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[NEW SERIES.]

Diseases OF SPECIAL OCCUPATIONS.

No. I.

THE SHEFFIELD GRINDERS.

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C. THE SHEFFIELD GRINDERS' DISEASE.

THERE is no necessary connexion between the Sheffield grinders' disease and thoracic consumption, although both affections may be present in the same individual, as in the cases described by Sir Arnold Knight, in the *North of England Medical and Surgical Journal*, vol. i, p. 86.

Many years ago, Mr. Thackrah pointed out the effects of arts, trades, and professions, on life and longevity. Stone-masons, quarry-men, cotton-batters, miners, leather-dressers, needle-pointers, machine-filers, and, in Sheffield, the grinders, all suffer more or less from inhaling, during their labours, an atmosphere which is loaded with irritating particles.

In Sheffield, the fork-grinders suffer the most severely, being what are termed dry grinders. The mortality ranges next in degree amongst razor grinders and scissor grinders, and those who work partly on dry and partly on wet stones; and the statistics I have collected, go to shew that it is much less amongst the men who work altogether on a wet stone. It should, also, be added, that the mortality is greater amongst the workmen who are obliged to labour in the town than amongst those carrying on the same trades in the villages around Sheffield. In all these cases of chronic bronchial disease, there is, in addition to the question of pulmonary irritation, the fact that many of these men are exposed to influences tending to induce the tuberculous cachexia. They pass many hours every day in a confined and deteriorated atmosphere; and the position in which they are obliged to work is unfavourable to the free action of the respiratory organs; and many of them are very intemperate. Much of the evil arising from the inhalation of metallic and gritty particles, I have already shewn could be avoided by working in hulls, where fans are provided to prevent the inhalation of grit, dust, and steel; but, singular to relate, these men are so indifferent as frequently not to make use of the means at their disposal for rendering their calling at any rate less injurious. Dr. Alison has stated that "there is hardly an instance of a stone-mason in Edinburgh free from an affection of the lungs at the age of 50" (*Trans. Med. Chir. Soc. of Edinburgh*, vol. i); and Dr. Forbes, "that an immense proportion of the miners in Cornwall are destroyed by chronic bronchitis." (*Trans. Provincial Med. and Surg. Association*, vol. ii.)

A chronic affection of the lungs is very common amongst bricklayers, and the poor Irish generally in the metropolis and the larger manufacturing towns. Exposed to every inclemency of the weather, scantily clothed and badly fed, one attack of catarrh, bronchitis, pleurisy, or inflammation of the lungs, is quickly succeeded by another, until at length the whole of the lungs, having their pleura more or less adherent over their whole extent, presents a mass of disease, partly tuberculous, and partly the result of chronic inflammation. Some difference of opinion has been expressed as to the real nature of the apparent tuberculous infiltration, from the resemblance it bears to chronic pneumonic consolidation. Dr. Walshe regards them as identical. It is possible, however, that, in a person whose blood is affected to a great degree with the tuberculous dys-

crasia, inflammatory hyperæmia may lead to the exudation of a material having a close resemblance to the tuberculous, but not so inclined to soften and break down.

Wepfer (*Observ. de Capitis Affect.*) had observed, even in his day, the destruction of the miners employed in cutting mill-stones from the mines of Waldschut, on the Rhine, where all the men are said to have become consumptive. The pernicious effects of the inhalation of silex, in a minute state of division, is described by Benoiston de Chateauneuf and M. Clozier (*Le Blanc, Œuvres Chirurgicales*, vol. i, p. 585); and, many years ago, Dr. Johnson, of Worcester, described (*Memoirs of the Medical Society of London*) the injurious effects to the respiratory organs from the inhalation of metallic particles, as exemplified in needle-grinding.

(a) The symptoms of the Sheffield grinders' disease during life, (b) the *post mortem* appearances presented by the lungs of those who have died from it, and (c) its treatment, invite our attention. The means of prevention were considered in the last section.

