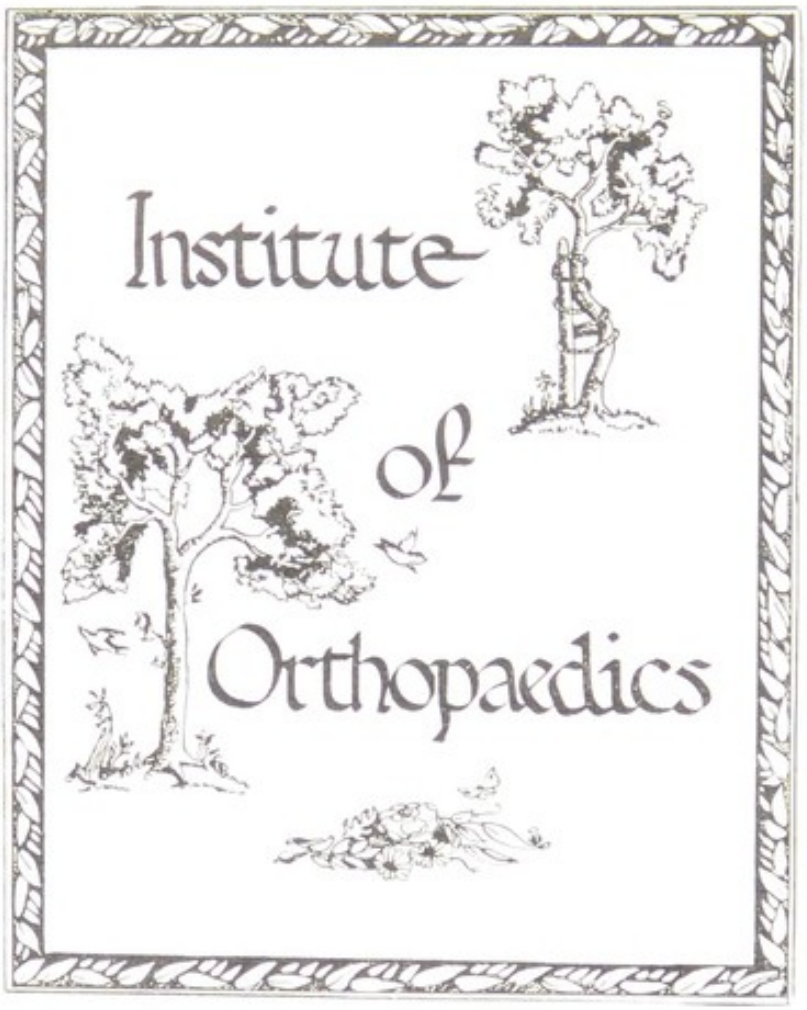
Studies of old case-books / by Sir James Paget.


Institute
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Orthopaedics

Arch.

Christopher Hatch Esq
with the author's kind regards

STUDIES
OF
OLD CASE-BOOKS

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SPOTTISWOODE AND CO., NEW-STREET SQUARE
LONDON

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OF

OLD CASE-BOOKS

By SIR JAMES PAGET, Bart.

LONDON
LONGMANS, GREEN, AND CO.
AND NEW YORK: 15 EAST 16th STREET
1891

PREFACE

FEW things of the kind seem to be more useless than old Case-books. To the writer himself they may have some value and even great personal interest; he may profitably study himself in them as well as some of the facts which he has recorded. But to others they have no such utility. It would be difficult to find an instance, during this century, in which the old Case-books left by even the best observers in our profession have been of any use to their successors.

Thus I have often thought when, from time to time, during the last few years, I have looked through the volumes and the piles of separate records of cases that I had written. They range through a period of about forty years, beginning with an account of the first case I ever saw. A young boatman in February 1830 was accidentally shot, with a big charge from a swivel-gun, through his left knee and elbow. Both limbs were at once amputated by Mr. Costerton, of

Yarmouth, to whom I was soon afterwards apprenticed, and the poor fellow recovered well and lived long. Thence onward the books or collections of cases were continued according to my various opportunities till 1870 ; and then I became so occupied in hospital and official work, as well as in private practice, that I could no longer fully record anything. The custom once given up has never been resumed in any form beyond that of short notes for private use.

While looking through and in some degree studying the many thousand cases thus recorded, it has not been difficult to find why they would be now so nearly useless and uninteresting to any but myself. For example, there are, in one volume, carefully tabulated reports of the daily progress of all my patients after operations, both in hospital- and private practice, during three or four years. They are quite useless now, for they were made before the introduction of antiseptic surgery, and before those improvements in nursing and the inventions of new ligatures and instruments, by which the risks of operations have been made comparatively trivial. Many of them might even be mischievous, for they would give evidence of considerable success under treatment which would now justly be deemed utterly

negligent. In another volume are records of all the post-mortem examinations that I made while I was demonstrator of morbid anatomy at St. Bartholomew's. These, too, are useless, for they were before the time of exact microscopic work, and of fine adjustments and thin sections, and various stainings and cultivations. They tell, indeed, of strange oversights; of typhoid ulcers of the intestines carefully described, but regarded as a sort of accident in cases of typhus fever—for Sir William Jenner had not yet made their meaning clear; and there are full accounts of the naked-eye appearances in cases of capillary embolism, which before the time of Kirkes and Virchow were passed by as unintelligible. And when one looks for facts that might help to the discovery of any of the things we now most want to know, none can be found, for such facts were not looked for fifty years ago, or were not seen, though they may have been within the easy range of sight.

Thus, as one looks through volume after volume, they seem to prove nothing but a waste of time, till one reflects that the present use of old Case-books is no just estimate of their value in past years. For, to say nothing of the materials they may have supplied for work already done in lectures or in books

and papers published at various times, they were among the very best means of self-education. The habit of recording facts is nearly essential to the habit of accurately observing and remembering them. That which we intend to record we are bound and may be induced to observe carefully, and the very act of carefully recording is nearly equivalent to a renewed observation. Thinking of this, and of their personal interest to myself, I ought, perhaps, to have been content with the good service that my Case-books have rendered to me and with the hope that they have been, in some measure, indirectly useful to others. But I hope that what is here gleaned from them may serve some good purpose, whether in the description of a few diseases or injuries not sufficiently well known, or in the suggestions of probably useful lines of enquiry, or of some general principles which it may be well for younger men to bear in mind and test as to their probability. Perhaps, even, they may have an admirable result, if they provoke some of my contemporaries to do similar but better work with their old Case-books.

The several studies, if they may be so called, have been written at various times during the last six or seven years, and some of them have been made

even less useful than they might have been by the publication during the same time, but after they were written, of excellent papers on the same subjects; for example, of that by Mr. Teale on subcutaneous ulceration.

Various as are the subjects of the studies, an orderly arrangement of them was not possible even if it would have been useful. I hope, therefore, that I need not apologise for what may seem too great disorder, or for the almost complete omission of references to other works on the same subjects. I could not have added these without reading very much more than in the last few years has been possible, and a multitude of references would have looked like a pretence of completeness of study, such as, for sketches like these, would have seemed absurd.

CONTENTS

STUDIES OF OLD CASE-BOOKS

CHAPTER I

PERIOSTITIS FOLLOWING STRAINS

Several cases have been published in which necrosis has occurred in a portion of a bone on which a straining muscle has pulled with unusual force either once or, in quick succession, many times.[1] But I think that the production of various less degrees and different forms of periostitis[2] by violent pulling has not been sufficiently considered. Such cases are, I believe, frequent; as, indeed, they well may be if we consider the enormous force of the strain often put on the periosteum, whether by the contraction of muscles whose tendons or shorter fibrous attachments

[1] Among the first and best are some by Mr. Solly, in the *Lancet*, November 3, 1855.

[2] I say 'periostitis' without meaning to imply that the periosteum alone is inflamed, and not the subjacent bone as well.

are mingled with its structures, or by the pulling of ligaments stretched in violent wrenchings of joints. It must be, at least, advisable to remember always that, together with the mischiefs done in severe strains to ligaments and other proper structures of the joints, there may be serious injury done to the periosteum on the adjacent portions of the bones. Some of the consequences of strains may thus, I believe, be better understood and better dealt with.

I had a good example of necrosis produced by muscular pulling in a young lady sixteen years old, of rather weakly general health, who was overworked in exercises which required all the force which she could use with her right deltoid. Sharp inflammation about the shoulder followed, and then abscess over and behind the acromion; and when I let out the pus I could feel a part of the acromion bare. In a few weeks the dead end of this process separated and was easily removed, and then, without further trouble, all healed.

No cause of the necrosis could be suspected except the pullings by the muscle, and the general disturbance of health was only such as was explained by the acute local disease.

In another case, a gentleman, training for the Universities' boat-race, felt his habitually good health failing, and became unusually weak, and during the

last few days before the race had a good deal of pain in his left upper arm. Still, he continued rowing hard every day, and he rowed very hard in the race. In the evening after it he had severe pain in the left elbow and upper arm and some swelling about the joint. A few days later, when he was first surgically examined, there were swelling and redness at the elbow-joint, especially over the olecranon and the condyles of the humerus. The joint evidently contained fluid, and was extremely painful when moved. The back of the arm, also, especially about the origins of the triceps, appeared intensely inflamed, and there was acute fever. Briefly, this was the beginning of acute deep inflammation of the whole upper arm with acute necrosis of portions of the wall of the shaft of the humerus, and suppuration of both the shoulder and the elbow-joints.

In the course of the year numerous sequestra, chiefly from parts of the humerus at and near the insertions of the triceps and biceps, were separated and removed. At the end of the year I excised the still suppurating elbow-joint, and then all healed. The patient remains well after many years.

Among a few more cases illustrating the same points as these do, I find one of a weakly boy, with evidently scrofulous brothers, who strained the anterior muscles of his thigh in kicking hard at a slate.

He kicked it only once; but acute necrosis of the femur followed, and quickly fatal pyæmia, and he died in little more than a week.

Next to necrosis, I believe that the most injurious effect of periostitis due to pulling is that which we see in some cases of caries. Cases are only too common in which caries of the bones of a hand or a foot, ensuing after slowly progressive periostitis, are ascribed to strains at the affected part. Scrofulous children's hands are pulled hard, and caries or chronic periostitis ensues in one or more metacarpal bones or phalanges; or they sprain a wrist or a foot, and similar results follow in the bones of the carpus or the tarsus. In cases such as these, when the force used is not in a blow or in pressure, the strain of pulling on the periosteum may fairly be deemed the only injury likely to be followed by such disease. The structures of the joints are, indeed, commonly involved; but this is by extension rather than by coincidence of inflammation.

I believe that caries of the lumbar or lower dorsal vertebræ, such as precedes angular curvature of the spine, may often be justly referred to similar injury of the periosteum when hard-pulled by the psoas, as in high-jumping or in preventing a backward fall. The progress of the disease may often be too slow to be sure as to its origin; but it was not so in the case

of a man, of twenty-four, who was under my care at St. Bartholomew's. Three weeks before his admission he had fallen with a heavy load on his back, and fell with his right leg twisted beneath him. He had had a great deal of pain at the right groin and had remained quiet since the accident; and on admission a firm painful swelling was felt above the outer half of the crural arch, well defined in front but not behind, and apparently filling the hollow of the ilium. And he could not completely straighten his thigh.

The swelling was the beginning of a large psoas abscess, which was opened and discharged a great quantity of pus. Its cavity soon after became full of blood: then was washed out and cleaned; and then the case went on after the usual manner of the time, near thirty years ago, and the patient died about five months after the accident, exhausted with suppuration, hectic, blocked femoral and iliac veins, and bed-sores.

The abscess extended through the whole space occupied by the iliacus and psoas muscles, and scarcely a trace of them remained. It extended upwards to the first lumbar vertebra, a portion of which was bare. There was a larger bare surface on the posterior part of the crest of the ilium, but no necrosis or evident ulceration of the surface of either bone. Besides, the abscess had opened through one

of the bed-sores, and the cavity of the right hip-joint and the whole of the articular cartilage of the head of the femur had been destroyed by ulceration.

Cases such as these, proving so grave injury of periosteum and bone after strains, may be enough to make it sure that strains of less severity, or in healthier persons, may produce many degrees of less, yet not unimportant, damage. An excellent example was in an elderly gentleman who came with a well-marked circumscribed periosteal swelling—a node it might have been called—on the inner border of his tibia, which had formed quickly after a severe night-cramp in the muscles of his calf. Much more common are the enlargements of the tubercle of the tibia which are often seen in young people much given to athletic games. They complain of aching pain at and about the part, especially during and after active exercise, and the tubercle may be felt enlarged and is often too warm. The pain often continues, more or less, for many months, and there may be enlargement of the bursa under the ligamentum patellæ, and the tubercle may remain too prominent; but common as are these cases, especially in our public schools, I have never known grave mischief ensue in any of them, and they get well of themselves. They may represent one of the least degrees of periostitis due to strain; the increase of the prominence of the bone

is only just beyond that which may be deemed the normal limit for the attachment of vigorous muscles.

A yet less degree, I believe, is indicated by the pain and tenderness at the anterior edges of the outer condyle of the humerus which some feel after driving a 'pulling' horse. And similar to this is the share which the periosteum has in the 'lawn-tennis-elbow' and the less frequent 'fly-fisher's-elbow'; and in both of these the result of the periostitic part of the trouble is often seen in the uneven nodular edge of bone like that formed in common osteo-arthritis.

The large number of cases such as these which I have found in my case-books makes me think that 'sprains' ought to be thought of as more complicated injuries than they usually are. It seems common to think only of the stretching or rending of the ligaments and other structures on one side of the sprained joint; but besides this there are the crushing of those on the other side, and the hard tugging of the muscles which strive to prevent the injury, and which in this strife pull hard on periosteum and bone. Such pulling may tear some part of the muscle itself, or it may be followed by long-abiding complete loss of power, or permanent wasting, or, I believe, by wide-spreading abscess; or it may rupture the tendon of the muscle, or separate it from its attachments. All these injuries due to the hard strain of muscles

are well known; but the immense force which they indicate may, sometimes, tell most on the periosteum with which the fibrous structures fastening the muscle are mingled, and in which aching pain is apt to last very long.

I think that differences in the injuries done to one or another of these structures may often be associated with differences of age. In the elder, the tendons are apt to be weakened or partially wasted or softened, as one sees in the tendons of the biceps and the quadriceps, and in the Achilles-tendons; and these changes are often symmetrical. The periosteum, on the contrary, in advancing years becomes more tough and more inseparable from both bone and tendon. In the younger, the tendons are strong, they do not waste more than the muscles; but the periosteum is much less firmly fixed and is softer and more vascular than in later years. Hence, probably, it is that the periosteal troubles which I have described are much more common in the young, especially in the less robust young, than in the middle-aged and old.

So many of the injuries of which I have spoken occur in athletic sports, that I may be expected to write urgent protests, and even claims for some sort of legislation. I am not disposed to do anything of the kind. The advantages, both moral and muscular,

of the free and self-managed games in our schools are immeasurably greater than the disadvantages of the occasional damages done in them. And the pleasures of nearly all sports and the associated ambition for success in them are augmented by a consciousness of some danger. In schools, ordinary prudence on the part of masters playing with the boys, or looking-on, may suffice; especially if they are careful about those who are evidently weakly in their health. After school-life, men must be trusted for self-care in sports.

CHAPTER II

DISEASES OF METATARSO-PHALANGIAL BURSÆ

One has often been consulted for aching pains in the sole of the foot, and some of my cases make it nearly sure that the pains were due to disease in some of the large number of bursæ connected with the origins and insertions of muscles on bones of the tarsus or metatarsus. But the only cases that I can fairly localise and group are those due to disease of the metatarso-phalangial bursæ.

The anatomy of these bursæ is described with a truly marvellous accuracy by Wenzel Gruber.[1] There is usually one in each of the four intermetatarso-phalangial spaces. They lie between the dorsal and the plantar ligaments of the heads of the metatarsal bones,

[1] In a paper in the *Mémoires des Savants Étrangers*, published by the Académie Impériale des Sciences de St. Pétersbourg, t. viii., 4to, 1859, p. 297. He rightly suggests that they may have great pathological interest, especially on account of their occasional communication with the adjacent metatarso-phalangial joint-cavities; but he describes only one case, a probable wound of one of these bursæ by a nail driven through the sole of the foot and inducing long-continued suppuration.

and are usually rounded, elongated, laterally compressed, and from a quarter of an inch to half an inch in their longest diameter. Their cavities are often partially divided by incomplete septa; and they sometimes, but rarely, communicate with the adjacent joint-cavities or with synovial sacs or other bursæ.

In some cases, disease of one of these bursæ is evident; in more, it is very probable. In the case of a woman about forty-five years old, an out-patient at St. Bartholomew's, I found a nearly spherical swelling, from three-fourths of an inch to an inch in diameter, between the distal ends of the third and fourth metatarsal bones, separating them so as to make a wide interval between the corresponding toes and appearing as a round smooth swelling on both the dorsal and the plantar surfaces of the foot. It felt elastic, moderately tense and firm, and pressure on it gave a sensation as of fluid moving in a sac from the dorsal to the plantar part of the foot. All the surrounding parts appeared quite healthy, except in being displaced by the swelling. No cause could be assigned for it, unless it were a consequence of ungainly walking due to complete rigidity of the knee after acute inflammation fourteen years previously.

I advised puncture of the swelling and complete rest of the foot; but the patient did not return to the Hospital.

In another case, I saw what I cannot doubt was due to suppuration of the bursa between the second and third metatarso-phalangial joints; a minute fistulous passage extending from the back of the foot to the sole between the distal parts of these two metatarsal bones. A probe passed through it did not detect any diseased or bare bone, or feel either joint exposed. It was a mere straight canal which had remained after discharge from a small suppurating cavity, and it slowly, but, I believe, permanently closed.

In the cases less marked than these, the disease of the bursa, as I believe, has been indicated by pain in one of the distal intermetatarsal spaces. This pain is felt usually or most distinctly or sometimes only during standing or walking; the part then aches more or less severely, and sometimes even so severely that patients cannot enjoy the active exercise they wish for. The longer this pain continues, the more widely it extends from the place at which it began. It may be less or more according to the kind of shoes or boots that are worn. Commonly, also, pain is produced or increased by pressure between the heads of the two metatarsal bones, or by firmly grasping and compressing the whole width of the metatarsus. No pain is produced by pressure of either joint, unless, as I suspected in one case, the affected bursa com-

municates with the joint. No evident signs of inflammation may exist; no swelling or felt heat of the part.

The description of the pain has often reminded me of that described by patients who have bursæ over exostoses subject to muscular or tendinous rubbing, or by those in whom there are enlarged bursæ under the tendon of the biceps femoris or semi-membranosus. Perhaps in all these latter cases the pain is induced or increased by the bursæ being rubbed over such nodules of bone as are formed in the common osteo-arthritis.

I do not know any speedy cure of these cases. I have never tried incision; having thought that it might sometimes bring in much worse troubles than it was intended to drive out. Rest and hot sponging and warm coverings of the part will always, I believe, give comfort, and the patient should wear none but well-fitting, roomy boots or shoes of good soft leather, not lined with the usual unyielding canvas, but lined with wash-leather or fur. Sometimes an elastic strap or an adhesive one worn around the distal part of the metatarsus will prevent or diminish the pain, as if by hindering the friction of the bursa in the movements of the foot; or a thick horse-shoe-shaped felt-plaster worn on the sole of the foot, so as to prevent pressure on the painful part when the weight is borne on the

foot. With these or similar means, and in course of time, the troubles of these cases do come to an end, leaving no mischief behind them.

After writing this paper I found that the same subject, or one like it, had been treated by Dr. Morton in an essay 'On Cases of Painful Affection of the Foot.'[1] He regards the disease as neuralgic, and in many cases has remedied it by excising the fourth metatarso-phalangial joint. I can well believe that in otherwise unmanageable cases this operation may be resorted to; it would remedy bursal disease as well as neuralgia.

[1] In the *American Journal of Medical Sciences*, January 1876, and in the *Philadelphia Medical Times*, October 1886.

CHAPTER III

ON SOME DISEASES OF THE CORPORA CAVERNOSA PENIS

Gouty inflammation.—Some of the affections of the penis associated with gout are commonly described. Among these are the frequent and almost painful nocturnal erections to which some elderly and old men, with too acid urine, are liable; and the hæmorrhages in the bladder, and much more rarely from the urethra, like the common gouty nasal hæmorrhages; and the gouty arthritis, which closely imitates acute gonorrhœa, but is not usually, if ever, infectious, and which, like gonorrhœa, is often associated with and sometimes evidently produces stricture. But I have not found records of what may justly be called acute gout of the penis, such as I once saw many years ago. It may, indeed, be observed that with gouty inflammation of the urethra there is commonly more swelling, heat and aching of the whole penis than is found in any but the most acute infective gonorrhœa; and that this

may be counted among the diagnostic signs of the gouty disease, especially when it has continued long or recurred often. But in the acute case which I saw the swelling was much more than usual and was the chief sign.

