Some observations on the effects of the Cotton manufacture on the health of the Operatives engaged in it.
Having had somewhat extensive opportunities of observing the different districts occurring amongst the Operatives in one of the most modern seats of the Cotton Manufacture, I have thought it might not be without interest to note down some of the principal results thus obtained.

I must premise that the district consists of a large irregular basin formed on the North and West by only a spur of the great range of Blackstone Edge, and on the East and South by the Derbyshire Hills. A small stream runs through the valley which has its junction on the North East and South East. The bed of the stream is about 9 or feet above the sea level, and the hills rise to a height of from 1000 to 1100 feet above the sea. The subsoil is principally a slaty shale, with extensive beds of clay, and also of sand and gravel, intermixed. The prevailing winds are East and North East. The annual rainfall is 80-90 inches. The number of days on which rain falls averages 210 per year.

It follows as a matter of course that the climate of the district, though not unhealthy to the abstract, is somewhat unhealthful, especially in the Winter and Spring, which, according to a local saying,
Last eight months out of the twelve. Apart therefore from any influence of occupation, Rheumatism, Promethia, and all the various ill effects accruing from sudden change of temperature, we are likely to develop ourselves in all who are weak and delicate.

The District has also other peculiarities, some of which may be gathered from the following extract from a London paper. "With reference to the insanitary conditions of Local Government and especially to the bewildering confusion of boundaries, a report just issued by the Local Government Board shows the following. The Urban sanitary District of Mossley comprises parts of four parishes, parts of two unions, parts of three counties, Lancashire, Yorkshire, and Cheshire, and parts of four sub-divisional districts, but only parts of two Registration Counties, viz., Lancashire and Yorkshire."

The Local Board District, I may say, is a very small one in area, several large hamlets which ought naturally to be included in it, being attached to other districts, but forming an integral part of Mossley medical practice.

From the above sketch, some idea may be formed of the difficulty of obtaining sound statistics, either of the death-rate or of the amount of disease present in the District at any time. To meet this difficulty the Public Health Officer of the District has been able to secure the Medical Officer of Health for some years, very much underestimated the Mortality of the District.
The population was generally estimated at 16,000 or even more, and consequently the mortality at about 18 per thousand. But a few years ago the Urban Sanitary Authority had a census taken by their own officers, from which it appears that the total population contained within the Local Board boundaries was only 13,382, and the mean average mortality 23.32 per thousand.

This population is to a very large extent composed of new comers into the neighbourhood, as less than 40 years ago the whole number of residents was only a few hundreds. Many of these new hands come direct from agricultural districts, so that any effect of familiarity whether as regards transmigrating acquired peculiarities or in acclimatizing old residents cannot be traced at all clearly. I may say in this connection that I have very rarely met with any of those feelings of nausea or even any considerable general malaise which I have heard described as usually occurring in those who first began to work in a cotton mill, after arriving at adult life.

As showing the influence of climate, the following abstract of the returns of the Medical Officer of Health is instructive:

<table>
<thead>
<tr>
<th>Year</th>
<th>Deaths</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1879</td>
<td>321</td>
<td>disease 96, injury 38</td>
</tr>
<tr>
<td>1880</td>
<td>295</td>
<td>disease 65, injury 30</td>
</tr>
<tr>
<td>1881</td>
<td>313</td>
<td>disease 84, injury 32</td>
</tr>
<tr>
<td>1882</td>
<td>311</td>
<td>disease 64, injury 59</td>
</tr>
</tbody>
</table>
The manufacture of cotton, though frequently spoken of as a connected whole, comprises several distinct branches, each of which exerts a modified degree of influence over those who work in it. But there are certain general conditions common to nearly the whole of them, such as confinement in a warm atmosphere—more or less dust-laden—long hours, and monotonous occupation.

The first process, that of opening out the bales and freeing the cotton from dust and various impurities, necessarily exposes the workers in the cotton chambers and blowing hole (as the rooms are called where these processes are carried on) to an atmosphere thickly loaded with dust, and fine particles of cotton fibre, and the result is, in almost every case, sooner or later, to produce diseases if the bronchial tubes, or air cells, or both.

