Notes on surgery for nurses / by Joseph Bell.

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Notes on Surgery for Nurses.

BY

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CONSULTING SURGEON TO THE ROYAL INFIRMARY, AND SURGEON TO THE ROYAL EDINBURGH HOSPITAL FOR SICK CHILDREN.

Fourth Edition, thoroughly Revised.

WITH AN ADDITIONAL CHAPTER OF GENERAL ADVICE TO NURSES.

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TO

FLORENCE NIGHTINGALE,

Chief of the Nursing Staff.

PREFACE TO FIRST EDITION.

THE following NOTES embrace only the main points of the Lectures which for twelve years I have delivered to the Nursing Staff of the Edinburgh Royal Infirmary. These Lectures were never committed to writing, and varied from year to year in matter and arrangement. They were spoken conversationally, and were illustrated by diagrams, tables, and specimens. Although no attempt is made here to reproduce in detail the instruction then imparted, it is hoped that what is given will sufficiently aid Nurses who take an interest in their duties to understand their cases, and to follow intelligently the clinical work in the wards.

JOSEPH BELL.

EDINBURGH, *July* 1887.

NOTE TO FOURTH EDITION.

THE rapid sale of the previous Editions and their favourable reception have encouraged the Author to publish a Fourth Edition, with revision and corrections, bringing it up to date, and with an additional Chapter of General Advice to Nurses.

Nov. 1895.

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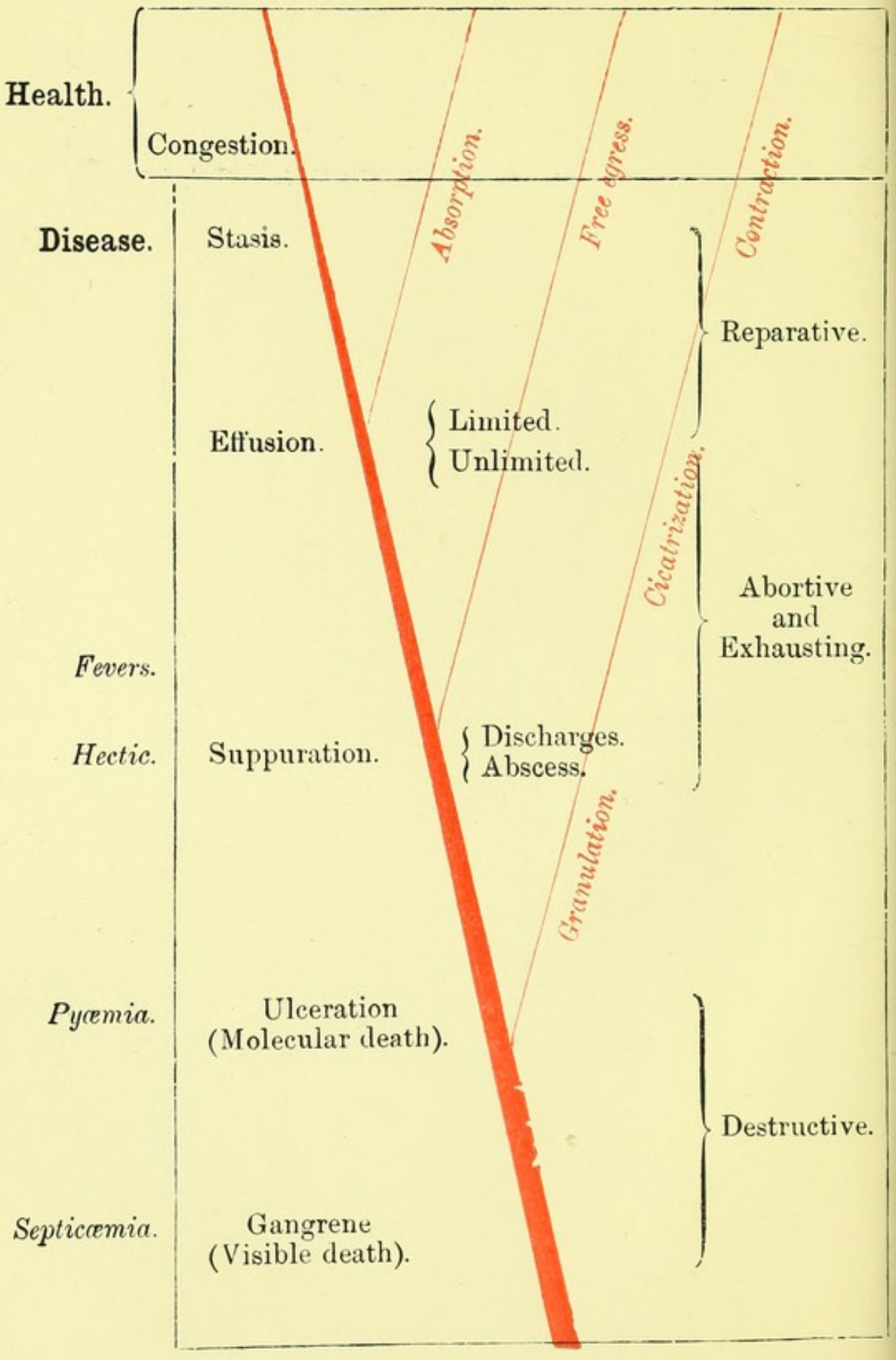
INFLAMMATION.



THIS Diagram may help you to understand the generalization we call the Inflammatory Process. Take the diagonal red line gradually broadening as it goes downwards. Follow it. In its first inch *Congestion* need not necessarily leave the region of health, for no visible or permanent structural change is present.

When we come to the level of *Stasis* it is disease—but may right itself. A little lower down *Effusion* takes place; and from this to get back to Health we need a process, shown in the upward thin line, Absorption. A little further down we have *Suppuration*, either in discharge or abscess, and this can recover only when free egress is insured. Both effusion and suppuration are abortive and exhausting, but not necessarily destructive of tissue. Still further down the line we have *Ulceration*, which needs for its repair the complicated process of Granulation and Cicatrization, not unfrequently ending in the troublesome result, Contraction.

Follow the down grade still further to *Gangrene*. Alongside these later stages I put in a rough way the constitutional results of fever—Hectic, Pyæmia, and Septicæmia. I would not insist too strongly on the exactness of the position of the two latter ones.

NOTES ON SURGERY FOR NURSES.

CHAPTER I.

INFLAMMATION.

THE following brief course of lectures or conversations on Surgery are intended to help you to understand and take an intelligent interest in your cases, to enable you to watch and possibly guide or assist the marvellous processes by which Nature heals or hurts.

Surgery—from Chirurgery, handiwork—means that part of the medical art which deals with the external parts of the body, and with such ailments as can be seen or touched, and helped by handiwork, removed by knife or saw, soothed by fomentations, rested by splints or bandages.

Acting on the visible, its action is fairly precise; its powers can be measured, its results judged; so in many respects the surgeon's and the surgical nurse's responsibility seems greater,

as her work so visibly makes or mars, and thus she more easily earns either gratitude or blame.

You must remember, however, that we, nurses and surgeons alike, are working on a complex, vital organism, not a mere mass of wood or iron, the dynamics of which can be accurately calculated, and the results of treatment precisely stated. Our work material is alive, and in everything we do we are either assisted or opposed by "a force" or condition, apart from which we are powerless, and which in excess, or acting in a wrong direction, may counteract all our best endeavours.

This strange ally or enemy has, by universal consent, got a name in nearly every civilized language implying the same thing. We call it *Inflammation*, and, as its etymology implies, it is in its essence a process of burning, and, like fire, it is a good servant but a bad master.

What you have to understand is, in familiar language, something like this,—The process which we are to describe is, in its beginning, entirely healthful, and absolutely useful and essential; in its excess or maldirection it is productive of the most dire results. Without it, in its early stages, no wound would heal, no

bone when broken would unite, repair would be at a stand still; with too much of it, or with its energy misdirected, all sorts of miseries, misfortunes, up to death of the part or person, will follow.

This process, then, of *Inflammation* we must understand if we are to understand anything aright.

Let us first identify it, and then explain it.

Symptoms.—Four chief ones, *redness* and *swelling*, with *heat* and *pain*, with a fifth, *interference with function.* These make up the characters of a condition, process, or state, which, starting from and compatible with health in its early stages, may gradually pass into a condition of disease, ending in death of part or patient.[1]

Let us first give a familiar example of a simple, uncomplicated kind, and then try to explain what happens and what the symptoms mean. An unaccustomed hand has in an emergency to take an oar after a shipwreck. In a few minutes, when stopping to rest, he looks at the palm of his hand, and sees it *red* and *swollen;* he feels it *hot*, and it will soon be *painful.* If he

[1] See Diagram on Frontispiece.

can stop and take a rest, all these symptoms will soon pass off; the hand will not be damaged—the process has not gone beyond health. But no, he cannot stop, he must go on, and soon the swollen skin will begin to swell more, its cuticle will be elevated into a bleb or blister, and fluid will be seen under the cuticle. Still he must pull; and in a few hours more the injured cuticle will peel off, and the skin will *suppurate*, *i.e.*, discharge blood and matter, then *ulcerate*, and in time even a piece of skin or tissue below may die—*i.e.*, *gangrene* has taken place. Thus, in a word, we have all the stages of the inflammatory process in this short time and small space.

Can we find out more exactly what occurs? Yes; if we trace the process in a transparent tissue with the aid of the microscope we learn much. Take the web of a frog's foot; fix the animal without hurting it, so that by the microscope you can see the delicate vessels in the layers of transparent membrane. Gently inflame it by a tiny drop of mustard and water, and what do you see? Many things too complicated to tell you fully, but chiefly this—the vessels and their contents (the blood) become altered, the vessels enlarge in their diameter, and the blood

corpuscles in them get too numerous, become crowded, and some leaving their vessels, either by rupture of their fine coats or by a gradual escape through the walls, get into the tissues, which are thus engorged with blood and its serum. In a word, the inflamed part is too full of blood, and also the blood, leucocytes, and serum are where they should not be—out of the vessels. Observe, we are not committed to any theory, for theories are numerous, and their holders are apt to quarrel. Some say the nervous system is chiefly at fault; others blame the bloodvessels; others the heart, the propelling power; others the tissues, in which all the organs lie; while others will tell you that the essence of inflammation is in the migration or generally eccentric conduct of *leucocytes*, which are, or at least are very like, the white corpuscles of the blood. Let us not mind this, but grasp the chief fact, that the inflamed part is full of blood and serum; that it is in consequence swollen, hot, and red; and that, above all, these new materials are ready to decompose, alter, generally go wrong, and apt to poison the system after irritating the part.

And thus our symptoms are so far explained.

The part is *red*, because too full of red blood; it is *swollen*, because this blood, serum, etc., are all in addition to its normal size; it is *painful* in great measure because it is swollen, and tension is caused. For, remember, pain is often quite disproportionate to the amount or severity of the inflammation, while it is almost invariably measured and caused by the tension. Thus a corn is a little thing, yet intensely painful if a drop of matter has been confined under the hardened cuticle. An abscess at the root of a tooth is agony till the swelling of the face (indication of the escape of the matter from its tight corner) has appeared. A whitlow of the tendons is intensely painful, while a cold abscess in tissues which easily allow expansion may not be felt. The greater *heat* in an inflamed part is owing partly to the excess of blood, and partly to the destructive tissue-changes really acting as a fire; while the hot *part* will soon make the patient a hot *person*, just as a little stove at one corner of a range of hot-houses, by heating the water in the pipes, will gradually heat the whole range of houses, and keep them hot so long as the fire burns.

Interference with function is a fifth symptom,

not so often given in the books, but very important. An inflamed eye will soon not be able to see. An inflamed ear may hear at first more acutely, but will soon hear sounds that do not really exist, and in the end hear none at all. An inflamed lung or kidney will soon do bad work, and then stop work entirely.

There are certain words or names in this process you must know. CONGESTION is the early stage of the inflammatory process still not beyond the borderland of health, and at which, if the process has been checked, the part may return to health, and not be a bit the worse. STASIS is a name given to the condition of the small bloodvessels when the flow has ceased, but before any corpuscles or serum have visibly escaped. EFFUSION we use for the escape of the contents—blood, serum, or leucocytes—into the tissues, as seen in the sodden tissues of an erysipelas, or in the cuticle raised by the serum of a blister.

ABSORPTION is the process by which effusion is removed by the action of the veins or lymphatics. SUPPURATION we will describe in a later chapter.

Hoping that you can recognise and under-

stand this early stage of inflammation, we may now say a word or two on its treatment. And first, and most important, discover, if possible, and remove its *cause.*

Stop the labour at the oar, the hand will soon be well. Put the poor washerwoman to bed, with her inflamed leg raised on a pillow, and the inflamed vein, caused by pressure of blood, by weariness and heat, will soon recover. Evert the lid, and remove the foreign body which has been irritating the eye, and the redness and pain will soon cease.

Diminish the supply of blood to the inflamed part, or, still better, lessen the blood-pressure. This was the great aim of all treatment by our ancestors, and they did it in a very direct and masterful way, by abstracting blood from the patient. This method has its advantages, but one great disadvantage—that it was very apt to permanently weaken the patient. However, perhaps we bleed too seldom nowadays.

Local bleeding and relief of tension by incision is very useful—leeches, scarifications, blistering over the part. Fomentations and poultices act in the same way,—when applied to surfaces over

inflamed parts they relieve the blood tension by competing for the blood.

The practical application of leeches, poultices, and blisters is here described by one well qualified to do so.

How to apply Leeches.—Wash the part well to which they are to be applied, rub over with milk, and wipe dry. Take hold of each gently in a piece of lint or soft towel, and apply. In their application, great care must be taken lest they should escape or drop off unobserved.