The patient was a gentleman sixty-six years old, tall and thin, often gouty, rather weakly and anæmic, with very irritable, capricious digestive organs, which he had not spared from work. Forty years before his present illness he had been treated for urethral stricture after gonorrhœa; but he had long thought himself cured of this. In the last seven years he had often had gouty attacks, some of them typical and acute; and in the last of them had what he described as severe inflammation of the penis, with pain, redness, turgescence, and purulent discharge from the urethra. All this, except the discharge, subsided together with the other signs of gout, and, during the last year, he had had better general health than usual, though the urine-stream remained much smaller and more feeble than it was before.

In the last week before I saw him, the penis, which had been of natural size, had again enlarged. The glans and the anterior three-fourths of the body were as large as during full erection, though not nearly so firm or tense as in that state. They

were tender to the touch, not over-hot or throbbing, pendulous, not rigid or curved; and the scrotum, perineum, and adjacent parts were healthy. There was a thin purulent discharge from the urethra, and its orifice and the visible part of its canal looked as if lined with a thin layer of yellowish false membrane. The urine was turbid with excess of acid; the tongue was thickly coated, but there was no fever.

Calomel, colchicum, and liquor potassæ were given, in the manner in which he usually took them when evidently gouty; and after four days the swelling of the penis had much subsided, but he had severe lumbago. This lasted about two days, and five days later he had gouty pains in the left great toe. The penis had steadily decreased, and four days later, when the gout in the toe had become more marked, it had nearly returned to its usual size. The attack had lasted nearly three weeks.

When the urethra had become fit for examination, a very narrow stricture with surrounding induration was found near its orifice. Probably some narrowing had long existed, and had been increased during the recent acute inflammation; for during that attack the stream of urine had not only been very painful, but had been evidently decreasing in size. The stricture was gradually dilated with

instruments, and for four years the patient was free from serious local trouble. At the end of this time he had another attack of inflammation of the penis, just like that which I have described, associated with well-marked signs of gout, with excessively acid, turbid urine, but without any increased difficulty in passing it. This attack, also, subsided like the others, and he died some years afterwards with the constantly increased defect of his power of digestion.

Induration of the Corpora Cavernosa.—In the case just described of acute and evidently gouty inflammation of the corpora cavernosa, and in others similar, but less acute, no permanent change of stricture was produced; the urethral stricture in the chief case had long existed and was only increased. But many examples of permanent hardening of the erectile structure or of its sheath seem to be connected with habitual and incomplete gout.

This is especially true of those tough thickenings of portions of the fibrous sheath and septum which produce curvings upwards or sideways during erection. The toughened structure is very like that of the usually gouty, contracted palmar fascia, which is common in many who can ascribe no local cause for the change. I have once seen similar changes in both the penis and the hands of the same gouty person.

But there are differences between the two conditions which should be noted. The indurations of the palmar fascia do not, so far as I know, ever become bony or calcareous as those of the sheath and septum of the corpora cavernosa sometimes do, when they form substances rather like those which German writers have classed among Exercirknochen. The changes in this sheath, also, may be found in some who have no evidence of being gouty; and they sometimes form quite rapidly, so that, within a few days, the thickening becomes sufficient to give an extreme curvature to the penis in erection.

Among indurations of the proper substance of the corpora cavernosa some may justly be deemed gouty, especially such as are coincident with the thickening of the fibrous sheath and not with any urethral disease. The induration of the substance is generally behind the glans, thence extending towards the pubes, and in both directions well-defined. Sometimes it affects both halves of the penis equally; in other cases unequally, and in these the induration not only limits the increase of size in erection, but produces distortion, and gives pain.

Another form of gouty disease in the corpus cavernosum is that described by Sir Prescott Hewitt[1]

[1] Transactions Clinical Society, vol. vi., p. 40.

as in the form of firm nodules, produced by blocking of the veins or venous spaces with organised blood-clots due to a kind of gouty phlebitis.

But, however rarely, cases of induration of the corpora cavernosa may be found very different from all these. I had such an one under my care in St. Bartholomew's in 1853.

The patient was a dyer, thirty-five years old, a pallid, sickly-looking man, but with fair muscular strength, and not complaining of anything but his penis. Its anterior half was enlarged to nearly the size it might have had in erection, but the glans was less enlarged than the body. To the touch and sight the glans appeared of healthy structure, but at the corona, and behind it, when the prepuce was drawn back, there was an appearance of superficial scar which might have been from former syphilis. An inch or more of the corpora cavernosa behind the glans felt intensely hard, as hard as in cancerous disease, but rather less so at its boundaries than in its very substance. A thin layer of the erectile tissue at the dorsum of the penis felt healthy; but some degree of induration appeared to have extended over a portion of the corpus spongiosum urethræ. The shape of the whole induration was irregular; its boundaries were ill-defined; the parts of the penis above and behind it and the integuments over it felt and

looked healthy. Only the lining of the prepuce was reddened and moist as if from constant slight irritation.

Around and just above the corona glandis were five minute apertures, and on the glans itself were three; and these all led into minute canals which opened into the urethra, at the part within the induration. When urine was passed it flowed freely; but it gave much pain in the diseased part of the urethra, and fine jets escaped from all the minute openings on the glans. Small quantities of pus and blood were often discharged from the natural orifice of the urethra, and it was tender on pressure of the hardened part.

This disease began sixteen months before the patient's admission, but he was very obscure as to its manner of beginning. There seemed to have been some general but not severe inflammation of the penis, after which, at the end of a month or sooner, the induration was found and it was not less in extent, though less hard, then than now. The apertures at the glans had formed about twelve months before the patient's admission, but he could not give any account of how they formed; only, there had been nothing like the formation of an abscess. He had freely taken mercury and iodide of potassium, but with no effect.

The diagnosis of this case was very difficult; but on the whole it seemed most probable that the

disease was due to some rare morbid compound, of which syphilis was the chief element; and in this view he took iodide of potassium with sarsaparilla, and they seemed to do good. After three weeks the induration was evidently less, the tissues bounding it could be more freely moved on it, and all the apertures around the glans were closed: the three on its surface remained. After this time the improvement was very slow; the slight stricture in the urethra was easily dilated, and, with injections, the discharge from it was diminished. At the end of two months from the patient's admission one of the openings on the glans healed; and at the end of four months another; but after he had been in the hospital for nearly five months there still remained very considerable induration of the anterior part of the corpora cavernosa, and one fine fistulous passage from the urethra to the dorsum of the glans.

He now returned to his home and lived carefully, and occasionally passed a full-sized catheter. Thirteen months afterwards, Mr. Whiting, of Lynn, who had watched his case, wrote to me that he was in good health, that the hardness was nearly all gone, and the urethra was quite pervious and very rarely seemed to need a catheter. The fistula was, I suppose, closed, for it was not mentioned.

I am still inclined to think that this disease

was chiefly syphilitic, and that the induration was of the nature of a gumma which softened and suppurated, and opened both into the urethra and on and around the glans. Certainly there were in this case no indications of the fistula being due to escape of urine from an ulcerated urethra ; and among some very brief notes on out-patients I find mention of one with syphilitic disease of the skull, in whom small urinary fistulæ like these formed in nearly the same quiet way ; and of two patients of whom it is said that 'two or more exceedingly minute channels extended from the urethra to the surface of the glans penis. Their orifices were scarcely visible, but, when the patient passed urine fine jets of it were impelled through them, or drops issued from them. Their mode of formation could not be traced ; they were "found by chance."'

I may as well add a few words on some other facts relating to these conditions of the corpora cavernosa, which may, perhaps, be useful.

I know of no treatment likely to be beneficial in the indurations of either the sheath or the substance which are or seem to be due to gout. When they are painful, or, as they sometimes are at first, associated with any general congestion of the part, alkalies or other things useful in gout may relieve these symptoms. At other times they have no in-

fluence. Sometimes, however rarely, the induration spontaneously decreases. When this occurs the hardened part of the corpus cavernosum remains always softer than is natural, and incapable of full erection.

Similar softness and loss of erectile power sometimes comes without induration in the part just behind the glans, and makes copulation nearly impossible; but in the very rare instances in which I have been told of this the patients had so unsound nervous systems that I have suspected a local nervous rather than a structural error.

In some persons the same part of the corpora cavernosa, for half an inch or more behind the glans, is naturally more than commonly tough; and some of them suspect cancer. But in these as well as in the really morbid hardenings of the part, the diagnosis from cancer is very seldom difficult. The hardening is less intense than that of cancer; it is more tough, elastic, flexible; the textures about it, unless inflamed or scarred, slide over it easily; there is no corresponding disease of the skin or mucous membrane, in or just beneath which, in an immense majority of cases, cancer of the penis begins; and, even after months or years, there is no ulceration or infection of lymphatic glands.

CHAPTER IV

ON SPINES SUSPECTED OF DEFORMITY

Among the fears of disease for which one is consulted none is more frequent than that of lateral curvature of the spine. These fears are felt, especially, by mothers among the richer classes; and usually the fear is only for their daughters' spines. It is thought essential to the welfare of a young lady that her spine should be straight, and her form not notably unsymmetrical, and that she should habitually sit upright with her back unsupported. There is no such thought for young gentlemen, and it appears to be, chiefly, a consequence of this difference that in the well-to-do classes lateral curvature of the spine is at least twenty times more frequent in girls than in boys. For mothers seldom look at their sons' spines; and they let them sit with their elbows on the table, loll back in their chairs, and lie flat on their stomachs, and do many more such prudent things as in the daughters would be deemed shame-

ful. Thus boys' spines grow straight; the muscles helping to support them are not over-tired, or, when they are, they can be rested in any comfortable posture. But among girls the postures deemed graceful must be maintained till some deformity is discovered or suspected, and then the poor girls must be made miserable by the treatment deemed necessary for its cure.

The folly and the mischief of this contrast are happily becoming known: the good rule of letting girls grow up like boys is becoming more and more widely observed, and a larger proportion of them are well-formed, graceful, and strong.

Still, the unfounded fears of deformity of the spine are far too frequent, and they are maintained, in many instances, by the existence of slight deviations from the supposed pattern-shape which are quite harmless. It seems to be assumed by some that all spines should have curves and other characters exactly similar to those which are seen in artists' models or in anatomical plates. It is much more probable that there are as many varieties of healthy spines as of healthy chins or cheeks, or as many in the human species as in the horse or ox. Round shoulders, straight backs, hollow loins, and other such shapes are as common in members of the same family as are any other family features, and

they are due to the imitation of parents in only the same degree as may be the expressions of similarly formed limbs or faces.

I wish I could describe the variations of shape as accurately as are the forms of spines studied and measured in skeletons or sections by such anatomists as Sir William Turner and Professor Cunningham. But this is not possible; and yet the varieties of form may be well enough observed, even as those of faces or of any single feature may be, though they be not exactly measured.

I find notes of some of these varieties which may supply hints useful to be remembered when examining cases of 'Suspected Spines.' They relate to the dorsal and lumbar portions of the spine in which alone the feared lateral curvatures are usually looked for; and they relate to none but young persons.

But, first, the suspicions are often founded on pains in the back which are, by some mothers, regarded as sure forerunners of deformity. When they are complained of, the whole length of the spine should always be examined, for they may be signs of disease in it, though, indeed, they rarely are so. The most common result of the examination is that the spine is found well formed, but tired through having been too much exerted in holding the body upright while sitting or standing. The tired muscles

ache prudently, needing rest and more various activities.

I often quote for such cases, and for many more, an excellent sentence which I learned from Sir Henry Holland :—'Standing has all the disadvantages of posture without any of the benefits of exercise.' And for spines it may be said that sitting upright has similar disadvantages without the benefits of rest.

Such aching muscles are, I think, most common in girls whose spines are very flexible ; and this flexibility in all directions should always be tested. An apparent excess is harmless, unless it be associated with such muscular weakness that when the spine is extremely bent in one direction it can hardly be lifted up again. A very defective mobility is more suggestive of disease, especially if it be associated with pain at any definite part of the spine, and if the pain be increased in very wide movements or in violent and not guided movements, as in sneezing or laughing. Such pain with restraint of movement may be due to a rheumatic trouble, but it should always suggest a suspicion that there may be carious disease of the spine and a possibility of angular curvature. If careful examinations of this kind be always made it will be found that only a very small proportion of the aching backs of young or recently

young persons are associated with spinal deformity. Many of them, as I have said, are due to fatigue and the want of various exercise; many more may be called neurotic, and may be remedied by improvement of the general health. In this group are most of the cases in which the pain is described as intense or agonising;[1] intense pain is extremely rare in young persons whose spines are really diseased.

Next to the cases of suspicion due to back-ache the most frequent are those due to awkwardness or carelessness in posture. Many, perhaps the majority, of cases of real deformity have their origin in wrong postures too long maintained, whether through carelessness or under compulsion. But, commonly, the imitation of deformity long precedes the reality, and may be known by the facility of at least a temporary remedy or concealment in a proper posture, especially in bending low. If a patient bending down, and nearly touching the ground with her hands without bending her knees, shows not only a rectilinear spine but similar muscular forms on each side of it, there should be no fear of deformed spine; there is none present, and there will be none unless through

[1] I speak here only of cases in which 'back-ache' is referred erroneously to disease or deformity of the spine. It may depend on renal or ovarian or other internal disorders: but of these cases I do not venture to speak.

mismanagement.[1] Fitting exercises and well-proportioned restings will prevent any permanent deformity. They must vary according to the error in each case, but one general rule may be given, and it is good for many cases besides these, namely, that all exercises and habits, postures, games, drills, and the rest, should be such as may best conceal the defect; for such concealment is one of the best ways towards cure. The muscles which can conceal a defect are those which most need exercise, and which, being strengthened, may most help to a cure. Such concealment of defect may be hard for children and others like them; but with care even these may be taught, and for a very large number of drooping and tilted shoulders, and limp spines, and other such imitations of deformity, the cure by concealment is sufficient. It is thus that strict drill often teaches soldiers to conceal such defects as an unequal length of limbs, ill-made feet, partial stiffness of a joint, and by concealment to diminish some of them.

Of the cases in which deformity of the spine is feared on account of some more abiding unusual shape, some are associated with inequality in the lengths of the lower limbs. In the most marked of

[1] If there be doubt when this test by stooping is applied, it is often useful to see the spine while the patient sits on the ground and then bends down.

these the inequality is due to imperfect growth or other change after disease of one hip or knee, or after a temporary infantile paralysis; but some are only instances of a more than usual defect of symmetry. Exact equality in the length of the limbs is rare;[1] but if the inequality be not more than a quarter of an inch, it will hardly be observable at the spine. A greater inequality may so lift up the side of the pelvis above the longer limb that the flank will appear sunken in, and the lumbar part of the spine must be habitually, however slightly, curved, so as to hold the upper part of the body erect; or else the spine, though straight, will be oblique.

In all examinations of the spine for supposed or real curvature the lengths of the lower limbs should be looked to; not only because of the obliquities and even the curvatures wholly due to their inequality, but because such inequality may increase the degree of curvature when it is real and chiefly due to other causes. The measurement may be made in many ways; but anyone in the habit of exercising his sight in discerning exactness of levels, as in the hanging of horizontal bars or other such things, may

[1] Numerous careful measurements of limbs have been published by Dr. Garson, Dr. Cox, *American Journal of the Medical Sciences*, and others.

measure the limbs accurately enough by placing his hands on the crests of the ilia while the patient stands erect and equally on both feet ; or it may be tested by making the patient sit on the ground on a low seat and bend forwards.

This inequality of the lower limbs is only one example of the very common deviations from exact lateral symmetry in even healthy and beautiful persons.[1] Such deviations may be almost always seen, if closely looked for, in the size and form of the two sides of the face, in the shoulders, the sternal ends of the clavicles, the sides of the neck, the breasts ; and some of these may suggest false suspicions of deformity. Especially may these arise when the two sides of the chest are evidently unequal. In some of these the difference is only an original defect of symmetry, and it often co-exists with similar difference in the two sides of the face, well marked in the eyebrows, or the lower borders of the jaw ; in some, and these more evident, the difference may be due to contraction of the chest after pleurisy or empyema. In cases of extreme inequality there may be well-marked dorsal curvature of the spine towards

[1] It might be better to speak of deviations from lateral symmetry as being constant rather than 'very common,' but in such cases as I am describing I have in mind only those which may be evident to the naked eye. I doubt whether exact symmetry, such as might be deemed mathematically exact, can be found in any organic form.

the larger side, and this is scarcely alterable unless by the gradual expansion of the contracted side of the chest. In less marked cases, such as are most of those which are due to original deviation from symmetry, the curvature is unimportant and may be remedied, in very young persons, by exercises giving wider movements to the arm on the smaller than to that on the larger side.

Together with these deviations of the spine, associated with naturally defective symmetry of the lower limbs, may be observed those associated with habitual resting on one limb more than on the other: whether because of weak ankles, or corns, or anything else. For all alike it has to be remembered that bad postures, long maintained, will bring in bad shapes, and even good postures maintained in weariness are hardly less injurious.

Many of the cases of inequality of the two sides of the chest are attended by that which some mothers regard as a sure sign of spinal deformity, an outstanding of the scapula on the larger side. But the fear is erroneous, and I think it may safely be held that no position of the scapula is alone a sufficient sign that there is spinal deformity. An unusual position of one or both must always make it right to examine the spine; but, if there be no unhealthy curvature, rotation, or other sign of deformity in the

spine itself, the position of the scapula is not evidence of any. Their dissimilarity may be due to inequality of the two sides of the chest, or to one-handedness, and the associated inequality of growth of the two limbs, or to a deviation from symmetry in muscles or in bones, like that of any other pair of parts.

Among the varieties of shape in spines which may be regarded as personal, in the same sense as are the varieties of faces, or of hands or feet, I need not speak of any but those that suggest fears of deformity.

One of the most common is the too great curvature of the upper dorsal part of the spine, giving the owner the appearance of 'round shoulders' and of 'poking.' If it be a regularly arched curve, not angular, it is not to be regarded as morbid; good drill and similar exercises may conceal and nearly cure it.

At the other and lower end of the dorsal part of the spine there may sometimes be found a defect, or as it were a delay, in the curving forward towards the lumbar concavity, and the hollow of the loins looks less both in length and in depth than it should be. But neither this nor the opposite peculiarity, in which the loin is extremely hollow, is the result of disease. The hollow-loin is sometimes very short, sometimes long. In the former case it looks like a diseased sinking-in, the more so the fatter the patient

is and the higher the rising of the fat on the nates. But neither of these varieties may be regarded as in any sense a deformity, unless all unusual faces are to be so called.[1] However much the anterior or the posterior curves of the spine may in these cases vary in length or depth—however long-loined or short-loined anyone may be—if there be no deflection to the right or left, and, if there be no angular bending or local unreadiness to move, the patient may be 'let be.'

I would not seem to imply the same in respect of cases of apparent bending forwards of any part of the cervical spine. It is sometimes seen at the beginning of caries, and had better be seriously suspected if it be associated with defective movement or unready and painful movement of the head.

And there are some appearances of lateral curvature and even of posterior projection which are not to be regarded as deformities. Some think, indeed, that the upper dorsal part of the spine has always, when well formed, a slight curve towards the right. Such a curve is not rare, but it is far from constant, and appears to be sometimes imitated by a slight lateral deviation of the spinous processes, as if they

[1] They are examples of such varieties of form as Sir William Turner has shown may, probably, be found characteristic of different races of our species.—*Journal of Physiology.*

were drawn over by the muscles or the weight of the stronger arm.

Instead of such a general deviation from the true median position of a part of the spine, there may sometimes be seen a slight lateral deviation of the spinous processes of one or two dorsal vertebræ. Whether it be due only to their own shape, or to any irregularity in the position of their vertebræ, or to a slight rotation of them, I cannot tell, but I have never known any harm associated with it, or with any similar condition of a lumbar or cervical vertebra.