If the man was previously healthy, he may go on for several years, without experiencing any great inconvenience, but after a time, he begins to feel a feeling of oppression about the chest, and some "shortness of breath"; but at first this feeling is only experienced when first going to his work on a Monday morning, or after a holiday, and passes off in a few hours, when he feels no further trouble during the rest of the week. After a further period, the breathing becomes habitually quickened, accompanied by a slight cough, and probably a little dark-coloured expectoration on first getting out of bed in the morning.
As time passes on, he begins to suffer from attacks of Subacute Bronchitis brought on by very slight exciting causes, and it is generally in one of these attacks that he first applies to a Medical man for relief. If consulted in the early stage, we shall find, in addition to the nasal sub-mucous and sub-mucous rales, a somewhat lessened elasticity of the chest walls; and the sputa if examined microscopically, will be found to contain fine particles of cotton fibre.

If the patient takes increasing in good time, and finds some healthier occupation, it is surprising how readily the affected structure will return to an apparently healthy condition. But it is very rarely this is done and if the patient cannot or will not change his employment, either a state of Chronic Bronchitis supervenes, with permanent thickening of the bronchial tubes, and generally a considerable amount of Emphysema, in which state he may linger on for many years with occasional exacerbations; or what is of pretty frequent occurrence, an attack of Hemoptysis comes on, and unless in an acute case of Phthisis.

Some few persons appear to possess a practical immunity from any of these effects, e.g. Mr. Head Carter, has worked successively in Cotton Room, Blowing House and Card Room, for over 40 years, and even yet has not the slightest cough or difficulty in breathing, in fact
the way, he can climb a hill as well as ever he could; but such instances are extremely rare.

The following case, which I recently examined, is much more in accordance with general experience. I am 56 1/2 years, first entered the sloping room when 20 years old and continued to work in it all about 4 years ago, i.e., for 40 years. The present condition is as follows. In appearance he is few and purdy. On examining the chest, crepitant rales are heard over the white area. The heart sounds can be heard over the whole chest and there is also considerable engorgement of both legs. He complains of Chronic cough with thick mucous expectoration in the morning, but says he does not suffer much in the day time, unless he bends himself. When he is "out of wind" directly; he is able to follow a light occupation.

The most processes in the cotton manufacture are carried on in the Card-room, where the raw cotton is first passed through the Carding machines, in which the fibres are disintangled and made into the fluffy texture generally known as Cotton wool. These Carding machines consist primarily of wooden cylinders, covered with leather cases perforated with fine teeth, and to maintain their efficiency these teeth have to be sharpened very frequently; this is done by holding forcibly an empty straddle to the face of the card, while revolving with great rapidity, and as may be readily supposed, the result is that an immense
quantity of fine particles of dust and airy fibre fill the atmosphere. This process necessitates the employment of a class of male operatives called Snuffers and Snouters, who are exposed to the inhalation of the atmosphere just described.

It is true that during the performance of their particular duty, they generally use an improvised respirator formed of a portion of raw cotton held between the teeth and large enough to cover both mouth and nose, but this precaution is only used at other times though the atmosphere is invariably loaded with dust. Still the card room being as a rule better ventilated and more spacious room than the cotton chamber, the evil results of the work are not manifested so early as might be expected, though they are in general character very similar to those previously alluded to. There is also in both these classes of cases a very obvious source of danger: the work can be easily and quickly learnt, it requires no special skill, it is only poorly paid, in comparison with some other employments, it is attended by constant danger and lastly it is in its very nature dirty and disagreeable; from all these causes combined it fails to attract the higher grade of operatives, and, with some exceptions, they, the workers, are not so favourably situated either in home surroundings, or social habits, as in some other branches. Indeed probably the nature of
the employment tends of itself to encourage
the habits of dissipation which, unfortunately,
prevail too much amongst them, and these
circumstances have a considerable influence
in modulating the rate of mortality.
Still there can be no doubt that Strippers
and Spinners, as a class, are not long-livers,
and as habits of dissipation are by no means
confined to them, it follows that the
work itself must be an important factor in
the matter, for it is rare to find a Striper
and Spinner of middle age who is not the
subject of what is called Simpler’s Asthma.

When, however, the case has not gone too
far, the power of recuperation is often
very surprising and a removal from the
Cardroom is attended with very favourable
results either in delaying or averting a
fatal termination. The two following
will illustrate this.

I Geo. W., at 28 years, married, a native of
Huntsville, had worked in the cotton factory
about 6 years at the time when first seen,
which was during the illness of his baby in
the Autumn of 1875. He was then noticed
to be losing flesh and also to have a cough,
with somewhat rapid respiration; but on
being questioned he declared himself to be quite well.

