The question is, Under what condition were these openings formed? It must be borne in mind that the man did not complain of pain in the part at any time; that there never was anything to indicate the existence of an abscess in the neighbourhood; and that *there was no sinus through which any portions of dead bone could have been discharged*. Apart from pressure, I am not aware of any condition under which bone comes to be simply absorbed; and if the loss of substance in the present case were due to ulceration, the silent way, so to speak, in which the removal was effected, is certainly very remarkable.

Through the kindness of Dr. Thorowgood, I am enabled to add the result of a microscopical examination of the specimen made by Dr. Sedgwick, for the Medical Society of London, since the above was written.

On section, both longitudinal and transverse, the bone is seen to be tunnelled in all directions. The tunnels vary in size, are very tortuous, and communicate freely with each other. They contain some fatty matter, and granular and other debris; part of which is soluble with effervescence in nitric acid, and another part is soluble in acetic acid; but, as the bone has been macerated and dried, a complete examination of the contents of the tunnels is impossible. The bone is whiter in some parts than others—chiefly on the outside. In the whiter portions, the tunnels are smaller in size, and the debris is not so copious as in the darker portions. In many parts of the whiter portions, the Haversian canals, lacunæ, and canaliculi appear to be of the natural size, and healthy. In some, the lacunæ are larger, and so appear much closer than they should be. In the darker parts, the Haversian canals are larger than natural. The amount of increase in size is various; some are only a little larger, others have extended almost to the boundaries of their own system. In some parts of this dark portion, the lacunæ are also enlarged. When mounted in Canada balsam, the Haversian systems are seen to polarise separately, a black cross rotating around each Haversian canal as its axis. In many instances, it may be seen by the presence of the extreme ends of the limbs of the cross in the walls of the tunnels that they are formed by gradually increasing excentric absorption of the walls of the Haversian canals.

As far as can be determined by examination of the macerated and dried bone, the process which has been going on may be described as interstitial death, with more or less complete absorption of the dead matter, and, *pari passu*, a network-like deposit of new bone around each centre of destruction. In this way the increase in the dimensions of the shaft would be proportionate to the decrease of its density and strength. In parts, the new structure is condensing, and becoming eburnated in their lines and patches.

ON THE NUMBER AND DURATION OF EPIDEMICS IN CANTERBURY IN A PERIOD OF THIRTY YEARS, AND THE FATALITY FROM EACH.

By GEORGE RIGDEN, ESQ.,

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THERE seems scarcely any subject more interesting to us as medical practitioners than that of epidemics—whether we consider the means for their prevention and cure, or whether we take into consideration their relative frequency, duration, and fatality. And it is to be hoped that, at some future time, the united experience of all the medical attendants upon the sick, in every epidemic, may be recorded, either during or shortly after the outbreak. In the meantime, it seems desirable that such records as we possess of epidemics occurring in a large population should be made available as much as possible for future observers.

With this idea, I have the pleasure of presenting to the Society a short description of the number and period of duration of, as well as the number of deaths recorded from, all the epidemics that have occurred in Canterbury in the thirty years during which it has been my privilege to administer to a large proportion of the sufferers; and I am enabled to do this, first, and principally, from my own observations while in attendance; and, secondly, from a monthly examination of the public bills of mortality, which, during the last eighteen years, have recorded the cause of every death, according to the medical certificate, with the utmost accuracy. It must, however, be acknowledged that, prior to the year 1850, a large proportion of the deaths in this city was registered without the assistance of any medical certificate, which has rendered them of considerably less value as statistical records.

I propose, in the following abstract, to give a short record of the following eight diseases; viz., small-pox, scarlet fever, measles, malignant cholera, diarrhoea, diphtheria, whooping-cough, and continued fever,

which have occurred as epidemics in Canterbury during the period between Michaelmas 1837 and Michaelmas 1867. And, first, it may be stated that there have been four epidemics of small-pox, seven of scarlet fever, nine of measles, two of malignant cholera, six of diarrhoea, three of diphtheria, nine of whooping-cough, and six of continued fever.