In other cases, in which the whole length of the spine may be justly median, one, or sometimes two, of the lower dorsal or of the lumbar spinous processes are more prominent than they usually are, or than they would be in a model. They stand out from the uniform curve towards the hollow of the loin as if due to a partial or commencing posterior or angular curvature. The appearance is often deceptive, and should be tested by making the patient bend low down till the hands are near the ground. If this is painless and the spinal curve becomes uniform there need be no fear. But the examination should be very carefully made, and, if there be doubt, if the bending down be difficult, or really painful, or if the other movements of the spine, especially the curving backward, be restrained, and, still more, if the general

health be impaired, or there be clear evidence of tuberculous inheritance, it is best to be suspicious that the projection may be due to caries or softening, and may be the beginning of angular curvature. And this is advisable in the case of adults as well as of young persons, for even in adults, as I have said in the next paper, it is not very rare to meet with instances of disease of one or two vertebræ or inter-vertebral ligaments, slowly progressive and scarcely to be recognised till the spinous processes are prominent. Of course, help to diagnosis may sometimes be found in knowing how long the projection has existed; but the evidence on this point is usually doubtful.

More rarely one sees spines in which two or three of the spinous processes, far distant from each other, stand out prominently and singly. They give a strange look to the spine, but imply no more disease than a naturally ugly nose does. They are a good example of what I have already said, that in different persons healthy spines may be as unlike as any other of their features.

I am conscious that this paper may seem to encourage a temper of mind which is in some of us habitual, and I suppose is in all occasionally felt—the temper that disposes one to make too light of a case,

and be ready to think and say 'There's nothing the matter.' If I am in this risk of doing mischief I would try to prevent it by reminding the reader of the great difficulty of proving a negative, and that, as a general rule, it requires much more time and care in examining a patient to justify a decision that there is no disease than it does to ascertain what the disease is if there be any.

CHAPTER V

OBSCURE CASES OF CARIES OF THE SPINE

Among or in connection with these may be found instances of great difficulties of diagnosis, especially among cases which occur after puberty. On the one side are the cases of 'nervous mimicry,' in which all that are commonly supposed to be signs of disease of the spine are imitated with emphasis, but in which no organic disease is found. On the other side are cases, much more difficult and serious than those, in which grave spinal disease exists in unusual conditions, or with so little indication that it is likely to be completely overlooked. Of the first set of cases I have written in one of my 'Clinical Lectures' on Nervous Mimicry, and in the preceding paper on Suspected Spines; of the second I will here tell briefly one case in illustration of the difficulty of diagnosis in each of three groups. In the first of these are cases of caries of the spine beginning in persons more than fifty years old; that is, at an age

when it is so rare that symptoms which, in early life, would be deemed characteristic are apt to be misunderstood. In the second group are cases of adults in whom the symptoms are vague, and the pains so misplaced that they are commonly referred to some disease deemed much more likely to occur than spinal caries. In the third group may be cases in which there is so little indication of disease of any kind or anywhere that the whole process, including the angular curvature, is completed before anything is observed.

In the first of these groups, the case of which I had the best, though far from complete, knowledge occurred in a barrister, about fifty-five years old, a member of a family deemed delicate though they lived long. He had had weakly health, but had worked hard at the Bar and in Parliament, and had had no marked illness till in March 1858, when he appeared weakened by overwork. He had at this time a severe shivering fit, which was followed by some kind of fever, and then by increasing weakness. At the end of May he began to have pains at his back and sides, which were deemed rheumatic, and were carefully treated; but he became more feeble and lost weight, and still suffered pain and panted in the exertion of walking even a few steps. No intra-thoracic disease could be found, and an accurate

diagnosis seemed impossible to Sir George Burrows and others, who at that time watched him.

After four months, in September, spinal disease was suspected, and he was advised to rest, recumbent; but he still continued to have almost constant pain, and it was felt as if shooting from the spine along the direction of the six lower ribs, and sometimes at the epigastrium. At the end of six months from the beginning of his illness his pain was more limited to the lower part of the dorsal portion of his spine, and now, when I first saw him, I found that he had a more than natural sensibility, and a feeling as of jarring, on pressure or striking of the spinous processes of the lower dorsal vertebræ. Two of these processes, also, were prominent and had a marked deviation to the right; they had previously been quite duly linear. He now moved his back, in whatever direction, with extreme caution, holding it usually very straight; his lower ribs, also, moved very little in respiration, and in any muscular exertion, even in much talking, he became nearly breathless and as if quite exhausted. There were no signs of pulmonary or any other internal disease, or of affection of the spinal marrow. But the diagnosis was now clear: disease, probably caries, of some of the lower dorsal vertebræ.

He was kept absolutely at rest, and took iodide

of iron and such good food as he could digest; and issues were made and kept open by the sides of the most painful part of his spine. Thus treated, his condition slowly improved. In about four months he could sit without pain, and his breathing power had increased, and, with gradually diminishing pain and increasing power, he was in about thirteen months from the beginning of his illness able to leave town, and to walk short distances without distress. The prominence and lateral deviation of the spinous processes continued, but became less abrupt, the adjacent vertebræ above and below having gradually adjusted themselves to the change.

He regained health, and was at eighty strong and active, above the average of men of that age. He did when eighty-one. His case was certainly one of ulcerative disease of the spine, whether in the bodies of some of the dorsal vertebræ or in some of the intervertebral cartilages. Few cases could be much more difficult of diagnosis than it must have been at its beginning.

The other cases of this kind which I have seen were in two men between fifty and sixty. In both the disease was in the lowest dorsal vertebræ; in both it was, at first, scarcely indicated; in both it ended with angular projection of the vertebral spines. One of these cases was believed to have followed

a 'fever'; both recovered with nothing evidently worse than the slight deformity.

One of the best examples in the second group of cases was in a surgeon about twenty-eight years old, who had lost two brothers in phthisis, and had generally had delicate health, but had been in active country-practice for five years. He believed that his disease began eighteen months before he consulted me, and that it was due to his having, for several months, ridden a fast, rough-going horse. The chief signs had been pain and weariness between his shoulders and in his flanks, and slight general loss of strength. These were much increased by walking far, and so much by riding that he had been obliged of late to give it up entirely, and to do his work driving with cushions at his back. During these eighteen months, but at what period was not exactly known, the mid-dorsal portion of his spine had acquired an angular curvature; the seventh or eighth spinous process having become very distinctly prominent, and those above and below it rather less so. There neither was when I saw him, nor had been, any pain or tenderness at the place of the curve or on any other portion of the spine; but he had some aching or feeling of constraint in it when he used his arms very actively. Besides the angular

curvature of the spine, there was at the same part a slight lateral deviation. In his general health there was nothing plainly wrong except the loss of strength.

Dr. Baly and I advised him to give up work, and live very quietly on the coast for two or three months, and take iodide of iron. It seemed certain that the case was one of caries of some of the vertebræ, slowly destroying their substance or that of the intervertebral cartilages.

At the end of three months he told me that he had followed the advice given him and felt well enough for all his work. Two years later he was still in active practice, and the projecting portion of his spine appeared rather less sharply prominent, but his general health was feebler, he was sooner tired, and sometimes had the old aching between the shoulders or pain in his intercostal muscles. Still he was fit for work, and so he continued for three years more, making nearly seven years from the beginning of his illness; but now he began to have a bronze colour of the face and scrotum, and rapid loss of weight and power, and other signs of disease of the renal capsules, and with these he died.

The diagnosis of this case before the change of the shape of the spine would have been very difficult; and the difficulty was still greater in three

otherwise similar cases which I have seen. In these the pain near the diseased, but not yet deformed, part of the spine was so acute, not in the spine itself, but at one or both sides of the chest, that it was thought the patient had some strange kind of pleurisy. The angular projection becoming evident explained the pain. But in all of them the disease appeared more limited than it usually is in children and young persons; for the angular curvature was formed by only one vertebra becoming prominent, and the deformity was not noticeable unless they were undressed. The recovery appeared for a time complete: but some had recurring pains; and of the three cases of which I heard the ends, one, I was told, died with disease of the renal capsules, and two with pulmonary tuberculosis.

The best case that I have seen of the third set, in which the caries of the spine passes through its whole course unobserved, was in a gentleman who consulted me in July 1859. He was between twenty and twenty-five, very stout and strong, addicted to the most athletic exercises, to hard drinking, and often to sexual excess. Except in being over-fat, which he ascribed to his being out of training, he considered himself in perfect health, and capable of the most violent exercise; he was ready for any

violence in anything. He had no sign of general illness, and I could find no organ in fault, unless in so far as his digestive organs were disturbed by his intemperance. But he had well-marked angular curvature of his spine, involving about the last three dorsal vertebræ; a curvature characteristic of carious disease. His lower ribs moved very little, and his breathing was chiefly diaphragmatic and sternal; but of this and of any history of disease he knew nothing. He knew that he had always been hollow-loined, but he was sure that this angular deformity had not existed more than three weeks. He was not aware of its forming; it was noticed by mere chance; and even now no pain could be felt in it, and it did not seem to affect his health in any way.

I told him that if the deformity were really so recent it would imply very dangerous disease, and that he had better give up his present manner of living; but he was doubtful whether he would.

A month later he again came to me and said he had been living quietly, with only occasional violence in exercise; but he was now less sure of the deformity being recent. He thought it might have been only unobserved, and he remembered that for three years he had been subject to frequent pains along the course of his lower ribs on both sides, and to sensations of sinking and weakness in the lower

part of his chest. These pains had been very irregular in their occurrence, and were generally increased by fatigue, and often by violent horse-exercise. They had been thought rheumatic, neuralgic, or pleuritic; but they had never prevented him from hunting, or any other amusement that he wished for, and he had never laid-by for a day on their account.

Believing that the disease was thus shown to be of at least three years' standing, and was now not in progress, and feeling sure that he would not observe any rigid rules of treatment, I advised him to avoid hard riding, railways, and all jarrings of his spine, and to lie down after exercise and live in all ways carefully. He would not follow even this advice, and I heard that he went-on leading a thoroughly dissolute life, suffering, at times, with symptoms of disease in the spinal marrow, and gradually losing power in his lower limbs. He did not become paraplegic, and the deformity did not increase, but in the winter of 1861 he became phthisical, and he died in 1862.

It may, with some reason, be said that this is hardly a fair case to cite in evidence of the overlooking of the progress of spinal disease, and that a less reckless patient would have given and asked for more attention to his pain. I could have told a case

in which, in similar unobserved progress, the pain was trivial; but this which I have related may be the more notable because of such an absence of all the other usual signs of the disease that the patient was never once obliged to spend a day quietly.

And the case is a good instance of that which I have referred to in another note, namely, the effects of the contrast between the neglect and overlooking of pain by a reckless athletic fellow such as this was, and the watchful outlook for pain by any sensitive woman who suspects that she has a diseased spine. In the one, the real disease goes on unobserved, uncared for, rarely felt; in the other the mimicry of disease is with constant suffering: in the one, life is enjoyed, though, it may be, after a vile fashion, even while disease is going on to death; in the other, life is made miserable by that which will not shorten it.

In the third volume of the Clinical Society's 'Transactions' and in my 'Clinical Lectures and Essays,' I published a paper on what I called 'Quiet Necrosis,' giving cases in which necrosis of bone, such as is usually attended with many and well-marked signs, went on through a long course unobserved. I see the name sometimes used by others describing similar cases, and the examples of caries of the spine con-

tained in the last paper induce me to point out that 'quiet diseases' are much more frequent in surgical practice than seems to be generally supposed. Everyone must have observed the various intensities of the symptoms in different examples of what must be called the same disease; and in some the usual symptoms are either absent or so little marked that they may be unobserved even by those who are watchful. Especially among cases of diseases of joints I have known several of these. The most marked was in a lad of whom, though he had been very carefully brought-up, it was never known that his left shoulder was completely stiff till he went to Eton and was found defective in some of the school-games. The joint was immovable, the muscles around it wasted, but it was free from all signs of active disease, and, I fully believe, always had been so; and, whatever had been the disease, it was now past. I remember two similar cases in which, in children of ten or twelve years old, always well cared-for, the hip-joint became stiff without any evident sign of disease beyond the increasing local discomfort. Both these were such as might be deemed scrofulous, and it might fairly be believed that in both of them scrofulous disease of the hip-joint went on 'quietly' till it ceased when the joint became stiff. The same quietude may sometimes be observed in osteo-arthritis (chronic

rheumatic arthritis) of the hip-joint in elderly persons. The limb becomes shorter and the joint stiff without any other discomfort than may be referred to these two changes, or, perhaps, with some pain in the knee which withdraws attention from the real seat of disease.

Other cases might be mentioned. They would help to show that it is useful to keep in one's mind the name of 'quiet disease.'

CHAPTER VI

PERFORATING ULCER OF THE SEPTUM OF THE NOSE

In my volume of 'Clinical Lectures and Essays' I mentioned this ulcer as one among the many signs of a scrofulous or tuberculous constitution; but I have notes and recollections of so many cases of it that I think it deserves more consideration than, so far as I know, it has yet received.

The characters of the ulcer are well marked and nearly constant. With very rare exceptions, it is limited to the cartilaginous part of the septum, not extending to either bone or skin. Only in one case a patient had, at the same time, a lupous pustule on the tip of the nose, but there was no continuity of apparent disease between it and the ulcer of the septum. In shape the perforating ulcer is broadly oval, from one-fourth to three-fourths of an inch in diameter. Its borders are well defined, passing directly or obliquely through the septum, not thickened or upraised or with overhanging mucous mem-

brane. In different cases, the closely adjacent mucous membrane is glossy or granulated or encrusted; in some it feels soft or slightly swollen, and it may be florid or dusky.

Previous to ulceration the cartilage is, I think, softened, and loses its resistance to pressure. I think, too, that sometimes there may be soft morbid growths, like granulomata, on the mucous membrane preceding the ulceration; but very often the early conditions of the disease give so little trouble that they are not observed, and patients are rarely seen before the perforation is complete, though it may be to a very small extent. Even in its further progress the disease may give very little trouble. I have found ulcers of full size in some who were unaware of their existence and had suffered only what might have been deemed a chronic nasal catarrh. In some, however, the irritation is more: there is a frequent troublesome running of this mucus, occasionally bloodstained; in some, frequent small bleedings, or accumulations of thick gummy mucus, or of dried mucous crusts irritating the nostrils.

In every case of this disease that I have yet seen there was evidence on which the patient might justly be deemed scrofulous or tuberculous, whichever he might be called. There had been slowly suppurating lymph-glands or follicular fauces, carious bone, sus-

pected phthisis, generally delicate health, or a marked inheritance from tuberculous persons. All the cases of which I have notes occurred in persons between eighteen and fifty years old; all seemed to derive some benefit from treatment appropriate to scrofula. In all that I could trace the edges of the perforating ulcer healed, however slowly; in none was the voice altered; in only one did the ulcer extend beyond, or, I think, reach the very borders of the cartilage; in only one did there occur any change in the shape of the nose. In this one the patient was certainly syphilitic; he had had both primary and secondary syphilis, and his case might be regarded as an illustration of what I think is generally true, that the various characters of tertiary syphilis are determined in great measure by the 'constitutions' of the different persons in whom they occur. Tertiary syphilis is usually a composite disease, and its characters are modified by its being combined in one person with tuberculosis, in another with gout, in another with whatever may have been his inborn tendency to disease.

The group of diseases with which I think that this of the nasal septum may justly be classed is that of the ulcerating forms of lupus. It is especially like the lupus of the soft palate; like it having a distinctive localisation and limitation, perforating in

the same direct or oblique manner, and then commonly healing; but, in the nose, with less diminution of size than is possible in the yielding tissues of the palate. The method of perforation is, indeed, in these and some other ulcers, especially in the chronic perforating ulcers of the stomach, so nearly uniform that it may well indicate that they have one and the same specific character, being all such as may be called tuberculous. And their definite shape may be a characteristic of their being due to parasitic influence, just as are the definite shapes of parasitic diseases on leaves.

The position, the shape, and the limitation of this perforation suffice for its diagnosis. Syphilitic ulcers in the nose have not these characters; they have no such limited shape or place; they invade bone or skin rather than cartilage, or they invade all alike. Rather more likeness to the perforating ulcers may at first appear in cases of small abscesses which form between the mucous membrane and the cartilage of the septum. With these the portion of cartilage beneath the pus may be softened or ulcerated; and it may be perforated when similar circumscribed abscesses form on both sides of it; but when the pus is discharged there does not, I believe, follow any extension of ulceration in either the cartilage or the mucous membrane, and they

heal, leaving only a small thin-edged opening in the septum.

For the treatment of these cases of perforating ulcer, that which is deemed generally appropriate for scrofula may, I think, be relied on. Iron, with or without iodide of potassium, good food, good open-air and bright daylight; and, locally, gentle washing and clearing from crusts and adherent mucus, and the occasional painting with strong solutions of nitrate of silver.

CHAPTER VII

THE DETECTION OF ABSCESS

I SUPPOSE that no one who has had much practice would deny that he has sometimes been mistaken in the diagnosis of abscess; has sometimes punctured swellings, in the expectation of letting out pus, and has found none; and sometimes failed to find it where it certainly was. The general accepted means for the diagnosis are many and well known; they are told in all surgical text-books, and are often asked for in pass-examinations; and yet, in some cases, they are all, whether singly or together, insufficient or misleading. I can remember more cases proving this than I can find notes of; but my notes tell two or three things which may be useful to any who can remember them, and may help them to be less frequently mistaken than I have been.

Among these is the condition of 'central softening,' such as gives a feeling of softness or easy yielding to pressure in some small portion of a

swelling, or of any part of which the rest is firmer or more tense than is natural. The softness is usually central; but, when the swelling or the increased firmness or tension is extensive, it may be at one or more places distant from the centre. Of course, if the softened part is raised or 'points,' the diagnosis may be easy; but the cases I have in mind are those in which there is no such change of level, even though the integuments be ruddy or mottled.

The most frequent examples of such softening—and these are well known—are in suppurating lymph-glands, especially the scrofulous, in which, as the finger is drawn with uniform steady pressure over one that is swollen, it sinks in at a soft place surrounded by more or less of the firmer gland-substance. Of course, if the gland is manifestly inflamed, the evidence of suppuration is more sure; and it is still more so if the central softened part is distinctly more sensitive than that around it. But well-marked central softening in an enlarged lymph may alone suffice. It is due, I suppose, to the fact that suppuration, like many other processes of degeneration, is apt to begin at the parts farthest from the free supply of blood; and this is, probably, the more likely to happen when the disease is in any measure tuberculous. The softening and the formation of pus gradually extend to the circumference till the whole

gland-substance is replaced by pus; and now there may be a feeling of fluctuation, the quantity of fluid being sufficient for undulations from side to side wide enough to be felt by two fingers; but this is not possible at the beginning, and should not be waited for; the central softening must be detected with one finger, and is enough to justify puncture, incision, scraping, or any other operation that in each case may be deemed best.

Few signs of suppuration are more characteristic than this. Only, in the case of inflamed clusters of lymph-glands, let care be taken to distinguish central softenings from soft interspaces between the glands.

Other good examples of this help to diagnosis are in many abscesses in the perineum and near the anus. In either of these places a soft spot in or near the centre of an induration, especially if it be distinctly painful on pressure, will always justify puncture. The softening may be the more significant in these cases because of the probability that many of these abscesses are associated with tuberculosis. It is often well marked in small abscesses near the anus; they feel like those which are common on the faces of children; beginning like boils, very slowly softening and suppurating, and slowly healing after discharge. And the likeness to tuberculous suppuration is the

greater for the frequency with which these abscesses tend to spread in branches or narrow tracks round the anus or in the perineum, and not rarely open into the rectum or the urethra. It is thus, I think, that the majority of the rectal fistulæ in children are formed.

Similarly, this central softness may often suffice for the diagnosis of swellings on the lower jaw, and generally of periosteal swellings. They may look like small sarcomata, but the pressure of the finger may detect safe evidence of abscess in some soft and tender spot. And the same test may often be used for the diagnosis of hard swellings of the epididymis.

I have found great help from this sign in some rare cases of abscesses very deeply placed, which had made their way to the skin by narrow channels through muscle and fascia. In one case, a gentleman had on the middle of his left buttock a patch of firm brawny integument, three or four inches in diameter, which gradually became dusky red and pink, and over-hot. There was nothing to indicate clearly what this condition of the integument was connected with, but in about ten days a small portion at its centre became soft, sinking under the pressure of the finger, not upraised or pointing. I punctured it, and a little serous pus escaped, and then I found a track many inches deep, passing through the

glutei into the cavity of the pelvis, probably into the hollow of the sacrum. The discharge after this puncture became so abundant as to make it clear that a large abscess had thus discharged through a devious track. In time, I believe, the track completely closed.

