	0'7
1896-1900.			
15-25	55	1'1	1'1
25-35	43	1'5	1'6
35-45	35	2'3	2'5
45-55	16	2'4	2'0
55-65	8	2'9	1'8
65 and upwards	2	1'9	0'6
1901-1905.			
15-25	48	0'9	1'0
25-35	34	1'1	1'4
35-45	29	1'7	1'8
45-55	11	1'5	1'8
55-65	6	1'8	1'1
65 and upwards	1	0'7	0'6

TABLE VI.
NUMBERS AND AVERAGE DEATH-RATES FROM RESPIRATORY
DISEASES OTHER THAN PHTHISIS, AMONGST WEAVERS
DURING THE LAST THREE QUINQUENNIAL PERIODS.

1891-1895.

Age-Periods.	Number.	Death-Rate.	Average Death-Rates of whole Borough from Respiratory Diseases.
15-25	39	0·7	0·8
25-35	30	1·1	1·2
35-45	40	3·0	3·7
45-55	37	5·9	7·6
55-65	36	16·5	15·9
65 and upwards	41	65·6	35·6

1896-1900.

15-25	21	0·4	0·6
25-35	18	0·6	1·0
35-45	28	1·8	2·4
45-55	27	4·0	5·0
55-65	39	14·3	12·8
65 and upwards	35	34·3	27·1

1901-1905.

15-25	10	0·2	0·4
25-35	12	0·4	0·7
35-45	12	0·7	1·4
45-55	28	3·9	4·7
55-65	35	10·7	10·1
65 and upwards	25	17·6	23·8

CHART I.

CHART SHOWING DEATH-RATES OF MALE AND FEMALE
WEAVERS IN THE 5-YEAR PERIODS, 1891-1895, 1896-1900,
1901-1905.

— indicates period 1891-1895.
 " " 1896-1900.
 - - - " " 1901-1905.

CHART II.
DEATHS FROM PHTHISIS AMONGST WEAVERS FROM 1891-1905
IN 5-YEAR PERIODS.

CHART III.

AVERAGE DEATH-RATES FROM PHTHISIS AMONGST WEAVERS
FROM 1891-1905 IN 5-YEAR PERIODS.

———— indicates period 1891-1895.
 " " 1896-1900.
 - - - - " " 1901-1905.

CHART IV.

DEATHS FROM RESPIRATORY DISEASES OTHER THAN PHTHISIS
AMONGST WEAVERS FROM 1891-1905 IN 5-YEAR PERIODS.

— indicates period 1891-1895.
 " " 1896-1900.
 - - - - " " 1901-1905.

CHART V.

AVERAGE DEATH-RATE FROM RESPIRATORY DISEASES OTHER THAN PHTHISIS AMONGST WEAVERS FROM 1891-1905 IN 5-YEAR PERIODS.

— indicates period 1891-1895.
 " " 1896-1900.
 - - - - - " " 1901-1905.

From the preceding tables and charts the following conclusions may be drawn :—

1. That the death-rates amongst the four main groups of cotton operatives in Blackburn at all the age-periods have diminished between 1891 and 1905.

2. That the death-rates amongst weavers from the ages 15 to 55 have been lower than the average death-rates for the whole borough since 1891.

3. The death-rates since 1891 amongst male and female weavers have diminished at each age-period except one, namely amongst female weavers from 45 to 55 years of age. This rate has increased by 2·1. It is also interesting to note that the death-rate at this same period from phthisis amongst weavers increased by 1·3 and 0·4 in the quinquennial periods respectively ending 1900 and 1905 compared with the quinquennial period ending 1895.

4. The death-rates from phthisis amongst weavers have shown a steady decline, with the exception named above. This improvement has been most marked between 25 and 45 years of age.

5. The death-rates from other respiratory diseases amongst weavers have also shown a very marked improvement.

6. The above death-rates have improved progressively during each of the last three quinquennial periods.

The foregoing facts and figures therefore enable one to state that the conditions under which cotton operatives work in Blackburn have improved enormously, and that the death-rates amongst them improve continually. This has involved less sickness amongst the operatives and an increased output in manufactured goods.

Finally, I would thank you for listening to these remarks, which I trust have illustrated the main points in a fifteen-years history of an important industry, in which energetic sanitation and carefully compiled statistics have produced very encouraging results.

SALE OF DISEASED MEAT.—At a meeting of the Western Counties Veterinary Association, held at Plymouth recently, it was stated that a very large number of diseased animals, both living and dead, found their way into the large towns for human consumption, especially into Plymouth, Devonport, and Stonehouse. It was suggested that this traffic was assisted by the large number of private slaughter-houses which exist in these towns. The Association urged the Authorities to take steps to put an end to this traffic.