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[NEW SERIES.

Diseases OF SPECIAL OCCUPATIONS.

No. I.

THE SHEFFIELD GRINDERS.

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[Continued from page 236.]

My attention has been directed to the ages at which the grinders have died at the different wheels for some years past, so far as I could collect them. At the wheel of Messrs. J. Rodgers and Sons, which is a peculiar wheel in many respects, being very well constructed, the fan is in general use where the dry stone is employed. The men also are, as a rule, at work on the higher class of goods, and are not obliged to labour so hard as the men who work at the inferior branches of the trade. At this wheel, since the year 1836, the average age at which the grinders have died has been 42. This return, however, only includes razor grinders and spring knife grinders. The oldest was 57, the youngest 25. Two died at the age of 28. The Union and Soho wheels are both first class wheels, and the mortality at them may be considered below rather than above the usual mortality.

The average ages of the grinders at death, at some of the principal wheels, are given in the next table; and the great majority of the grinders (probably eight out of ten) work at about ten large wheels; the rest at small wheels.

TABLE IV.—Average age at death of grinders at the following wheels.

Name of wheel.	Return of deaths since the year	Average age at death.
Messrs. J. Rodgers and Sons	1836	42
Union Wheel	1850	40
Soho Wheel	1845	40
Old Park wheel.....	1844	41
Suffolk Works	1845	38½

In the deaths at the Union wheel, there is a return of the death of a grinder aged 70, who had not worked at his trade for some years. Excluding this man, the average age at death would of course be much less. In the deaths at the Soho wheel, I find returned a fork grinder aged 48. This man had not worked regularly at his trade; he had been the chapel keeper at one of the dissenting places of worship in Sheffield many years, and had not been much at the wheel. There is also the return of a fender grinder (wet) aged 64; he came from the country, and had not worked very hard at his trade. Excluding this man from the list of deaths at this wheel, the average age at death since 1845 has only been 38. At the Suffolk Works wheel, which is a well constructed one, and the property of Messrs. Turner and Co., the ages at death since 1845 have only averaged 38 years and 6 months: the ages at death were 25, 46, 47, 49, 27, 61, 35, 41, 27, 23, 48, 50, 41, 22, and 35 years. The man who died at the age of 61 was a table blade grinder (wet); he had worked at a water wheel in the country many years of his life, and had only been a very short time at the Suffolk Works wheel.

In taking into consideration the ages at which these men have died, it must be borne in mind that some of them have probably perished from other diseases, as well as from the one

to which grinders are so liable. Still, on looking at these returns, at the low average age of the men at the time of death, in all these large wheels, the low average age of the men now working in some branches, fork grinders only 29, razor grinders only 31, scissor grinders only 32, as well as the large proportion of boys at work in many of the trades, the high rate of mortality appertaining to the calling of a grinder is certainly perfectly appalling! We observe, also, that the mortality varies with the nature of the trade; and that it is much more destructive of life in the dry branches than in the wet.

Men who work in the country are, as a rule, more healthy than those who grind at the wheels in the town. One of the most healthy branches is that of saw grinding. A number of saws are, it is true, ground in Sheffield, but many of the men work at the water wheels on the picturesque streams around our large manufacturing town; want of water often obliges them to discontinue their work; and as a general rule they have not to labour so many hours a day, as in many other branches. The trade is too heavy to admit of boys coming into it at a very early age, and as the man stands to his work, the lungs are not compressed as when, sitting on his horsing, with his elbows resting on his knees, and his face bent forwards, the grinder is employed on forks, razors, scissors, and pen-blades.

There is another feature, also, of some importance to be considered. Some branches, for example, pen and pocket-blade grinders, now employ the wet stone, who once worked at dry grinding; and, therefore, though at present not exposed to its injurious effects, they formerly were so, and many of them are suffering, more or less. When these men have passed away, and our observations are applied only to men who have worked all their lives on the wet stone, I anticipate that, in this branch, the average age of those employed will be much increased, and the mortality much diminished.

