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CHRONIC POISONING BY BISULPHIDE OF CARBON.

BY

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CHRONIC POISONING BY BISULPHIDE OF CARBON.

THE following three cases of this form of poisoning came under my observation at the Western Dispensary, Fountainbridge, and seem worthy of the attention of the Society, as they are apparently the first described in this country. The subjects of it worked in the "curing-house" in one of the rubber-works here, their duties requiring them to dissolve chloride of sulphur in bisulphide of carbon, and to superintend the working of the machine for vulcanizing the cloth. They are thus almost continuously exposed to a more or less concentrated atmosphere of the bisulphide.

CASE I.—J. M., a healthy looking man of 49 years of age, with an unexceptionable family and social history, was the first to work in the "curing-house." For six years he had been employed in the same factory as a "spreader" of the rubber dissolved in naphtha on the cloth. Though much exposed to the naphtha vapour, he never suffered in the very least from it. About September 1880 he was transferred to the "curing-house," where for about two years, owing apparently to his not having been very closely confined to the work, he does not seem to have suffered very much beyond occasionally vomiting his food—an act which was always followed by immediate relief from the nausea produced by the inhalation of the vapour. About October or November 1882, a change in the mode of manufacture led to greater concentration of the vapour; and J. M., who was now constantly exposed to its influence, immediately began to suffer. He lost first appetite for his evening meal, became more frequently sick, vomiting always relieving the nausea as before. (J. M., who is a perfectly temperate man, tells me that he sometimes took a glass of whisky to induce emesis, which it did at once.) He found himself unable to retain his urine for above an hour, and states that the act of micturition was often accompanied by a feeling of scalding, and followed by a discharge which stained his linen. He became easily

fatigued, feeling constantly, on the slightest exertion, as if he had walked many miles. On this account, and partly because of a severe pain in the loins, induced by the sitting posture, he generally went to bed on returning from work. He became listless; talking and being talked to were alike a trouble to him. Then he seems to have been at times nervous and easily agitated, at others half stupid, almost entirely losing his memory, and imagining that he was going to lose his reason. At night he slept little: he had horrible dreams of falling over precipices, being hanged, committing murder, etc., and would frighten his wife by shouting aloud, starting up with the terror, and throwing his arms about wildly. On no occasion were his dreams of a pleasant nature. He rapidly lost all sexual desire and power. In December he broke down, and was confined to bed for six weeks, with great weakness in the limbs, a feeling as if the left leg were paralyzed, numbness and coldness of the feet and legs (which had lasted a long time), cramps in both calves, and dilatation of the veins of the right leg. During these six weeks the appetite was very good. At the end of this time, though not fully recovered, he returned to work, the feeling of weakness and numbness in the limbs still persisting to some extent. All the symptoms got gradually worse again, but he continued at work till about the middle of April, when he began to observe that his vision was not quite so clear as formerly. About the end of the month, after a more than usually prolonged exposure to the bisulphide, he became very sick; was seized with a "cold trembling all over." To throw off the feeling of nausea, he went into the open air, and was surprised to find, after an attack of vomiting, that he had lost the power of distinguishing objects, and that everything appeared of a bluish green hue. He says, "Everything looked as if seen through a greenish veil. I could not see the telegraph posts on the opposite side of the road, nor the clock in the steeple of the Dalry church, nor some cows 30 yards off; and yet I had plenty of light, but could only distinguish large objects quite near me." There was no night blindness. This curious condition persisted, and he says that he could not recognise his own son in the middle of the street; that he one day lost two of his sons who had strayed a little way from him on the road in the Queen's Park. Perception of small objects was so enfeebled that he could not distinguish even the type on the page of a newspaper from the unprinted margin; both were alike of the same greenish tint. He tried glasses on his own account, but found none to improve vision. He states that perception of moderately near objects was improved by means of an opera-glass, but that he could not by its aid see Inchkeith from Leith Pier. He managed to continue at his work somehow for about another fortnight, when he went to the Eye Infirmary in Cambridge Street, where he says it was found that he could only read the largest of Snellen's types on approaching it very closely. Vision was not improved by