To make Poultices.—Have ready the following :—Poultice board ; basin and spatula ; basin of boiling water (for spatula) ; kettle of boiling water ; linseed meal (or other material as required) ; carbolic oil ; carefully teased-out tow (this is best to make the poultice upon, and may be destroyed with it). Heat your basin thoroughly, and put into it just enough boiling water to make the poultice the required size. Gradually sprinkle in the meal, briskly stirring the spatula until the mass is of the proper consistency ; spread (dipping spatula in hot water) of a thickness sufficient to retain the heat, and yet not so thick as to be uncomfortably heavy ; neatly turn in the edges, and apply.

In surgical cases it is advisable to spread a very little carbolic oil over the poultice; it is antiseptic, cools the surface, and admits of the application of the poultice hotter than it could otherwise be borne.

Proceed in the same way in making a bread poultice, substituting bread crumbs for the linseed meal.

To make a charcoal poultice, mix the required quantity of charcoal with linseed meal, and make in exactly the same way as an ordinary poultice.

To treat Blisters.—Cut at the most depending part, catching the fluid as it escapes with a bit of absorbent cotton-wool; dress with zinc ointment spread on lint, or otherwise, as the surgeon may direct.

Drugs to relieve blood-pressure are useful—such as aconite.

Above all, starvation, to give the patient's organs a rest, and purgatives to relieve tension by removing the serum of the blood, will do as much, or nearly as much, for the inflammation as a general bloodletting would do, without weakening the patient so permanently.

For a limited early and local inflammation,

the continuous application of cold by an ice-bag or an evaporating lotion may be of great value.

One caution here of special value to a nurse —when heat is ordered, see that it is continuous; or when cold is ordered, persevere with it; for the sudden alternation from heat to cold and back to heat again, caused by ill-applied or irregular poulticing, is very bad.

CHAPTER II.

SUPPURATION.

THE stage of the inflammatory process to which the name of Suppuration has been given is chiefly characterized by the presence *in* the tissues and *on* the surface of the inflamed part of a peculiar fluid called pus. Pus is a thick creamy fluid, of a yellowish colour, alkaline in reaction, tasteless, and devoid of smell, often mixed with blood from the ruptured or divided vessels of the part. Its yellow colour is due to the suspension of refractive bodies in a fluid. On standing for some time in a glass vessel, two layers will be seen—the lower, a yellowish-white deposit, with a uniform surface; the upper, a nearly clear fluid, which fluid resembles very closely the liquor sanguinis, or fluid part of the blood.

The microscope shows the lower layer to consist of corpuscles—some rounded, others crenated (with puckered irregular edges, as if withered),

some cloudy and containing fat and granular matter—all varying in size from $\frac{1}{2500}$ to $\frac{1}{3500}$ of an inch in diameter. These cells or corpuscles are derived partly from the broken-down tissues, but chiefly from the white corpuscles (leucocytes) of the blood. In many cases the process of suppuration is related to and hurried on by infective material, such as bacteria, micrococci, etc.

For practical purposes we divide Suppuration into—1. *Discharges*, *i.e.*, suppuration from the surface of a part, of which an excellent familiar example is that from a blister; and, 2. *Abscess*, *i.e.*, suppuration occurring *in* the tissues.

1. DISCHARGES.—Sometimes kept up artificially for purposes of treatment. This does not necessarily imply any permanent loss of substance in the part; the irritant keeps up the proliferation of the cellular elements of the tissue and the escape of the leucocytes from the blood; but on the irritant being removed, the part will heal, and may leave no scar. When tissue elements are destroyed and permanent damage begun, we call the process *ulceration*. (See Chapter III.)

If a nurse is ordered to keep up a suppuration, the greatest cleanliness is necessary; frequent

dressing with water dressings, or the use of boric lint soaked in hot water and covered with oil-silk, and the occasional application of the irritant as directed. Discharges from mucous membranes, as in leucorrhœa, dysentery, etc., are sometimes very tedious, weakening to the patient, and need special treatment.

2. ABSCESS.—We describe it for practical purposes under the head of—(1.) Acute, or (2.) Chronic Limited Abscess; and (3.) Abscess Unlimited, or Phlegmonous Erysipelas.

(1.) *Acute Abscess.*—When pus forms, even in very small quantity, in a deep part, we find all the inflammatory symptoms rapidly exaggerated; *pain* severe, with a throbbing character, *i.e.*, each pulse beat adds to the tension, and is represented at the part by a tiny impulse or wave; *heat*, both of part and patient, exaggerated quickly; *redness* may not be much visibly increased unless the part is superficial, but the blood-fulness is there more marked if we could see it.

Swelling.—This is not only much increased, but altered in shape. The previous general softness and fulness of the part alters; it becomes more soft and projecting in its centre, while the circumference feels harder, like a wall of brawny

tissue round the softer centre. To this change, and to the peculiar sensation to the fingers resulting, we give the name *fluctuation*—a condition much more easy to show than to describe. To make it out you must use the fingers of both hands, or in a small abscess the tips of one or more fingers of both hands; and you must learn to do it thus—keeping one hand or finger tip, the left one, quite still at one edge of the swelling, you must gently tap or percuss with the other, and thus will elicit the feeling of movement in the fluid below, which is soon communicated to the resting finger.

Rigor.—One marked symptom which assists much in the diagnosis of abscess is the rigor which accompanies the first pus formation—that is, the patient has a sensation of chilliness, varying in amount from a small momentary shiver down the back up to a convulsion of chilliness which will shake the bed, and which may last for a quarter of an hour or half an hour, notwithstanding you lay clothes on him, surround him with hot bottles, and pour brandy down his throat. Such a rigor, we will see, heralds severe pyæmia or septicæmia. (See Chapter V.)

We must now follow the course of an abscess

if left to itself. The swelling increases, all the symptoms are aggravated, and while pain and tension are greater, the matter burrows in all directions, greatly adding to the danger and diminishing the chance of a speedy cure. Thus, if a whitlow is left to itself it will not only destroy the parts first affected, but will find its way up the sheath of the tendons, below the annular ligament of the wrist-joint, into the forearm, dissect between the muscles, destroy the cellular tissue, and risk the vitality of the limb.

But at last the soft centre becomes softer still, a portion of skin reddens, a small piece of cuticle is raised as if blistered, the yellow colour of the pus is seen shining through, and at last, on some sudden movement of the patient, it bursts, and the matter escapes through the hole, which is apt to enlarge pretty quickly. But by this method the tissues have been undermined, the hole is too small to drain it properly, often it is in an unsuitable position, and the progress is thus apt to be exceedingly slow.

Another risk in leaving abscesses to themselves is, that if in the vicinity of mucous canals or of serous cavities they often tend to open into them, and thus result in formation of a *fistula* if

into the mucous canal; or in setting up peritonitis or pleurisy if into the serous cavity.

The surgeon then ought to open the abscess, and his object is to do this as early, as safely, and yet as freely as possible. Different situations require different details of method, but there are certain general rules of treatment that guide us,—for example, we usually open an abscess in a limb in the long axis of the limb; we must avoid in all cases great bloodvessels; we must select the position most suitable for drainage; and, above all, we must endeavour in every case so to manage the evacuation of the matter, and the dressing of it afterwards, as to avoid any contamination of the abscess sac from without—that is, we must use those precautions which enable us to eliminate the danger from the germs, bacilli, dirt—call it what you like—in the air, or on the patient's clothes or person, or in the surgeon's hands or instruments. Every surgeon you go to will have his own method; but all of us equally insist on the most scrupulous cleanliness of hands, instruments, basins, dressings, etc., and the avoidance of any sponge, or "swab," or bandage, that has ever been used before.

As to the exact method of opening an abscess, that is rather for the surgeon than for the nurse. Practically we generally open superficial ones by a rapid dig into them with a curved knife, with which we cut out; deep ones we open by cutting down on them through layer after layer of tissue; and ones in dangerous situations we often open by Hilton's method—that is, dividing the skin with the knife, and working through the rest of the tissues with a probe-pointed director.

Here, before leaving suppuration, we may notice that any long-continued suppuration, either from abscess cavities or from mucous surfaces, is apt to induce a form of wasting fever, to which the name of Hectic is given. You see it in the medical wards in the victim of phthisis pulmonalis; in the surgical wards you look for it in those who have spinal abscesses, hip-joint disease, and similar painful and wasting disorders. Let me try to give you a word picture of it, not scientific, only descriptive. The patient is nearly always bright and cheerful, with a clear eye, the white of which has a pearly, transparent lustre; a pink colour in the centre of the white cheek; the hair is usually dry, but often thick and long; the hands are white and thin—indeed, emacia-

tion is a constant result. The *fever* is not always present, for at certain times of the day the patient feels well and bright, and the temperature is normal; but in the afternoon he is restless and weary, perhaps improves after teatime and when the friends come to visit him, and by bedtime is very tired; he falls asleep, but in the early morning you notice the dry hair becoming dank with moisture, and the forehead is bedewed with sweat, and he wakens soaked in perspiration, and asking to have his linen changed and fresh sheets put on. This goes on night after night; often the sweats are doubled or even trebled, and as they increase, so the patient's strength is lost and the case proceeds. Few cases task the patience, kindness, and sense of a nurse more than these do, for much can be done to alleviate suffering and diminish risks of cold and chill by careful changing of linen, gentle sponging and rubbing, management of diet, arrangement of bed, watching of temperature of room, etc.

(2.) *Chronic Abscess.*—These, often connected with diseased glands, bones, and joints, are insidious in their progress, and are apt to be unnoticed and neglected till far advanced. There is little pain, and, till opened, generally very

little constitutional disturbance. They often contain curdy masses (caseated gland material, etc.), in thin serous pus. They are very apt to become putrid after opening, and the defective vitality of their walls, and the manner in which they have displaced the surrounding parts, makes healing slow and doubtful. The older surgeons used to fear them, and delay their opening as much as possible. Now with antiseptic precautions we fear them less, yet still to treat a chronic abscess safely will tax all the surgeon's knowledge and require all the nurse's care.

(3.) *Abscess* (*unlimited*).—Just a word on this most dangerous condition, which we find in certain forms of erysipelas. In this we have the suppuration rapidly formed in the cellular tissue of a part or in one of a chain of glands. It generally results from some infection or putrefactive change. It is characterized by the complete absence of the hard ring of thickened cellular tissue which is described as surrounding the soft centre of an acute abscess, and in consequence of this absence, nothing stops the progress of the suppuration along the tissues. It spreads with rapidity, does not tend to point, and unless promptly and efficiently attacked by

free incision, allowing of relief of tension and escape of putrid discharge, the result may be very rapidly fatal to the vitality of the part and of the patient.

Fistula and sinus are common results of chronic abscess.

Fistula means a suppurating track with two openings, one into a mucous canal or serous cavity, the other to the skin surface.

Sinus is a track leading from some chronic source of irritation, such as dead bone, cheesy gland, or ill-managed putrid abscess, to the surface. Both require cleanliness and care from the nurse, and may need operative interference by the surgeon.

CHAPTER III.

ULCERATION.

THE next stage of the inflammatory process we come to is Ulceration. So far as we have gone we have not necessarily had any destruction of tissue, for a long-continued suppuration may not leave any permanent loss of substance. Ulceration and gangrene, however, imply loss of tissue, and they differ from each other only in degree. Ulceration we may define as a *molecular death*, a loss of substance in fragments invisible to the naked eye; while gangrene is the same form of death detaching visible fragments, varying from the small slough in the centre of a boil up to a whole limb in which the artery has been occluded.

A simile may explain this: every wave and every tide are surely and slowly wearing away the chalk cliffs of our south coast in unnoticed, because almost invisible, detritus—that is ulceration; a great gale comes with a spring tide, and

carries off tons of cliff with a house or two, or a church—there is a gangrene.

There are many and varied causes of ulceration, all in the direction of lowered vitality of the part or patient. Diseases or injury of vessels, specially of veins ; cuts or sores which have not been rested sufficiently, but have been neglected ; wasting diseases, scurvy, syphilis, and the like ; and the product of ulceration we call an Ulcer.

Ulcers—various, frequent, pauperizing, fill our hospitals, fit many a breadwinner for the workhouse—are too often despised by surgeons, and groaned over by nurses, still they have to be cured, and to be cured must be understood, and if understood are less uninteresting, and are excellent lessons in pathology, and keynotes to many diseases ; so we must try to tell you of them, and to interest you in them, for much of your surgical work in workhouse hospitals, district nursing, and dispensary practice will be the care of ulcers, let us hope also the cure of them.

Let us first arrange them, and then describe them. A scientific arrangement is very difficult, and nearly all are unsatisfactory. Let us use the one given by the late Professor Syme, which, though couched in unscientific language,

is practical and useful. He divided ulcers into three great classes, thus :—

I. Ulcers prevented from healing by want of action.

II. Ulcers prevented from healing by excess of action.

III. Ulcers prevented from healing by peculiarity of action, local or constitutional.

Under these three simple heads we can arrange them all readily enough, and also are guided to treatment. We can also describe each ulcer in various stages. When it is *forming* or *ulcerating*, when it is stationary, and when it is healing.

But before we commence a description of those ulcers, we must notice the points to be attended to in looking at or describing one; and we should also have a standard of comparison, so as to see how, and how far, the diseased departs from the healthy standard. So let us take for a standard what may be called a healing sore or surface, and describe it under six points ; and let us see what these six points are. A healing sore then has—

1. A smooth, level, velvety *surface*, of a pink-crimson colour, very slightly raised above the surrounding tissues.

2. It has *edges*, which are bluish, level with the ulcer surface, and when carefully measured are evidently gaining on it from day to day.

3. Its *granulations* are equal, regular, covering the whole surface, giving it its velvety aspect. (Now note here what a granulation is: it is a loop of capillary surrounded by leucocytes, which are grouped in an intercellular fibrinous substance of greater or less density and firmness. As this substance contracts and becomes firm, concealing the capillary, and assuming with its next neighbours on each side a smooth fibrous surface, we call it cicatrization or healing.)