Without anticipating the remarks which belong to the third division of our subject, where I intend to enter into the pathology of the grinders' disease, and to give some drawings of the exact appearances presented by the lungs of several of those who have perished from it, I may say that, in dry grinding, very often before the age of twenty evidence is afforded of the existence of grinders' disease. The breathing is difficult, particularly when ascending a hill, or the steps leading to the hulls in which they work, and the shoulders even at this early age are often elevated in order to relieve the distress occasioned by shortness of breath.

The cause of this disease is, first, the irritation produced by the metallic and gritty particles inhaled in grinding, in "hang-ing", and in "racing" the grinding stone; and, next, the constrained position in which the men labour. To this must be added the working for many hours in a badly ventilated room, and the very unpleasant smell produced by the friction of the steel on the grinding stone. When at work, the grinder sits astride of what he calls his "horsing"; this is a low, narrow wooden bench; his elbows rest upon his knees, and his head, particularly when employed on very small articles, is bent over the stone. The position is a very injurious one, and when long continued, is calculated most unquestionably to induce pulmonary congestion.

Again: in many of the heavy branches, such, for example, as table-knife grinding, the men work in the coldest weather without either coat or waistcoat, with their handkerchiefs off, their shirts open, and their chests fully exposed; and this too, in a room every bit of the glass from the windows of which has been removed, that the light may not be obstructed by the splashing of the water rendered dirty by the grinding stone. The work is very laborious, the men perspire freely, and in this condition they will often leave the hull without putting their clothes on, and recklessly lounge about in the yard even in weather as bitterly cold as we have had this winter. Inflammation of the lungs, pleurisy, rheumatic fever, and diseases of the heart, are consequently not unfrequent amongst them.

The workmen in other of the Sheffield trades suffer from inhaling dust as well as the grinders. Bone-scale cutters, ivory

cutters, and the girls employed in the hair-seating manufactures, especially when working with foreign hair, suffer more or less from the dust. A most singular affection is produced on the men who haft knives with cocoa wood and ebony; the dust from both of which woods causes in some instances constriction of the chest, running from the eyes and nose, and symptoms which resemble those present in hay asthma. It also produces, when the skin is at all tender, a peculiar kind of erythema on the hands, face, and other parts of the body.

Prevention of the Grinders' Disease. Can nothing be done to prevent, or at any rate to render less fatal, the occupation of a grinder? This is a question of national importance, and one well deserving our most serious attention. Formerly this disease was unknown, and for this reason; until the year 1786, when the first steam wheel was erected, grinding was not carried on as a distinct branch of trade. The grinding wheels were all built upon the banks of the rivers in the district around Sheffield, and water being the power employed to turn them, it will at once be obvious that the grinder would have many interruptions to his trade, and that to labour day by day as many hours as the grinders do at present, was altogether impossible. Nor was this all; by the old regulations of the Cutlers' Company, passed in the reign of Elizabeth, it was provided that "No person engaged in the said manufactures, either as a master, servant, or apprentice, shall perform any work appertaining to the said science or mystery of cutlers for eight and twenty days next ensuing the eighth day of August in each year; nor from Christmas to the twenty-third day of January, upon pain and forfeiture for every offence, found and presented by twelve men of the said fellowship, of the sum of twenty shillings. No person occupying any wheel for the grinding of knives to allow of any work being done during the holiday months: penalty as before."

When grinding became a separate branch of the Sheffield manufactures,—when the hours were no longer limited during which the men were employed, and when the fearful effects on the animal economy of the particles of steel and grit became apparent, attempts were made to remedy the evil.