In March 1876 he had a monchitic attack,
from which he recovered in due course, and
notwithstanding repeated warnings, persisted in returning to his former work. In October 1876 he had a severe attack of Hæmoptysis by which he was greatly prostrated, and recovered only slowly, being confined to the house during the whole of the following Winter and Spring. Early next Summer, he commenced business as a Coal Dealer, and, having plenty of fresh air and moderate exercise, he rapidly regained his former strength and weight, and continued to enjoy fairly good health until the February 18, 1882, when he was then subjected to severe exposure, which resulted in considerable Pulmonary congestion and on percussion, a small not well defined area of dulness was found over the left apex. From this state the case ran the ordinary course of Phthisis, terminating fatally in about 12 months.

Case II. George W., first seen in August 1875, 50 years. Had worked in various parts of the factory, but for the last 6 years had worked in Cardroom and Blowing hole. Up to 6 years ago he had enjoyed good health, but since then had been subject to colds and shortness of breath. On August 6th he was attacked with Capillary Bronchitis and some Hæmoptysis, from this attack he recovered fairly well, but after he had resumed his former employment about a fortnight, he had a relapse and on
recovering from that he attained employment on the railway, as an extra porter. Whilst so employed he remained free from chest symptoms, but some months afterwards being out of work on the railway, he once more tried to work in the Card room; but after a few weeks' trial had another attack of Bronchitis愍municia which left him very much debilitated. On getting strong enough, he went for a few weeks to the seaside where he speedily recovered strength and up to the present time continues in apparent good health, though not quite so robust as formerly.

Many similar cases might be quoted though of course they form the exception, and not the rule; in fact the greater number of such patients the disease recovering a comparatively rapid course, not differing from ordinary phthisis Pulmonalis either in symptoms or duration.

In the Card room—though in quite a different part of it—the process of forming the loose cotton into the rudiments of a thread is carried on by machines, which are tended by females, who thus constitute the majority of Card room hands. But though working in the same room they are much less exposed to the dust and dirt, and being at a greater distance from the Carding engines the ventilation is considerably better, so that the female card room hands cannot be said to suffer especially from respiratory diseases.
But there is a special class of diseases from which they seem to suffer unduly, e.g., Diurno and displacements of the uterus, especially retroflexus and retroversion. This may be attributed to various causes. 1st. Many of them have to lift heavy weights and that under a good deal of muscular disadvantage, as they have to reach above the level of their heads unless they are exceptionally tall. 2nd. The custom of returning too soon after confinement. This is general amongst all the various departments, but it seems only reasonable to suppose that where the work is strained and lifting the effect upon the imperfectly recovered structure will be all the greater. In this connection, I may make a short quotation from the last report of Mr. Walker, coroner for Rochdale, presented to the Salford Quarter Sessions. In his report, "If the information given at the last meeting of the Salford County Recruit Committee, I now propose to furnish you with some particulars relating to the deaths of infants, presumably from the neglect of mothers, who are still occupied, and who return to their employment too soon after giving children birth. During the past year I have held 285 inquiries, without a jury, relative to deaths that have been reported to me by the police; 62 have been on children above one month and under ten months, and of these cases, 22 have been on children.
who had been practically deserted by their brothers, who being mill operatives had returned to their employment too soon after the birth of their children. In no less than seven instances the mothers returned to their employment, when the child was only 3 weeks old and in the other cases from 5 to 6 weeks.

I need not enlarge on the manifest impro-

avity of such conduct, but in some cases it has been the result, not of choice, but of necessity. Independently of the cases cited there are many deaths from the same cause in my district, but which are not reported to me, owing to previous illness, the cause of death being certified by a medical attendant.

I will also take this opportunity of giving some curious data as to the period in which sudden death occurred. You will understand that the whole of the promiscuous inquiries are confined to what may be termed deaths from natural causes, which occurred on the following days – on Sunday, 27 deaths, on Mondays 43, on Tuesdays 47, on Wednesdays 47, on Thursdays 43, on Fridays 49, on Saturdays 4, total 225.

You will observe that the highest death rate was on Sundays and by far the least on Wednesdays, Thursdays, Fridays and Saturdays.

(These are the same causes which are so
injurious to the infant, cannot fail to be equally injurious to the mother; but as I have no reason to believe that the cardroom hands are more guilty in this respect than the females working in other departments - this cannot account for the whole of the case. At any rate the fact remains that a great number of cardroom hands are the suffers from some form of intra-venous displacement for which mechanical support is required, and that the nature of their occupation has much to do with it, may be inferred from the number of patients who cannot wear Hodgkin-Owen's apparatus, or any of their modifications, but who require some of the forms of Sheffield's Porcelain Cassy with belt and straps to suit internal support.