Small-Pox.—The first epidemic of this disease occurred in 1837-38, and extended from October in the former year to June in the latter; it was fatal during the nine months to 64 persons, or at the rate of about one death to 270 inhabitants. The second was in 1847-48, and extended over a period of eleven months, viz., from November in the former year to September in the latter; it was fatal to 26 persons, or at the rate of about one death to 700 inhabitants. The third was in 1855-56, and extended over a period of fifteen months, viz., from February in the former year to April in the latter, and was fatal to 45 persons, or at the rate of one death to about 420 persons. The fourth epidemic was in 1865-66, extending over a period of thirteen months, viz., from February in the former year to March in the latter, proving fatal to 62 persons, or at the rate of one death to about 350 persons. Thus it may be reported that epidemics of this disease have visited Canterbury with considerable regularity about once in seven years, proving fatal to 197 persons; which, together with 19 deaths from sporadic cases, will give a total of 216 as the mortality from small-pox during the thirty years, or about 1 per cent. of the mean of the population during the period reported on.

Scarlet Fever.—The first epidemic of this disease extended over a period of thirteen months, viz., from March 1839 to April 1840, and was fatal to 80 persons, or about one death to 220 inhabitants. The second extended over a period of seven months, viz., from July 1843 to January 1844, and was fatal to 16 persons, or about one death to 1,125 inhabitants. The third extended over a period of five months, viz., from November 1848 to March 1849, and was fatal to 9 persons, or about one death to 2,000 inhabitants. The fourth extended over a period of twenty-four months, viz., from June 1854 to May 1856, and was fatal to 38 persons, or about one death to 490 inhabitants. The fifth extended over a period of ten months, viz., from October 1856 to July 1857, and was fatal to 24 persons, or about one death to 800 inhabitants. The sixth extended over a period of twelve months, viz., from February 1859 to January 1860, and was fatal to 38 persons, or about one death to 550 inhabitants. The seventh extended over a period of eighteen months, viz., from March 1864 to August 1865, and was fatal to 100 persons, or about one death to 220 inhabitants. Hence it may be reported that epidemics of this disease have occurred in Canterbury with considerable regularity about once in four years, proving fatal to 305 persons; which, with 17 deaths from sporadic cases, will give a total of 322 deaths from scarlet fever during the thirty years, or about 1.7 per cent. of the mean of the population.

Measles.—The first epidemic of this disease extended over a period of two months, viz., in March and April 1844, and was fatal to 8 persons, or about one death to 2,200 inhabitants. The second extended over a period of five months, viz., from December 1845 to April 1846, and was fatal to 42 persons, or about one death to 440 inhabitants. The third extended over a period of four months, viz., during April, May, June, and July, 1849, and was fatal to 8 persons, or about one death to 2,250 inhabitants. The fourth extended over a period of three months, viz., during April, May, and June, 1852, and was fatal to 16 persons, or about one death to 1,150 inhabitants. The fifth extended over a period of six months, viz., from December 1855 to May 1856, and was fatal to 19 persons, or about one death to 1,000 inhabitants. The sixth extended over a period of ten months, viz., from May 1858 to February 1859, and was fatal to 13 persons, or about one death to 1,600 inhabitants. The seventh extended over a period of five months, viz., from December 1861 to April 1862, and was fatal to 24 persons, or about one death to 890 inhabitants. The eighth extended over a period of four months, viz., during May, June, July, and August, 1863, and was fatal to 8 persons, or about one death to 2,700 inhabitants. The ninth extended over a period of three months, viz., from November 1866 to January 1867, and was fatal to 18 persons, or about one death to 1,220 inhabitants. Hence it may be reported that epidemics of measles have occurred with some irregularity about once in three years, and that its epidemics were fatal to 156 persons; which, together with 11 deaths from sporadic cases, will give a total of 167 as the mortality from this disease, or about 7 per 1,000 of the mean of the population during the period reported on.

Malignant Cholera.—The first epidemic of this disease extended over three months, viz., from July 20th to October 14th, 1849, and was fatal to 43 persons, or about one death to 450 inhabitants. The second extended over three months, viz., from July 25th to October 19th, 1854, and was fatal to 60 persons, or about one death to 310 inhabitants.