4. Its *discharge* is yellow, sweet, *i.e.*, not putrid, not blood-stained, not very copious, and always tending to decrease in amount. (The discharge consists of leucocytes in blood serum which have not been utilized by being caught in the fibrinous plasma of the granulations.)

5. The *sensations* of a healing sore are trifling; that is, it is tender to touch, but is not painful, because it is free from tension, and is not inflamed.

6. *The surrounding textures* of the limb or part are normal, except just at the ulcer edge,

where they may be a little too full of blood (congested or hyperæmic).

Now with this standard let us describe the deviations.

I. *Those Ulcers prevented from healing by Want of Action.*—For practical purposes we must divide these into two great varieties. A. Those in which the want of action is from weakness; B. Where it is from indolence.

A. *The Weak Ulcer.*—In it we find the—1. *Surface* œdematous, and projecting often in irregular masses, with a tendency to bulge and resemble a tumour. 2. *Edges* are overhung by the surface, are of a purple-blue colour, like a cold hand. 3. *Granulations*, which form the projecting surface, are weak, flabby, deficient in colour, and having no tendency to cicatrize. 4. *Discharge* is copious, but serous or seropurulent, and in it few leucocytes are seen. 5. The *sensations* are blunted, the sore is hardly ever tender, and is thus liable to get knocked about. 6. The *surrounding tissues* are often swollen and dropsical, sometimes hard with a solid œdema.

Now ulcers like these are very common in the legs of labouring poor, who have to stand much, and who are weak and ill-fed, and any

wound or ulcerated surface is apt to degenerate into these conditions just from mere length of time ; a slowly healing ulcer is apt to become a weak one. *For treatment*, it is in few words : support the patient, raise the limb, and compress and stimulate the granulations. *Compression* by careful bandaging, especially by an elastic one. A piece of the soft lead lining of a tea chest, thoroughly sterilized and covered with boric lint, makes an excellent compress, under a layer of salicylic wool. *Stimulation* by the use of the familiar stimulating lotions, such as the red, blue, or black.

B. *The Indolent or Callous Ulcer.*—Though as common as the former, and in somewhat similar cases, it differs much in appearance, and also in the treatment needed. Its *surface* is smooth, excavated here and there, but with no velvety projections ; it varies in colour with its condition, being red or angry crimson if it is accidentally inflamed, black or brown if neglected. *Edges*—These are characteristic, and give the ulcer its second name ; they are hard, *callous*, and ring in the ulcer with a craggy wall all round it. *Granulations* in typical cases are absent ; in less marked ones are few and scarcely visible. *Dis-*

charge is scanty, glairy, and nearly always horribly fœtid, from the soakage from the thick old edges, which are made of epithelium of the cuticle and products of decomposition of the sweat and hair glands. *Sensation* generally blunted—so much so that the patient is tempted to neglect treatment till the limb is nearly hopeless. *Surrounding tissues* are, as in the weak one, thickened, dropsical, often much hardened with layers of rotten cuticle, spreading from the immediate edge.

Treatment must be active and energetic, for one such case left uncured in a ward will poison the air, and cause risk to the other patients. The first thing to be done is to get it sweet, and this you may do by charcoal poultices, carbolic applications, or mercurial ones, as your surgeon directs. I generally, after a night's poulticing with charcoal, attack the ulcer on its edges with a sharp scoop, and scrape away all the old rotten epithelium, often making the ulcer look much larger than before, then applying a 1-40 solution of chloride of zinc all over the sore and edges, we can dress it with salicylic wool and protective, or with wood-wool wadding. The dressing will next day be full of soakage, and per-

haps still putrid; still one or two or more days of this will soon cure the putrescence, and you will have it very quickly a healing sore.

The same result may be got without, however, so rapidly sweetening it, by free blistering of the edges and surrounding parts, causing them to slough; if this is done, it must be done with caution, and perhaps bit by bit, lest the blistering should irritate the kidneys, for in the victim of indolent ulcer we often find kidney disease. Strapping with strips of plaster, which is recommended in many of the older books, is not only a very slow and expensive method, but horribly putrid, and thus risky both for patient and ward.

II. *Ulcers prevented from healing by Excess of Action.*—As a rule, these are not only prevented from healing, but are often actively increasing in size by reason of the excess, and in some of these the active increase is so rapid and visible as to be with difficulty separated from gangrene.

One, however, which is well named the Irritable Ulcer, we may describe first, which rarely if ever attains a large size.

It occurs generally in well-fed, under-exercised patients of middle age, and often of gouty habit. You may find it in a butler or a squire, rarely in

a probationer, nurse, or a hard-worked doctor. It is generally on the leg, oftenest on the shin. Its *surface* is fairly smooth, sometimes glossy, of a darkish-crimson colour. Its *edges* are sharply excavated, as if cut out with a punch. The *granulations* are small and velvety. The *discharge* is scanty. The *sensation* is characteristic—an intense pain, coming in spasmodic starts, worse at night, and connected with great irritability of temper. The *surrounding textures* are generally fairly healthy. This form of ulcer is not much seen in hospitals, but in private practice often requires a good deal of management. Attention to the health, a starvation diet, and locally a firm application of solid nitrate of silver, will generally cure the ulcer quickly.

The more characteristic examples of ulcer prevented from healing by excess of action have been described under different names, such as sloughing sore, sloughing phagedæna, etc.; but all practically may be included under the one great head of HOSPITAL GANGRENE, a most important study for the nurse as well as for the surgeon. Why, you will say, call it an ulcer if it is a gangrene? For this reason, it is

a gangrenous condition of an ulcer, wound, or sore, and it is a local mischief, not connected with a central cause either local or general.

First, then, to describe it as simply and practically as possible, and then a word on its causes and its prevention and treatment. A wound or sore previously healthy, if exposed to the contagion shows on its *surface* a glairy, viscid, greenish or yellowish scum or membrane, not unlike rough tow which has been soaked in dirty oil. At first you might think you could scrape or sponge it off; but no, it sticks and floats about on the surface. The *edges* of the sore you will at once notice to be excavated, and thus the sore enlarges. Generally the excavation or enlargment is only at one side of it, not often all round.

The *granulations* are also here and there concealed, at other places punched out and worm-eaten by this new material. The *discharge* is copious, fœtid, and under the microscope shows *débris* of tissue, blood, and pus. The *sensations* are blunted, the pain being not so great as you might expect. The surrounding textures are swollen, infiltrated, and often irritated by the acrid discharge. The chief characteristic is the

extraordinary rapidity with which in a marked case, and in a severe epidemic, the sore or sores enlarge, and the cicatrices of wounds break up. I remember one poor fellow who had a simple fracture of the patella, with only a small abrasion over the knee, and who was put by the surgeon into a ward where hospital gangrene was raging, because it was supposed a simple fracture could take no harm. His abrasion became infected. The first day it was noticed a threepenny piece would have covered it; next day half-a-crown would not have concealed the sore; and when on the third day he was dying, the whole knee-joint was denuded of skin, even back to the space behind the knee-joint on both sides. The constitutional symptoms also are in many cases most severe, and rapidly run on to a fatal issue, with symptoms either of pyæmia or septicæmia.

Now, as to the causation of the fearful malady. Well, I am going to preach to you a very hard doctrine, severe in its bearing on all of us. I hold that hospital gangrene is in nearly every case caused by *dirt*, and dirt communicated to the patient by his *doctor* or by his *nurse*. A great statesman once defined dirt as matter in a wrong place. Our view of dirt must be that it

includes everything septic, all products of decomposition, everything that has a smell; and I hold that if we can eliminate these from our wards and bedrooms, we will have no hospital gangrene. Drains have been blamed—perhaps rightly—sewage poison may help its ravages; but you will find that where wounds are kept sweet, and where doctor and nurse know what real surgical cleanliness means, we have no more hospital gangrene.

I am not very old, but many of you here will hardly believe that little more than thirty years ago I have seen the dressings done, assisted by *ward sponges* carried from bed to bed in ward basins, and that it was not considered necessary, not even advisable, to change the water on passing from patient to patient. Can you realize it in the light of our present day knowledge and our present civilisation? When sponges were done away with, and either swabs of wool or linen—a fresh one for each patient—took their place, a great stage was reached, even before strict antiseptics rendered each patient harmless. We had gained much when we did not actually infect each fresh one from his dangerous neighbour.

Ventilation of wards, cleanliness of floors and

walls, and bed-linen, have aided in the work that clean, fresh dressings began, and it is now more than a quarter of a century since I have seen a case of hospital gangrene.

How did we treat it? you will ask. In various ways locally. One wise old nurse[1] believed that she used to clean the wounds quickly and shorten the malady by the application of a strong solution of sulphate of copper.

To swab the wound well with fuming nitric acid in the early stage sometimes aborted the attack.

Bromine was much used in the hospitals in America. My own experience was that no external application was of much use. Extreme care in cleaning the wound or ulcer, and removal of the patient into fresh air and a different ward, or even to a wooden shed, was of great value.

III. *Ulcers prevented from healing by Peculiarity of Action, Local or Constitutional.*

1*st*, *Local.*—Chief among these local causes is *varix*, that is, a varicose condition of the superficial veins of the limbs. This is a very common affection in the labouring poor, specially in those whose occupations involve much standing and

[1] Nurse Porter died at her post, after 47 years' service, February 10th, 1890.

exposure to vicissitudes of temperature, such as tall London footmen with their tight garters, washerwomen, cooks, engine-drivers. What we first notice is a fulness of the veins indicated by bulging and formation of long, blue, corded looking masses in the leg and thigh.

After a severe blow, fall, or exposure to cold, a portion of the livid blue swelling becomes hard, red, and painful. These symptoms indicate that the blood has become stagnant in the inflamed vein. The stagnant clot may then undergo certain changes, *i.e.*, 1. If the patient at once is put to bed, with the limb raised and fomented, all may return again to health, and no bad result follow; or 2. The clot may suppurate, and either soften and empty itself, or require to be opened—in either of which cases an ulcer remains, which is very difficult to heal, for this reason, that its surface is really the posterior wall of the inflamed vein, a tissue which, from its very nature, is most unsuitable for the formation and growth of granulations. A third possible result of the inflamed clot may be a most dangerous one—that is, a portion of it may become detached, get into the current of blood, and thus may find its way through the

veins to the heart, and eventually to lung or other organ.

To return to the varicose ulcer or ulcers (for as clusters of veins suppurate at once, they are often multiple). They have—1. *Surface* smooth, sharply excavated; 2. *Edges* sharp, generally crimson or dark red in colour; 3. *Granulations* few, or none; 4. *Discharge* scanty; 5. *Surrounding parts* often swollen, and nearly always showing the veins enlarged and inflamed; 6. *Sensations* generally very painful, especially if they have been inflamed or injured by too much walking.

Treatment.—The first indication is to relieve the passive congestion of the limb, which is the result of the swollen veins—that is, absolute rest is essential at first, if possible with the limb elevated. Put the patient to bed and elevate the foot of the bed at least six inches, by blocks of wood under the castors. Local treatment—Black wash used to be considered almost a specific, and boracic lint is much used. When once the ulcers have fairly started to heal, much good can be done by the constant wearing of a pure rubber bandage, neatly applied from foot to mid-thigh, so as to support the

column of blood, and thus relieve the pressure. The bandage must be applied directly to the skin, not too tightly, and should always be removed at night, being put on whenever the patient wakes, before any walking about.

Note.—Wash the bandage every night in cold, not warm, water.

2nd, Ulcers prevented from healing from Constitutional Causes.—These are very various and important. 1. We may group together and describe side by side ulcers prevented from healing, and, indeed, caused by those constitutional conditions of the cellular tissue we call gummata. These are of two great varieties—(1.) Strumous; and (2.) Syphilitic. In both the pathology simply given is somewhat as follows:—(*a.*) A portion of the cellular tissue of the limb immediately subcutaneous becomes inflamed and thickened with new material, forming a little nodular projection under the skin; this is at first not very painful, and rarely red. It gradually goes on, if untreated, till it (*b.*) softens in the centre. A small opening forms, into which a probe can be passed, and through which projects, or at least is visible, a thick, yellow, leathery-looking substance, which extends under the raised and

separated skin. Till this is (*c.*) got rid of by natural or artificial means, the ulcer cannot heal, and generally extends. The discharge is dirty and ichorous, the place is often painful, and the ulcers are frequently multiple. The treatment must be both local and constitutional: local, to get the slough to come away, which is best managed by blistering the edges of the undermined skin (the blistering fluid is to be applied carefully with a fine brush); and after the blister has cleaned edges, and when new granulations are forming, these ulcers still require very great attention. Red wash and black wash may be alternated as dressings, and both may require to be used stronger than usual. A more rapid method is at one sitting under chloroform to clear away all the disease tissue with a sharp spoon, and, if possible, get the resulting cavity aseptic. Constitutional, by giving drugs to prevent the tendency to strumous and syphilitic deposit. Of these, cod-liver oil and iodide of potassium are our sheet-anchors.

2. Another ulcer resembling these in some respects is the gouty—not common, and especially rare in hospital. In it the skin is separated from its surrounding parts, and caused

to die by the presence beneath it of the calcareous material known as chalkstones. These ulcers are generally small, and in the vicinity of the joints of the fingers and toes, and require treatment of the constitutional habit.

3. Another is the scorbutic, or ulcer of scurvy. This is not common in civil practice, but is occasionally seen in foreign or naval hospitals.

Scurvy is a condition of the blood brought on generally by unsuitable food, and in advanced cases any slight injury or scar of an old wound is apt to cause a raw surface which constantly tends to bleed, and on the surface of which clotted masses of blood form, which the sailors call bullock's liver. These masses grow rapidly in size, are painless, so that they can be shaved off with a knife, but from the loss of blood they generally injure the patient's constitution. In such cases the treatment must be rest, pressure, and, above all, suitable diet, for once the patient can be fed on milk, bread, and suitable vegetables, recovery, as a rule, is very rapid.