either convex or concave lenses. Atropine was dropped into each eye, and an ophthalmoscopic examination made; but what was found, it is now impossible to say. A curious condition of vision followed: for a day afterwards everything appeared red, or rather rose coloured, instead of green. (His other special senses do not seem to have suffered in any way. He complains of having had a constant cold band extending round his forehead back to the occipital protuberance. Unlike the other cases, he does not seem to have lost flesh to any remarkable extent.) He went to the country for eight weeks, where he gradually improved; the feeling of weakness passed off from his limbs. In seven weeks the green vision had gone; he began first to see objects at a distance, and after three or four months he could see to read with glasses (of 2.5 D) perfectly. On examination (2nd April) the pupils are equal, of moderate size, react normally. There is 1 D of hypermetropia; the fundus oculi is quite healthy, and shows no trace of any previous disease. There is no colour-blindness. His other symptoms also gradually left him, and he is now, intellectually and physically, "as good a man as ever he was," as he says.

CASE II.—G. P., æt. 49, married, of temperate habits, and previously always fairly healthy; has been employed for a year in the same factory, at first as a general workman, and later regularly in the "curing-house," for about ten hours daily. For two months he did not feel any marked symptoms, except that occasionally his eyes would water profusely, and that he would feel dizzy, especially late in the day, and when walking home from his work. After this period he became rapidly worse, and began to feel that he was really ill. He lost appetite, and had a constant feeling of nausea, and after a short time vomited the greater part of his meals. He felt always tired, and on returning from work generally went straight to bed, or remained sitting in a listless condition, not caring to speak or be spoken to. He was not breathless on exertion; had no palpitation; no cough except when exposed to very concentrated fumes of the vapour in the workroom. He became unable to retain his urine for any length of time, and during the last two weeks of his work it was passed with some pain and difficulty. He became pale and emaciated. His hands, forearms, feet, and legs felt cold and benumbed, or tingling. There were frequent and severe cramps in the legs. He soon became so feeble that he could not do the work of a small boy, and that he could only walk on a level floor, and that he had to be assisted up and down stairs to and from his house. He seems to have got rapidly worse during the last three weeks of his work in the factory. He found himself sometimes, on coming home in the evenings, excited as if with alcohol, but never so bad as to be unaware of what he was doing. Generally, however, instead of being excited he was dizzy and stupid. He suffered from intense

headaches, reaching from the root of the nose round the head to the occipital protuberance. His sleep became unrefreshing, and was broken by dreadful dreams, of falling down precipices, etc., from which he would awake with a start and find himself bathed in perspiration. His memory became greatly impaired, and during the last fortnight of his work he was often at a loss for words to express himself. His special senses did not suffer in any way. After continuing at his work, and becoming daily weaker for three weeks after the first symptom manifested itself, he was removed to another part of the work, in the hope that a healthier atmosphere would restore him. His change did him no good, and he was dismissed as being of no further use on the works. So weak was he that he had to rest several times on his way home, and had to climb up stairs on his hands and knees to his house, and across the floor into bed, where he lay exhausted for some hours.

When I saw him first he was sitting up in bed with a wearied, listless expression, with his head bent forward on his chest. He replied to questions with the air of one extremely exhausted from over-fatigue. On general examination, there was nothing marked on the skin, but there was almost complete absence of subcutaneous fat, and great diminution in the size of the muscles.

In the *alimentary system*, there is still great anorexia, but now nothing else worth noting. He states that previously all his food tasted of the bisulphide of carbon.

The *circulatory system* shows nothing abnormal except a pulse of 92 per minute, a rate which increases to 110 on assuming the erect position. It is regular, and of fair volume. On examination of the blood the hæmocytes and hæmoglobin are not diminished.