The first plan suggested was that of a wooden flue, extending from the grinding-stone to the chimney, for the purpose of carrying off the dust; this, however, was only partially useful. The next was the invention of Mr. Abraham; it consisted of a magnet used as a mouthpiece, or, as the grinders term it, a "magnetic moustache"; it has fallen into general disuse. The next, and the best, was the fan on the principle of a winnowing machine; and with a flue properly constructed, leading from each of the different wheels in each hull, the dust may be most effectually driven out of it, and the pernicious effects, both of the particles of grit and metal which arise in grinding, and of the dust created in glazing and polishing, in a great measure prevented. In two hulls, one at the Union wheel, and one at the Soho wheel, and also in the hulls at the wheel of the firm of J. Rodgers and Sons, I saw the fan at work with the happiest effects. In the hull of G. Trickett, at the Union Wheel, the different operations were gone through in my presence without making any dust; and at the Soho wheel I saw that shaping razors and racing a stone, by adding a properly contrived box, could be rendered perfectly innocuous by the use of the fan; all the dust being driven off by the fan up the shaft on the outside of the building. The particles of dust and steel not carried away by the fan in racing a stone may be prevented from entering the air-passages by a very simple contrivance, consisting of a piece of wadding sufficiently large to cover the mouth and nose, enclosed between two pieces of silk, and secured by a band of elastic to the back of the head.

That the fans, or, as the grinders call them, "*fannies*," answer perfectly, I have convinced myself by actual experiment; and I have also received the unqualified testimony of all the most intelligent dry grinders who use them of the advantage to be derived from them. A razor grinder at the Suffolk Works wheel assured me that but for the fan he should not have now been living; and he said, "If I were to shape twelve razors without a fannie I could hardly breathe next day; with a fannie I can shape them and feel as well as ever I did in my life."

To those who are not as conversant with the economy of a grinding wheel as myself, the question naturally suggests itself, how comes it, that with a contrivance so admirable and so effectual for carrying off the dust from the steel and grinding stone, the mortality is so great? I am sorry to say that these fans are far from being in general use. In some wheels I did not find one; and I went into hull after hull in other

wheels where the men were humping scissors, shaping razors, and grinding forks—the most destructive kinds of grinding, as we have seen—without finding one at work. In other hulls one man perhaps was at work with a fan, and the next was destroying himself and his fellow-workmen by grinding without it; in another the man at the end *throw* had put up a fan that would serve the whole hull, which he charged, perhaps, each man a penny a week for; the man next him paid for the fan, but not having been at the trouble to fix a box, it was useless to him. Others had the fan fixed, but not at work; "the noise was too great for them." And (I blush to write it, but such was the case) some dry grinders told me, that "the trade was bad enough as it was; and if the men lived longer it would be so *over full* there would be no such thing as getting a living." To such men I would say,—if ever there was a trade more poisonous than the fabled valley of the Upas—more slow in its effects, it is true, but equally deadly with the inhaling of the atmosphere of the famous Grotto del Cane—it is that of a fork-grinder who works without employing the effectual means for his preservation which the fan affords. And, over the door of the hull of every fork-grinder who day after day ventures to grind without the fan, ought to be written,

"All hope abandon, ye who labour here";

for the work in which you are engaged, without this protector, will most certainly destroy you. The cost of a good fan is from 30s. to £3.

Allusion has already been made to the age at which boys are taken to work at the wheel. To send a boy at eight or ten years of age to work at polishing forks, in a grinding hull, is an act of refined cruelty which the powerful arm of the law can alone restrain. The application of the Factory Act to the Sheffield grinding trades would, in my opinion, be most wise and salutary. These helpless children I would indeed commend to the protection of the state; and glad indeed shall I be if these remarks attract the eye of any member of the House of Commons and induce him to bring the question before parliament; or if the evils, moral and physical, under which these poor boys are suffering, lead the inhabitants of Sheffield to petition the legislature to throw around them that protection which they have not at present. The early age at which these boys are made to work, and the many hours during which, day by day, they labour, render it impossible to give that general instruction, and religious training, which we have a right to see extended to all classes in a Christian land. The immense competition that exists in many branches, the manufacture of articles to supply the "Cheap Johns" and others who frequent our markets and fairs—articles which are made for *sale* and not for *use*—has doubtless caused many more boys to be employed than would otherwise have been the case; the men remarking, with some degree of justice, that inferior goods are charged so low that they are obliged to make boys work with them or they could not get a living.

That the present high rate of mortality amongst the grinders in Sheffield may be diminished, I am certain, by—

1. Reducing the hours of labour.
2. Preventing boys from being apprenticed to the trade so young as at present.
3. Obliging all dry grinders to use a fan, and to keep it in active operation.
4. Preventing dry and wet grinders from working together in the same hull.