Lime-juice, if given regularly, is almost an absolutely certain preventive of this condition,

which is now comparatively rarely seen in British ships.

It is important in the after-treatment of all the above ulcers that the limb be carefully and smoothly bandaged from the foot upwards, not only up to the highest ulcer, but past it, so as to prevent swelling and œdema of the superficial veins.

CHAPTER IV.

GANGRENE.

THIS is the next and final stage in the inflammatory process. From a Greek word meaning "I devour," it speaks in its etymology of rapid destruction of part or limb. It is a visible death as distinguished from the molecular death which we saw in ulceration. There are many ways in which we might divide gangrene for purposes of description, and perhaps the most scientific method would be according to its causation; but for practical purposes we will class cases of gangrene under two great divisions —Moist and Dry.

1. *Moist.*—In this form, as its name implies, the dead part has died suddenly, with all its fluids or juices still in it, and as a consequence its putrefaction is rapid; and as the putrefaction can easily spread to the system by the veins and lymphatics, the danger of systemic infection, blood-poisoning, and pyæmia is very great and immediate. The *causes* of moist gangrene are

either severe local injuries, which have destroyed or impaired the blood supply of the part or limb; or some disease which has affected from the centre either the blood supply or the nerve supply of the part in a sudden manner and with completeness of result.

Great interference with the blood supply of a large artery may do very little harm if its progress is gradual, thus giving time for the circulation by smaller branches in the vicinity to be established; but a sudden interference with either blood supply or blood return, *i.e.*, either with artery or vein, will very rapidly induce gangrene.

Description.—Let us now try to describe a case, and see what it may be mistaken for, and how it should be treated.

A limb has been badly crushed, we will say, without any external wound; but the large vein has been torn across, and blood effused into the tissues, causing swelling at the part and great tension. Pain at first is probably severe, especially at the seat of injury, and tension is present. This pain, however, gradually diminishes, till at last it is entirely gone, and even common sensation in the skin of the more distant parts of the limb is lost.

The limb is of a dark livid colour, which at first closely resembles the colour of a bruise, and may be mistaken for it; but the discoloration spreads rapidly, and soon changes into shades of brown olive, or in warm weather even of dark green. At same time bullæ or little blisters appear here and there on the surface, separating the cuticle from the true skin. Now do not suppose that every case of livid tense limb with little blisters on it is necessarily one of gangrene, for in a bad bruise you often have little blood blisters rising. You can easily distinguish the one from the other thus,—in an ordinary bruise the blisters are full of blood serum, often dark with blood, and are stationary—that is, you cannot move them; you may break them, letting out the fluid, but they do not run together. In gangrene the bullæ contain air as well as serum, that means they are products of early decomposition, and also you can easily make them join each other, like drops of water on a pane, by pressing them along under the sodden, separable cuticle.

With these symptoms—coldness, want of sensation, and bullæ—you will, I trust, be able to recognise early a case of gangrene, and it is of

vast importance that you should; for in a simple fracture it may come on, and every hour is of value; for once a limb is in the state we have described, early and high amputation is the only chance for the patient, for it will spread with great rapidity, involving part after part, tissue after tissue, even higher up than the injury that began the business. And not only that, it very rapidly poisons the constitution, and renders the case hopeless; for in such a case the limb has died with all its juices or fluids in it, and they are dead and poisonous, and by the veins and lymphatics are rapidly carried into the general circulation. You will say, if this be the case it is no good doing anything, the patient must be poisoned so quickly. Now you must remember, and here is another sign of gangrene to help you, that by this time the circulation is really almost, if not altogether, stopped; the arteries of the limb are no longer pulsating, or pulsate very faintly, while in a bruised limb, however sadly swollen and tight it is, *you* can always feel the pulse, and the *patient* will always tell you how it throbs.

Now I think I hear you say, What is the use of all this to a nurse? We cannot amputate

the limb, and we cannot prevent the gangrene. Well, I do not know that. Many a limb has become gangrenous from too tight bandaging, too careful splinting, and this a good nurse must watch and prevent; and you can always tell the doctor as soon as possible. If in a cottage hospital, or among the poor, you find an injured limb which you think is bad, you may save time and prepare for the doctor by removing every constricting bandage or button, and laying the limb in the easiest possible position, covered by some light and not tight non-conductor—best of all is cotton wadding or soft tow—so to maintain an equable heat without any sudden change of temperature.

By such care you may save a limb or a life. The surgeon has to come in in all cases of moist gangrene with his knife—early and free removal *above* the cause. If we go too low, we operate through tissues of low or lost vitality, which cannot stand the extra stimulus of the knife and loss of blood, and our flaps slough, and the gangrene spreads. Some of us and some of you have seen marvellous recoveries from an almost hopeless state once the dead parts are freely and frankly removed.

2. *Dry or Senile Gangrene.*—In this the limb dies because it dries—because, for some reason or other, its nutrition has been so interfered with that, beginning at a finger or a toe, the gradual shrinking and drying of the parts spreads slowly upwards. It is called Senile because rarely seen except in those whose tissues are aged either by years or disease. Many cases of Senile Gangrene are found in patients who have a diabetic tendency, in whom the urine is loaded with sugar. Its most common causation is a disease of the bloodvessels, which, by thickening their walls and impairing their elasticity, narrows their lumen or capacity as tubes. This gradually impairs the vitality of the more distant parts, such as fingers and toes. This is indicated in coldness, blueness of colour, and a stagnant condition of the blood in the capillaries. Then some exciting cause begins to set up inflammation; perhaps the old lady cuts a corn too deep, or the old gentleman stands too long in the cold after a good dinner, and comes in with cold feet, and pops them into hot water. Anyhow, the part inflames, becomes red, painful, and hot, and in a day or two the redness becomes dark crimson or blue, then black,

the cuticle peels off, and the tip of the toe shrivels. This spreads bit by bit to the toe joint, then to the next toe, and so on, even to the foot or up the leg. Under proper management it may sometimes stop, and Nature may cure it by cutting it off in her own slow way; for, unlike in moist gangrene, in this form our treatment must be waiting. I will tell you Nature's way first, if it is to cure at all. The blackness ceases to spread, and one day just at the edge of the black, you will notice a thin line of vivid red on the sound part. This will spread and deepen, ulceration will begin, pus will form, and day after day you will see the little sulcus or furrow deepen by eating away the healthy edges till the black toe is left just hanging by a tendon or two, or, perhaps, kept in position by a bone. I remember having to go a very long journey once to see an old gentleman whose foot was dead to the ankle-joint. I told him what to do in treatment, and heard no more of him till that very day a year afterwards, when I again was sent for. I found him in perfect health, and free from pain. His foot was, as when I left it, nicely wrapped up in wadding, with no smell, quite dry, and black and hard, and

kept in position only by the tendons. With a pair of sharp scissors I cut these with no pain nor a drop of blood, and we found the stump was healed entirely, except just where the tendons were each looking out of its sheath, and these soon healed.

This disease is one of great danger, and always will cause grave anxiety. Still, we do not fear it so much as did our ancestors. If we read the older books, we find the most discouraging opinions given, and the rarity of cure described. The treatment was then directed in every possible way to support the patient's strength, on the idea that as it was a disease caused by want of circulation, the circulation should be stimulated; and this was always done in one way by rich, nourishing food and large quantities of the more generous wines, or brandy or whisky. Now we have changed all this, and our present treatment of these cases I will try to describe:—

Constitutional.—Owing in great measure to the teaching of the late Professor Syme, the diet in this school for these cases is exclusively a milk one—as *non*-stimulating as possible, while still nourishing—and wines and spirits are forbidden.

Local.—And these are especially nurses' cases. You are to put two chief objects before your eyes. 1. To avoid any sudden alternations of temperature, and all injuries, however trifling; 2. To keep the part, especially where and when Nature's line of demarcation is going on, as sweet as possible. If these two conditions are attained, it is extraordinary how little constitutional inconvenience is sometimes caused, even by an extensive senile gangrene, and how little annoyance the dead part often gives. All kinds of poultices, wet dressings, ointments, and the like, must be avoided, as implying exposure and changes of temperature.

Salicylic or carbolic wool in large quantity, lightly applied and carefully cleansed, when necessary, with, if need be, some active antiseptic lotion to the line of demarcation if it has begun, will fulfil the indications I have mentioned.

When the toes are beginning to turn black, it is important to separate each from its next neighbour by a little strip of boracic lint applied dry, and changed at distant intervals.

In suitable cases, an amputation of the limb well above the line of demarcation may be successfully accomplished even in very aged people.

CHAPTER V.

PYÆMIA AND SEPTICÆMIA.

HAVING now traced the stages of the inflammatory process to the end of gangrene, we must pause for a moment; and as we described a form of constitutional disturbance connected with profuse suppuration, which we called Hectic Fever, we must try to make you understand the kind of surgical fevers connected with ulceration and gangrene, or, indeed, with putrid infection of all sorts. These are variously classed according to their severity, and also according to the varying ideas entertained as to their causation under the heads of Pyæmia and Septicæmia.

Pyæmia.—In the form of fever it was supposed, as its name implies (pus in the blood), that there was either an actual escape of pus from abscess or suppurating surface into the general circulation, or that there was a formation of pus in the vessels, either by secretion or by development from previously admitted pus

cells. It matters little to us what theory is correct, or indeed if either is, if only we remember that the malady we are to describe is found in cases where pus is putrid, and where pus is retained in a wound, *i.e.*, ill-dressed and ill-drained cases.

To describe it. After a big operation or a bad compound fracture, the patient after a few days is evidently more *ill* than he should be ; his pulse is probably about 110 or 120, and his temperature is 100° or over it. He is out of sorts and uncomfortable, his appetite is bad, his breath offensive, and his colour dull, muddy, or yellowish, but he has had no special local pain, and perhaps no alarm is taken. Suddenly, he one day complains of being intensely chilly, his teeth begin to chatter, his bed shakes, he is alarmed, and feels ill. The nurse piles on blankets, puts hot bottles round him, and probably gives him some hot brandy and water ; still the shivering lasts, perhaps, for 10 or 15 minutes ; after it he breaks out into a perspiration, feels easier, and probably falls asleep. If the temperature is taken just before or during the rigor, it is probably about 104° or 105° ; after it, it will fall to 99°, or even below normal.

Some hours, probably about 36 or even 48, will pass and no return of fever takes place, and nurse and doctor may be lulled into a false security, but sooner or later a second rigor will ensue, much the same as the first, with the same results. Again and again the rigors return, generally at shorter intervals, with a weaker patient to attack; he is sleepless and restless, yellow, and stupid, with delusions, sometimes with diarrhœa, always with a weakening and fœtid sweat, till, rapidly exhausted, he dies in a time that is measured by days, not by weeks.

But what is going on inside him all this time? and what do these rigors mean? They mean, every one of them, the formation of pus somewhere, and that pus in such cases is confined, and is an abscess. In most cases you can trace these abscesses, in some you can treat them, in few you can cure them, for internal and important organs are most frequently attacked. Lung, liver, brain, eyeball, joints, are all favourite situations for these abscesses. In a joint, though intensely painful and generally destructive to the functions of it, we can sometimes open the abscess, keep it sweet, and cure it; but in lung and liver they must take their chance of bursting

into bronchus or bowel, or cavity of abdomen, and in most cases that means death, while in abscess of brain or eyeball the chance of recovery is exceedingly small. Many theories have been held as to the exact pathology of this pus formation ; enough for you to know that the circulation in the vessels of poisoned blood is sufficient to account for all.

How to treat it? Well, in this disease especially, prevention is better than cure ; the early recognition and treatment of old abscesses, or bagging ulcers, or fœtid wounds, in these a good nurse can soon help a doctor—the most careful and tender nursing and watching to avoid the first chill, and to cut it short if possible. You will be told of drugs to cleanse the blood, antipyretics to keep down the temperature—all, in my opinion, broken reeds to rest on.

However, do not lose heart when the dreaded word pyæmia is mentioned. I have known many a bad case recover after abscesses in lung, liver, kidneys, joints, etc., so never despair of any one. Fortunately, improved cleanliness has made a vast improvement, and pyæmia is nearly banished from aseptic wards and hospitals.

Septicæmia.—What am I to say of this dread

disease, the terror of the midwife, and the scape-goat of the ovariotomist or laparotomist? By it we describe a form of fever in which the blood and the patient are poisoned, as if by the bite of a venomous snake, which runs through its course of high temperature, weak pulse, delirium, coma, and death, with a rapidity so alarming and with a certainty so absolute, that treatment seems vain and recovery hopeless from the first.

Some forms of dissection wounds, especially of recent and diseased rather than putrid and decomposing bodies, cause it in students. Some discharges from dying patients, some tiny scratch which has been poisoned in performing the last offices for the dead, may cause it in a nurse. Certain kinds of abscess bursting into the peritoneum, certain forms of ovarian inflammation, may cause it in a gynæcological case; while those practising midwifery tell us it may occur by infection from the patient herself, from another patient in the house, or even may be brought into the house by nurse or doctor.

Some cases seem to follow a low form of erysipelas. Some may have their origin in bad drains or sewage poison. All are rapid, and well-marked cases are practically hopeless.

Again, avoidance of cause in scrupulous cleanliness and careful thoughtfulness will be the nurse's duty, remembering that clothes, hair, hands, hot bottles, instruments, blankets, bedsteads once infected may infect a succession of cases.

CHAPTER VI.

ON THE HEALING OF WOUNDS.

WE must now consider the important subject of the Healing of Wounds—that is, what must be done by Nature acting on the wounded parts to repair any wound or breach of surface; and incidental to this we must discuss what prevents healing, and how we can assist it. Much has been written on the subject, and many different methods are described. Sufficient for our purpose to understand the three most usual methods in which it occurs.