The next process after the cardroom is the spinning department, and as this is carried on in large well-lighted rooms with a necessarily large critical space to each worker, there is not the same amount of solid particles floating in the atmosphere, and the proportion of oxygen is greater whilst the respiration products of respiration are more diluted, so that the directly injurious effects on the workers are more difficult to ascertain.

But the rooms are kept constantly at a great heat, and most operatives spinning complain of the frequency with which they take cold, from the sudden exposure to a cold atmosphere, when leaving
work. The Minders and Piece men, i.e., the overseers and their assistants, are obliged to be walking or running about nearly the whole of the time they are at work, especially when the machinery is of modern construction and the material used is of the best quality. As a result of this position, a great many cases of deforming cases are to be met with, especially for life and knock-out.

This is not to be wondered at when we consider the early age at which children are sent to work, but it may be hoped that recent legislation, which has done so much to improve the position of women and children, will render these cases much less common in the future.

When the yarn leaves the spinning room it is either at once placed in the cap cellar, or given to the relievers, to be wound into bales.

These hands employed in the cap cellar are continually exposed to an atmosphere that is both wet and cold; so in order to make the yarn weigh as heavily as possible, it is regularly watered and the whole floor kept nearly flooded. Naturally those thus employed are the victims of chronic rheumatism, but as old and worn out men, no longer capable of active exertion, are generally employed for this purpose, it would scarcely be fair to attribute the whole of their ailments to their last employment.
The Reels are, so far as I have observed, not subject to any special class of diseases.

The above branches are all comprised in what is technically called Cotton Spinning.

The manufacturing of cotton cloth is a distinct business, and though the two (Cotton spinning and manufacturing) are frequently carried on by the same firm, yet this is by no means generally the case, and even where it is, the processes are almost always carried on in distinct buildings.

The preliminary operations of preparing the same for weaving, though presenting many processes extremely likely to be injurious to health, still employ so few workers, that the number is too small to enable one to form any reliable statistics. But the weaving department itself gives employment to a great number of people, of whom, in this neighbourhood at any rate, at least four-sixths are women and children.

The progress of competition has proceeded so far, that almost any means of increasing the profit, whether by using cheaper materials, or artificially adding to the weight of the cloth, are eagerly adopted with very little regard either to the comfort or health of the workpeople. In consequence of this policy various ingredients are now added to the cotton warp in the process of sizing.
The plan of sizing has been carried on in some form or other, from the very earliest times, beginning with the rice water of the Indian Raj, and thence to the thin flow paste of the old fashioned English handloom weaver. After a lime tallow was added to lessen the harshness of the thread, and this continued to be the general practice till the Russian War of 1854, when the scarcity and dearness of tallow led many persons to exercise their ingenuity in finding substitutes.

The use of adulterations thus begun has been continued to the present day, and now in certain classes of goods, the main object seems to be to work out as little cotton and as much size, as can be accomplished by any amount of skill and ingenuity. The chief ingrediants used are flour or some form of farina, to give liness and firmness to the threads; China Clay, to add to the weight; Magnesium Sulphate and Magnesium Chloride, to increase the absorbent power of the material; and lastly Jute Chloride, to prevent the mildew, which the other ingrediants described were apt to cause in cloth when sent on long voyages.

Before the American War, 30 per cent additional weight in the sizing was considered a fair allowance, now 50 per cent is thought very moderate, and in some instances even 200...
per cent is added.

But in order that the yarn may be woven without losing a very large portion of this extra loading, it is necessary to maintain the weaving sheds at a high temperature, particularly in cold and frosty weather; and at the same time, to keep the atmosphere in a very moist state. Both these indications are fulfilled by the use of steam.

The waste steam from the boilers is sent round the sheds in pipes, to raise the temperature, and at the same time, various plans are adopted for allowing a portion of it to escape into the room; sometimes by purposely leaving the joints of the pipes in a leaking condition, sometimes by minute perforations in them, and at other times, by small steam pipes which send a jet of steam into the room, above the heads of the workpeople.

The last is probably the least objectionable plan, but even then, the moisture combined with the dust from the looms, and the general want of ventilation, produce an atmosphere, that only the strongest lungs can bear for any length of time with impunity.

A Memorial, presented to the Secretary of State for the Home Department, in 1872, by the Trade Union Congress, places these matters in a very strong light, but still with less exaggeration than might have been looked for.
They said, "Your memorialists desire to draw your attention to a practice that has of late years become very common, especially in the making of goods known as Tofilothe, and Indian Shirts. We allude to the overening of cotton yarn, out of which arises another evil, especially in dry weather, viz., the infusion of steam into the weaving shed to in order to stfel the stuff over-aged threads."