The *respiratory system* is found, on physical examination, to reveal nothing worth noting. The breathing is like that of an over-tired man.

Genito-urinary System.—The urine is of specific gravity of 1020, acid, free from deposit, albumen, or sugar, and passed without scalding.

All sexual desire and power vanished after he had been at work in the curing-house for a week or two. (There was no previous increase.) The testicles are somewhat atrophied.

Integumentary System.—Absence of subcutaneous fat, and great increase of hair on forearms.

Nervous System.—Great pain and pricking in the hands are induced by washing them under a tap with cold water. Sensibility to tactile, thermal, and painful stimuli were found unimpaired. The legs are cold to the touch from the knee downwards.

On ophthalmoscopic examination, there is no evidence of present or previous disease. The pupils are of medium size, and contract normally; convergence good; no strabismus. The other special senses are in no way impaired.

Motor Functions.—Organic reflexes normal. Skin, patellar, and other tendon reflexes could not be elicited.

His muscular system was so enfeebled that he could not rise from or sit down upon a chair without the aid of his upper extremities. When placed prone on the floor he can only, and with difficulty, raise himself on to his knees, and is quite unable to get upright on his legs without assistance. In walking, the steps are extremely short, the sole of the advancing foot is brought flat to the ground, while the knee, after giving way slightly, is extended with a jerk before the next step is taken. Turning is impossible unless he is supported by some object. The flexors of the fingers are so feeble that the act of shaking hands is impossible, and the index of a dynamometer cannot be moved from zero with the right hand, and only to 5 lbs. with the left. The flexors of the forearm are very weak, especially those of the right side. The other muscles of the arm are so much affected that he cannot place one of his hands behind his head without assistance, nor can he shave himself. When he attempts to raise a tumbler of water to his mouth he can only clutch it with great effort, and he has to hesitate for some seconds before beginning to raise the vessel. During the act there is much fibrillary tremor in the muscles of the forearm, but the vessel is carried up fairly steadily, and there is no shaking of the head. The hand becomes very unsteady in its descent.

Co-ordination is not much, if at all, impaired. Electrical examination by the faradic current showed diminished reaction to stimulus of both nerve and muscle. When the electrode was applied to a muscle only those fibres immediately underlying it contracted.

The muscular system was throughout very reduced in size, but there was no special atrophy of any group of muscles.

The treatment adopted was the internal use of *nux vomica* and faradization of the muscles, which was most regularly carried out by Mr Mallam. This has been followed by a gradual improvement in all respects, although that has been retarded by insufficient food.

CASE III. was slighter in nature, and may be briefly summarized. M. A., æt. 39, married, temperate, began work in the "curing-house" in July of last year, and broke down in November. For a month he felt no bad effects. After that he began to suffer from gaseous (CS_2) eructations, vomiting, inability to retain his water for any length of time, severe frontal headache, dizziness, coldness and numbness of the extremities, feeling of great lassitude. On leaving his work he frequently felt, and often staggered on his way home, as if intoxicated. Sleep became restless, disturbed by horrible dreams, similar to those of the other two patients. His memory became somewhat impaired. For a time he took open-air exercise,

in the hope of counteracting the evil effects of the exposure to the vapour, but was at length compelled to desist, from his increasing feebleness, and by severe pain over the base of the sacrum. He had also severe cramps in the legs during the night. There was complete impotence and loss of sexual desire. The special senses were not affected; and on examination the various forms of sensibility were not impaired. There was great diminution of the subcutaneous fat, and some decrease in size of the muscles, but no special atrophy. The galvanic and faradic reactions were diminished in amount, but there was no departure from the usual formula.

Compared with the other two, this case was very slight, and improvement under *nux vomica* and faradization was comparatively rapid. The faradization was at first applied to the upper extremities, which, within three weeks, regained almost their normal power. The increase in strength of grasp immediately after the application of the current was most marked, but this was only partially maintained till the next application. Similar treatment to the lower extremities was found to be similarly beneficial.