(a) The symptoms of the Sheffield grinders' disease during life. The symptoms vary, of course, in each individual case, the length of time the disease has existed, and the extent of lung involved. After working some years at dry grinding, without the protection of the fan, the disease creeps by slow degrees upon them, and often, before the age of twenty-one, has made some progress; the digestive functions become impaired; the breathing is short and difficult, even after very slight exertion; the face has a dirty white aspect; the countenance is indicative of distress; and they complain of a sense of constriction across the chest, and a dry sensation at the back of the throat. To these symptoms succeeds a cough, at first dry; after a time, this cough is attended by expectoration; the sputa is at first frothy, and indicative of irritation. Sometimes the expectoration contains a little dark coloured matter, which, in a large manufacturing town like Sheffield, is thought by many to owe its origin entirely to the carbonaceous matter floating in the atmosphere; but, on the addition of nitric acid, the colour fades, and we must, therefore, conclude that some of this dark colour is derived from the pigment-cells, where I know it to increase even under very slight attacks of bronchial irritation. Figs. 1 and 2 present the appearances observed on looking at the sputa of the wet and dry grinders with the microscope. The objects in each circle are magnified 250 diameters.

Fig. 1 contains the sputa of a table blade and file grinder. (a) cells containing pigment; (b) sarcina ventriculi; (c) curled elastic fibre; (d, e, f) pus and mucus cells; some very transparent, shewing a distinct nucleus; others (g) with pigment.

The sputum at the bottom of the circle, a and c, was from a file-grinder. The admirable drawings whence this wood-cut by Mr. Orrin Smith has been taken, were made for me by Mr. Tuffen West, from two slides that I prepared for him. The other objects were from a table-blade grinder, who, having suffered for some months from grinders' disease, gave up his employment; at this time, the disease may be said to have been arrested. The sar-

cina was discovered in the expectoration of this man; it was coughed up in my presence, and at once put up in a glass cell, and forwarded to Mr. Tuffen West. I discovered sarcina several times in the sputa of this man—the only instance in which I have seen it in the expectoration; and, so far as I know, until it was figured in my recent work on consumption (*"Hints on the Pathology, Diagnosis, Prevention, and Treatment of Thoracic Consumption"*, by J. C. Hall, M.D., with twelve microscopic illustrations), no one had mentioned the discovery of it in the expectoration.

The sarcina ventriculi was discovered by Professor Goodsir, in 1842, in some matters vomited by a patient. It has been found in the urine by Haller, Dr. Mackay, Dr. Johnson, and Dr. Lionel Beale; in the feces, by Dr. Bennett and Dr. Hasse; by Dr. Jenner, in the fluid of the ventricles of the brain; and by Virchow, in an abscess of the lung. M. Robin has arranged it under the genus *merismopædia*, and has given it the name of *merismopædia ventriculi*.

As already stated, the other objects in the circle are from the sputa of a file-grinder.

Fig. 2. Sputa of a fork grinder (dry). (a) epithelium from the mouth; (b) epithelium from the fauces; (c) silicious particles; (d) metallic particles; (e) blood-corpuscles; (f) pus and mucus cells.

It should be added, that the expectoration from which this drawing was made was coughed up soon after leaving the wheel at which the man had been at work. The quantity of the particles of steel and stone observed in the expectoration is of course much greater in a grinder who has just come from a wheel where he has been working without the fan.

Sometimes, as the disease advances, and a cavity is formed in the pulmonary tissue, the softened and broken up matters find their way into the larger bronchi, and the sputum, when placed under the microscope, is found to consist of pus, mucus, melanotic, oily, and granular matter, interspersed with epithelium, and the curled elastic tissue surrounding the pulmonary vesicles. It is at the period of the formation of these excavations in the lung, that I have most frequently observed in the sputum, the elastic tissue forming the areolæ of the air-vesicles.

If asked to present a brief *résumé* of the physical signs of the Sheffield grinders' disease, I would say, those of bronchitis and dilated bronchi in some cases; in others, of emphysema, or of consolidation; and, lastly, of excavation: but, in many cases, the general symptoms are not in proportion to the extent of the disease in the lungs. In Sheffield, a knowledge of the occupation of the patient must always, however, ensure, with ordinary care, a correct diagnosis.