Similar discharges through the nates may sometimes be observed in cases of diseases of the hip-joint when all urgent symptoms have passed by, and when there are no openings nearer to the joint. What is sometimes called 'shirt-stud abscess' may illustrate a similar condition in the breast. Pus is formed and collected behind the mammary gland, and is indicated externally by a brawny patch on the integument of the front of the breast. This softens at or near its centre, and, being punctured, a large quantity of pus may flow through a canal traversing the whole substance of the gland. Similar conditions may be observed in some cases of deep subfascial abscess.[1]

On the whole, I think that this sign of central softening is less fallacious and less often imitated

[1] As I am writing of far-tracking abscesses, I may as well say that I have notes of a case in which what was deemed a pelvic abscess in a man opened behind high up in the rectum and, in front, at the reflection of the prepuce on the glans penis. Small puffs of air with fæcal odour used to pass out under the prepuce, and the minute hole, through which they escaped, led to a small canal along the healthy-looking dorsum of the penis and under the symphysis pubis. The case had been in this state for a long time, and I do not know how it ended.

than any other of the usual signs of abscess; even less often than fluctuation. The best coincident and confirmatory signs are an œdematous or brawny state of the integument, pain or tenderness on pressure on the soft spot, and its remaining for a few seconds after the pressure pitted or depressed as if the tissues were œdematous.

The imitations of the fluctuation, which is the sign of abscess always felt for, may be found in many instances of collections of fluid, as in cysts, enlarged bursæ, and many more; and if there be not, or have not been, some signs of inflammation the doubt may remain. And very often, though this doubt may not be settled by the mere to-and-fro movement of the fluid, it may be by the general softening, or the flushed or mottled colouring of the skin over it, or by the greater firmness of the surrounding parts.

But the more puzzling cases are among those of what may be called 'soft œdema;' an œdema which is found in softened, wasted, loose-skinned parts, as at an ankle, or the back of a hand, or a thigh, where there has been acute inflammation which has subsided. The tissues in these cases are usually so softened by the inflammation that they can scarcely restrain the movement of the fluid with which they

are soaked; it moves to and fro as the fingers press it, and closely imitates a real fluctuation. Similar imitation is found in cases in which very soft pulpy synovial membrane is protruded at the parts of scrofulous joints which are least firmly bounded by tough fibrous structures. And, again, it is found in the feeling of soft wasted fat on the nates of those who have been long bed-ridden.

In all these cases of suspected suppuration in limbs, the to-and-fro movement like fluctuation is always more deceptive when the alternate pressures made for its detection are made transversely or across the axis of the limb. Transverse pressure for diagnosis of nearly every disease should always be tested by longitudinal pressure, and if they do not agree, the longitudinal should be deemed the more trustworthy of the two.

This test, with all others, needs to be carefully applied for the diagnosis of abscess from the softer kinds of tumours, especially the deep-seated, soft, and cystic sarcomata. Among these, indeed, may be found, I think, the most difficult of all the diagnoses that depend chiefly on the sense of touch, and they should impel everyone who is to practise to cultivate that sense to the highest possible degree; even as the skilled pianist does, or the skilful silk-buyer, or as one who is blind and learns to distinguish by

the touch the colours of the worsteds with which she works.

I have said little or nothing of the general or constitutional signs of suppuration, for in the great majority of such cases as I have referred to they are absent or are little to be relied on. Of course they should always be asked for, and their presence may not rarely be decisive; but their absence in cases in which they might be fully expected is not decisive. Cases occur in which abscesses, such as, for the swiftness of their formation, might justly be called acute, have more of the characters of those that are called chronic or cold. I have notes of such cases in which I think there was no probability that the abscess had existed long before it was observed.

One of the most marked of these cases was in a man fifty-two years old, who was in St. Bartholomew's. He considered himself healthy and fit for his work as an engineer, though he had tubercular syphilitic eruption and, probably, chronic pulmonary tuberculosis. He came only on account of a large swelling situated partly below the left scapula, partly between that bone and the walls of the chest, and thence extending into the axilla. It was smoothly rounded, measured from ten to twelve inches over its surface, was painless, soft, fluctuating, 'bagging'

hither and thither in changes of posture or under hand-pressure. It lay under the serratus and latissimus dorsi muscles, but both these and the skin over it appeared healthy, and there was no surrounding induration.

The patient had not been aware of anything wrong at or near the seat of this swelling till three weeks before his admission, when suddenly he found himself unable to pick something from the ground. Then he found the swelling 'as big as his fist,' and was sure it could not have existed more than a few days. He could not suggest any cause for it unless it were that just before he found it he had slept for an hour with his shoulder against the engine-boiler, which was as hot as his hand could well bear. But he continued at work after finding the swelling, and it increased regularly and without pain.

On puncture this abscess discharged a large quantity of thin pus, like that of an ordinary 'chronic abscess,' and it was slowly healing, without pain or general disturbance, when the patient was obliged to leave the hospital. Three years later he died with phthisis.

In another direction of misguidance the signs of acute abscess, which may be absent from one quickly formed, may be present when cancerous or sarcomatous tumours are rapidly softened, but

not with suppuration. I observed such a case in a lady who had intense shiverings, sweatings, and high temperatures, and had pain, with increase, softening, and a feeling of fluctuation and tenderness in some large swellings in the liver. The propriety of puncture was discussed in consultation, but death seemed too imminent, and after death the disease was found to be cancer in large masses soft and creamy.

I have once seen similar events in a case of acute cervical lymphadenoma, and here the imitation was that of the central softening in the acute inflammation of diseased glands. It completely deceived me but, happily, puncture did no harm.

And here I may mention two groups of cases in which, though there may be no doubt as to the existence of abscess, it is well to be cautious in foretelling what will follow its discharge. The one group is that of syphilitic gummata, especially of those that form in muscles; they sometimes suppurate, and the event is sometimes a relief from the suspicion of sarcoma; but it is not commonly followed by complete recovery, unless after long treatment. The other group is that of obscure diseases in the abdomen, with or without a feeling of something

suggesting cancerous disease in the cavity or the abdominal walls. Abscess may form in the walls, and is often thought to be a happy event, but very commonly there is cancerous disease behind or beneath it. Few cases lead more often than these do to erroneous forecasts.

CHAPTER VIII

ERRORS IN THE CHRONOMETRY OF LIFE

I HAVE often found reason to believe that, in the study of pathology, we do not sufficiently consider how much of disease or of its variations may be due to disturbance of the time-rate at which the organic processes should be discharged. And I think this may be because too little thought is bestowed on the law that all the processes of organic life are regulated as strictly in regard to the time in which their work is to be done as they are in regard to the quantity of material employed in them or the size and shape of any structure formed by them. We are too apt to forget that there is a Chronometry in Life as well as a Chemistry or a Mechanics.

I venture, therefore, to reprint a condensed report of a lecture which I gave at the Royal Institution some thirty years ago. It may make some more ready to study the errors of chronometry in disease if they are in the habit of thinking of the

exactness with which rates of time are, in all living creatures, observed in health. It is, indeed, very difficult to determine, in any case of disease, how much may be due to chronometric errors, and how much to other errors or defects; and nothing might show this better that some of the notes in my case-books. Still, it is certain that errors in the time-rates which should be observed in all parts of the body are frequent, and that the study of them may be very useful.

The following abstract of the lecture is copied from that which was published in the Report of the Royal Institution, Weekly Evening Meeting, Friday, April 8, 1859. A complete report of the lecture might have been more easy to read, but I was not able to write one. And I may as well add that the lecture was delivered to a mixed audience, not to a medical one.

The design of the discourse was to illustrate the law that the processes of organic life are regulated with a regard to time, as exact as that which is observed by them in respect of size and weight and quantity of material employed in them; and to show that such an observance of time is characteristic of life, depending essentially on properties inherent in the living bodies themselves, and not on conditions external to them.

Laws indicating the limitation of the organic formative processes, in respect of quantity, are evident in the facts that,

in the ordinary conditions in which each living being is found, it and all its parts have appropriate size and weight and mutual proportion. These may, indeed, be modified by the variations of external conditions, or by events that are of the nature of accidents: but the range of possible variations is, in nearly all cases, comparatively narrow; and the boundaries are soon reached in which changes of external conditions become incompatible with life.

An instance of a corresponding limitation of the organic processes in regard to time might be noted in the natural duration of each creature's life. It is, indeed, not possible to assign any exact number of hours, days, or years, as the constant limit of life in any species; but it is enough to prove a law of time, as limiting the total duration of the organic processes in each, when we see that, in man, and in other species, the length of life, when not diminished by disease or violence, is as fixed as the natural weight or stature is, and that the term of life is marked by changes whose source is inherent in the living body. Watching these changes in the senile degenerations of the human body, it is evident that life does not cease, naturally, because of any change in the external conditions of living; and that the body is not, with advancing years, gradually worn out, as if there were a gradual consumption of a store of material or of force; but that as, at a set time, the development of the body ceases and growth goes on, and then growth ceases and the body is only maintained in its perfection, so, after a time of such maintenance, the method of the formative processes in the body changes, it slowly degenerates, and through degeneracy dies. And all these stages are, alike, natural, constant, timely; all, too, are together, characteristic of life; there is no such succession of events to be traced in any form of dead matter.

Observance of time may, again, be noted in the formative processes concerned in any of the organs whose changes mark the divisions of a life into its chief periods; *e.g.*, in the teeth. Considering merely the conditions in which the teeth of the first set are placed before they project from the gums, there appears no reason why one should be cut before the other, or why they should not all grow with equal speed. Yet while they all grow alike in regard of structure and composition, they have very different rules in regard to the time-rate of their formation. And a yet more marked instance of time-regulation is in the contrast of the teeth of the first set with those of the second. In all essential characters, except those of strength and size, the two sets are much alike; yet there is the widest difference in the rates at which they are formed, and in their duration. The second teeth require as many years for their formation as the first require months; the first live but a few years, the second should live as long as the rest of the body, and sometimes do so. Now there appears nothing to which, as to an efficient cause, this difference can be referred. Its utility and final cause can be discerned; but, as to that which verily determines the rates of growth, and the durations of the teeth, it can only be referred to a First Cause; or it may be said, as of other things subordinate to a First Cause, that it depends on some of those properties which each living being inherits from its parents, and through which it results that, in respect of time, as well as of method and quantity, the formative processes in the offspring are a repetition of those of the parent.

The observation of the development and changes of the teeth affords, moreover, an excellent instance of the punctuality with which time-work is regulated in the organic processes, and of the manner in which several different, and

really independent, processes, being set to the same time-rate, are made to co-operate to the end of utility in the economy. This is evident in the coincidence of the development of the teeth of the second set, with the removal of those of the first; and in the coincident growth of the jaw and all its muscles and other apparatus for mastication. In all of these (and the same might be said of any other system of organs in any species) the formation of every part is achieved with an admeasurement of time as precise, and as perfectly designed, as that of its shape, or size, or structure.

For examples of organic processes, adjusted to be complete in definite periods of time, the germination of seeds, and the hatching of eggs, could be cited. In plants, and in cold-blooded animals, the time varies according to temperature, yet not without evidence of a proper time-rate; but among birds, each species has its own time for incubation, as fixed as its other specific characters. In other words, the development of the structures of an egg into those of a young bird, appropriately fitted for life in the open air, is timed to a certain rate of progress; so much work is to be done in so many days, neither more nor less; and on each day its appropriate and special portion of the work. And it is evident that the time occupied in the process is determined by the inherent properties of the egg itself. For if the eggs of any number of species be exposed to the same heat and other conditions in a hatching machine, then, as surely as the bird produced from each will be like its parents, so surely will it be hatched in the same time as its parents were; in other words, the observance of a specific time-rate in the process of development is as exact as that of any other specific character.

With this observance of time in the development of the young might be noticed that which is, commonly, coincident

in the parent. Not to cite the example of all the mammalia, that of pigeons might be taken, in which, during the incubation of their eggs, the crops of the parents are remarkably developed, so that they may be fitted for the secretion of a fluid destined to make the food of their young offspring more suited for their sustenance. The correspondence of these time-rates, observed, at once, in the development of the young pigeons, and in that of the crops of the parents, demonstrates, in both, a division for chronometry in their organic processes, as clearly as the faces of two clocks, constantly keeping time together, would prove that they both have some apparatus for chronometry within.

Further, the provisions made by parents for their future young afford evidence of the time-regulation of organic processes, in so far as those provisions seem to indicate a reckoning of the time necessary for their completion. For example, certain turtles lay their eggs in hollows made in the sand, leave them there to be hatched, and at the time of hatching return to them for the sake of their young. It might be asked, how can these creatures, and many others in similar cases, reckon the passage of time? Most probably, they do not reckon it at all; but just as the timely attained fitness of their organisation for preparing and filling their nests impelled them to those acts, so some time-regulated organic processes, taking place in them after the laying of their eggs, bring-about at length a new condition, of which a dim consciousness becomes an impulse to them to return to their nests. Such an explanation would involve little guesswork; for changed organisation is, manifestly, often the source of impulse to instinctive actions, and the parental organisation does commonly change at a rate commensurate with that of the development of the offspring. And a similar reference to chronometric processes in the body might explain many,

though probably not all, other instances in which animals seem to have a power of reckoning the passage of time.

The phenomena of disease, especially in fevers, agues, the consequences of injuries, and many cutaneous eruptions, would afford abundant instances of the observance of time in the organic processes. The vaccine disease might be generally watched as an illustration, being characterised by a vesicle at each place of insertion of the virus, which vesicle begins to appear on the third day, and on the following days passes through changes which are as exactly regulated in time as they are in visible characters. The changes in this vesicle are, moreover, indicative of a coincident succession of events in, or produced by, the virus inserted, which, in the blood of the vaccinated person, increases, and, incorporating itself in the vesicle, reaches its highest development and greatest inoculating power on the eighth day, and then degenerates.

The vaccine might, in most essential points, be regarded as a type of morbid poisons, *i.e.*, of such as are the products of disease. Whether inserted in the blood by inoculation, or bred therein, they commonly occupy definite periods of time in their development, and increase, and decline; as with a life which is chronometric in all its phases and in its total length.

The instances of morbid poisons would supply examples of organic processes timed to various numbers of days; and many that are completed in a day, or in given portions of a day, are traceable in the events of sleep and waking in animals (and, perhaps, also in plants), in the daily variations of the pulse, and of breathing, the returns of hunger and thirst, the regulated times of the digestive functions, &c. In man, indeed, consciousness and will are so concerned in some of these functions, that they may seem to lack that regularity which

belongs to merely organic processes ; but, if studied generally, and in other species as well as man, they all tell of such processes accomplished with regular measurement of time, and not determined by the external events or conditions of the day or night. Thus, for sleep and waking, and the times of hunger and thirst, man's independence in regard to day and night, or light and darkness, and the habits of different species whose times of activity are, severally, in the early or later day, in twilight or at night, may prove that the earth's diurnal changes are not the causes of these diurnal peculiarities of animal life. The very cause of sleep, and of that which is yet more mysterious, waking, may be unknown ; but they are evidently connected and correlated with those alternating conditions of the structures, of which men, and probably all animals that sleep and wake, are conscious in the sensations of fatigue and of refreshment. The ordinary activities of one portion of the twenty-four hours, the activities, especially, of the muscles and nervous centres and the senses, produce an amount of structural, or chemical, change which is exactly repaired in rest during sleep. In other words, the organic processes for the repair of structures changed (as all structures are) by exercise, are adjusted to such a rate, that, in general, and on an average, in the time of sleep, they may completely restore the parts that are impaired in the activity of waking time. And so, of that replacement of substances in the several structures and in the blood, which is the purpose of feeding ; the processes of digestion and of the several stages of assimilation are so timed as to accord exactly with the times of daily taking food.

The most minute observances of time in organic processes might be noted in organs that have rhythmic motions, as in hearts and breathing muscles, ciliæ, the vacuoles of certain zoospores, as Volvox and Gonium. In the Croonian Lecture

at the Royal Society, in 1857,[1] the speaker had endeavoured to prove that these and other rhythmic movements in plants, as well as animals, are due to corresponding time-regulated nutrition. He had expressed his belief that 'rhythmic motion is an issue of rhythmic nutrition, *i.e.*, of a method of nutrition, in which the acting parts are, at certain periods, raised, with time-regulated progress, to a state of instability of composition, from which they then decline, and in their decline may change their shape and move with a definite velocity, or (as nervous centres) may discharge nerve-force.'[2] And this would be still maintained; but whether it were true or not, the rhythmical nutrition of rhythmically acting muscles would be certain. If not a cause, it must be a consequence of such acting; for it is inconceivable that the heart (for example) or the diaphragm, or any other rhythmic muscle,

[1] *Proceedings of the Royal Society*, vol. viii. p. 473.

[2] It seems well, now that the action of cardiac nerve-centres has been more studied, to add that the reference of the rhythmic movements to them does not tell how rhythm is really produced, for the questions remain, What determines rhythmic action in these nervous centres? how is the time-regulation determined for the discharges of nerve-force which we believe induce the successive contractions of the heart? The time-work must be done first in really elemental structures as it is in the simple pulsating hearts of embryos, mere clusters of apparently simple cells, altering their forms with as well-timed a rhythm as does the completest mammalian heart. They show, as do many other organs, that an exact chronometry may prevail in changes quickly wrought in structures which, to our present powers of sight, appear so simple that we call them elemental; they compel us to believe that in these elemental structures, these mere cells or their contents, there are regulated chemical changes producing the regular discharges of mechanical force which are manifested in their changes of shape and the movement of the blood. And we may believe that in the course of development the rhythmic action of the muscular structures of the heart is subordinated to regulated changes in the elemental structures of the cardiac nerve-centres; the discharges of force due to these changes being transmitted along the cardiac nerves.

should be free from waste or impairment in its action, or from the necessity of being renovated in its rest. Difference of mode of action could not determine a difference in the immediate effect of action. With long exercise, muscles become so changed that their changed state can be felt in the sensation of weariness, and proved by chemical analysis. But the change thus proved is only the accumulation of the changes wrought in many muscular actions, each of which has contributed a share to the whole amount, just as each revolution of a wheel contributes to the final wearing out. Similarly, every action of the heart, or of the breathing muscles, is attended with change or impairment of composition; but the impairment is repaired in the next following period of rest or relaxation. In other words, the alternating actions in shortening, and rests in lengthening, of the muscular fibres are correlative and synchronous with their alternating impairments and repairs of composition. The chronometry of such organic processes seems perfect; nutrition is in them divided, as it were, into units; and for each unit, there might be reckoned a unit of time.

Two results of this constant maintenance of rhythmic muscles are remarkable; namely, the enormous power they are capable of exerting, and their freedom from fatigue when only naturally acting. The latter result is proved to depend on the constant maintenance of the muscles, in their timely intervals of rest, by the weariness which is produced in the same muscles when they act otherwise than rhythmically, as in the muscles of respiration when employed in any voluntary movements, or in coughing or other violent respiratory acts.

The instances adduced thus far might supply examples of organic processes adjusted to periods of time varying from the length of human life to less than a second. They were all examples of large classes of facts, from which might be

filled up the instances of observance of other and very diverse periods of time; and in all of them, the time-rate is essentially determined, not by external conditions (though these may, in some measure, modify it) but by the inherent properties of the organic bodies themselves.

In another large group of instances, those, namely, in which vital processes are completed, or attain some climax, in a year or in a set portion or season of a year, an independence of external conditions appears less evident. The higher organisms, chiefly by reason of their having in themselves the power of generating heat, may manifest their own time-laws with comparatively little disturbance from without. But in the vegetable world, and in the lower animals, the organic processes are, for the most part, suspended during part of the year, for want, chiefly, of the heat which is a necessary condition of their activity, and the variations of which, for the rest of the year, very greatly affect their rate. Yet even in these, there appear sufficient indications that the times in which the processes of organic life are accomplished depend, essentially, on the specific properties of the several organisms themselves.

Thus, under the same external conditions, each species observes a proper rate of its own. All the plants, for example, of a given locality are subject to the same temperature, and other seasonal conditions; but their rates of living, like those of various eggs placed in the same heat, are different; each reaches the chief events of its life at a certain period of the year. Variations of the seasons may affect all of them; but their method of succession is not thereby changed; they observe the same proportions in the times severally required for their organic processes; and this unaltering proportion indicates a time-rate specific for each, though equally variable in all.