There have been but three other deaths recorded as the result of this disease, which all occurred in the summer of 1866; they were evidently sporadic, and were readily traced to determinate local and removeable causes.

Diarrhœa.—During the thirty years, there have been registered the deaths of 152 persons, mostly infants, resulting from this disease, unconnected with any record of other complication. Of these, 85 occurred during six epidemics; viz., first, in July, August, September, and October, 1846, resulting in 12 deaths; second, in July, August, September, and October, 1849, resulting in 16 deaths; third, in August, September, and October, 1857, resulting in 16 deaths; fourth, in June, July, August, and September, 1859, resulting in 12 deaths; fifth, in August, September, October, and November, 1861, resulting in 15 deaths; sixth, in July, August, September, October, and November, 1866, resulting in 14 deaths,—leaving a residue of 67 solitary deaths that have been registered principally in summer months of different years, but in no one year exceeding 11 deaths.

Diphtheria.—The first epidemic of this disease extended from July 1857 to July 1858, and proved fatal to 25 persons; the second extended from January to July 1859, and was fatal to 8 persons; the third extended from January to November 1862, and was fatal to 10 persons. So that it may be reported that, during the three epidemics, this disease has been fatal to 43 persons; which, with 21 solitary deaths occurring since July, 1858, will give a total of 64 deaths as the mortality from this disease during the period of ten years and three months; for it may be remarked, that there were no deaths from this disease recorded in Canterbury until the epidemics of 1857 and 1858.

Whooping-cough.—The first epidemic extended from December 1840 to May 1841, and was fatal to 15 persons. The second extended from December 1842 to July 1843, and was fatal to 22 persons. The third extended from February to June 1846, and was fatal to 8 persons. The fourth extended from December 1855 to July 1856, and was fatal to 16 persons. The fifth extended from November 1857 to June 1858, and was fatal to 21 persons. The sixth extended from September 1860 to May 1861, and was fatal to 20 persons. The seventh extended from November 1861 to February 1862, and was fatal to 10 persons. The eighth extended from November 1863 to May 1864, and was fatal to 20 persons. The ninth extended from March to October 1866, and was fatal to 15 persons. These numbers make a mortality of 147 deaths during epidemics of whooping-cough; which, with 16 solitary deaths from this disease, will give a total mortality of 163 during the thirty years reported on.

Fever.—The certificates of death from fever very rarely distinguish the type of disease under which the patient suffered; but experience proves that in Canterbury the epidemics of fever have usually assumed considerably more of the typhoid than of the typhus type; and there have been but very few deaths recorded, and in no case in an epidemic form, as resulting from puerperal fever. Of the total number of deaths registered as the result of fever, the greater number—viz., two-thirds—have been more or less sporadic, occurring at the average rate of rather more than one per month. There have, however, occurred six epidemics of this disease, extending over periods of from three to six months' duration each, in which the mortality was at the average rate of four, or even more, per month. The first extended from January to June 1839, and was fatal to 20 persons. The second extended from November 1843 to May 1844, and was fatal to 20 persons. The third extended from May to October 1848, and was fatal to 17 persons. The fourth extended from July 1857 to February 1858, and was fatal to 41 persons. The fifth extended from December 1862 to February 1863, and was fatal to 36 persons. The sixth extended from February to August 1864, and was fatal to 26 persons.—These numbers make a total of 160 deaths during epidemics extending over a period of thirty-six months; which, with 471 deaths more or less of a sporadic character, will give a total mortality of 631 from continued fever during the thirty years, or a little more than the average annual rate of one per 1,000 of the population.

The foregoing records naturally suggest the inquiry whether, in other cities and towns with a like number of inhabitants, epidemics have occurred as frequently, each continuing for about the same period, and resulting in about the same fatality; and it is much to be regretted, that to this question I can give no satisfactory answer; for, although it seems probable that Canterbury would not be found an exception to the rule, such records, as far as I am aware, for other similar populations, at least in this division of the kingdom, have not as yet been published.