There has been for many years past no little difficulty in investigating this disease in Sheffield, from the great repugnance of this class of men and their friends to permit a *post mortem* examination; and, although this foolish prejudice is not so great as formerly, there is still frequent objection made to the examination of the body after death. Accounts of *post mortem* examinations have been published by Mr. Gregory, Mr. Porter, Mr. Gillott, and by the late Dr. Charles Fox Favell, whose premature death deprived Sheffield of an accomplished physician, and the profession of the completion of investigations with respect to the grinders' disease that could not have failed to be as interesting as important.

The symptoms present in those labouring under the Sheffield grinders' disease will perhaps best be exhibited by transcribing an abstract of the notes of a few out of the scores of cases that are, and have been, under my care in private practice and at the Sheffield Public Dispensary.

CASES OF THE SHEFFIELD GRINDERS' DISEASE.

CASE I. Adriel Shaw, pen and pocket blade grinder, was admitted under my care at the Sheffield Public Dispensary, February 26th, 1857. He complains of great difficulty of breathing, cough and expectoration. He has always ground on the wet stone, but states that "razor grinders have worked in the same hull with him", and added, "*there is no fannie in my room, nor about our wheel*"; he went to the trade at the age of fourteen; before that he worked as a cabinet-maker. He came from the country to Sheffield. His father is a gardener; he is living, aged 40; his mother died of thoracic consumption. He had slight hæmoptysis three years ago, but took no notice of it; it has frequently recurred, and he is always attacked with it after "racing" a stone. He began to feel very short of breath six months ago: he now feels very weak, and can take hardly any exercise. He is thin; the chest measures thirty inches, and expands only to thirty and a quarter inches; there is considerable dulness under each clavicle; a loud blowing sound is heard under the right nipple, and a peculiar creaking sound under the left. The expectoration, under the microscope, exhibited pus and mucus-cells, enveloped blood-corpuscles, cells containing pigment, and particles of grit dust.

CASE II. John Gosney, aged 31, scissor-grinder (dry), was admitted March 12th, 1857. He first went into the wheel when nine years old. He has had attacks of shortness of breath, at intervals, for years, but got on very fairly till about a year ago, when he was seized with profuse hæmoptysis, and he has never been well since. He complains of cough, great shortness of breath, and states that he feels "as if a wire had been drawn round his chest." The chest measures thirty-three inches, and does not reach thirty-three and a half inches when he attempts to take a deep inspiration. The chest is generally flat; there is considerable depression under each clavicle; beneath the right clavicle the respiratory murmur cannot be heard; on the left side a few moist clicks may be heard very distinctly about two inches below the clavicle. The sputa under the microscope appeared to be pus and mucus cells; one or two bits of bronchial columnar epithelium could be seen, and several pieces of the elastic tissue forming the areolæ of the air-vesicles were distinctly visible; also some particles of grit and steel.

CASE III. John Stephenson, aged 44, file-grinder (wet), admitted March 12th, 1857. He began to grind at the age of fourteen, and was never ill till he was thirty: he then began to have a dry cough, and to feel short of breath and fatigued after very slight exertion. He has lost weight. He has several times had hæmoptysis. The chest is flat, and the right side does not rise so well on taking a deep inspiration as the left. The expiratory murmur is prolonged on both sides; percussion elicits on both sides a dull sound immediately under the clavicle, and over a square of about two inches on the right side the respiration is jerking: above and below the nipple, on the left side, a blowing sound can be heard. Posteriorly the respiration in both lungs is feeble. The expectoration is considerable; under the microscope I found that it consisted of pus and mucus; some shrivelled cells with irregular edges, groups of cells with pigment, coming, in all probability, from the bronchial glands; blood corpuscles surrounded with a delicate envelope, silicious and metallic particles, etc. With the exception of the little bits of stone and steel dust, there was nothing to distinguish the expectoration in this case from what is observed in the flocculent sputa of an ordinary case of phthisis.