"Your memorialists complain that the extraordinarily addition to the yarn of the ad-
mixture already described, gives off, in the
process of weaving, deleterious effluvia,
dust, and flocculent matter, which are
inhaled by the weavers to the injury of their
health." "Your memorialists complain that
the clothes of the persons, chiefly women and
children, who are employed in those sheds
are so damped by the warm moisture given
off by the steam, that after going out
into the open air, cough, colds, and the whole
train of lung diseases are contracted; and
inflammation and many other bodily affections
which tend to excite and break up the system
at a premature age, follow."

That these complaints are by no means
without justification, a few statistics will show:
In one of the oldest weaving shed in this district,
the outside Temperature being 61° F., the inside
Temperature was 71° 2 F., and the quantity
of vapours, per cubic foot, was 5.4 praeins. In another more modern shed, outside temperature was 43.5°F, inside temperature 71.5°F, and quantity of vapour was 8 to praeins per cubic foot.

It might be supposed that people continually working in such an atmosphere would, in almost every instance, present manifest symptoms of ill-health; but this is by no means the case. Many of the women, who have worked in the weaving sheds, from childhood, enjoying good health and some of them even a fairly good complexion. But yet it must be admitted, that in addition to Pneumonia and other chest affections, Neuralgia and Dyspepsia are unduly prevalent amongst them. Indeed, some of the most obstinate cases of Dyspepsia, I have ever seen, have been amongst this class of operatives. These Dyspeptic cases vary greatly in severity, but are frequently so severe as to simulate Pneumonia, and sometimes cannot be relieved by any medicine, without removal from their place of work. They cannot be referred to Hysteric as in many cases the Hysteric condition is not present, nor any of the usually concurrent symptoms. Its probable cause seems to be the quantity of "fluff" which enters the mouth in breathing, and is imperceptibly swallowed. The Neuralgia is of various kinds, sometimes closely Andemic, and the weavers themselves
frequently try their own treatment by
successive piles of From and purgative pills,
finding them useful in this class of cases.
In other cases, when there is no defined
Chromatosis, there seems to be a chromatic
element and Calcination and Potass. To
Chromatine prove efficacious; while others again
seem to have a more obscure origin and put
all the resources of Medicine to the proof.

Another inconvenience to which weavers are
subjected is the excessive noise caused by
the motion of the looms. This is so great
that even those working near to each other
are unable to hear their near neighbours shouting
and in order to hold any communication with
each other, they have a sort of Telegraphic
Code, formed by the movements of the lips
without the slightest sound issuing from them.

From working in this violent noise, many of
the weavers are, not exactly deaf, but dull of hearing;
the auditory nerves appearing as if their sensi-
tiveness were blunted, and not capable of
recognising nice distinctions of sound as
readily as in the normal state. I have
carefully examined the case of persons in
this condition, but have not been able
to detect anything abnormal either in the
external ear or the tympanum. I may
mention, what is perhaps merely a coin-
cidence, that I have observed a much
larger proportion of male, than of female, weavers suffering from actual deafness.

The only treatment I have found to be at all useful, in these cases is Dilatory Hearing, has been the insertion of a plug of cotton wool into the external meatus, and wearing it there for some time. When the auditory apparatus is thus protected from continual over-stimulation, the nerves will sometimes recover their tone again.

Amongst the more remote effects I have observed, in over-heated rooms, meningismus may probably be enumerated. At least I can give no other explanation of the frequency of its occurrence in this neighbourhood. A short time ago, within the space of one week, I met with three instances of intractable meningismus, following the extraction of teeth, and it is rare for many months to pass by without some case of dangerous bleeding from an equally slight cause.

The foregoing sketch, though by no means exhaustive, still comprises the principal diseases of the district, whose undue prevalence can, in my opinion, be fairly attributed to the influence of occupation.

On impartially reviewing the whole subject, it must, I think, be conceded, that the evil effects of the cotton manufacture...
Upon those engaged in it, have been greatly exaggerated. The dwarfed and stunted forms, the bony and cadaverous countenances, which even writers have ascribed to the cotton operatives; if they were ever common, are now, at least, things of the past; and when they did exist were the result of the excessive hours of labor, and the early age of commencement to work, which formerly prevailed, and not of anything inherent to the manufacture itself. Some of the processes carried on are certainly deleterious, and perhaps can scarcely be rendered otherwise, but those in which the chief number of hands are employed, either are, or might readily be made quite as free from injurious effects as the average trades of the country.

I shall certify that the above is my own composition.

F. G. Blanchard, M.D.

April 22d, 1854