Moreover, among plants, there are numerous examples of varieties, which differ from the general characters of their species only, or chiefly, in regard to the times at which their vital processes are accomplished. Such are the variations that are known as 'late,' and 'early,' among flowers or fruits; of which some may be propagated by seeds. [Specimens were shown from two horse-chestnuts growing near to one another by the great gate of the Kew Gardens, of which one is, every year, three weeks earlier than the other, in all the processes of its life; and of varieties of Erythronium Dens Canis, from the same gardens, the plants of which, growing side by side in the same bed, always present a similar difference in their times of flowering, &c., though in all other respects alike.] It would be difficult to imagine a variety thus marked only by a peculiarity in rate of living, if temperature, or the influence of the seasons, alone determined the rate of life in the species. The simplest explanation seemed to be that, as there may be varieties in size and number of organs, and almost all those other properties of a species which together make up its specific character, so there may be also varieties in regard to that time-rate of the processes of organic life which, even by this variability, is indicated as essentially dependent on the properties of the organism itself.

Again, there are some species in which there seems to exist a singular independence of external conditions. Instances of this are found in the Eriogaster lanestris, and the other moths mentioned by Kirby and Spence. If pupæ, formed in June or July, be 'selected of the same size, and exposed to the same temperature, the greater number of them will disclose the perfect insect in the February following; some not till the February of the year ensuing, and the remainder not before the same month in the third year.' (Vol. iii. p. 264.) The design of so singular an arrangement is, as they observe,

to secure that insects, coming into active life in February or March, may not be utterly exterminated by the ungenial weather of a single season, or of two such seasons in succession: but the very cause of the differences among the pupæ, in their relations to the same external conditions, must be in their own properties.

A somewhat similar instance of apparent complete likeness among seeds in all respects except that of time, is in those of a Begonia, which, if taken from the same pod, and all planted together, and all kept in the same conditions, will germinate, some in a day, some at the end of a year, and some at various intermediate times.

To these indications of self-dependent time-rates in the lower organisms, might be added all the facts of another class, which show punctuality in the adjustment of several distinct processes. Scarcely an event of life could be watched which would not show it.

[The instance by which it was illustrated, was that of a Saxifraga, whose stamens, like those of Parnassia, arrive at their very maturity, not all together, but in pairs, and in pairs bend upon the pistil, each pair rising again before another pair bends down.]

And, lastly, the influence of temperature on the rate of the formative processes in the lower organisms is scarcely, or not always, greater than that of nutriment and other external conditions, is on their quantity. The occurrence of 'good' and 'bad' seasons indicates the latter influence, as that of 'early' and 'late' seasons does the former. Plants of the same species growing, some in an arid, others in a rich soil, differ exceedingly in size; the one are stunted, the others exuberant; here nutriment modifies the quantity of formation as, in other instances, varieties of heat will modify its time-rate. But this being so, it may be held that as a cer-

tain average size or quantity of growth is a characteristic of each species, and an issue of its very nature, so is a certain average time or rate of growth. Quantity and rate may alike be varied by external circumstances, but the standard or medium of both, as well as the limits of variation compatible with life, are determined by the natural and inherent properties of the species.

Whatever evidence these and the like facts might supply, that, in connection with the seasons, the time-rates of the organic processes in the lower organisms are essentially dependent on the inherent properties of each organism, similar evidence might be adduced for the case of the higher, and especially the warm-blooded animals. In these the varieties of seasons have less influence in modifying the time-rate, as well as all the other measures, of life; and the less influence, the higher the species, or the degree of development of the individual. Moreover, there are in birds some instances in which organic processes have a tendency to observe certain times of the year even when the seasons are changed. Thus among those brought from Australia to this country, some of the parakeets breed here in December; the black swan sometimes breeds in November as well as in May; the New Holland Cereopsis-goose has bred at the Zoological Gardens every February for five or six years.[1] Among migratory birds, also, it has been observed that when they are kept in confinement, and removed from all the circumstances that

[1] Mr. Sclater, to whom the speaker was indebted for this fact, supplied also dates which tend to prove that the Australian parakeets, in this country, breed less often in December than in the months from May to September, inclusive; but even a minority of instances of the observance of times, and a general tendency towards it, when the force of such external conditions as those of the seasons is strong against it, is good evidence that inherent properties are the mainsprings determining the rates of life.

might be supposed to induce or necessitate their journeys, they yet become restless at the return of the season for their migration.

In these and the like facts there appear indications of a chronometry in the organic processes of warm-blooded animals, which corresponds with that of the seasons, but is essentially independent. And, if it be so, these might form a group of facts, in addition to those of the diurnal variations of the organic processes, in which vital changes are set to the same rules of time as changes of the surface of the earth, yet have their own proper laws; and concerning which it might be said, that the cycles of life, and of the earth, do, indeed, correspond, but only as concentric circles do, which are drawn round one centre, but are not connected, except in design and mutual fitness.

But, however this might be, all the instances of time-regulation cited in the discourse (all being examples of large groups of facts), would seem sufficient to prove, that the observance of time in organic processes is as exact and as universal as that of any other measure; that each species has a certain time-rate for the processes of its life, variable, but not determined, by external conditions; and that the several phenomena commonly studied as the periodicities of organic life, are only prominent instances of the law which it was the object of the discourse to illustrate.

Before speaking of the errors of chronometry in relation to disease, I wish to point to the probability that in many of the instances which I cited of the observance of time in disease, the time-rates may be determined chiefly by the events in the lives of microbes, which were scarcely subjects of study when the lecture was given.

And I may suggest an inquiry, which I have often wished that I could pursue, into the influence of the variability of a time-rate, as of one of the conditions on which may have depended the 'selection of species.' The subject was hardly within the general range of study thirty years ago.

It is not difficult to imagine many terrestrial events in which the 'survival of the fittest' among species or individuals might depend, chiefly, on the possibility of adjustment of a time-rate in one or more processes. In the ordinary course of nature the time-rates in each creature are adjusted to those of the external conditions most necessary to its life. The development and hatching of the young pigeon keep time with the development of its parent's crop; the development of the mammalian fœtus with that of the mother's mammary glands. Such adapted

changes in parents for the sake of their offspring are everywhere to be seen; and so are the instances in which the developments of animals of all kinds keep time with those of the plants or other animals on which they live.

It is hardly too much to say that the whole course of nature among living things thus depends on their mutual adjustment in time as well as in all the other conditions of their lives. And if this be so, then, any alteration of the time-rate of life in any species might gravely affect its fitness for an unchanging environment, or might lead to the natural selection of a few of the species whose differences from the rest would be transmitted to some of their offspring. Or, in the other direction, a considerable change in the time-rates of any of those things—such as a vegetable or other food—on which a species depends for its continuance, might lead to the extinction of that species, unless the time-rates of some of its members and their offspring could be adjusted to the change. It cannot reasonably be supposed that the time-rate is the only characteristic of the processes of life which is not liable to variation; the 'late' and the 'early' varieties of a species are instances of its occurrence; and whenever a change of time-rate occurs there must arise an opportunity for 'natural selection,' just as there does on the

occurrence of any variation in the form of a limb or of any other part.

But I can only wish that I could work at this: it is too far beyond the range of both my knowledge and my opportunities. I commend it to younger and more learned students of evolution.

This subject of chronometry in life has, naturally, been very often in my mind, and facts illustrating it have often seemed as if they might be arranged in some systematic manner useful for the evidence of general principles in physiology. Through want of ability or want of time I have been unable to do this; but I may mention one instance in which the time observed in processes in living structures may show a general principle which, I think, can hardly otherwise be established, namely, that none of what we may regard as the component parts of any organised structure are exactly alike. For example, no two or more minute structures can appear more exactly alike than do the adjoining cells of a leaf; yet, if we watch them in the unfolding or other expansion of the leaf, they do not all at the same time attain the same size or the same colour; and yet more evidently in their decay, we see the yellow or other tint gradually extending in different shades of intensity from one part to another of the same leaf. The

external conditions of the whole leaf may be the same: if all or any of its cells were exactly alike, they would pass through changes of colour in exactly the same time; but they do not so change unless, perhaps, it be the cells placed in exact symmetry on two parts of the leaf. Now, the fact that different lengths or periods of time are required for producing similar changes in two or more structures, is sure evidence that those structures are not exactly alike. I know no other test than this that could detect a difference among, say, the cells most near to one another.

Similar illustrations may be found in so many structures—for instance, in two parts of the same tooth, the same hair, the same cornea—that I think the rule may be deemed general and constant; and it may be useful to bear it in mind as evidence of differences among structures in which no difference can be detected by even the finest chemical or physical test yet within our power. It is often said that no two cases of disease are alike; we cannot expect them to be so if no two elementary structures in the same person are.

The errors of chronometry—unpunctualities in life, as they may be called—may be studied in two different, though often mingled, forms. In one, an unusual time-rate is maintained in all parts, or, at least, in all important parts, but is maintained alike and uniformly in all; in the other the time-rate is erroneous in only one or a few parts. To use an illustration from what may happen in an orchestra, in the one case the error is like that of music which is played too fast or too slow, but in which all the musicians keep the same time; the music is not good, but there is no discord. In the other case it is like the music in which one or more of the musicians play too fast or too slow, and are as constant sources of discord as if their instruments were out of tune.

The most frequent and obvious instances of the first class in which the time-rate is erroneous, but is uniform in all parts, may be observed in the earlier and in the later periods of life. It is matter of common observation that some young people look older and some look younger than they are, and the former are generally deemed stronger and healthier than the latter. In later life, also, some people look older and some look younger than they are; but the judgment

is reversed, and the latter are deemed stronger and healthier than the former. The judgments are so often right that one is often prone to think that looks are better evidence of the probabilities of life than are the registers of births; for a register can only tell the time since birth, but looks—*i.e.*, the appearance not only of the features in the face but of the size, shape, and manner—can often indicate accurately the rate at which the vital processes have been carried-on, and at which they may be moving to their end.

But, although this may be generally true, there are very many exceptions to the rule, and it may be that in this as in all pathology, more truth may issue from the study of exceptions than from the ready acceptance of general rules.

The young persons who look older than they are, and who have had in all their structures more than the mean time-rate of development and growth, are usually healthy and potent in resistance of disease, but exceptions are not rare; scrofula may be seen well marked in some whose stature, muscular power, and sexual development are three or four years in advance of the mean at their registered ages. Still, if there be no evident marks of defective health, they who, when they are less than twenty, look older than they are, may be deemed healthy above the average.

I think that the greater time-rate does not, in this class, continue in later life; that they are not commonly among those who at all ages, especially when in or near old age, look older than they are. But this needs more accurate inquiry.

On the other hand a large majority of those young persons who look much younger than they are, are weakly and have what is called delicate health. Some are evidently scrofulous, having clear signs of such diseases of the glands, or joints, or other parts; and some are as evidently syphilitic by inheritance, or rickety; and many more, though not plainly thus diseased, are certainly prone to scrofula, tuberculosis, acute rheumatism, and other diseases of this class. They have large tonsils, granular pharynx, swollen nasal mucous membrane, and other minor signs of such diseases. Thus, together with their chronometric errors, they have coincident or, perhaps, in some measure, consequent errors of structure or composition in this or that part or group of parts.

It may seem probable that the 'delicacy' of the young who look younger is generally due to this qualitative error rather than to the error in their time-rate. For in a numerous minority of them there is no such delicacy; all their functions are discharged in right mutual adjustment, and in quantity befitting their apparent, though not their registered, age; and

after what may seem a long time they acquire a manly, robust health and full power, though rarely a full stature. Still, it is very often useful when elderly or old people are ill, especially if they are ill with obscure chronic disease, to ask them about their looks in early life. Facts helping to a right diagnosis may often be thus learned; many of the subjects of senile scrofula will tell that they were small and delicate while young, though not evidently unhealthy, and that after their youth they were hearty and strong till their old age began. They may be examples of a second childishness in bodily though not in mental defect.

I have often tried, but often in vain, to learn the conditions which have retarded the time-rate of development and growth in the young. I have not found that the health, good or bad, of parents has any clear influence on the time-rate of their children in early life, nor that the children of the old are different in this respect from those of the younger. Yet various time-rates are often characteristic of families, and examples may easily be found of two or more families in the same conditions of life, and equally good general health, in which the young people of one family look much younger than those of the same ages in the other, and are really younger in all reckonings but that of the times since birth. I

have notes of an example of eight children of the same family living to middle age, small and always looking young, and with one exception always healthy. Their parents, this exceptional one told me, 'looked their age.'

The most frequent cause of delayed growth, when any cause for it can be assigned, is an acute illness, such as scarlet fever, diphtheria, or whooping cough. Mr. Galton[1] relates a striking instance of retarded growth of children's heads during and for a time after each of their occasional illnesses. A less considerable fact is in the checked growth of the nails during illness.[2] Mr. Galton's fact was ascertained by very careful measurements. Often, though less accurately, one sees that after apparently complete recovery from scarlet fever, pneumonia, whooping cough, or other acute illness in early life, growth is so retarded that two, three, or more years seem to have been lost, and young people of fifteen or eighteen look, and are, as if not more than twelve or fourteen years old. They may be, for their apparent age, quite healthy, but more often they are not, and they

[1] *Inquiries into Human Faculties*, p. 235. I have heard also from Mr. Galton that, in the growth of cereal crops, a check at any period of their progress is followed by long-continued delay in growth, imitating the consequence of an acute illness.

[2] Dr. Wilkes has related a case in which this occurred in the sea-sickness of two voyages across the Atlantic of only seven or eight days each.

are among those who will prove the value of a general rule in both practice and education, that both lessons and the rules of living should be adjusted to the apparent rather than to the registered age.

It is often said that during and after acute illness some young people increase in height very rapidly. This may be true, but I think that such growth in height is seldom, if ever, associated with equivalent growth and development of organs whose size is more important than is the length of the lower limbs and spine. Length thus attained is not significant of high development;[1] it may no more be so than is that strange increase of fatness sometimes occurring in young people after illness. I have seen this especially in some when convalescent after acute scrofulous joint-disease; they have become big, round, fat, and dull, yet they looked too young.

What is true of these general illnesses in respect of the general time-rate may be true of the influence of local disease or severe injury on the time-rate of

[1] I say 'thus attained' because more generally stature and development may seem in some measure correlative. Mr. Roberts (*Report of the Anthropological Committee of the British Association*, 1883) reports that, 'Compared with the general [adult] population, lunatics show a deficiency of stature of 1·96 inch, and of weight of 10·3 pounds, and criminals of 2·06 inches and 17·8 pounds.' Nationality also must here be taken into account. 'In this country shortness and lightness are deemed signs of degeneracy; in America and the older Australian colonies excess of stature is so regarded.'—Roberts, *St. George's Hospital Reports*, vol. viii. 1874–6.

the one part affected: it may be made or may become comparatively old or young; almost certainly it will be out of time, as well as out of harmony, in structure. And, as all parts do not grow at the same rate at all times, so various disproportions may be determined in different persons by the time in early life in which any general illness may have occurred.

A slow time-rate is often observed in children who were prematurely born. They seem behind time till their growth is nearly complete, but some of these continue to grow longer than usual, and some attain, in time, great stature.

The foregoing facts relate chiefly to delayed growth, and it is, of course, in early life that such chronometric errors are most frequent; but delays, or slow time-rates, may also be noted in later years. Then, the looking young, in which is often expressed the fact of being comparatively young in all but years, is probably due to slowness in the degenerative processes of life; and we may fairly guess that this may also explain the many instances of great longevity in persons who, when they are very old, say that they never were strong, never vigorous in health. Their whole time-rate has been slow, and they have, therefore, lived long; as among several clocks of similar construction, those which go slowest will go longest.

The contrast with these may be found in some

who look prematurely old; but it is hard to judge of these, because so few have lived long without having some disease or disturbance of this or that part which has destroyed the uniformity of the time-rate at which all the organs began to live, and which may have been necessary to healthy life. Hence it is that natural death—that is, death through uniform and exactly contemporary decay of all the structures—is very rare. The few cases in which it is observed do not prove more than that there is no fixed time at which it should occur.

The foregoing facts, incomplete as they are, may be enough to show that important and useful knowledge may be gained by a careful study of those deviations from the usual time-rates of life in which all parts deviate alike, the rate being in all parts equally too fast or too slow. A still larger field for study is in what may be deemed the premature development or degeneration of one or more parts; the rate of life being not uniform in all. But on this I can scarcely do more than recommend it for the study of younger men, for I have no clear facts concerning it in relation to any of the most important parts.

The best illustrations are in some of the least important parts, but these may suffice as suggestions for seeking similar facts in the most important.

Premature development is only too commonly seen in the teeth. Their time-rate may be faster than that of the jaws, with which it ought to coincide exactly; and in this case they come out crowded, and the more so the more exactly they keep time with one another. Often, however, they do not keep time either with one another or with the jaws; they come out both crowded and disorderly. I have seen a young gentleman who, at eighteen, had cut all his wisdom-teeth, and his teeth were in advance of everything, for his jaws were small and had not room for them; he had no appearance of hair on his face, and he was altogether boyish in build and mind. The opposite error in time, shown in delayed tooth-cutting, is nearly as common, and cases are not rare in which the eruption of the wisdom-teeth, which signalises their complete development, is delayed till middle age or later.

Errors in time such as these are very troublesome, not gravely important. But surely it is very probable that similar errors occur in other more important parts. Premature puberty may be cited; and it may at least be suggested that grave trouble may ensue if, for example, a heart should be acquiring its full power more quickly than the lungs or arteries. And let it be remembered that even the smallest defect in chronometry, beginning in early life and continued,

will become constantly more serious in its effects; just as an inaccurate clock becomes more wrong the longer it goes.

The premature degeneration of this or that part, whether with mere wasting or with fatty or other change of structure, while the other parts go-on at their usual time-rate, is, no doubt, often due to disease of the part; but it is not always so. The changes which are natural in old age, and which when uniform end in natural death, often begin at different times in different parts and make unequal progress. Here again the plainest illustrations may be found in the teeth and in the hair. We are apt to think lightly of premature grey hairs because they are common and may be seen in many who are in good general health; but it had better be believed that analogous untimely degenerations may occur, without disease, in much more important parts. All parts do not often grow old at the same rate; and as people of the same age according to the register are, in many instances, of widely different ages by every other test, so is it with the several organs of the same body. For all the purposes of life some parts may have grown old much faster than others; some may even be dying as of old age while others are still fit for active life; and these dying parts may never have been the seats of any morbid process; their errors

may have been only chronometric; they have not kept time; they have too quickly become 'grey.'

I think that we may thus explain, or, at least, may thus express, some of what are deemed diseases of old age. One sees people with scarcely a grey hair at seventy whose stomachs are simply incapable of digesting, as feeble and as quiet as in those who are dying of old age. And so, one sees some with shuffling tottering gait, and with such weak and shrivelled limbs, as might be deemed natural in people of ninety, and who yet say that they can eat and drink and digest as well as ever. Similar illustrations of different time-rates observed in different organs in the same person may be found, I suspect, in some weak dilated hearts, and some wasted emphysematous lungs and inelastic arteries. Certainly, I think we may thus explain many cases of distended urinary bladders in men of sixty or but little older, who in general health show no signs of old age. Their bladders become distended with gradually accumulated urine, which they are too weak to discharge, though there be no hindrance in the urethra or prostate. The patients, themselves, are often unaware of the distension, the bladder being alike insensible and inactive; and the urine may be quite healthy, unless, as in some cases, it be of very low specific gravity. Similarly, the rectum may be found

weak, dilated, and irritable, with detained solid fæces, in elderly people who are sturdy and active, and in whom all other organs seem naturally strong. The rectum alone in them is old-aged.

I venture to think that our pathology and, sometimes, our practice would be improved if local defects of working power were more often thought of as errors in the time-rate of life in the defective parts; if we would think of the 'age' of each part as not always wholly or exactly expressed by the time that has elapsed since it was first formed; if we would bear in mind that any internal organ may deviate from the general time-rate of the body as much as the teeth, and the hair, and the skin, which we so commonly think of as old before their time. We should not be content with asking a patient how old he is; we should ask ourselves, how old is his heart, or his brain, or any other part which seems now less healthy than the rest.

CHAPTER IX

RESIDUAL DISEASES

THE last essay may show that as we grow old we are apt to believe that we can see lines of enquiry which ought to be pursued, and which we would ourselves pursue if we were likely to have time and opportunity sufficient for such work. Among the enquiries of which I have often thus thought is that which might decide whether each disease does not leave, after it has ceased, certain conditions of blood or structure which, sooner or later, may manifest themselves in what may be named a residual disease. When a patient after illness feels well and shows no definite sign of disease, we are ready to think that he has recovered his former health: but often it is not so; and I always remind myself of what my admirably wise friend and colleague Dr. Baly used to say, that among the most useful books might be one 'On the Diseases of Convalescents.'