Another suggestion presents itself to us as sanitary reformers; viz., that a large proportion of the mortality has been caused by epidemics of small-pox, cholera, diarrhœa, and fever, which, under strict sanitary arrangements, should not have existed; and that the remaining epi-

demics of scarlet fever, diphtheria, measles, and whooping-cough, perhaps not entirely under such control, would but rarely have terminated fatally, but for some lamentable neglect of sanitary precautions. It is satisfactory, however, to record that, since the adoption of the Local Government Act in this city, a vast number of nuisances detrimental to health have been removed or lessened; and the mortality from epidemics, as well as the general mortality, has been very sensibly diminished. We may, therefore, confidently appeal to our local authorities, supported as they ought to be by the public opinion of the citizens, to still further carry out the sanitary improvement of this and other cities, and to the same extent still further diminish the mortality and the sickness upon which it is principally dependent.

CASE OF TRANSPOSITION OF VISCERA.

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W. H., aged 10 years, a delicate looking boy, but well developed and intelligent, is the fourth of a family of six children, two of whom died in early infancy. The parents are both living and healthy. The patient has had no serious illness, but his chest has always been delicate, and he has suffered from occasional attacks of dyspnoea, with pain in the right side, lasting for a few days and relieved by aperients. He has never had hæmoptysis, but suffers occasionally from epistaxis. He complained, on first coming under my notice as an out-patient at the Brompton Hospital, September 16th, 1868, of some pain in the side, hacking cough with yellow expectoration, indifferent appetite, painful digestion, and confined bowels. The pulse was regular, of moderate frequency; the tongue clean. On inspection, no distortion of the chest or curvature of the spine was observed; the expansion with inspiration was fair and equal on the two sides. The right semi-circumference, an inch below the nipple, measured 11½ inches, the left 12 inches; above the nipple, the right 12½ inches, the left 12 inches. The pulmonary resonance was good, sibilant *râles* were audible scattered over the chest, but there was no other auscultatory evidence of disease. The heart's apex beat in the fifth right interspace just within the nipple line: the upper border of the cardiac dulness corresponded with the fourth cartilage, its left border with the right margin of the sternum. The impulse and sounds were natural. In the ordinary hepatic region there was hollow resonance of the same character as the "stomach note." In the left hypochondriac region there was dulness below the sixth rib in the nipple line, and extending round to within not quite three fingers' breadth of the spine, where there existed a band of resonance of tympanitic quality. The margin of the liver could not be felt below the cartilages; the hepatic dulness could be traced anteriorly and to the right across the middle line to the mid-sterno nipple line, whence its lower margin slanted back again to the left till it became lost under cover of the cartilages. No splenic dulness could be detected.

Dr. Hare was kind enough to examine the patient with me in October; and, having confirmed most of the above statements, he observed that the relative position of the testes was reversed, that on the right side being the lower. This was a point of some interest, since Dr. Hare had noticed the same thing in a case of transposition some years ago; and, though the very general rule of the left testicle being lower than the right is not without many exceptions, yet that these two cases should be exceptional is worthy of remark, as tending to prove the general rule to be not merely numerical. A venous hum was audible on each side of the neck, loudest on the right side. On examining the blood microscopically, March 5th, 1869, no excess of white corpuscles was found. No other fact of importance was noticeable.

REMARKS.—This case seems worthy of being recorded; since, though several cases have been discovered in the dissecting-room (one very fully described by Dr. Baillie, in the seventy-eighth volume of the *Philosophical Transactions*), very few have attracted attention during life. The diagnosis is extremely easy if the nature of the case be once suspected; it rests mainly upon the facts of the cardiac impulse and dulness being on the right side without any discoverable displacing cause, while the liver dulness is on the opposite side. Absence of splenic dulness is not uncommon; but in this case it may be due to the spleen being divided into many small splenuli, as in the case described by Dr. Baillie, and in one brought before the Pathological Society lately by Dr. Hickman. This patient is now much improved in general health and is growing fast. I have examined his mother and elder brother, neither of whom have any peculiarity in the position of the heart. The boy is right-handed.