1. *Union by First Intention, without the presence of any new material.*—This, in cases of wounds of any great size, is probably very rare; a good example of it is found in cuts inflicted by the razor when shaving. These may bleed for a little, but come together at once, and usually are found absolutely healed in a day, with no trace of scar left. For the occurrence of this mode one has to imagine that, after the bleeding has

ceased, the cut surfaces fall at once and accurately into apposition so precisely that each divided vessel unites, every cut muscular fibre rejoins, and the part is at once in the condition it was prior to the infliction of the wound.

2. *Immediate Union without Suppuration, and with the resulting scar a mere line.*—This is the more common mode of healing, and what we aim at in every, or nearly every wound inflicted by the surgeon through healthy skin.

Let us first describe as simply as possible what happens after an incised wound has been made. We presuppose that the skin has previously been rendered absolutely clean and aseptic, that the instruments and the surgeon's hands are sterilized, and that a suitable antiseptic wash is used all through the operation. The tumour or foreign body, or whatever rendered the wound necessary, having been removed, the bleeding is to be stopped as thoroughly as possible, every morsel of clot, sawdust, cloth texture, fragment of sponge, completely washed away, the flaps adjusted without tension, and the sutures and bandages applied to keep the edges accurately in position.

If we could suppose our dressings trans-

parent, what would we see? From the mechanical effect of the knife on the cut edges a faint blush of redness will appear, even though the wound is absolutely sweet and free from tension; in addition to this, from the whole surface of wounded tissue, and especially from the cut edges of the skin, a serous oozing takes place, gluing it all together. Sometimes, if in too great amount and blood-stained, there is enough to make us fear hæmorrhage is commencing. This serous oozing, useful in small quantity, is a decided disadvantage if profuse, as it is apt to separate the lips of the wound and cause tension, so that we have to provide against its bad effects by giving it a means of escape. This we do in various ways—in large, deep wounds by drainage-tubes, and in smaller ones by horsehair or catgut drains. Let us suppose, however, that it is just in sufficient quantity, with no redundancy. There is now a period of rest or repose in the wound, in which no textural changes are visible, though doubtless good work is really being done, for in two or three days, when we again look at the wound, we find that this serous oozing has become organized—that is, if we put a little of it under the microscope,

we find it contains cells and fibres ; and not only that, but it is now vascular, bleeds when cut or pulled ; that means that the vessels in either side of the wound have been developing capillary tubes into this new material, which have met or will meet across the bridge, and thus make a vital union between the edges.

In a few days more this union is perfected, and the uniting medium has contracted to an exceedingly narrow, almost invisible, line. Almost invisible, I say ; and that is just the difference between this mode and the first and rarer one we described, for this little fine line will always remain visible as a linear scar. It is visible because it varies from true skin in being only vascular fibrous tissue, not containing hair bulbs or sweat glands, and generally varying in its vascularity according to its breadth and age. If broad—that is, if there has been much and slowly organized material—it will be more visible. Specially when cold has rendered the surrounding skin blue or white, or when heat has made it rosy or crimson. If it is narrow, however, it has no other bad effects, so long as it is not adherent to deeper textures. Adhesion may nip or press a nerve, and hence cause neuralgic pains. We

sometimes find this result in stumps, especially if the cicatrix is over or near a bone.

3. If, however, the first and second methods have not been aimed at or have failed, we next come to a third mode of healing, which we may call *Secondary Union of Granulations.* We know what a granulating surface is, and we know how it heals. This mode of union of wounds implies two granulating surfaces, both healthy, and both to be brought into accurate apposition. We find this mode very applicable in cases of flap amputations which have not healed by first intention. Indeed, in older French surgery, this used to be the selected mode by which amputations were expected to heal. The surgeon did not bring the flaps into apposition at first, but after checking the hæmorrhage, filled the hollow with *charpie* (torn up rags or lint), and then waited till suppuration had fairly begun and the whole surface was a granulating ulcer, after which the flaps were brought into accurate apposition. A little consideration will show you that this method has some advantages and also some risks. For example, by this plan you avoid the risk, which used to be a serious one, that in a big amputation the skin edges might

unite before the deeper parts were fairly drained of serum,—in which case, whenever putrefaction and suppuration of the imprisoned serum occurred, you at once had a deep abscess, with its certainty of pain and fever, and its great risk of blood-poisoning and pyæmia. Among the risks (less now than in old days) was the great one of a large exposed cut surface which might easily be attacked by putrid germs or hospital gangrene. However, there is no doubt that in many a case our chances of union are greatly aided by a judicious use of this mode of healing. Attention must be paid to the drainage of the deep parts, so as to insure that it heals from below rather than from the edges, and the stricter the antisepsis, the more likely it is to have a successful and rapid result.

With this very brief introduction as to the modes of healing, let us now see how we are to assist or allow wounds to heal. The three great enemies to union are—BLOOD, DIRT, and the result of the first two, PUS. Our object then is to prevent the occurrence of these three, and to get rid of them as soon as possible.

I. *Blood.*—Every wound, however small, is pretty certain to cause some bleeding, and in

great wounds the patient will soon die unless this is stopped. So here is a good place for us to consider the whole subject of hæmorrhage, its varieties, and the various methods of checking it before, during, and after an operation.

1. *Varieties.*—Bleeding in a wound may be either from arteries, veins, or capillaries—perhaps from all three at once. (*a.*) *Arterial.*—Bleeding from an artery large enough to be easily visible is recognised by the following characteristics: the blood is of a bright red colour, and spurts out with force like water from a hose-pipe, with a certain intermittence in its force coincident with the pulse, but with no cessation of its stream. If a large artery be cut and no assistance is at hand, the bleeding will go on till the patient either faints or dies—perhaps faints first and then dies. (*b.*) *Venous.*—In a cut of a vein the blood is darker in colour, and wells up in the wound without pulsation and without force. A large vein wounded may cause death, but not so rapidly or certainly as an artery of similar size does. (*c.*) *Capillary.*—In capillary oozing, the blood, generally red in colour, slowly fills the wound or cut without impulse, is generally small in quantity, and, except

in diseased individuals, it generally stops of itself or under the most gentle treatment.

2. *Treatment.*—Now, briefly and practically, let us discuss the treatment of hæmorrhage, and let us first consider what should be done in cases of accidental, sudden, or unexpected bleedings; and, second, how to manage it before, during, and after an operation.

(1.) *Unexpected.*—Try first to get over your fear of it; nothing is so apt to unnerve a lay person—even a nurse, and even still worse, a doctor—than an unexpected gush of blood with its concomitants of fear and fainting. Try to remember, I always tell the students, that every visible bleeding can be stopped, for a time at least, till help comes if you do not lose your heads; and above all, if you insist on seeing it—look at it, do not cover it up; if you try to conceal it by piling on cloths, wadding, handkerchiefs, and the like, they will be soaked, the bleeding will be encouraged, and the patient may die. Look at it, try to trace it to its source, and then put your finger on the place it comes from. Sponge away all the clots which have gathered round the wound, and from under which the blood is oozing; the very exposure of

the bleeding spot to the air may make it stop at once. If it is a shattered limb from which the blood is oozing, get at the artery above the wound and compress it.

You may like to know where to find the great artery of the limb, so that you may compress it with your fingers if you have no tourniquet or rope at hand. All ambulance classes and class-books are supposed to give accurate descriptions of their anatomical situations; but they are probably more ornamental than useful. Practically there are in the upper limb three chief places, according to the position of the bleeding: 1. If it is the hand that is bleeding, you will find the arteries half-an-inch inside of either edge of front of the forearm, just above the wrist. 2. If it is forearm or elbow that is bleeding, you can compress the great vessel of the arm by grasping it firmly in a line just inside of the biceps, the great prominent muscle of the upper arm. 3. If the arm or shoulder is shattered and bleeding, get a big door-key, cover its handle with a handkerchief, and press this firmly into the little hollow or depression just above the collar-bone of the same side of the neck. In the lower limb you cannot easily get the artery to press on,

except just in the hollow of the groin, midway between the projecting spine of the haunch bone and the centre bone.

If help is not near, take a handkerchief, a garter, or piece of rope, anything you can get, tie it tightly round the limb above the wound, and then, putting a stick through it, twist the stick till you have made it so tight that all bleeding ceases. Mind you do this between the wound and the heart—not below the wound, like the poor young surgeon whom John Brown tells of, who lost his head and his patient too.

The great majority of the cases of bleeding you are likely to see will not need such heroic measures—exposure, cold, and the pressure of a bandage or pad will do all.

Venous hæmorrhage needs little more than common sense. Position of the limb—lift the bleeding hand above the head, or even just raise it to the other shoulder, thus bending the arm. Raise the leg, which is bleeding from a varicose ulcer, above the level of the patient's hips, keeping the head down to save a faint, and it will soon stop. Put a bag of ice on, or let a stream of cold water fall over a bleeding surface.

(2.) *Hæmorrhage following an Operation.*—

But let us suppose we have to amputate a limb, let us think how we are to do it with as little bleeding as may be. For this end, can we do anything before the operation? Yes; we may in many cases empty a large part of the blood from the limb. Some recommend for this what is called Esmarch's bandage. A long bandage of pure rubber is carefully applied evenly, but with some force, from the toes upwards to the part where amputation is to be performed. After it has been applied for some minutes, a cord of rubber tubing is applied very firmly round the limb at the upper edge, and when this is secured the bandage is removed. An equally good result is obtained more simply and with less pain, simply by position. Let the limb be raised by assistants and kept at a right angle to the recumbent trunk while the anæsthetic is being given. You will find it blanched and emptied just as well as by the rubber bandage, and with this immense advantage, that the subsequent hæmorrhage after the operation is less difficult to stop, for we find after the tight bandage has been long on, that it seems to paralyze the smaller arteries and prevent them from contracting, and hence more require to be tied,

and more time and blood are lost in the end.

So far before the operation. Now, to prevent bleeding during an operation we must command the vessels. This may be done either by pressure by the finger on the main vessel of the limb, or in a better and firmer way by some mechanical method. The most common used to be what is called *Petit's tourniquet*, familiar to you all, in which by a screw separating two brass frames a loop of strong tape or ribbon can be tightened to any amount you wish, and easily relaxed and retightened again. For most operations this is still most valuable. Of late years many of us use the india-rubber tube known as "Foulis's tourniquet," called after its inventor, the late Dr Foulis of Glasgow. You know with what ease it can be applied and also removed by relaxing the pressure of the little clip. Either of these instruments, if properly applied, give us the power of removing a limb absolutely bloodlessly, during the operation at least.

But, the cutting and sawing being now over, how are we to seal the ends of the vessels and prevent hæmorrhage? First remember Nature's efforts will suffice for all the little arteries. The

contraction of their muscular coats and their retraction into the tissues will give time for a clot to form in their mouths, which will soon seal them up finally and firmly. But for the larger ones, they cannot be let alone, or the patient will soon bleed to death. Our ancestors used to try to cauterize them,—to plunge the stump into boiling pitch, etc., but nowadays we have practically two plans to choose from—torsion or ligature.

Torsion, or twisting, succeeds admirably for small vessels, and in some hospitals is used even for large ones. To do it, you must seize with suitable forceps the exact end of the vessel and twist it round into a sort of rope, either twisting off the end or leaving it, making sure, however, that you twist it so far that it will not uncurl again. In healthy young arteries the method is both easy and safe, but arteries suffering from atheroma are apt to break off short during the process without the bleeding being stopped, and such a failure makes it very difficult to secure the vessel again.

Ligature is practically the easiest, safest, and most effectual mode of sealing a vessel. To do it, we catch the end of the vessel by a pair of forceps, which have a catch so as to hold on by

themselves when once applied, so that the surgeon may put on several very rapidly without waiting to tie any. These are of different patterns, but the ones most usually in use in this school are those invented by M. Pean and improved by Sir Spencer Wells. Having caught the vessel, we draw it out, and then tie round it near the forceps end a piece of silk, flax, or catgut thread, or of tendons or other animal fibre, which we secure with a double knot, making sure that we tie a reef-knot, not a granny. We then free the forceps and go on to the next. Now, what comes of this,—what happens first to the vessel, and second to the string?

1*st*, The vessel. If it is a large one like the femoral or brachial, the very tying of the knot, if we have done it rightly, has divided the more brittle inner and middle coats, has thus puckered them up and brought the inner surfaces of the elastic outer coat in contact. A clot forms in this pouch we have made, and this clot extends backwards in the lumen of the vessel as far as the first large branch. In a few days the clot and the inner surface of the outer coat, with retracted and puckered inner and middle coats,

are found all firmly welded together in an organized fibrous cord. The little piece of vessel beyond the ligature is either absorbed or washed away in the discharges, and all is well.

2nd, What of the piece of ligature? Well, that depends on what it is made of. If of silk or flax, in the great majority of cases it acts as a foreign body, sets up inflammation and eventually suppuration, and at last is washed away in the discharge. In my student days the silk ligatures used to act as a drain for the matter, which was always looked for and expected in every amputation case. They were brought out at the most convenient part of the stump for such drainage. We used to pull gently at times to see if they were loose, and used to treat with great respect the one on the main vessel, which was always furnished with an extra knot at its end so as to be recognised, and till all the ligatures had come away the fear of secondary hæmorrhage remained. Now, however, our ligatures are made of some animal material which we can trust the granulations to absorb or the tissues to encapsule, and thus, whether we use catgut or kangaroo tendon, we cut the ligature short and leave the little knot to look after

itself. If there is suppuration it is often washed away in it. If there is none (as in most tumour cases and many amputations we expect), then the little morsel with the end of the vessel is probably partially absorbed and partially formed into a fibrous cord.

Are there no risks connected with the catgut ligature? Certainly; nothing is perfect, and one is that it may uncoil itself and cause hæmorrhage by not holding long enough; another, that it may be absorbed too soon and give way before the clot is consolidated. Different modes of preparation, now nearly brought to perfection, have made such accidents very rare.