CASE IV. Henry Longdon, aged 53, razor-grinder (dry), admitted December 29th, 1856; has worked at Marsden's wheel: has used a fan part of his time; worked hard when he was able, but has laboured under grinders' disease many years; he is about 5 feet 4 inches; countenance very sallow; hair iron grey; he stoops a good deal; he complains of the greatest possible difficulty in breathing; has had a cough a great many years, and suffered two or three times from hæmoptysis. The chest measures thirty-two inches, and expands to thirty-two and three quarter inches; the mobility is greater on the right than on the left side; there is considerable dulness on both sides of the chest, more particularly on the left, and the surface is a good deal depressed; the movements of the chest, more especially the costal ones, are impaired; the antero-posterior, and the superficial width of the chest is diminished, and there is marked parietal resistance. The percussion sound in some parts is tubular, and the respiration weak, and unequal in quality—harsh and bronchial; in two or three places a diffused blowing sound can be heard. The cough

was constant; there was not much expectoration at this time; there was thirst and anorexia: the night perspirations were insignificant, but the loss of flesh was considerable. He was seen by me at intervals, till he died on the 4th of March, 1857. No *post mortem* examination was allowed, as is too often the case in grinders.

CASE V. Henry Wollen, aged 28, pen-blade grinder (wet), was admitted June 29th, 1854. He complains of shortness of breath, cough, night-sweats, and loss of flesh. He has frequently had hæmoptysis. There is depression of the infraclavicular region on the left side, and the respiration on both sides is rough and jerking; the jerking respiration, I should add, was *partial*, and confined to the upper portion of the right lung. The expiratory murmur was prolonged.

CASE VI. Frederick Clark, aged 19, a razor grinder (dry), was admitted September 18th, 1854. The disease had made considerable progress; he had been in the wheel from an early age. He has had cough and great difficulty of breathing for several years: he states that "he has occasionally spit blood;" his dyspnoea is aggravated on the slightest exertion; there is œdema of the feet and ankles; the clavicles are prominent, and there is a deep hollow between them and the upper ribs; the respiration is feeble on the left side, and a series of clicking crepitations may be heard during both the respiratory movements: there is a cavity of considerable size at the upper part of the right lung. He died on the first of November. No *post mortem* examination was permitted.

CASE VII. James Hodgkinson, aged 21, a table-blade grinder (for the most part wet), consulted me, April 4th, 1857. He has a pale pasty-looking face; he stands 5 feet 3½ inches, and weighs 8 stone 7 lbs. His mother is living, aged 55; his father, a table-blade grinder, died of the grinders' disease at 39, and his grandfathers, on both sides, died of the grinders' complaint. "Does not think consumption was ever in his family." He went to the wheel at the age of thirteen, and has been in it ever since. He has felt a dryness in his throat for a long time, and has been "a bit out of wind when going up hill, but nothing to mean anything;" he has got worse the last few weeks, and "the dry cough begins to trouble him very much." He works mostly wet; the bolsters of the table-knives are ground dry. "He suffers very much from dust when they 'race' the stones, which fills the hull with dust." He has never spit blood. His chest measures thirty-four inches, expands to thirty-five inches; fairly formed; movements better on the left than on the right side: slight dulness under each clavicle; the respiration is harsh; the expiratory murmur is prolonged on the right side; and, three inches under the clavicle, a slight blowing sound can be heard.

I give this case as illustrative of the earliest symptoms of the Sheffield grinders' disease. By abstaining from work a few weeks, under appropriate treatment, this man will recover; at any rate, for a time.

CASE VIII. Ellen Kennedy, aged 21, admitted November 6th, 1856. This girl is employed in a hair-seating manufactory; she has been engaged in working foreign hair; there is much dust in the room in which she works, and the hair has a very unpleasant smell. She has had a dry troublesome cough for some months, with considerable difficulty of breathing; she is much thinner. The pulse is 86 when sitting, and 96 when standing. The chest is well formed; the body tolerably well nourished. There is slight dulness under each clavicle; the respiratory murmurs are harsh, and especially on the right side of that diffused blowing type, to which reference has already been made. Both her parents are dead: the mother died of phthisis. She was advised to discontinue her employment; the croton oil liniment was applied to her chest, and some expectorant medicine administered, with a few grains of the compound ipecacuanha pill each night. She was ordered a milk diet, and after a week or two, meat once a day and a glass of bitter beer. The counter irritation was kept up at intervals for about three months, and she took, during the same period, cod liver oil. Under this treatment the cough left her, she gained flesh, and, when she was discharged, expressed herself as quite well.