1. *Reducing the hours of labour.* It is a notion in Sheffield that a drunken grinder often lives the longest. This a very great mistake; for intemperance has hurried hundreds of these men to the grave. I have almost invariably remarked that so soon as the liver becomes affected, the chest symptoms are much increased; and that when the liver fails to discharge its functions a very slight amount of disease in the lungs of a grinder will cause far more distress and difficulty of breathing than much more extensive disease when this organ acts properly. The truth is, that the drunken grinder is much away from the wheel: he does not work so many hours at his trade as a steady man, and thus escapes the evils which arise from the dust, and the injury to his lungs which a long continuance of labour, day after day, in a constrained position must occasion. By limiting the hours of labour, time would be afforded for indulging in out-of-doors pursuits—in exercises which would bring the different muscles of the body into play, and have a tendency to prevent some of the effects resulting from bending over the wheel when at work. It must not be forgotten, that until grinding became a separate branch of trade, and steam-power enabled the labour to be constant, the dis-

ease which forms the subject of our present inquiries was hardly known.

II. *The prevention of children entering the wheel at an early age* would afford an opportunity for the body to develop itself on the one hand, and that needful education to be given on the other, which would remove the fearful ignorance at present existing, direct the mind to pursuits which are ennobling, and give to the Sheffield grinders, as a body, a position in the social scale to which they have never yet attained. With the removal of the present state of ignorance, the importance of those general hygienic principles so conducive to health and to longevity would be more generally adopted, and the wheel well ventilated, kept clean, and frequently white washed, and no longer regarded as a place "only to work in," and of no importance whether clean or dirty. At home efficient reforms could not fail to be effected; during the day every room in the house would have air freely admitted, and the sleeping apartment, no longer overcrowded, would be ventilated either by taking out a brick over the fireplace near the ceiling and placing a bit of silk over the hole to keep out the soot, or by substituting ribs of glass for one of the upper panes in the window. Personal cleanliness would not as now be neglected; for the occasional use of the bath, sponging with cold water daily, friction with a coarse cloth or a flesh brush afterwards, should never be omitted by these artisans. And, when the minds of these industrious workmen shall awaken to the importance of employing the three great sanitary agents, Light, Air, and Water,—agents which are all important for the preservation of health and the prevention of disease; when the folly of intemperance is admitted, improvident marriages avoided, and boys are allowed to remain at school instead of being forced at eight and ten years of age into the hull of the grinding wheel, then, and not till then, may we hope to see the high rate of mortality which at present exists diminished, and with a reasonable hope of lengthened days, the Sheffield grinders discharging faithfully the duties of that station of life unto which it has pleased their Creator to call them.

The pathology of The Sheffield Grinders' Disease will form the subject of my next paper.

Surrey House, Sheffield, March 19th, 1857.

Illustrations

OF

HOSPITAL PRACTICE:

METROPOLITAN AND PROVINCIAL.

ST. MARY'S HOSPITAL.

JAUNDICE: DISEASE OF THE LIVER, ATTENDED WITH EXTREME DILATATION OF THE BILE-DUCTS.

Under the care of F. SIBSON, M.D.

[From Notes by E. A. HART, Esq., House-Surgeon.]

BARTHOLOMEW C., aged 59, was admitted Feb. 9, under the care of Dr. Sibson, on account of an attack of jaundice, of two months duration. He had been under treatment as an out-patient, under Dr. Sieveking's care, without benefit. There was considerable pain in the region of the liver, and in the chest; the skin and conjunctivæ were deeply stained. The liver could be felt enlarged, and its edge strongly marked. The urine was acid, and contained a large quantity of bile. He was ordered to have mercurial liniment applied to the abdomen; and to take a draught, containing iodide of potassium with solution of bichloride of mercury and tincture of hyoscyamus.