Having thus secured by twisting or tying all the visible vessels, have we done all for the bleeding? Not always; for though during the time we have spent in our manipulations most of the smaller vessels may have contracted and ceased to drop, still some slight oozing of blood may be going on. To stop this, we may pour on the surface either very cold or very hot water. Tepid water will encourage and keep up bleeding. The extremes of temperature consistent with maintaining the vitality will stop it, and curiously enough, very hot water (about 115° or

120°) will do it more safely, surely, and pleasantly than cold. And this washing will help us in our second aim,—that is, to remove all—

II. *Dirt from the Wound.*—Under this we include all foreign bodies, such as cotton from the towel, sand from the sponge, sawdust from the divided bone, and, above all, germs from the atmosphere. The more visible and tangible foreign bodies can be removed easily enough, if only pains be taken to do it; but these germs, they give us anxiety enough, and the practical question we have to settle is, How best to prevent them getting into a wound or harming it after they have got in? We need not greatly care to discuss what is called the germ theory, which some believe in, and some do not; but we may accept it as a valuable *idea* to keep always before our eyes—the prevention of all infection of a wound.

Now a wound may be infected or dirtied in various ways. If we know them, then we can try to prevent them.

1. The *patient* may be dirty, — probably every primary amputation is begrimed with dust, or powder, or mud. Get the wound as clean as possible, and specially the part

of the limb where the amputation is to be done.

2. The *doctor* may be dirty,—he used very often to be very dirty. His hands should be washed with an antiseptic after every patient, and especially before every operation. Nails require great care, and if he has dissected, done a post-mortem, or seen a fever case, his care will need to be redoubled.

3. The *nurse* may be dirty,—in many wards and cases must be at times. She must have clean *aseptic hands* before touching a wound.

4. The *sponges*.—Of all sources of infection this is probably the most dangerous and insidious. No sponge that has ever touched a putrid wound should ever touch another. Do not use sponges at all for dressing. And in operations, if you cannot have a new set for each case, as in private we always try to have, at least make sure that the ones you do use have been thoroughly cleaned by antiseptic solutions, by boiling, by drying—in fact, find out from your hospital authorities the most perfect way of cleaning, and see that it is always done perfectly, and keep them in an airtight antiseptic tin box till required. While sponges are still

required and used in certain operations, in many their places can be taken most cheaply and conveniently by pads of wadding wrapped up in sterilized gauze.

5. The *instruments* used at an operation may convey poison into the wound unless scrupulous cleanliness (a cleanliness that used to be the exception, not the rule) is used. Every hospital worthy of the name, and most surgeons, have their instruments constantly sterilized before every operation in suitable sterilizers, the careful management of which will be often put into your hands, superintended by the staff-nurse. The towels and sheets in which the patient is wrapped need similar care.

6. The *air and walls of the room* may contain septic germs. All old hospitals underlie this risk, and how to avoid it is one of the problems of the day. The spray, now practically abandoned, was the outcome of an attempt to destroy any septic germs in the air over and round the wound and the operator. The antiseptic solution with which we drench and soak every cranny of the wound is the present mode of destroying possible germs which have settled in the wound during the operation. After a very

patient and careful use of the spray for many years, experience showed me it was both useless and unnecessary, and for more than twelve years I have trusted entirely to very careful cleanliness during the operation, and most exact washing of the wound after the operation with a 1-1000 solution of the bichloride of mercury. Iodoform in powder, or mixed with two or three parts of boric powder, makes an admirable dusting application to dry wounds. The first and subsequent dressings are done under the protection of swabs of wadding soaked in the antiseptic solution. There is no risk of septic infection when the wound is looked at, which need be very seldom.

III. *Pus.*—This should be a comparatively rare foreign substance in a wound, but still in many cases a part, at least, of a stump or tumour wound may suppurate, and we must provide for such an occurrence. This we do by leaving a part of the wound not so carefully in apposition as the rest, and not secured by stitches; and if the wound be a deep one, we need the additional assistance of drainage. Drainage is now generally managed by drainage-tubes of various kinds; in the older days the ends of the

ligatures were so utilized, or a piece of oiled lint was laid in a corner of the wound. Now we make them of glass, of india-rubber, of decalcified bone, or of skeins of catgut, or bunches of horse-hair. Each and all of these have their own advantages in different cases; probably the most useful is the india-rubber drain-tube, which can be used of various sizes. Whatever you use, be careful, *first*, not to put it in any position where it may make pressure on a vessel or important organ, as ulceration and hæmorrhage will be sure to result; and, *second*, do not leave the drainage-tube in too long. It is specially too long in when it is lost or forgotten. It is not a pleasant result to find in a post-mortem examination a foot or two of india-rubber tubing forgotten in the chest, or for a surgeon to find that a stump will not heal for months because his assistant forgot to take out the last piece of tube. To avoid such accident, every tube on its insertion should have a long piece of horse-hair or loop of silver wire sewn into its outer end. The tube must, of course, be thoroughly antiseptic when used, and put in soaking in an antiseptic solution.

Before leaving the subject of wounds and

hæmorrhage, we may just say a word here upon a subject of great interest both for medical and surgical nurses. I mean *Aneurism.* Without going into precise anatomical or pathological details, it is enough for you to know that an aneurism is a tumour connected with the lumen of a great bloodvessel, receiving blood from it with an expansile force, so that, unless checked by treatment, its tendency is to constant increase, pressure on important organs, rupture, hæmorrhage, and death. If inside chest or abdomen, these are hardly amenable to surgical treatment, and we try by diet, drugs, and rest to quiet the circulation and induce a cure. In the limbs and neck, however, surgical treatment can be adopted, of two principal kinds, with the same end in view. Our end and object is so far to limit the circulation in the vessel, and consequently in the tumour, as to allow the contained blood to become stagnant, and then to become coagulated. We do this first, if we can, by temporarily compressing the vessel, either by suitable instruments or by the fingers of trained assistants. If this fails, or in cases where this is impossible, we tie the affected vessel between the heart and the tumour with the same object.

Now, here comes the important point for a nurse. How are *you* to treat the limb thus operated on? The surgeon has tied the main artery in its course, and by so doing has for a good end gravely imperilled the vitality of the limb. The patient is put to bed, and under your care. He awakes from the chloroform, and finds his limb cold and numb, almost without feeling, but still very uncomfortable. He calls, as he hears other patients call, for a hot bottle. Are you to give it him? No, certainly not; if you do, you will almost certainly cause gangrene of the limb. You must coax and soothe him, wrap the limb comfortably but not tightly up in a soft covering of cotton wadding, and wait for orders. Again, it is always possible, though not frequent now, that secondary hæmorrhage may take place from the wound where the ligature was applied. This is rare where the wound has been kept aseptic. You must be on your guard, with a tourniquet ready, at the first sign of a drop of blood, so as to secure the vessel above the wound for the time, while you send, *not run*, for assistance; with tourniquet or hand, in every ordinary case, you will be able, if you keep your head, to cope with the bleeding till the doctor comes.

CHAPTER VII.

BURNS AND SCALDS.

THESE injuries are of great importance from their frequency, their severity, their painfulness, their dangers, and their numerous and difficult complications. The term Burn is applied loosely to all injuries by fire, gunpowder, molten metal; the word Scald is more generally reserved for the superficial, though often extensive, separations of cuticle, the result of rapid action of steam, hot water, or hot oil.

Let us begin practically. Suppose that your own dress or that of a friend catches fire, what are you to do? Crush it out at once, if you have presence of mind; but above all remember, avoid any draught of air which fans the flame, and, if possible, exclude all air. Lay your friend down on the floor, wrap her up in the hearthrug or any thick woollen material that may be near. To race off to the top of the stairs and call for assistance is about the worst thing you could

do, as the opened door and the air from the stair will make the clothes burn all the fiercer.

But such an opportunity is not frequent for a nurse, while to treat and manage a burn after it has been done is one of the commonest of a nurse's duties. Before we describe the degrees of burns, remember that you may do any case good or harm according as you act during the first dressing; the great rule for your guidance being in every case, Try to save the cuticle and to exclude, as far as possible, the air. In a word, be exceedingly careful in removing the clothes to cut them off and lift each piece or layer off most gently; and in mild cases, or when the doctor is not present, be prepared with your first dressing to put on at once.

For convenience of classification and description, surgeons are accustomed to speak of burns as of different degrees, according to the depth of tissue involved; and each burn is described as under certain stages, according to the progress of its sloughing or its healing.

The Degrees.—Six in number, and with each we will try to associate the prognosis and appropriate treatment :—

1*st Degree.*—General redness of the cuticle.

Such cases differ in importance according to the amount of surface. A burn with sealing-wax of one's finger will be painful for a few moments and red for a few minutes, but will leave no trace in an hour. A little child's frock may catch fire, blaze up in a moment, cause general redness of the surface, an amount of agony, and what we call shock, that may kill in half an hour; and yet on the little dead body hardly a sign of fire may be visible. In such cases hardly any treatment is needed, except warmth and stimulants to get over the first shock.

2nd Degree.—Elevation of the cuticle into a blister, with effusion of serum below it. This is the most common result of scalds with hot water or oil, and like the first depends for its importance entirely on its extent. If extensive on the trunk in a child or weak person, it may kill very rapidly; but once the shock is over, pain will quickly diminish, and the patient, if properly treated, will rapidly recover, and no traces need in the end be left. In such a case the good nurse will be known by the care with which she removes the clothes and yet does not remove the cuticle. Be ready to puncture the

blisters and let the serum escape, and instantly cover the part to exclude the air. The mode of excluding the air differs in private practice and in hospital, and each hospital may have its own plan. In private practice you must take what you can get—oil, flour, common whitening, and cotton wool may each and all be used. In hospital, Carron oil (olive oil and lime-water in equal parts) is always ready. Strips of lint or linen well soaked in this may be put on with care and gentleness, and cold and air still further excluded by layers of antiseptic wadding (sublimate or salicylic). If the shock is extreme, as in many cases of extensive scalds it will be, the patient must be kept as warm as possible with the head low, hot bottles to the extremities, and ether, brandy, or ammonia should be given in small doses frequently. Opiates should be avoided, especially in children, till the stage of shock is over.

3rd Degree.—In this the true skin is partially destroyed, its upper layers being burnt, and its texture exposed. *4th Degree.*—In it the true skin is entirely destroyed. These two degrees had better be described together as a sort of contrasted parallel, as in actual practice we find

them usually conjoined in the same case—that is, part of the affected skin will be only partially injured, while the rest may be completely destroyed.

The third degree is the more painful of the two, for in it the sensitive nerves of the skin are exposed and irritated. The fourth may be absolutely painless, from the complete destruction of the nerves. We see that practically in cases of application of the actual cautery; if it is done with a firm hand at a white heat, the part is at once reduced to a dead slough, and the operation is almost instantly painless; while if done with a half-heated iron and a shaky hand, the burn may smart for hours.

Burns of third and fourth degrees are both sure to be tedious; but if the slough is once separated, the burn of the third will heal more rapidly, while the progress of the fourth is slow. But by far the most important distinction between them is, that a burn of the third degree will in the end heal with little scar and no contraction of the part around; a big burn of the fourth is always attended by extensive scarring, and most annoying and persistent contractions of the part or limb. Of course such contractions will be even

more likely to follow burns of the fifth and sixth degrees, which we may now describe before going on to treatment of all.

5th Degree.—In it we have cellular tissue, periosteum, or muscles involved. *6th Degree.*—This stage is kept for cases in which the whole thickness of a limb is destroyed. It is rarely seen except in cases of burns in foundry work, where men are caught in escaping molten metal. Any contact with this more than for a few seconds may end in complete destruction of the foot or leg. It is also seen in those curious cases of slow combustion which occur when, drunk or wearied, men lie down with their limbs near slaked lime. A remarkable case of this is recorded in Carpenter's *Physiology*, fourth edition, p. 875. As, however, the fifth and sixth are only severer stages of the third and fourth, and as all four require, in fact, plain treatment of a similar character, we may now discuss it for all, and under three stages, which are necessarily pathological. We have, you will see, a portion of the body which has been destroyed, and which must be removed by the efforts of Nature. It is, in fact, a slough, larger or smaller, according to circumstances. So we have, 1st, a stage

of shock ; 2nd, one of separation, the result of inflammation ; and, 3rd, the stage of suppuration, which is to end either in exhaustion or in cure.

In the first stage of *shock* the patient is cold, almost pulseless ; complains of intense pain and great thirst ; often throws the arms about as a patient does in loss of blood. This stage will last for a longer or shorter time according to the extent of the burn, age and strength of the patient, and must be treated by warmth, diffusible and alcoholic stimulants. If recovered from, it soon passes into the second stage of

Inflammation.—This is indicated by a rising temperature, a bounding and rapid pulse, redness round the burnt part—often by delirium. The delirium may be merely temporary, the result of the fever, or more permanent and dangerous, from an inflammation of the membranes of the brain ; for you must notice that in this stage the internal organs are very apt also to be congested, and to produce marked symptoms.

The lungs often inflame, from the fact that so much of the skin is thrown out of gear and does not do its work, throwing more work on the lungs. The windpipe and bronchial tubes are often locally injured by the effects of flame.

The membranes of brain and brain itself may be inflamed, especially in burns of scalp and neck. The liver is thrown out of gear, and may induce jaundice. One other internal part may inflame, ulcerate, and cause symptoms of a most severe and dangerous character, which a good nurse must look for—I mean the duodenum—which is apt to result in severe hæmorrhage, sometimes indicated by vomiting, when the blood regurgitates into the stomach—more commonly shown in dark-coloured, tarry stools, when the undigested blood passes down the intestines. The slightest indication of any such hæmorrhage must be looked for and reported, and great care must be exercised in the dieting of patients in this stage.