Of the soon occurring sequels[1] of diseases we

[1] I use this word rather than 'sequelæ,' of which the sound is as ugly as itself is un-English, and rather than 'consequence' because the

know many; of the later, comparatively few. Yet, for an example, I have notes of cases which seem to make it nearly certain that the periostitis which is often observed soon after recovery from typhoid fever may not appear till one or even two years after. And I have heard of cases in which paralyses, such as are often seen after diphtheria, have not occurred till three months after apparently complete recovery. It is, of course, impossible to prove that the sequence was a consequence of the previous disease; some other cause may, possibly, have intervened and escaped notice. But I am sure that these cases were sufficient to suggest, as I have said, that it may be very useful to ascertain whether many diseases do not leave behind them residual conditions which, after long intervals of apparently good health, may manifest themselves in characteristic signs. It is a well-known part of the natural history of ague and of syphilis that such residual conditions remain after their primary attacks, and show themselves, in the one, in recurrences of similar periodic signs, in the other, in a succession of diseases regular enough to be regarded as specific secondary and tertiary consequences of an infection. And, as these among general diseases, so among local diseases residual

'sequel' is not nearly constant, and may depend on many conditions not yet nearly ascertained.

abscesses,[1] or any recurrent inflammation in an injured part, may be taken as the guides by which to look for similar events in other instances, and to study whether other diseases leave similar residues and how these residues may be known.

Nearly all diseases leave what is commonly called weakness, and, in this weakness, many diseases to which there were previously only the ordinary personal liabilities are likely to appear. Thus, scrofula or tuberculosis or gout may become evident in the weakness following fever or any severe injury. And often the 'weakness' is shown to be local as well as general; for the disease is especially likely to appear in the part which has been injured. Thus gout is apt to attack a strained joint; or a joint may first be gouty and then scrofulous. But these are not such residual diseases as are characteristic of those which preceded; they are in no such definite relation to the preceding disease as secondary syphilis is to primary, or as periostitis or phlebitis is to typhoid fever, or diabetes to ague. These do not occur indifferently in the weakness that may follow any acute or prolonged illness; each of these follows one disease alone or much more frequently than it follows others, and each may be fairly suspected to be due to some

[1] Such as I described in *St. Bartholomew's Hospital Reports*, 1869, and in *Clinical Lectures and Essays*.

residual material left in the blood or in one or more of the tissues.

A residual disease may appear very soon after the primary disease from which it is derived, as secondary syphilis commonly does after primary, or as paralysis after diphtheria. Or it may be long delayed, as in the cases of periostitis already cited; and after this delay its outcoming may be due to some casual disturbance of the general health. Thus, after any number of years, ague may reappear in those who have lately undergone operations and, with its shiverings and high temperature, may excite alarms of septic infection; alarms which may be quieted with the quinine, which is thus at once diagnostic and curative. Or, more than this, ague may appear for the first time, after an operation, in some who lately, or even many years previously, were exposed to malaria.

A clergyman whom I cut for stone had a fierce rigor, followed by intense heat and sweating, on the third or fourth day after the operation. It was not associated with any passage of urine along the urethra; it was very like the beginning of pyæmia. Of course I asked about ague, and he told me that he had never had it, but had given away 'pounds of quinine' to his parishioners. He had lived in an ague district, the 'poison,' whether microbe or any

other evil thing, was in him; but it was harmless till, we may suppose, his blood was made fit for its multiplication or diffusion by the changes following the operation. In another case, a middle-aged lady, whose breast I had removed, had regularly periodical attacks of chilliness, followed by heat and sweating. She had never had ague, but her early life had been passed in a place where it was frequent, and her mother was 'always giving her quinine.' And now quinine cured her.

The residues of diseases manifested in such cases of ague show characters unchanged through years, or even in the whole of a long life. I have known well-marked ague in one who had first incurred it sixty years before. Similarly, a chronic pyæmia may go on for many years after septic poisoning, with repeated abscesses in similar textures, and with long intervals of apparently good health.[1] More commonly, in course of time, the residues change and other characteristic signs appear; as tertiary syphilitic diseases may follow secondary, or, without the intervention of secondary disease, may appear long after the primary disease. But there is no constant rule for these events; the usual secondary symptoms are sometimes, however rarely, delayed for many years.

[1] Or, as in one case, with complete freedom from suppuration during three periods of pregnancy and lactation.—*Clinical Lectures and Essays*, p. 171.

A man when eighteen years old had a primary sore, and he had no other primary affection or any signs of secondary disease till seventeen years later, when I first saw him. Then, after a great fright and grief, he had been ill for a month, and had lost much in strength and weight, and now a copper-coloured eruption, like the most ordinary secondary syphilitic psoriasis, appeared on the scrotum, and soon after on the scalp. Two weeks later he had small superficial ulcers on the tonsils and the glans. He got much better while taking mercury, but had a small ulcer on the side of his tongue.

Many such cases might be cited, and still many more showing that, at any time, the residues of syphilis may appear modifying the signs of scrofula, or of gout, or of any other disease with which syphilis may combine.

But I can only cite these facts as encouragements for the study which I have suggested,—the study of the probability that many other diseases do, like syphilis and ague, leave certain residues in some part of the system, which, long after apparent recovery of health, may show themselves in distinctive morbid processes or in modifications of those due to other diseases. This study may give more definite design to the records of the history of each case, and I am sure that, in private practice, I have found it much more

useful than my case-books would prove it to have been. We should in nearly all cases ask, Have you ever had a serious disease? Were you healthy in childhood? The answers will often help to accurate diagnosis.

CHAPTER X

DISEASES OF STRUCTURE DUE TO DISTURBANCE OF NERVE-FORCE

It seems possible that it may be useful to record some of the least common-place of my cases of structural disease having its origin chiefly or solely in nerve-disturbance. They may be useful as additions to any collections being made by others, just as specimens of varieties are useful in herbaria destined chiefly for the study of species.

Among the cases are several of rapid wasting of parts after injury of their nerves, including especially some in which nerves and the parts round them were severely crushed.

The most remarkable was observed in a gentleman, about twenty-five years old, very strong and muscular, who had been for two years subject to epileptic attacks, some of which were preceded by half-a-minute's mania. In one of these attacks with mania, a month before I saw him, he was seized by

six workmen, who, in their fright and against his violent resistance, tied his feet and hands and arms with strong thin cords. The cords on his feet gave him only temporary trouble, but those on his arms and wrists did greater damage. They were twisted and tied as tightly as possible and kept on, I think, for some hours, and the marks of their coils were still distinct in bands of bruised and brownish skin.

When he was set free his hands and wrists were powerless and insensible; he described them as 'dropping' like those of one with lead-palsy. Soon after, the arms began to swell, and in the next four or five days they were in such a state of inflammatory œdema that it was expected that portions of them would slough, or that there would be extensive suppuration. The pain was extreme, with burning and tingling and aching in the hands and fore-arms, though to the touch they were insensible; and this pain continued much longer than the swelling. After the swelling subsided, which it did without suppuration, he began to regain some sensibility and some slight power over the muscles, but they were found to be exceedingly wasted; they had been very robust, and they had become quite slender and puny. In the fourth week after the injury the whole condition improved; the pain decreased, the muscles became rather more

active and increased a little in size, but still they showed signs of having wasted, more rapidly than any I had ever seen. The pulse was natural, there was no sign of injury to bone or joint, or of any deep-seated disease; the skin remained in some parts completely, in others partially, insensible to touch. Slowly recovery ensued, and I believe that, in time, the muscles regained their size and power.

It is by the rapidity rather than by the degree of the wasting that this and similar cases are distinguished, and such rapidity, far greater than that with which muscles waste through mere inaction or after division of their nerves, is, I think, indicative of inflammation in the nerve-fibres, or, perhaps, in some cases in a nerve-centre. Such rapid wasting of the muscles, and, probably, of other structures in the limb, is seen in cases of what may be considered acute sciatica, and, I think, it may distinguish the cases due to neuritis from those which may be ascribed to neuralgia. A similar condition is sometimes, though rarely, observed in association with herpes zona. I have seen two examples of this in middle-aged men in whom the herpes was in the range of distribution of part of the brachial plexus, especially on the shoulder. The pain was intense, and the wasting rapid and excessive; the muscles were reduced to an extreme emaciation within a

month, and were for some time powerless. But the pain was not unusually prolonged, and the wasted parts recovered, in one of the cases I know, and in the other I believe, completely.

I do not pretend, for, indeed, I am quite unable, to express what may be the difference between these disturbances of nerve-force which are attended with similarity of pain, but of which some are, and some are not, productive of wasting or structural change in the parts in which the nerves are distributed. There are singularly intermediate or mingled illustrations in different cases of herpes zona. Ordinarily, with considerable preceding or associated pain there is only so much local necrosis as is expressed in the death and separation of the epidermis of the minute vesicles and the shallow ulceration indicated by the little scars; but this ulceration may be deep, and I have seen one case in which, with herpes in the range of the second division of the right fifth nerve, there was necrosis of the portion of the alveolar border of the upper jaw and of all the teeth receiving branches from that nerve. In the cases which are most severe as to the structural changes, there is not always more than ordinary pain; and, on the other hand, there are the usual cases in old persons, in whom the pain continues during and long after the eruption, but neither hinders the healing nor is asso-

ciated with considerable wasting. Rarely, also, one meets with cases of long-abiding and intense pain in one of the ordinary seats of herpes zona, but without either eruption or any other apparent structural change.

Among the cases of inflammation due to nerve-disturbance, I find one in which parotitis was consequent on the sight of acid food. A gentleman, sixty-nine years old, thin, feeble and gouty, had become unusually weak through over-work. Eight days before I saw him he was just going to eat some acid fruit, when he felt, as he had often felt at the sight of acids, a painful tightness or soreness behind his lower jaw.[1] It was as severe as any of the kind that he had ever felt, and he could not take the fruit. Soon after, one of his parotid glands began to swell; and from that time it had been swollen, hard, tender to the touch, and, at times, intensely painful, and the skin over it was ruddy. His pulse was quickened and full; he had little appetite and felt 'ill all over,' but he slowly recovered, and no permanent harm was done.

Somewhat similar to this, but much more frequent, are the inflammation of the prepuce and glans

[1] He could remember being, in his boyhood, sometimes obliged to leave a room at the sight of some drops of vinegar.

consequent on sexual excitement. The inflammation, which is often like a preputial herpes, commonly appears a few hours after copulation; and I have seen one who, abstaining from sexual intercourse because of this consequent annoyance, had similar inflammation after an involuntary seminal emission. I think that cases of this kind are most apt to occur in men with too acid urine; but the inflammation is never harmful, never more than troublesome, and washing and correction of the urine will cure it.

I may refer to one more case of transient inflammation consequent on nerve-disturbance. A lady had some congestion and toughening of part of her left mammary gland, and with this a fear of cancer and intense neuralgia in the breast and along the branches of the brachial plexus in the upper arm. Within the range of the neuralgia were many patches of erythema.

Cases of 'glossy fingers' after injury of nerves have been so often recorded since I ventured to suggest the name for them, that I can add nothing useful on them. Neither can I concerning the gangrene of fingers following intense neuralgia in 'Raynaud's disease,' unless it be that in one case, in a lady, about thirty-five, together with the 'deadness,' coldness, and excessive pain in the fingers which pre-

ceded their partial patchy gangrene, there was unnatural heat of the scalp, and with this a profuse growth of strong black hair, and free perspiration, while from other parts she perspired little. The growth of hair might be compared with that which one sees on limbs with disease of a joint or other structure associated with abnormal afflux of blood and high temperature.

In the following case of local death associated with intense pain one may believe that there was some affinity with Raynaud's disease.

A healthy-looking young man of nineteen was in St. Bartholomew's with extreme pain in the forefinger of his left hand—pain so severe that it often kept him awake all night and made him beg that his finger might be amputated. Its chief seat was at the joint between the first and second phalanges, and at this part there was slight enlargement with thickening and induration of the tissues; but there neither was nor ever had been any open suppuration. The pain had existed three years with scarcely any intermission; he could not assign any cause for it, and of many treatments none had alleviated it.

I amputated the finger and found that all the visible disease was in an ulceration, which had formed a cavity, about one-sixth of an inch in diameter, on the palmar surface of the first phalanx close to its

distal articulation, but not involving or affecting the joint. This cavity was filled with a firm substance, like firm granulation tissue, projecting a little beyond the level of the surrounding bone, but without any appearance of abscess formation. All the adjacent parts looked quite healthy.

The case went on well after the operation, but the subjective sensations, as if there were still a very painful finger, remained long after, and seemed to indicate, as did the previous pain, that the origin of the disease was in some nerve-disturbance.

The indications that the wasting and other degenerations, including those of acute inflammations, are associated with neuritis, not with mere neuralgia, are confirmed by the frequent cases of rapid and wide-spreading bed-sores and other sloughings in some cases of acute myelitis, especially in those which follow injury of the spine. But I think that the most remarkable facts illustrated in these cases are those which show that structures which, having their nerve-supply cut-off or hindered, are unable to maintain themselves in size and texture, or to endure unusual pressure or any other continued hindrance of nutrition, are yet able to repair the injuries which may happen by accident, or may be caused by sloughing or ulceration. In other words they can,

in a measure, repair the losses of some of the structures which they could not maintain.

Of many cases one may serve for evidence of this :—

A man, about thirty-eight years old, was in St. Bartholomew's with paraplegia, the consequence of injury of his spine about two years previously. He was very slowly regaining some power in his lower limbs, and in the course of a year's treatment had acquired slight sensation in his feet and more in his legs and thighs, and some power of movement sufficient for crawling about the ward. But his feet and toes were so shrivelled and incurved that they prevented all attempts at walking. To remedy this his surgeon divided his Achilles' tendons and the tendons of his toes. No immediate harm ensued; but, three or four days afterwards, his limbs were put on splints and bandaged to them, and then, though the bandages were not very tight, sloughing quickly ensued on and around both the insteps. The sloughs at first included a large portion of the integuments of these parts and, for a time, they seemed separating in an ordinary and healthy manner; but when the dead skin was separated, the sloughing again extended, and it laid open the dorsal arteries of both feet, permitting severe hemorrhages. Then, again, it extended, and both ankle-joints were laid open; and

yet, with all this, the process of granulation on adjacent parts seemed to go on healthily, and the patient's general condition was good, except in so far as he was weakened by the loss of blood.

For some time, however, it seemed as if the repair would not go beyond the granulation-process; the granulations were well formed, florid and firm, but they did not appear to develope epidermis or, perhaps, connective tissue. Production was active; complete repair was delayed. It was only after a long time that the granulations began to be covered with epidermis extending over them, as usual, from the circumference, but from this time the healing went on steadily, and in three months from the beginning of the sloughing the scar was complete, even the opened ankle-joints being completely covered-in by it. During the healing the feet became rather more sensitive, and at last he could just feel when touched as low down as the ankles.

No case could better show that parts incapable of maintaining themselves during even slight disturbances of their ordinary conditions may yet repair themselves after severe injury. It is as if we might say that repair costs less than common maintenance, and indeed many other facts show that such an expression might be justly used; for, not rarely, the repair of an injured part will go on while

the rest of the body is dying, whether of old age or of premature decay or of some general disease. The explanation may be that the substance by which the injury is repaired is a less complex or less developed structure than that which was injured or removed, and that much less power is needed for the production than for the higher development of organic structures.

CHAPTER XI

DIABETIC GANGRENE [1]

In spite of all that M. Marchal (de Calvi)[2] and others have written on diabetic gangrene, I feel sure that the liability of diabetic old people to gangrene is not sufficiently estimated. I have seen so many instances proving this liability that I am disposed to think that diabetes has a share in fully half the cases of senile gangrene that occur in the well-to-do classes of English people. It may be the same among the poor; but I have not been able to study in workhouses where the majority of the cases would be found.

I hoped that in looking through my cases, briefly

[1] This paper was written before I received one on the same subject by Dr. William Hunt, published in the *Transactions of the Philadelphia County Medical Society*, vol. ii. 1888. If he had published it in a book likely to be found in any but our largest libraries, I should not have printed this, for his study of the subject is complete, and its results are admirably told. I can only hope that my paper may be auxiliary to his.

[2] *Sur les Accidents diabétiques*, 8vo. Paris, 1864.

as they are recorded, I might have found facts enough to show how the diabetic might, by its own characters, be distinguished from other forms of gangrene. But I have failed, chiefly, I think, because so few people who are diabetic after middle age are in all other respects sound, and the various unsoundnesses variously affect the characters of the gangrene in each of those in whom it occurs. Still it may be useful to state some of the facts that I have observed.

I have only once seen a case in a person under fifty; but though he was less than fifty years old by the register, he was much more by the tests of health. The cases in men are far more numerous than those in women; but probably in not larger proportion than diabetes itself is.

The diabetes had been in some cases observed long before the gangrene began; in one instance as much as fifteen years. In others it was unsuspected, though its existence was made probable by failing health, thinning, and other signs remembered when asked for. In some it had been intermittent, and in one there was reason enough to believe that the gangrene began during an intermission. The quantity of sugar found in the urine in different cases was, I think, various; the quantity of urine was rarely very large; in a few cases it was albu-

minous as well as saccharine; in some overcharged with uric acid.

I have not seen a case of gangrene during a 'diabetes insipidus,' and only one in a very corpulent person.

The gangrene has not in any case of which I have a record begun suddenly, as it usually does in cases of embolism or rapid obstruction of main arteries. Neither has it been so often threatened and not come to pass as one observes in the cases in which it follows the repeated local chills and flushings, the signs of local syncope or of local asphyxia, which seem chiefly due to nerve-disturbance. Its most frequent preceding signs are swelling, duskiness, œdema, and over-heating, of one or both feet; with pain—the pain of 'local dying,' which is often severe, but not, I think, accompanied by fever.

It is common for the diabetic gangrene to begin after injury, often very slight injury, such as the cutting of a corn, or anything that produces inflammation of a toe or other part of a foot. It is rarely dry or shrivelling as the typical *gangrena sicca* of old age or of Raynaud's disease is. Usually it sets in with increasing heat and œdematous swelling and flushing, and the dead parts remain warm longer, I think, than in other forms of senile gangrene, and even long after they have become deeply discoloured.

The extent of the gangrene at its beginning is very various. It may be one toe, or even a small portion of the skin of one, and here it may end, and healing may follow. But more often it extends and invades other toes, and they die in their whole thickness, and portions of the foot or leg perish; all after the same manner, with pain and heat and 'moist sloughing.'

Two things are, I think, more frequent in the diabetic than in any other form of senile gangrene: namely, a tendency to occur in places at some distance from its first seat, and a frequent extension along subcutaneous tissue, leaving the skin unaffected. Thus, soon after it has begun at one or more toes, we may find separate patches of skin discoloured, and quickly dying on the foot or even high on the leg. And often, when it seems limited to the toes, one finds suppuration extending along the sole of the foot, with sloughing of the connective tissue, or even of the plantar fascia and parts of the flexor tendons.

The speed of progress and the termination of the cases I have seen have been widely various. Most of them have ended fatally; some rapidly, with coma or exhaustion, or, I suppose, blood-poisoning. But the rate and manner of dying have depended much less on the gangrene than on the general conditions of disease to which itself was chiefly due.

On the other hand, recovery has not been rare. The dead parts have been separated, and rapid healing has ensued, following step by step the process of separation and forming good sound scars. Healing may thus go-on in one part while gangrene is extending in another.

What may ensue after healing is uncertain, but depends, I suppose, on the degree in which the diabetes and other morbid conditions are maintained. I have known survivals of three years, five years, and, after a diabetic necrosis of the jaw, of at least ten years; but I do not know how those patients died at last. In other cases the healing has been partial or of short duration, and gangrene has soon recurred.

Respecting treatment, it must be so varied according to the conditions with which the gangrene and the diabetes are complicated that it would be unreasonable to think of many simple rules. But there are two which may generally be observed: first, that the diet must be much more various and less exclusive than it should be in the usual diabetic state; and that opium should be given in frequent doses and in larger quantity than may be necessary for the mere alleviation of pain. Albumen in the urine may forbid or much limit the use of opium, but if this be not necessary it should be given freely in

any form in which it can best be tolerated; and it is a good rule to give with it, occasionally, a small dose of calomel, or other preparation of mercury.

For local treatment, the chief good things are warm, soft, and dry coverings, such as thick wrappings of cotton-wool around the whole limb, and deodorant stimulant ointments. The less of local interference, in the way of picking off bits of slough and the like, the better; but of the larger proceeding by amputation far above the gangrene I have seen too little to write with any confidence. Mr. Hutchinson[1] has published a very remarkable case of success; and one of my patients, sixty-three years old, who died quickly with diabetic gangrene of a foot, had undergone amputation of the other foot for similar gangrene three years previously, and had recovered well with a good stump.