On further examination, it was found that the right lung reached down to the sixth costal cartilage; and the edge of the liver could be seen through the walls of the abdomen, descending about half an inch with each inspiration. The superficial veins of the abdomen were full, but not much distended. The treatment during the next few days consisted in blisters to the hepatic region, and a fourth of a grain of elaterium every morning. Under this treatment, the yellow tint became less marked; and the size of the liver appeared to decrease, as its movement in respiration could not be seen through the abdo-

minal parietes, though it could be very plainly felt. The appetite, however, remained very bad; the motions were white and clayey. The elaterium, having produced copious purging, was omitted; and the yellow tint of the skin soon began again to deepen. On Feb. 26th, he was ordered potassio-tartrate of iron, with cod-liver oil. Nitro-muriatic baths were also employed, but without benefit. About this time, the glands of the groin were observed to be enlarged. The tint of the skin was deepening into a bronzed colour; he was extremely weak, and was getting occasionally drowsy. On the 7th of March, it is noted that he was comatose; the urine very scanty, and slightly albuminous; the pulse scarcely perceptible. There had been bleeding from the gums occasionally, to a trifling extent. He continued in this condition till his death, on March 15th.

On *post mortem* examination, the tissues were found extensively stained of a bright yellow colour; and the body was much emaciated, the fat in the omentum, as well as in other parts, being consumed. The thoracic viscera were pretty healthy; the kidneys soft and friable, but not diseased as to structure. The suprarenal capsules were healthy. The liver weighed 4 lbs. 14½ oz.; it was of a leadenish black colour. There were two or three small nodules on its surface, which, when cut, gave exit to a viscid, transparent, albuminous fluid. On a further section, a considerable quantity (half a pint) of this escaped, exactly resembling the white of an egg; and large cystic looking cavities, or dilatations, were seen through the entire substance of the organ. In the left lobe, the bile-ducts were dilated from their smaller ramifications quite up to the hepatic duct. In the right lobe, this was not so universal amongst the smaller branches, but the larger ducts were universally expanded, so that a finger could readily be passed into them: they had compressed the parenchyma of the organ, so as to render it hard and dense. The branches of the hepatic artery and portal vein were displaced in consequence, so that they were found with difficulty; and their calibre much interfered with. A section of the organ was intensely green, and full of biliary matter. The right hepatic duct was at one point constricted, and would there only admit a probe.

REMARKS. This case was a subject of much interest to those who had an opportunity of examining it during life, as opinions were somewhat divided with respect to the malignancy or non-malignancy of the disease to which the great enlargement of the liver was owing. The opinion of those who were inclined to attribute the enlargement to malignant disease, was favoured by the presence of the nodular swellings on the surface of the organ, noticed in the *post mortem* description, and which were felt through the abdominal parietes during life; and, as this phenomenon is justly regarded as strong evidence of the presence of cancerous deposit, it may be useful to remember this case as an instance proving that such a condition may coexist, however rarely, with simple inflammation.

The state of the liver disclosed by the dissection was a very peculiar one; inasmuch as enormous distension of the ducts, to such an extent as to seriously modify the secreting tissue of the organ, was found coexisting with a state of the excretory channels which did not oppose any efficient obstacle to the flow of bile into the duodenum. It appears most probable that the disease was an extreme form of that catarrhal inflammation of the ducts described by Dr. Budd (*Diseases of the Liver*, p. 177), in which the ducts become loaded by a viscid whitish secretion. In the present instance, this distension of the ducts had gone on to such an extent as to interfere materially with the circulation in the organ, and very probably with the integrity of its ultimate elements. A case is reported in the same work (p. 210), in which, coincident with distension of the ducts, the whole of the cellular tissue of the liver was destroyed.

Another interesting feature noticed in this case was the movement of the liver in respiration, which could be plainly seen through the thinned walls of the abdomen; and the distinct edge which could be felt around the whole of its circumference. This latter point is noted by Dr. Budd (*loc. cit.*), as being often observable where the liver is enlarged from simple retention of bile (to which the above case is analogous, at any rate, in its physical phenomena), in contradistinction to those cases in which the enlargement is due to strumous or fatty deposit. The precise history of the attack from its commencement was not attainable; but, if the patient was correct in dating it from so recent a period, the rapidity with which it reached its fatal termination is not the least remarkable feature in the case.