The third stage of *suppuration* (which generally begins about the eighth, tenth, or twelfth day after a burn) is characterized by great exhaustion of the patient—a low, febrile condition, which must be met by nourishing diet, wine, and other support. This exhaustion, of course, may get worse and worse in bad cases, and in all may run the risk of inducing hectic fever. In this third stage a good nurse will show her excellence by feeding her patient, and also by delicacy of touch, rapidity and gentle-

ness in the dressings, which are usually a most painful process. Both nurse and doctor will often be at their wits' end in bad burns to select the best, easiest, and most suitable dressings, so as to encourage the healing process. The benzoated oxide of zinc ointment spread on lint suits some cases; others do well under water dressing carefully and most lightly bandaged. These are the cases that tax a nurse's patience and a doctor's cleverness, and we cannot have a better place than this for describing a process you will often have to watch and dress.

Skin Grafting.—By this we mean the planting out over a raw surface of numerous little pieces of skin derived from a friend, or from another bit of the patient's body. Cutting off a small portion say as large as a threepenny piece, we at once divide it into a very large number of small scraps, each as far as possible consisting of all the skin layers; these we at once plant out on the granulating surface, giving to each a plot of its own as large as a shilling. They do not require much "dibbling in"; it is generally sufficient to push them into the granulations with the blunt end of a probe, and the less bleeding you induce the better. The difficulty now is to

dress them and cover them in without moving them for the first two or three days. Most of you have seen the plan I devised many years ago; in it we cut the thinnest sheet gutta-percha into little squares, each about a quarter of an inch each way, and lay them all over the wound and grafts about four deep. They act as little scales, and play so smoothly on each other that any rubbing of the dressing which we put over them only moves the upper layers against each other, and does not disturb the lower layers or the grafts. The dressing we put above these varies according to the taste of the surgeon. We here find wet boracic lint very convenient and cleanly. Carbolic acid in any form is irritating to the granulations, and, as you know, when applied to a granulating surface, is apt to cause constitutional symptoms. If the grafts succeed, you will find about the fourth day that they look small and transparent, the ghosts of their former selves; but in two or three days more they will be seen as little vascular patches, which in another week will have grown cuticle on their surface, and in time will coalesce and soon heal up the wound.

Another method of grafting often used is the

one devised by Thiersch. After careful antisepsis of the part from which the grafts are to be taken, large sections of true skin are cut with a sharp razor, making quite certain that the whole depth of the skin is not reached. These are floated off the razor on to the surface of the ulcer, which has been previously denuded of granulations by scraping with a sharp spoon, and washed with a sterilized solution of salt. The grafts may adhere *en masse*, in which case much time will be saved to the patient, but the resulting skin is for months very delicate, and requires protection.

Large grafts from the skin of young animals, such as kittens, terrier puppies, and white rats, often can be fixed with success.

A very troublesome result, even of the best-managed and most successful cases of extensive burn, is contraction of the scar. In certain parts of the body these contractions are most annoying, as in the neck, where the chin will be found drawn down, so as actually to alter the shape of the face. In the face, the eyelids are everted and rendered hideous. The arm may be permanently bent at the elbow, the leg at the ham ; fingers may be webbed, and toes puckered. To

avoid such results, the good nurse will watch the progress of the case, and by position, splints, rubbing, and exercise, much may be done.

Effects of Cold, Frostbite, Chilblains.—The effects of extreme cold in many respects so closely imitate both in appearance and result the effects of burns that a few words will suffice on the subject.

In Arctic regions exposure to cold may, and often does, result in an alteration of the circulation of the part, which, if untreated or wrongly treated, rapidly results in frostbite—a sort of gangrene hardly to be distinguished from that which results from a burn of the fourth, fifth, or sixth degree. The part first becomes of a dead white if neglected, or, still worse, if suddenly heated, the vitality is destroyed, and the white becomes black, the edge of healthy tissue becomes red, ulceration is set up, and in time the part will separate, much as in senile gangrene. To prevent this result, the great object is to restore circulation in the part gradually, and practically in these cold countries this is done by gentle friction, generally with snow as a medium, so as to prevent the heat being too suddenly applied.

Where frostbite has once occurred, amputation is generally necessary whenever the line of demarcation is well marked.

In this more temperate country frostbite is rare, but chilblain is very frequent. This, though a trifling ailment, is often very annoying and depressing. It occurs in those whose circulation is naturally slow and defective, and especially in those who have to pass *suddenly* from cold passages or open air into warm rooms. In the most cases it is merely a swollen and red condition of distal parts, such as toes, fingers, ears, or nose, which produces an intolerable itching and tingling whenever the patient becomes comfortably warm. In neglected children these not unfrequently go on to form superficial ulcers, which are often painful, always exceedingly slow to heal, and intractable. To avoid chilblains, the extremities should be warmly and loosely clad; tight kid gloves, elastic-sided boots, etc., should be avoided, and especial care should be taken that when the extremities are cold they should not be thawed too quickly. If your toes are very cold, do not rush straight to the fire; wait near the door for a little first. If you are dressing for dinner with chilled feet,

put them in cold water first before plunging them into a warm foot-bath. Keep up general circulation by tonics—a glass of claret at dinner will sometimes cure a delicate child of chilblains. Locally, the application of tincture of iodine relieves the itching; and stimulating ointments, such as the red oxide of mercury, with rest in bed and warmth, will be needed for the ulcerated cases. A very experienced medical man recommends cajeput oil, vinegar, and whisky in equal parts, as an excellent lotion for the itching. Remember also always to wash weakly children in hot rather than cold water, and even strong children who have a good reaction after a cold bath should be rubbed with a rough towel till in a glow of heat.

CHAPTER VIII.

FRACTURES AND DISLOCATIONS.

FRACTURE, a word derived from the Latin verb to break, is in surgical language applied to broken bones. Fractures of the limbs are important injuries from their effects mechanically in interfering with the patient's power of working the limb; they require much treatment, both from the doctor and the nurse. Fractures of the head, chest, and pelvis are important from their effects on the contained organs, which will require special mention. At present, let us speak of fractures of the limbs.

Varieties.—Fractures are divided into three great classes:—1. Simple; 2. Comminuted; 3. Compound.

1. *Simple.*—In a simple fracture the bone is broken at one place, and the break does not communicate with the external air.

2. *Comminuted.*—The bone is broken in two or more places. This you will see as we go on

is a very serious complication, as the broken fragments may be so separated from each other and from the surrounding part as to be deprived of their vitality, and so the fracture may not heal at all, or heal in a bad position.

3. *Compound.*—In this variety the fractured portion of bone is in communication with the outer air. This is also serious, as implying the risk of suppuration, putrefaction, and all the other resulting accidents.

A fracture may of course be both compound and comminuted. This greatly adds to the danger of the case.

A fracture also may be *complicated* by other injuries, *e.g.*, a dislocation of one of its ends, or by an external wound not communicating with it.

Fractures differ also from their causation. A bone may be broken in either of two ways. A. *Direct* violence, as when in a football match the shin bone is broken by a kick; B. *Indirect*, as when two men are struggling, and one trips the other, breaking the leg above the ankle. In the first of these the soft parts may be bruised and injured, but there may be little displacement; while in the other there may be no bruising, but much tendency to displacement.

Displacement also depends on the direction in which the bone is broken. If it is transverse right across, if you put it right, it will stay in place; but if oblique, it will at once be reproduced when you lay the limb quiet. Such displacements are also caused in various ways,—thus, a broken upper arm will be displaced by any movement of the muscles unless guarded against; a broken thigh will be put in a wrong position by the mere weight of the limb, for the weight will evert the toes and thus displace the broken ends, not only past each other, which the muscles will do, but also in rotative displacement.

This all sounds hard, and more for doctors than for nurses; but you will not be able to nurse a fracture well unless you see all this in the eye of your mind, and know intelligently what it is the surgeon is trying to prevent.

Having thus looked at the varieties and displacements of fractures, let us now see what happens at the seat of a simple fracture for the purpose of cure, and then we will understand what are the duties of the surgeon and the nurse.

To understand what happens at the spot, let

us recall what is the structure of a long bone. It is a hollow tube of mineral matter, permeated in its own texture with vessels, surrounded by a very firm, tough, fibrous envelope or bark called the periosteum, and its hollow filled up by light, very vascular fat.

Once the bone is broken you will see that the soft tissue must be more or less torn, so that blood is effused in the hollow from the fat or marrow, and also between the fibrous membrane and the bone, the periosteum being torn to a greater or less extent. All this causes swelling at the part. If the bone be displaced in the direction of shortening, of course that means added swelling in the direction of thickening or broadening. If all goes well the bleeding will cease, and with rest the swelling will gradually go down ; but the irritation has set up an action by which the periosteum thickens in layers, forming a tough envelope round the part, while the effused blood inside also helps to mat the parts together. In fact, Nature acts on a fracture much in the same way as we fit the two ends of a fishing rod together—by a pin in the centre and a ring outside.

In six weeks all will be firm enough to bear

weight, and in six months or a year the broken part will be as strong as before. But that all this may go right, the surgeon must get the broken fragments into accurate apposition (this we call *setting*), and must keep them so by splints and bandages. With the setting and splinting your responsibility is only that of skilled assistants, who should know what splints are needed and how to pad them. Is it after the surgeon has done his work, and the patient is put to bed, your duty begins? No; your duty begins when the patient comes in, for you may by your management, good or bad, harm or aid your patient to an almost incalculable extent. Now for your duty. 1. A patient is brought in, said to have broken his leg in a railway accident, covered with mud and dirt, cold, pale, and suffering—What is your duty while the doctor is coming? 1. Help his bearers, skilled or unskilled, and the less skilled they are the more they need your help, to lay him down in an easy position, if possible *not* on the bed he is to occupy permanently; be very careful to move the injured limb as little as possible; then, after giving him a drink of water and what he wants, carefully *cut* the clothes from the limb—ripping

the trousers up the seam, and cutting the stocking—not pulling it off, as any undue movement might drive the broken ends of bone through the skin, and thus make a simple into a compound fracture. Having thus exposed the limb, lay it on a pillow in whatever position is easiest to the patient, and see that nothing tight is pressing on it higher up. If you see you can do it without paining, gently sponge and dry the part, and cover it with cotton wadding till the surgeon arrives. Then prepare the bed, putting on a fracture mattress; in private see to it that the hardest and flattest mattress be got and put uppermost. Above all, do not put a fractured thigh or leg on a feather bed. If you have time and know what to select, have splints ready with wadding and bandages. After helping the surgeon and getting the patient to bed, arrange, as far as possible, that movement of the patient for any purpose be avoided or limited. Most hospitals have special beds arranged for fractures, which enable the patient to be easily moved. Now comes, perhaps, the most important part of a nurse's duty to a fracture case, to see that the bandages do not become too tight, and not to let the patient suffer any unnecessary pain, and

at the same time not to run risks of displacement and movement by undue slackening of the bandages.

A good experienced nurse is often trusted with a certain amount of discretion in her own hands as to tightening or loosening the layers of bandages which keep the splints together. My own advice would be, always to give the patient the benefit of any doubt, and if he says the splints are hurting him, the bandages are too tight, to send for the doctor, even at the risk of being thought fussy, rather than let him suffer pain, or possibly cause a slough from pressure.

The nurse's duty in a case of comminuted or compound fracture varies with the severity of the case. It may help your intelligent appreciation of what is aimed at in treatment to tell you what circumstances guide the surgeon in his treatment, and what are the dangers. In a comminuted fracture, from the complex nature of the break, the surgeon has to manage his splints so that the fragments are not unduly displaced or compressed, and especially has to be careful lest great vessels and nerves are pressed upon.

In compound fracture the first object is, if

possible, to get and keep the wound aseptic, for putrefaction and suppuration in a compound fracture of the leg or thigh make it an exceedingly dangerous accident, and often necessitate amputation to save life; so a good nurse, unless the surgeon can be got at once, will at once take care to apply some non-irritating antiseptic to the injured part. In a serious smash, when amputation is probably to follow, her chief object will be as far as possible to save blood to the patient by position, pressure, or tourniquet.

But here you may naturally ask, How are we to recognise a fracture; what are its chief symptoms? 1. In the great majority of fractures you have shortening and at the same time thickening of the limb. This may not be present if the fracture is absolutely transverse, and is not found in fractures of the heel, knee-pan, or tip of elbow, but in most cases it is sufficiently obvious. 2. Crepitus or grating of the fragments: this is in some fractures a very marked and valuable symptom, quite characteristic; but in others, especially those that we call impacted, it is not found, and in all cases it cannot be detected after the first few days have elapsed. 3. Pain on movement and inability for

active movement in the proper direction. 4. Abnormal movements or joint-like yielding in a wrong place.

To go back to our patient, we were to see that the splints did not become too tight in the first few hours, and next we must watch lest, after a few days, they get too loose, for as Nature absorbs the blood at the spot the swelling will gradually begin to disappear. How long must the splints be kept on? The time varies in different bones, at different ages, and with different constitutions, but, as a rule, the larger the bone the longer will it take to knit, and you may take the splints off an arm which will lie in a sling much sooner than off a thigh which is endangered at every movement of the patient. If the fracture implicates important tendons, as at the wrist-joint, you must see that the fingers are not allowed to stiffen; if it is near or into a large joint, as the elbow or knee-joint, you must not postpone passive movement too long, lest the joint be rendered stiff and useless.

Now, were I teaching students, I should need to go very carefully over all the special fractures and the treatment of each, describing the splints and bandages to be used in each case.

For you, just to give you enough interest to guide your nursing, I may point out the special risks and dangers and difficulties of certain common and important fractures.