The cases thus far referred to have been so closely in accordance with the general descriptions of senile gangrene that they, and others like them, may justify the practical rule of always thinking that an elderly person with gangrene of any part of an extremity may be diabetic. But the rule had better be extended far beyond this, even to all cases of local death not due to adequate local injury. The frequent association of boils and carbuncles with diabetes is

[1] *Medico-Chirurgical Transactions*, vol. lxv. p. 97.

well known; and the formation of vesicles and blisters in some of the eruptions that are common in the diabetic may justly be regarded as due to the death, and consequent separation, of small portions of epidermis. They are like the blistering due to burns and scalds which, in one degree of severity, kill only epidermis; in other and greater severities, kill skin and yet deeper structures. I saw a good illustration of such apparently insignificant local dying in an elderly lady from whom the nails of both little fingers came off quietly, without pain or inflammation. She had long been diabetic. The nails were replaced by healthy ones; but a few years later, remaining still diabetic, she had small sloughing sores on one heel. These also healed, but within a year afterwards she died.

It may be well to mention a form of diabetic necrosis of which I have seen three examples, two in the upper and one in the lower jaw.[1] They were all in elderly men, in whom, after tedious ill-smelling suppuration under the gums, with decay or falling of teeth, portions of decayed and dead bone separated and were removed. One of them died before the diseased part healed—died as if finally exhausted by

[1] M. Magitot, in the *Bulletin de l'Académie de Médecine de Paris*, 1881, mentions as signs of the beginning and progress of diabetes an inflammatory condition of the gums indicating an alveolar periostitis which tends to loosening and loss of teeth.

the diabetes; in the others the parts healed soundly, and one of them, as I have already said, lived for at least ten years.

And there is a remarkable form of diabetic disease of the scalp in which portions of the subcutaneous tissue slough, and are discharged or removed through large sloughs or ulcers in the skin, which may then heal with round or irregular deep tough scars. They are not like carbuncles; they are very slow in progress, not attended with much pain or, I think, with any acute illness. When the sloughs are separated the ulcers remaining are very like those of some cases of tertiary syphilis. They may heal and be long survived, and the scars remaining are very characteristic. Nearly similar shapes of ulcers and of scars may be seen in and after some kinds of Indian ulcers. And I think that this likeness between the diabetic and the syphilitic ulcers and scars—especially in their crescentic, horse-shoe, or nearly annular shapes and well-defined borders—may be very much worth studying. Differences of plainly visible shape are commonly significant and characteristic of differences in the most intimate composition of organic as well as of inorganic bodies.

Dr. Hunt, in the paper already referred to, gives

references to all the cases of diabetic gangrene recorded previously to its publication ; and they include examples of gangrene in lungs, pleura, and some other parts. The rule of suspecting diabetes in cases of local death may therefore be a very general one. The suspicion may be much greater in the cases of the old than in those of the young, if the estimate of age be made by the personal characteristics, not by the birth-register. I should, indeed, have given the title of Diabetic Senile Gangrene to this chapter if Dr. Hunt had not cited two cases occurring in young persons. I have not seen a case in anyone whom I could not regard as 'old,' and I have always counted this fact among many that may make it probable that the diabetes of the old and that of the young are widely different diseases, though they are alike in what seems, at present, their most characteristic symptom.

CHAPTER XII

SUBCUTANEOUS ULCERATION

Mr. Teale[1] has given this very appropriate name to cases very similar to those on which I had written the following paper. They are not rare, but they are, I believe, too often overlooked because they are not described in the surgical works most often referred to. Probably, now that they can have a distinctive name, even though it be a plain one, they will be more generally described and studied.

I will not report the cases I have seen, but will give a general account of the disease as observed in them, and will illustrate its likeness to others to which it appears nearly related.

Among the frequent effects of inflammation are separations of adjacent layers of dissimilar tissues. Some of the simplest examples of this dissevering

[1] *Liverpool Medical and Surgical Journal*, vol. vii. p. 37, 1887. The name had occurred to myself as a fitting one, and is certainly much better than 'necrosis of fascia.'

process are those in which one finds the capsule of the kidney more than usually separable, or the periosteum separated or too easily separable from a bone, even though there be no evident effusion between them. In these cases there may be no more morbid change than that of softening of the walls of the vessels and of the small quantity of connective tissue which naturally hold together the two parts. A greater change is effected when articular cartilage is separated or can be stripped from bone; for here the separation is not possible till after ulceration or extreme softening of one or both of the adjacent layers. In some of these cases it is observable that the disseverance of the bone and cartilage is without apparent formation of pus or other morbid fluid. The cartilage, usually ulcerated on its under surface, can be raised from contact with the bone, and the bone either appears roughened as by ulceration or is covered with a thin layer of granulations; but between the two there may be, at least to the naked eye, no appearance of pus, even though there be pus in the cavity of the joint.

This method of separation by ulceration of bone and cartilage is a common and well-known result of acute inflammation in joints; its effects are shown in all good pathological museums, and it may help to the understanding of the similar subcutaneous ulcera-

tion. In this the subcutaneous fat is separated from the subjacent fascia, and when, after incision, the skin and fat are lifted up and everted, so as to expose the space beneath them, they are usually found covered with rather dusky granulations like those which may be found on the surface of a wound not prone to heal. The change may seem just like the more frequent change in the diffuse inflammation of phlegmonous erysipelas (so-called); but there is this among several differences, that in the one the ulceration, in the other the suppuration, greatly predominates: in the one there may be widespread disseverance of the layers of tissue without much, if any, pus between them; in the other there is abundant pus diffused between the layers and in at least one of them. Besides, in the one there is only severance by ulceration, in the other there may be sloughing.

I believe that subcutaneous ulceration is most frequent in the thigh or leg, especially in the parts near to the knee. It is commonly indicated, at first, by an ill-defined patch of mottled dusky redness of the skin, which feels warm, firm and brawny, but is scarcely raised above the level of the surrounding healthy skin. The brawny, firm feeling of the skin usually precedes and extends far beyond the redness, but has no marked boundary and is not very painful, if at all so. After a time some of it usually feels

tender and more yielding to pressure, as if it were softening, and, sometimes, at these soft places it opens by ulceration, and this ulceration may extend rather widely. There is seldom any fever or other acute general symptom, and I have never known this disease associated with rigors or hectic.

The most frequent subjects of the disease are young persons of pallid complexion, with feeble general health, thin, and with very little muscular power. They might be called scrofulous; but I have not observed in them any special enlargement of the lymph-glands or other of the more distinctive signs of that condition. Neither have I noted any suggestion of syphilis, either acquired or inherited. I think the disease is most common among the poor and ill-fed; but I have seen it among those living in all comfort, and in these it had just the same characters as in the hospital-patients.

I have never seen a case of this disease cured by any medicinal treatment, whether general or local. The only useful method has been the puncture at one or more of the softened portions of the skin, and then, from this opening, or from any ulcerated openings already formed, the free laying open of all the space in which the skin and the subjacent tissues have been dissevered. And this space has generally been much wider than the outer appearance of the part led one to

believe, extending to parts over which the skin seemed healthy, neither ruddy, nor tough nor softened, and, indeed, only just separated from the layer beneath it, separated by an ulceration with scarcely any trace of pus visible to the naked eye.

After this free laying open, and with cleanly dressing, healing has been slowly completed in all the cases that I have seen. And the healing has been with ordinary production of pus, without any sloughing or ulceration of the skin, and with no other defect than that of large thin scars, apt, for some short time after their formation, to 'break-down' and to need rest and soft coverings to heal them again. The patient's general health, too, needs repair and strengthening with tonics, good food, good air, and light. I have never seen the disease in one who could be deemed of sound constitution.

Mr. Teale recommends the thorough scraping-away of the granulations exposed by the laying open of the cavities, and I do not doubt that the healing may thus be hastened. He gives, also, good reasons for regarding these cases as really scrofulous.

CHAPTER XIII

UNUNITED FRACTURES IN CHILDREN

I HAVE seen only three cases of ununited fractures in young children, and the measures which are usually sufficient for the cure of this defect in adults were in all these cases completely useless. Similar cases have occurred to others; and, so far as I know, they have not been explained. I can only guess at a possible explanation, but it may help others to do more than guess if I tell at least one of my cases.

A little girl, three and a half years old, was brought from Australia, and I saw her with Sir William Fergusson and Dr. Protheroe Smith. She was fair, light-haired, healthy-looking, well-formed, and full-sized. When she was five months old her left tibia and fibula were broken at the junction of the middle and lower thirds. She was in her mother's arms at the time, and the force that broke them was very slight. Probably there was little, if

any, displacement of the fragments, for the fracture was not detected and was not carefully treated for nine weeks. Then, the fracture having become evident, the limb was put-up in gum and chalk-splints and was thus kept long in good position; but no union took place. In the course of the next year a seton was put between the ends of the broken bones, but it did no good. After this, when the child was two years old, the ends of the bones were exposed and ivory-pegs were put in them. The progress of the case after this seemed good; but after eight weeks erysipelas attacked the limb and no union took place. Since this failure the child had learned to walk and run, and did so actively, with a strapped boot that reached high up the leg and kept the fragments well together.

When I first saw this child, at three and a half years old, the ends of the bones overlapped between half and three-quarters of an inch, and there seemed no kind of union. Their ends were about a quarter of an inch apart and moved freely upon one another; they felt smoothly rounded and tapering, and the upper were in front and to the inner side of the lower. The leg was rather more than an inch shorter than the other, and its muscles were small and soft. The shortening was due partly to the overlapping of the bones and partly to defective

growth. The foot was large and heavy as if with residues of œdema.

None of us had known of any good ensuing from operations in such cases, and we recommended only an improved support for the limb. With this the child could run and walk actively, and in six months the leg grew seven-eighths of an inch and she returned to Australia.

I did not see her till thirty years afterwards, and then she told me that the limb had become every year more troublesome and, when she was fifteen, was so intolerable that it was amputated; and she had been in comparative comfort and completely good health ever since.

I believe that this case may be regarded as a good example of the group which it illustrates, and that the general course of events begins with a fracture produced by what may seem an inadequate cause, proceeds through a series of vain attempts to obtain reunion, and ends with amputation of the limb. Thus it was in another case which I often saw, and in which I assisted Sir Prescott Hewett at some of the failures and at the final remedy.

A baby, the child of rich parents and apparently healthy, beginning to run about, fell and broke his tibia and fibula just below the middle of the leg. The fracture was at once well set, and every care was

taken of it in respect of surgery, food and nursing. Good union seemed complete; but some weeks afterwards, without any force applied, the union gave way, and the fragments moved freely on one another. What may fairly be called 'everything' was done to promote repair: absolute fixity, friction, scraping, excision, wiring, everything; but it was all useless, and when the wish for public school-life came the limb was amputated. The patient is still active and healthy.

It may be only a chance-coincidence that in the three cases that I have seen of fractures in children, which were not repaired in the usual time and manner, the repair appeared to be impossible. But I think that other similar cases may have occurred[1] and that the subject may deserve careful study. At the least the cases are enough to urge that when, in a young child, a fracture is caused by what would generally be regarded as an inadequate force, no pains should be spared to insure, if possible, its direct repair.

So far as I know, nothing has been ascertained as

[1] Among 484 cases ofununited fractures collected by Gurlt, *Handbuch . . . v. d. Knochenbrüchen*, Th. i. 1862, there are seven which occurred in children not more than four years old. In three of the seven union was not obtained by the treatment to which they were submitted; in another it was only reported as 'beginning.' In adults the proportion in which treatment failed was far less.

to the condition of the bones at the time of fracture in any of these cases. When they have been seen in or after operations for inducing repair, they have been so changed by inflammatory and degenerative processes which may all have occurred after the fracture, that it has been impossible to find how, if at all, they were changed before it. They can hardly have resembled the bones in ordinary cases of the so-called 'fragilitas ossium;' for in these cases there are fractures of more than one bone, and union is as sure to happen as in any broken healthy bones. Neither was there in any of them any characteristic appearance of rickets or of syphilis or any other general defect of health.

The only disease to which I can think they have borne near resemblance is that described by Professor Czerny under the name of *Ostitis deformans*.[1] In these a morbid condition, which appears to have been like the ordinary Osteomalacia (Mollities Ossium) which commonly affects many bones, was found in only the tibia, or the tibia and fibula, or, in one case, the femur. In each case the affected bone was bent to an angle in only one part of its shaft; and one may believe that a little less or more of the disease

[1] In the *Wiener medizinische Zeitschrift*, September 27, 1873. I had not seen this paper when I gave the same name to the disease which I described in the *Medico-Chirurgical Transactions*, vol. xlii. 1877. A specimen of Czerny's disease is in the College Museum.

would make this one part either bend or break according to the force applied to it. But I can only guess.

Since that was written the guess has been in some measure justified by a case which I saw with Dr. Scowcroft, of Bolton, and of which he has kindly given me notes.

The patient was a girl, eight years old, apparently quite healthy, as, indeed, she always had appeared. When she was four days old it was observed that her right leg was bent to an obtuse angle just below its middle; it may have been so at or before birth. The bones were entire, but when she was three years old a bone-setter broke them, made the leg straight, and so fixed it and kept it steady for some long time. But the fracture was not repaired; and all the means employed to obtain union completely failed. Among these were long-continued pressure and absolute fixity, resection of the ends of the fragments and accurate wiring; and this was repeated; but nothing did good. The whole limb wasted, and the leg could be bent in every direction. Dr. Scowcroft amputated below the knee, and the child recovered well, and the muscles of the thigh grew quickly. There was no appearance of any process of union at the fracture.

CHAPTER XIV

SWELLINGS ABOVE THE CLAVICLE.

I WISH to draw attention to a kind of swellings above the clavicle, of which I have many short notes, and in which I believe that some good observer may discern facts of pathological as well as of practical importance. Practically, they are of interest as being sometimes regarded as fatty tumours; pathologically, I think they may be considered examples of a localised myxœdema.

They are found in the hollow just above the clavicle; sometimes on both sides and symmetrically, sometimes on only one side, and, I think, more often on the left than on the right. They fill the hollow space and may extend some short way above it on the side of the neck. They are oval, with their longer diameter transverse, lowly convex and usually rather less than an inch in thickness. To the sight they may appear well defined, but to the touch they are not so; their borders appear to be lost in the

adjacent fat or connective tissue. The skin moves freely over them, and they feel as if they could be moved freely on the deeper parts; but their substance is so pliant that this test cannot be relied-on. They may at first feel like soft fatty tumours, or like the softer fatty overgrowths which one finds symmetrically placed at the back of the neck or under the chin. But these swellings above the clavicles are still softer and more pliant, more easily pressed up and folded, than any kind of fat, unless it be that which has wasted and become soft and flabby like that of the pendent part of the nates in one who is much emaciated. They are just like portions of soft myxœdematous tissue, and such I think they would be found if they could be examined; but I have never had an opportunity of examining one, having not yet removed one in the suspicion of its being a fatty or other tumour.

I have seen some ten or twelve cases of this condition, but have not seen one in which the growth increased to such an extent as could be deemed unsightly, or could give any serious trouble other than that of the fear of disease. I think that they have all been in women in adult life, many of whom were such as might be called neurotic and had heavy aching pain in the swellings. In other respects they were healthy, and in some they became less

and so remained; but it was observed in all that the swellings often varied in size, 'puffing up' at times with increase of pain.

I should be ashamed of so incomplete a narrative as this if it had any other purpose than that of helping to diagnosis and of indicating what I believe to be a good subject for study,—localised myxœdema perhaps associated with disturbance of some nervous centre. But, when writing on the diagnosis of swellings above the clavicle, I may as well add that the explanation of some of them is to be found in the existence of cervical ribs. I remember consultations on two such cases, in which the uplifted and flattened subclavian arteries caused serious fears of aneurism; and more in which the rather enlarged free ends of the ribs suggested exostosis. The diagnosis will not be difficult to anyone who will remember that cervical ribs are not very rare.

CHAPTER XV

AN IRREGULAR PULSE

In the early part of July 1886, I chanced to find that my pulse beat irregularly. It may have done so before I observed it, for I was not in the habit of feeling it, and only by chance did so now, while sitting with my hands clasped, so that the beating of the digital arteries could be felt in the mutually compressed fingers. The irregularity was in the frequent missing of one beat. Three or four or more would follow regularly; then, one would be missing; and then, in exactly the due time, the regular beats would again follow. There was no order in the times at which the missing of the beats occurred; the irregularity was quite irregular. Three beats might be regular; then one would be missed; then there might be six regular and a miss; then ten or fourteen or twenty; then, again, four or five and so on. I could neither then nor at any time after find any rule or order in the method of irregularity.

The defect was almost wholly in respect of the time of the beats. At the most I could feel that the beat which followed next after an intermission was a little stronger than the others, as if during the longer rest the ventricle gained rather more power for contraction; but the difference was not very marked. I think, too, that the pulse became, generally, rather slower. For the last two or three years it had been about eighty in the minute; before this time it had generally been from seventy to seventy-five; now again it was commonly, I think, not more than seventy-two, even when one counted the intermissions as if they had been pulse-beats. And I think it had for some time been becoming a little harder, as if with an increase of arterial tension or an increase in the toughness of the arterial walls.

With this irregularity of pulse I was not conscious of any change in my feelings of health. I was rather tired with the year's work, but not more than I usually had been in July; and on the day on which I detected the irregularity I felt very fatigued by unusually hot weather; but neither then nor at any other time could I observe any change whatever in any function except this of the heart, and in this the only change was in its loss of rhythm. I sometimes watched closely; but I could find no change in breathing or digestion, in renal or intes-

tinal action; and Dr. Andrew found nothing wrong in the heart's sounds. In everything I seemed just as usual, and my usual condition was that of quite good health. There was one apparently slight change; and it seemed possible, not more, that the heart's error was associated with this. For about two years I had had on each leg a small patch of eczema, dry and very thinly scaly, and sometimes at night irritable and itching. They were such as I had often had before on the legs or other parts, and I deemed them 'gouty,' and took no measures to get rid of them; I rather preferred to have them as, probably, averting some of those worse issues from the same inherited malady as I had at times suffered with. But a few weeks before I first observed the irregularity of the heart's action these spots had begun to grow paler, and less scaly and less irritable; and about ten days or a fortnight before the heart's error was detected they wholly disappeared, and none formed in any other place.

After the irregularity had been observed for two months, during which I had never felt so many as fifty beats, and seldom as many as fifteen, without an intermission, my holiday-time came, and I went to the Pyrenees, and some of the Provençal towns. I took no special care of myself, but ate and drank the usual foods and wine of each place in the

country, and travelled and walked and amused myself in any way that chanced. I could walk much more and better than I expected; as much as, at least, twelve to fifteen miles, including 2,500 feet of rather steep and very rough ascent and descent. Still, the irregularity of pulse continued, and nothing seemed to change it, except that in long walking uphill, the beats became quicker and fuller, and the intermissions were less frequent. There were sometimes twenty or thirty regular beats, then one was missing, then a succession of from five to ten or fifteen, but never was there complete regularity, or any order in the irregularity.

At the end of five weeks of thorough enjoyment in which I had never once felt ill, or been conscious, except by feeling my pulse, of any change in the action of my heart, I came home quite refreshed. I had never from any holiday felt greater advantages: I could work harder, walk further and faster, and digest and sleep, if possible, better than before I went abroad.

In the first ten days abroad I lost ten pounds in weight; chiefly, I think, through much more than usual sweating; for there were two intensely hot days in Paris; and then followed active exercise in bright clear air. In the five weeks I lost twelve pounds; but soon began to regain them in the conditions of

home-life, when I had returned to the same diet and manner of life as I had when the irregularity of the pulse began,[1] and it still continued exactly as it had been: or, if there were any alteration at all, it was only in the intermissions being rather less frequent. It was not till three weeks after my return home that any change occurred; and then I unexpectedly found my pulse quite regular again, and just such as it had been three months previously. I do not know whether the change were accomplished suddenly or gradually; it must have been within two days; and the first time I observed it, it was complete.

Now, this irregularity of pulse had continued unchanged in all the variety of home-life, and all the different varieties of holiday-life. I tried in vain to find anything materially affecting it. Heat or coolness; hard work or light; exercise or rest; full meals or spare; near sleeping or when waking, it was always alike, unless in being made rather less irregular, and more frequent and forcible during very active exercise, or sometimes after a full dinner with wine. Only one change could I observe about the time of the pulse becoming regular again; namely, that, in the fortnight previously, the eczema on the legs,

[1] For many years and, perhaps, for many more than those in which I have observed it, I have always thus lost weight in holidays abroad, always coming down from near 11 stone to scarcely more than 10 stone. I suspect that many others do the same.

which had disappeared just before the irregularity began, now reappeared. At least, there were small scattered papulæ in and near the seats of the former eczema, and they itched as that did, especially at the change of temperature in undressing in a cool room.