The above have been selected from my notes of a great number of cases that have been entered in the books of the Sheffield Public Dispensary, and they are placed before the profession as presenting a correct description of the symptoms generally present in the unfortunate men who have the misfortune to be suffering from the Sheffield grinders' disease. The case of the girl from the hair-seating manufactory is recorded, because I have found many of the symptoms pre-

sent in grinders' disease in those who labour in rooms filled with dust.

The *post mortem* appearances present in the lungs of those who have died from the Sheffield grinders' disease, and the treatment which I have found the most efficacious, will be described in my next paper.

[To be continued.]

Surrey House, Sheffield, April 6th, 1857.

Illustrations OF HOSPITAL PRACTICE: METROPOLITAN AND PROVINCIAL.

ST. GEORGE'S HOSPITAL.

STONE IN THE BLADDER: LITHOTOMY.

Under the care of T. TATUM, Esq.

[From notes by F. WINTER, Esq., Surgical Registrar.]

JOHN L., aged 66, was admitted September 17, 1856, under the care of Mr. Tatum, on account of symptoms of stone in the bladder. He had suffered from these symptoms (*viz.* pain in the back, frequent desire to pass urine, and pain in doing so) for the last two years, and stated that five years ago a small piece of stone was passed by the urethra. The urine was generally of a pale colour, and thick (probably from ropy mucus). His health was said to have been good up to the time of his admission. If so, however, it rapidly declined after this time, the principal symptom being continually recurring attacks of obstinate diarrhoea, which left him so reduced in strength, that Mr. Tatum was unwilling to undertake any operative procedure. The treatment, therefore, for some time consisted simply in endeavouring to restore the tone of the system by nourishment, opiates, and astringents when necessary; and under this he sufficiently recovered his strength to allow of some prospect of benefit from surgical interference in the month of February. At that time he had recovered his general health, but was pale and weak; he suffered much from the irritation of the stone, and from sleeplessness, the result of constant desire to pass urine during the night. The urine was turbid, and contained a little pus, but no other morbid matter.

On Feb. 28th, it was decided to attempt to ascertain by means of a lithotrite the size of the stone and its probable density, and then to act according to circumstances. This having been done, it was found that the stone was both very large and very hard; at least, one or two turns of the screw made no impression on it. The idea of lithotripsy was therefore abandoned; and, on March 6th, lithotomy was performed. The stone was easily grasped; but, from its great size, it was not so easy to extract it. It measured two and one-eighth inches in length, one and a half inch in breadth, and one and a quarter inch in thickness, and consisted of lithic acid; the weight was 1040 grains. There was considerable hæmorrhage at the time of the operation, which, however, was easily commanded by plugging the wound. He passed a pretty good night, but next day shewed some symptoms of threatened peritonitis, which yielded, however, readily to treatment, and he has had no bad symptoms since. He is very much improved in general health; and, except that the wound is not quite closed, and a little water still occasionally escapes, may be reported perfectly well. He goes about the ward, and will shortly be discharged.

REMARKS. This case is quoted in contrast to two of lithotripsy, where the stone was large, which ended fatally, recorded in this JOURNAL for March 14th. The patient whose case is reported here, seems to have been in a worse state of general health than either of the former; and the stone was probably quite as large as that in the first case, where, after six months of active treatment, a larger quantity was still left in the bladder than had been procured from the urine. It is probable, therefore, that in this case also many months (we might say, judging from the case quoted, about a year) of very annoying and even painful treatment, would have been required, before the stone could have been removed, even in the most favourable circumstances. Meanwhile, the patient is suffering from