I will not profess more than a belief that there may be an intimate relation, in some cases, between an eczema and a regular pulse; and that such a relation existed in myself. I will not be so credulous as to think I can explain it, or can conceive what change from the ordinary condition of blood or nerve-force it can be which, without any other apparent alteration in any function in the body, can produce and maintain in combination a patch of eczema and a disturbance of the time-rate of the discharges of force in the muscular fibres of the heart. I am content to think of it as one of the facts which justify the holding that few things are more inconceivable than are many things which are certainly true.

Sir Dyce Duckworth, in his admirable 'Treatise on Gout,' page 319, has related a case very similar to my own.

After 1886, when the foregoing paper was written, my pulse remained regular, and I almost always had

some little patch of eczema for about two years; but the pulse became slower and was usually below sixty. Then it became sometimes slightly irregular, and so it has been at times ever since. Sometimes I have had a trivial eczema; sometimes muscular aching or cramps; sometimes a kind of flashing neuralgia; but all these and other signs of incomplete gout, such as I have had for many years past, have been of too short duration for me to find any constant relation between them and the pulse. Only I think I can be nearly sure that my pulse has generally been regular at and near the times in which I have had one or other of these signs of my inheritance.

CHAPTER XVI

SINGLE RARE CASES

ABSCESS IN THE PATELLA

In June 1860 I was consulted by a lady, forty years old, who looked healthy, though, she said, she had never been very strong and had, habitually, cold feet. Near the end of October 1859 she began, without evident cause, to have pains in the front of her left knee. It was ascribed to rheumatism and so treated; but it increased and, after a very short time, though she was free from pain during the day, she suffered what she described as 'agonising' and 'excruciating' pain every night. It began half an hour or more after she went to bed, continued till she fell asleep, and was attended with extreme sensibility to the touch. There was, at that time, little if any swelling at the knee; the pain was at and near the patella. In the second week of January there ensued 'pain, swelling, and inconvenience' in and about the knee-joint, and a blister was applied, and after this she never had the same nocturnal pain as before, but the

swelling continued. In April, an additional swelling appeared over the front of the middle of the patella; and here suppuration took place, as if with inflammation of the patellar bursa, and pus was spontaneously discharged through an opening which remained in June when first I saw the case.

There was now no appearance of general illness. The whole knee-joint was slightly enlarged, rounded, puffy, elastic as if with some increase of synovial fluid, but, chiefly, with swelling of the tissues. But the joint was not painful either in movement or on pressure; it could be moved quickly and there was only slight lameness. Over the middle of the lower part of the patella there was a small ulcerated opening, like that of an abscess, through the thick tough skin. It led to a subcutaneous cavity about half an inch in diameter, the wall of which felt firm and insensible; but beyond this a probe could be passed to a bare rough spot on the front of the patella near its lower border; near this spot was a very sensitive one, but the touching of the bone was painless. All that could thus be found implied that the case was one of necrosis of a piece of the patella such as might have been produced by hard pulling of the periosteum; but neither this nor any other cause could be assigned.

I cut right over the diseased part of the patella

and found an opening of about one-sixth of an inch in diameter, leading through the front wall of the bone into a cavity of scarcely larger diameter extending right through its substance. The opening and the walls of the cavity felt as if formed of sound bone, not dead or very soft, and at its base the probe felt only some soft structure; as if the cavity, extending through the lowest part of the patella, reached the fibrous and fatty tissues behind it, but missed the articular cartilage and did not open into the joint. I widened the external opening in the bone, filled the cavity with scraped lint, covered it with water-dressing and kept the limb completely at rest. No trouble followed; the wound and the abscess slowly healed, [of course in more recent times the healing would have been much more speedy]; and the recovery was complete. The patient could walk as much as she wished, and, if she did not walk fast, did not appear lame; only the knee remained slightly enlarged and the tibia was a very little displaced backwards. She lived without discomfort at the knee and had good general health for more than twenty years after the operation.

DEFECT OF ONE HALF OF THE DIAPHRAGM

In 1851, a man was admitted by my house-surgeon, Mr. Archer, into St. Bartholomew's, and he said that, just before he came, his master was going to strike him and, in his fright, he jumped back and 'felt something give way' in his chest. He was faint and depressed and complained of some pain in his left side; but there was nothing indicating the need of active treatment and he was left at rest in bed. In the evening, a few hours after his admission, he had cough and dyspnœa, or, rather, a cough which he had had for two weeks became worse, and he was now found to have double pneumonia. With this I found him next day and with this in two days he died. [A more exact record of his case would have been kept if there had been any suspicion of what would be found after death.]

In the examination we found the greater part of the lower lobe of the right lung and the lower half of the upper lobe of the left lung completely solid, in well-marked 'red hepatisation,' soft, brittle, with thick turbid livid fluid. There were obsolete tubercles in the upper part of the right lung; but with these exceptions the organs of the chest and abdomen appeared healthy. What was most remarkable

was that the left half of the diaphragm arched up to the space between the third and fourth ribs, and the stomach, which was very large, was pushed up so high as to be nearly concealed by the left ribs, the liver lying below and in front of it. The right half of the diaphragm appeared normal. The reason of this malposition appeared to be in the condition of the left half, which was almost wholly devoid of muscular fibres. In the left crus, which was altogether about half as large as natural, there were strips of pale muscular tissue; but in the left half of the arch there were only just so many fibres that, on holding the diaphragm to the light, one could see a few slender pale pinkish lines radiating from its central tendon to its outer border. They were just visible; just enough for saying that muscular fibres were not wholly wanting. No more than these existed either by the central tendon or near the ribs. On the right side all appeared natural. No defect of symmetry was found either among the intercostal muscles or in any other part; but the phrenic nerves and arteries were not examined.

[I venture to add the comment on the case written at the time.]

Many things here deserve notice:

1. A very rare condition; briefly, an almost complete defect of the proper muscular substance of a

diaphragm in its left half: the right half being healthy.

2. Probably, this was a congenital defect; for there was no apparent change of structure; the pleura and peritoneum were in contact, both healthy in their structure and with no fat or other degenerate tissue between them.

3. There appeared, notwithstanding this defect, to be sufficient respiratory power. The patient breathed very forcibly in his dyspnœa and, in auscultating him, the sounds and movements of the chest were just as in an ordinary double pneumonia. The stomach was found to be very inflated and high-up; but there was nothing suggesting a suspicion of the defect of the diaphragm, and I am quite sure that the left side of the chest moved freely and that the patient, in his dyspnœa, often lay on his right side.

4. Were then the intercostal muscles sufficient for free respiration? If they were, the case may be adduced in evidence of their great inspiratory power.

5. The history of the recent illness was too obscure to make one think more than that the 'give-way' which the man felt and some of the subsequent pain were due to the unequal 'tug' of the diaphragm when, in his fright, he may have made a sudden deep inspiration.

LARGE RANULA

April 1854.—G. R., thirty-four years old, a bookbinder, was a healthy-looking man, but had a large swelling on the right side of his face and neck, which felt like a cyst, flaccid and as if half-filled with fluid. It was irregular, lobed, appeared subcutaneous and extended downwards to the cricoid cartilage, upwards to the zygoma and malar bone, backwards to the anterior border of the masseter and the posterior border of the lower jaw, forwards to near the middle line below the jaw and to near the angle of the mouth above it. In all this extent the swelling felt alike soft, flaccid, fluctuating, flapping. All the skin over it was healthy: so was the mucous membrane of the cheek which the swelling pushed slightly inwards. Sometimes, when pressing the swelling a little glairy fluid oozed through a small aperture in the middle line in front of the frænum linguæ; but this did not always happen, and no continuation of the swelling could be felt under the tongue; there was here only a general rising of the mucous membrane of the mouth, with some increased firmness as if from former hardening of the part. The swelling was not transparent. All other parts appeared healthy.

The patient said that this disease had existed four years, and that it began as a swelling under his tongue, which after about a year burst, discharged a glairy fluid into his mouth and then disappeared. He had never since had a swelling under his tongue; and the present swelling appeared soon after the discharge of the former one, but only under the jaw and not reaching to the cheek. About April 1852, this second swelling emptied itself into the mouth through an opening under the tongue, and the parts collapsed and regained their healthy aspect. A third time, however, the swelling formed and again, about April 1853, similarly discharged itself. Then the present swelling began to form: it steadily increased, without pain, and now first extended over the jaw and up the cheek. No treatment had been employed.

I made a puncture about half an inch long in the lower part of the swelling and let-out nearly twelve ounces of a thick glairy fluid, tinged pink as if with colouring matter of blood. The cyst, so far as it could be seen, had walls from $\frac{1}{4}$ to $\frac{1}{8}$ of a line in thickness with a pure-white polished internal surface.

In a week the swelling became as large as before. It was then punctured with a trocar and cannula; then it inflamed and suppurated and was more freely

opened, and then it slowly contracted with thickening and hardening of all the structures round it and with suppuration at different parts of its walls. It appeared cured at the end of two months and I believe no further trouble occurred.

CHAPTER XVII

THE USE OF THE WILL FOR HEALTH.

It may often be observed that not only the signs of some diseases but their progress and issue may, in some measure, be determined by the patient's will ; I mean not only by the will to live prudently or unwisely, but by the direct influence of the will on sensation and motion.

The subject may be studied in, at least, three sets of cases ; some show how the will, by acts of attention, can affect the clearness and intensity of pain and other morbid sensations ; others how it can control the movements of muscles generally involuntary ; others how it can, at least in some degree, determine the methods of some of the processes of organic life. And in every set of cases illustrations may be found of the power of the purposely-educated will to prevent or remedy the defects due to its natural or permitted weakness.

INFLUENCE OF THE WILL IN PAIN AND OTHER SENSATIONS OF DISEASES.

We have no means of estimating the degrees of pain from similar sources in different persons, or from different sources in the same person. But we may fairly speak of different diseases as more or less painful, and of different persons as feeling some less and some more acutely the pain of this or that disease. On the whole, too, we may be sure that the more cultivated races are far more sensitive to pain than are the less cultivated ; and that, among ourselves, a similar rule holds ; that mental cultivation increases the sensibility to pain as well as to pleasures ; and that it does this, in great part, by increasing the force and facility with which the will, though it may be almost unconsciously, can direct attention to external things. Moreover, what is, in this respect, true for pain is true for other morbid sensations, itching, burning, tingling, and the like ; but pain, as generally understood, will give the best illustrations of my subject.

The influence of the attention, that is of the will directed to sensations, is illustrated by facts at opposite extremes ; by those which, at one extreme, show that pain is not felt when the attention is completely distracted, and, at the other, that pain becomes more keen and more constant when the

attention is constantly, though it may be almost unconsciously, directed to it. Among the former are the numerous instances in which soldiers engaged in battle have been for a time unconscious of having received severe wounds. The latter are shown in cases, to which my notes often refer, of persons who have unwittingly cultivated a natural sensibility to pain. These show that it is with pain as it is with sight or touch or the muscular sense, or, for example, with hearing. As some persons have, naturally, an 'ear for music,' so have some, and often the same persons, a very fine sensibility to pain ; and, as one who has habitually and very earnestly directed his ear, *i.e.* his auditory nerve-centre, to the discernment of sounds becomes, in time, keenly, and without conscious effort, sensitive to even the least sound or the least variation of a tone, so is it with some in regard to pain. With almost constant direction of the mind they increase every pain, and even find or insert pain in places and conditions in which one less exercised would not feel any. And this goes on till they become able, without conscious effort, to observe the least deviations from natural sensation and almost wholly unable to distract the mind from them.

Hence it comes that, in a given kind and amount of injury or disease, that which one person hardly observes or regards as a mere discomfort, is to

another an 'agony'; and this, it may be, not in imagination, not in invention, but as really felt as are those refined sensations of the artist, the musician, or the gourmet, to which common people cannot attain. I think that nearly every one in practice must have seen cases illustrating these statements: but I may tell of some for examples.

Thus, as showing insensibility when pain was not expected or attended to: A boy from whom a part of a finger was to be amputated refused to let it be done without chloroform; but, as it was not convenient to give this, the surgeon signalled to a dresser to pretend to give it with a wet sponge. The boy smelt the sponge till he believed himself insensible, and the operation swiftly done was not felt.

And, for the indifference to pain of the uncultivated mind: A lady in New Zealand gave a pair of leather boots to a naked-footed native boy. They were too narrow for his toes, and he at once, with a tomahawk, chopped a piece off the inner border of the end of each of his great toes, covered the wounded parts with some dry stuff that lay on the ground, put his feet back into the boots and wore them till the wounds were healed.[1]

[1] It is often said that 'savages' have exceedingly acute senses because they hear or see some things which others cannot. But this acuteness is only in relation to one or a few things; just as dogs have an exceedingly acute sense of smell for game or blood or some such

And for an instance of the inducing of pain by attention. A lady showed me a cancer of the breast which I could be sure had existed for several months, but which she had not been aware of till, some days before she consulted me, she saw it in her looking-glass. I asked if it had been painful, and she answered, 'Of course it has been painful ever since I saw it.' It had not been so till her attention was directed to it.

From facts such as these, numerous as they are, we may deduce some rules to be observed in practice:—

(1) It is neither wise nor just to say that all these 'painful' people, as they may be called, only imagine the pain which they describe. They really feel it all, unless they wilfully tell lies, and they are unable to distinguish the pain which may naturally be due to the injury or disease from the augmentation of it which is due to their too watchful attention.

But (2) in these, and, in various degrees, in many other persons the pain suffered supplies no sure evidence of the kind, quantity, or intensity of a disease. The value of the evidence of pain cannot

thing, but none, so far as we know, for flowers or wines, or the many more which are discerned by cultivated men. In this wide and various range of keen sensibility in all the sense-organs the evolution of our race is shown as evidently as in the range and variety of sentiments and intellectual power. In our estimate of the degrees of sensibility of any sense-organ in ourselves and other animals we may fairly reckon the range and variety of power as well as the intensity.

be estimated without some knowledge of each patient's mental character, and, when he or she is known to be naturally very sensitive or very watchful, it will often be safe to hold that, in obscure cases which have long endured, without any grave injury to the general health or any manifest change of structure or loss of weight, the more the pain the less is the organic disease, if, indeed, there be any at all, at the seat of pain.

(3) On the other hand, they that are careless and not observant of themselves, however keen they may be in their study of external things, may be found with diseases long overlooked or neglected, or only sometimes felt, even though they be diseases commonly very painful. Here, too, the diagnosis must be determined by the surgeon's sensations rather than by the patient's. He may have in his mind, 'It is by what I feel, not by what you feel, that this question is to be settled.'

(4) A lesson for all whose sense is quick for pain is that they should strive for such control of will as to be able to divert the attention, as much and as often as possible, from the watching of pain. For pain expected, watched for, long thought of, or talked of, will come; it will come in or from the nerve-centre and may be as bitter as any from the nerves' ends. Any real pain that is often described

by one who feels it is thereby nurtured, and the power of discerning it is being made stronger; and, conversely, the longer and the more often the attention can be diverted from any pain, the less does the power of discerning that pain become, just as the muscular or any other sense, when out of practice, loses some of its cunning. And patients should not trust to others for this distraction; they should educate their own wills so as to be able to direct their attention to whatever may for the time be best.

INFLUENCE OF THE WILL ON OTHER THAN THE VOLUNTARY MUSCLES

The influence of the will on disorderly or inconvenient muscular actions may best and most usefully be studied in the half-involuntary organs, whose action is usually preceded by distinct sensations and associated with an effort of the will.

The rectum and the bladder are the best of these. Usually, in healthy persons, they have certain habits in their acting; the once a day for the one, the three or four times a day for the other, and these at certain regular periods of the day or night. The habit is generally a good one: but I think it is advisable that men should not in this more than in anything else become the slaves of habit; for if they do, then,

when the habit is perforce disturbed, it may bring distress, and to some persons utter misery and alarm. Cases of retention of urine are only too common in those who, being in the regular habit of passing it every three or four hours, are by some accident obliged to hold it for six or eight. Or, if they escape this trouble once or twice, then they are frightened lest the difficulty should occur again, and they are always watching their bladders, and are on the alert for the sensation of fulness and of the muscular disquietude of the walls ; the sensation which, like all others, will come the quicker and the sharper the more earnestly it is expected.

Healthy people should not allow this. These half-involuntary organs are good servants but very bad masters ; and the more they are indulged the more peremptory do they become. They should be educated to subserviency ; and the earlier in adult life that their education is begun the better it will be. If they are fairly healthy, any one with a resolute will may easily teach them. It is sufficient if the sensation that usually indicates the need of action be sometimes neglected ; if the attention be diverted from it, or permission to act be resolutely refused, or else be promised in half an hour or an hour. It is well, at least for some, if this education be insisted on, at first, only at times and in places in which it is

sure that the promise to permit the action can be fulfilled. A bladder imperfectly educated should not have to claim such a fulfilment in a railway-carriage or a church. But with a little prudence of this kind I believe that any healthy and not too old person may educate his bladder to be quiet for eight or ten hours, and within these limits to act at any time that is most convenient to him. Similarly, any one may teach a healthy rectum, and may thus gain a very desirable liberty for business or for pleasure at the times that are most convenient to himself or others. It involves nothing more than a resolute extension of the usual range of the will.

It is needless to multiply the instances in which one has seen the influence of the will in tendencies to disorderly muscular action. A strong-willed man can often repress the words and movements significant of delirium; or he can conceal such a degree of drunkenness as a weak man would show in every word and movement; and, unless in real disease, he can enjoy a wider range of liberty in respect of food and drink and sleep, of work and of rest, than is possible for one who is timid, self-watchful or irresolute, although, in all that is commonly understood as bodily health, they may be alike.

I feel strongly that this influence of the will upon

the health should be a subject of resolute and careful self-education. Men should resolve that they will not allow every unusual sensation to distract their attention from work or any other important object. If they would steadfastly go-on working in spite of noises in the street or of talking in their rooms, they would more easily be indifferent to sensations suggestive of disease. The opposite of this is too often allowed and even boasted of. It is common to hear healthy people say, and sometimes as if it were praiseworthy, that they cannot sleep on this side or that, or without a pillow or some such help. In some of these there may be just reason for their defect, but in the greater number it is a mere habit grown out of a want of the will to resist some discomfort. If such people would resolutely pass some hours, or a night or two, without sleep, sheer fatigue would insure them sleep in any posture whatever. And others, many of whom are healthy, tell that, unless they have their meals at regular and fixed times, they cannot digest them. There are few of these who may not safely resolve that they will not fix the times, but will breakfast and dine whenever they please or when circumstances make it most convenient. Their digestive organs will submit to their wills, if their wills do not submit to them.

These small imperfections should be, if possible,

amended by the will, because they all restrict that reasonable and useful liberty of life which we may enjoy, and they diminish our power for the work which we ought to do; they are hindrances to both pleasure and duty. Besides, harmless as they may seem in health, they may be serious complications in disease. A man, for instance, who cannot sleep on his right side is at a great disadvantage if he have a pleurisy on the left; he who cannot sleep on his back is doubly distressed by a fractured thigh, till, after some sleepless nights, the necessity of lying on his back enables him to sleep on it as well as he used to do on his side; he who binds himself to certain times for his meals is unfit for the casual and irregular work by which others can prosper.

I may as well say that I am the more sure of these things because I have myself done what I have here recommended, and have thus worked hard for more than fifty years, happily and without harm. And I have learned to believe that many persons, or all who are not definitely unhealthy, may go even beyond these rules. If they will resolve that their stomachs *shall* tolerate this or that food, or shall not have this or that stimulant, whether wine or mustard or any other, their stomachs will, in time, yield. They need not be more resolute than most of those must be who wish to be smokers; these find that,

after a few days' distress, pleasure comes from the very thing that was a cause of misery. They have only to place themselves willingly in difficulties such as others have to endure whether they will or no; as when, for pleasure or for duty, they go to sea or to places where the food seems at first unfit to eat. In time they learn to enjoy it and it serves for active work.

Elasticity and pliancy in all the functions of the body are among the essential characteristics of health, and all should strive to attain them. That is not completely good health which cannot endure any disturbance from the usual habits of life. I wish there were as much ambition for really good health as there is for athletic strength or bravery. There is too much of the very opposite, and one hears people boast that they cannot do this or that, and they write or talk as if all others ought to be like them. It is as if a cripple should insist that others ought to limp as he does.

INDEX

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PRINTED BY
SPOTTISWOODE AND CO., NEW-STREET SQUARE
LONDON

9