Fractures of the Skull.—These may be either simple or compound, fissured, punctured, or depressed, and they vary in danger according to the effects thus produced on the enclosed brain. These effects are so important and interesting that I may take this opportunity of saying a few words about them, so that you may recognise them, and be able to distinguish between them, and what they are often confounded with — drunkenness and poisoning by opium. These effects may be either immediate or delayed, temporary or permanent, and go under different names,—names, however, which we must not be slaves to, as the symptoms of one condition are very apt to pass into another. The earliest and most common result of a fracture of skull we call *concussion.*

In this the brain has had a shake, and possibly a good deal more than a shake. The patient is unconscious, pale, cold, with generally contracted pupils and a weak thready pulse. His face is often covered with sweat. By shouting

or pinching you may rouse him to notice a little, but his eyes again close, and he remains insensible. After a shorter or longer interval, if he is to recover, the temperature of the skin returns, probably after vomiting the contents of his stomach, his colour is regained, and he wakens up with a dazed expression, probably unaware of where he is or how the accident happened.

This, you will see, in many respects closely resembles a drunken sleep, or the condition of one poisoned by a narcotic, and it is of the utmost importance that you should distinguish between them, for the emetic or stomach pump required for the poisoned one would be very bad treatment indeed for the fractured skull. Still worse is it if both conditions are present, as, for example, if a man full of alcohol has fallen, and also fractured his skull. In such a case the skull injury may be unrecognised and ignored, till the continuance of the insensibility excites suspicion that there is more than mere drunkenness to account for the symptoms.

The recognition, even for skilled observers, is often very difficult; for you, as nurses, I would advise, in every case of doubt, fear the worse alternative, and get the doctor at once. In

drunkenness you have the odour of alcohol and often the history given by his friends. In opium poisoning, you have the pupils contracted to a pin point, the livid, almost blue colour of the skin, the slow respiration, and in later stages, the weak pulse.

What are a nurse's duties in a case of fracture of skull before the doctor comes? Having put the patient to bed in a quiet, dark place, see that nothing tight is round neck or waist. If there is an open wound, put on some mild antiseptic dressing as in any other compound fracture. If it is a fracture of the base of the cranium with no wound, there will probably be bleeding, or at least welling of a blood-coloured serum from one or both ears. It is of most vital importance that the blood or serum be not allowed to putrefy; if it does, it will inevitably set up inflammatory mischief in the membranes of the brain. If it can be kept sweet, the patient may recover. Cleanse the external ear, and put in it a small pad of lint soaked in carbolized oil, and over this put a pad of antiseptic wool or gauze, keeping it in position with a bandage. In female patients evacuate the bladder, if necessary, by a catheter.

Compression of the Brain is another condition

which, as a result of depressed fracture, hæmorrhage, or inflammation, is not uncommon in head injuries. When caused by the depression of a fracture, it may be instantaneous in its coming on. When the result of hæmorrhage, it may be more slow, perhaps taking minutes, or even hours, to appear. When the result of inflammation and suppuration, it may not supervene till from the sixth to tenth day after the injury, and is then attended by constitutional symptoms of great severity. A patient suffering from compression generally lies quite unconscious on his back, with livid face and breathing of a peculiar snoring, slow character. His pupils are sometimes both dilated, sometimes unequal. You cannot rouse him from his condition, which, unless treated, will pass on to death.

Fractures of Jaws and Bones of the Face.— These are sometimes most severe and dreadful looking accidents, often compound and comminuted, as when caused by a kick by a horse or a blow with the handle of a crane. The one caution I give to students and may give to you is, never despair of them, and never try to remove any loose bits of bone so long as they have any attachment at all. Try to put them

in place, stitch up the skin most carefully and neatly, and you will be both surprised and delighted with the unexpectedly good results you may get.

If the lower jaw is broken or movable, till the doctor comes keep it in position with a soft handkerchief tied over top of head, or a 4-tailed bandage.

Fractures of Breast-bone and Ribs.—These vary much in their severity and danger according to the force applied, the number broken, and the amount of displacement. Their importance depends on the amount of injury to the organs contained in the chest, the heart and lungs, but especially the latter. If the pleura (the lining membrane which covers both the inside of the chest-wall and the outside of the lungs) is not injured, then there are few symptoms, and there is little danger. In such a case the patient will have difficulty and pain when he coughs or takes a long breath; he will point to one or more spots tender to the touch, and that will be all. You will treat such a case by (as far as possible) preventing movement of the chest-wall of the injured side, by putting on plasters, extending parallel with the ribs from spine to breast-bone,

overlapping each other in layers. You will put a firm, comfortable flannel bandage all round the chest, and the patient will soon tell you he hardly feels it now, and will be fit for work in a few days.

It is very different and far more serious when the fracture has been more extensive, and the broken fragments have penetrated the lining membrane of the lung, and thus wounded that vascular organ ; for, as a result, numerous and dangerous complications will follow. Think for a moment what the lung is. It is the part where the blood of the body meets the air to be purified, and for this meeting the tissue of the lungs is exceedingly vascular, and the walls both of the air-tubes and of the finer bloodvessels are very thin and fragile.

These being wounded, first the *blood* escapes into the air-passages, causing cough, difficulty of breathing, and frothy expectoration of a red colour : this we call HÆMOPTYSIS. If the wound be a large one, the blood may also, secondly, escape into the pleural cavity—that is, between the lung and the chest-wall, in which case we have what is called HÆMOTHORAX. In some rare cases, where the rib-fracture is a com-

pound one, there may be external hæmorrhage from the lung substance. Now, in the same way as blood may escape and get into a wrong place, so the *air* of the lung may also escape and do harm. It may do this in two ways—first, it also may escape into the chest, between the pleuræ of the wall and the lung, and cause PNEUMOTHORAX, and it also may be pressed into the cellular tissue round the broken part of the rib and cause EMPHYSEMA. Thus we have four puzzling words in big capitals: let me tell you what they are, how to know them, and how to treat them.

1. HÆMOPTYSIS—spitting of blood, or rather of blood mixed with air, frothy blood. This is alarming to patient and bystander. What can you do? Not very much. The patient should lie still, but often cannot from the breathless feeling induced. Apply cold externally and internally; let him suck ice in absolute silence, and, as a rule, the bleeding soon stops.

2. HÆMOTHORAX.—If extensive, most dangerous, for it implies two things: one is, that the patient is losing blood rapidly into his own chest, and thus he is pale, feeble, apt to faint, and to throw his arms about; and also, secondly,

the blood presses on the lungs, and by its presence prevents them from acting, so he is oppressed and breathless as well as faint.

The doctor will recognise it by all those signs, and also by the fact that the affected side of the chest is *dull*, and that he can hear no breathing there. What are you to do? Warmth to feet and hands to relieve the congestion of the circulation—give him ether, or even brandy in emergency, and make him comfortable by pillows.

3. PNEUMOTHORAX.—In it the lung is pressed on and rendered useless as in the last case, but as it is air that does it, there is no dulness, and the patient not losing blood is not so weak. Still, this may for the time give rise to very alarming symptoms, specially difficulty of breathing. The patient will gasp for breath, sit up supported by pillows, and look very ill. Diffusible stimulants, such as ether, will be needed. The surgeon sometimes has to let out the air by a fine trocar or aspirator needle. The nurse must do her best to keep feet and hands warm, and to support the patient with pillows.

4. EMPHYSEMA is the name given to air in the cellular tissue. This occurs in surgery in

various ways, but most commonly from a wound of the lung by a broken rib, which allows the air to escape from the lung into the pleura at each *in*spiration, while at each *ex*piration this air is forced, not back into the lung, the wound of which is closed as by a valve, but out through the wound in the wall into the cellular tissue. In extreme cases the patient's cellular tissue is blown up in the most extraordinary way, giving him a most ridiculous appearance,—the air, which is recognised by its peculiar crackly feel, extending all over the body except to the scalp and palms of hands and soles of feet. An odd proposal has been made, apparently seriously, that, in cases of shipwreck, every wise passenger, having previously provided himself with a suitable trocar, should cause an artificial emphysema, and thus quite prevent any risk of sinking.

Emphysema requires little treatment; in most cases it will suffice to apply a pad, kept in position by plaster or bandage over the broken rib to prevent further extension, and the air soon becomes absorbed. In more severe cases it is occasionally recommended to evacuate the air by punctures or small incisions, but I have never required to do this in any case.

Fractures of the Pelvis.—From the enormous strength of the bones of the pelvis and their firm union, fractures of them imply great force and weight as causes, and hence serious risks, and the importance to life of the contained organs is also a great source of danger. Practically, for both nurse and surgeon, the first point in such a case is to discover whether or not the bladder is wounded or ruptured, and whether the urethra has been torn. So much hinges on the immediate discovery of this, that in any case, if it is possible that such injury may have taken place, a good nurse should at once get the surgeon *before* allowing the patient to attempt to relieve the bladder. Absolute rest is required in all pelvic fractures; firm bandages applied round the bones; great attention will be needed to prevent bed-sores.

While it does not come under a nurse's duties to recognise or set fractures of the limbs, a single word here upon the special risks of certain fractures, and how the nurse may aid in avoiding bad results. Take the arm first—

Scapula, or blade-bone—when it is broken there is often injury of the chest and ribs with it, and its fracture implies considerable

violence. Careful bandaging and padding will be needed.

Clavicle, or collar-bone, will need comfortable slings, and the dressings put on by the surgeon are very apt to chafe the neck or armpit. A little care from the nurse may save much discomfort.

Humerus, or arm-bone. In fractures of this bone the chief risk is non-union from undue movement on patient's part. A nurse will see to it that bandages do not slip, and that the arm is kept carefully slung.

At Elbow-Joint.—There is one, the fracture of the tip of the elbow or olecranon, which has often to be put up for the first few days in the extended posture, and if the patient is allowed to get about with the hand hanging low it is very apt to swell, and thus tighten the bandages so much as to risk gangrene or at least ulceration. The nurse should look out for this, and by putting the patient to bed and raising the limb the swelling can be diminished.

There are other fractures of the arm-bone within the joint which are apt to be followed by stiffness of the joint. Unless these are carefully

watched by nurse and surgeon, the weight of the arm and neglect on part of the patient often cause the forearm to hang down, and thus the elbow-joint becomes stiff in the very worst position, partially or nearly straight. Your efforts ought to be directed at keeping the forearm quite at a right angle to the arm, and, with the surgeon's approval, making passive movement to prevent stiffness.

Radius and Ulna.—The special dangers in fractures of these bones are,—(1.) If the splints are too narrow, the broken fragments may be driven together and thus motion lost. (2.) If the bandages are too tight, the vitality may be destroyed. (3.) If the splints are kept too long on, the fingers may be stiff. These cases are generally treated as out-patients of a hospital, and the nurse may do good service by seeing that they come back soon enough and often enough, and that the surgeon's attention is directed to the above points. Fractures of the hand and fingers have no special dangers, except that the general tendency is to keep on splints too long without movement, and thus to risk stiffness of the tendons in their sheaths.

In the Lower Extremities.

Fracture of Neck of Femur or Thigh Bone.—This is a very common accident in old people, especially old women, and the nursing is the most important element in the case. For there are two special dangers. (1.) The long lying on the back in an old person is very apt to cause bed-sores of the most trying kind, rapid in occurrence, and very difficult to heal. Cleanliness, dryness, a water-bed, and the most scrupulous attention to the tiniest chafe of skin, will be needed. Paint the skin with whisky and white of egg in equal parts. (2.) The lying in bed is very apt to bring on in the old person a low form of congestive pneumonia, the symptoms of which the nurse must notice and report.

Fracture of the Shaft.—These injuries, often in muscular adults unaccustomed to bed and apt to be restless, will require much patience and watching on the nurse's part to see that the weights and pulleys remain adjusted, that the splints do not slip, and that the skin is not chafed by the bandages. The bed must be kept dry and *flat;* an ill-arranged bed which allows the hips to sink into a hollow will be certainly followed by a badly-mended fracture.

Fractures of the Patella or Kneepan vary much according to the manner of their causation. When the result of muscular exertion, such as a sudden jerk or strain, as when a footman tries to save himself and his tray from falling downstairs, the chief aim of the surgeon is to replace and keep the fragments together, and the nurse has often little to do except watch the bandages. But when the kneepan has been broken by a severe fall or blow, the case is much more serious. The joint is often filled with blood and synovial fluid. Inflammation may follow, and in such cases the nurse will have to attend to icebags, or poultices, or hot fomentations, according to the treatment adopted, and will have to be very careful lest any dressings or bandages get too tight, as they in such cases are very apt to do.

Fractures of the Bones of the Leg.—These are treated in some hospitals by plaster of Paris splints put on over flannel. These will need attention, lest, in the first place, they are too tight, and, in later stages, too loose as the swelling disappears. In Edinburgh the box splint is the most common mode of treatment, swung in a Salter swing. This, if properly

applied, is very comfortable, and allows the patient to move his body easily. The nurse must notice lest the heel be allowed to be depressed, and must guard against any pressure on the prominences of knee, ankle, or heel.

Fractures of Bones of Foot are generally caused by direct violence and complicated by swelling and bruising. In such cases, when the swelling is severe, the nurse may get the case and be ordered to foment it steadily till swelling disappears. It will be her duty to watch its disappearance, and warn the surgeon of any deformity or appearance of displacement.

Injuries of Joints.

We have seen that bones may be broken. Joints may be *dislocated*,—that is, the joint surfaces which naturally are in contact are displaced and separated from each other. They may also be *sprained*,—that is, the ligaments which bind the joints together may be lacerated or stretched. The joints we call ball-and-socket ones, as shoulder and hip, are most frequently dislocated. Hinge joints, such as knee, ankle, and wrist, are more frequently sprained. The elbow-joint, from the manner in

which its bones are locked, is often badly bruised, and often has its bones broken into it, but is less frequently either sprained or dislocated.

Dislocations require the surgeon to replace them, but the good nurse will soothe the pain till the surgeon comes, by fomentations, and pillows in an easy position, and after it is replaced she will have to see that the retaining bandages are both firm and comfortable. *Sprains* will require different treatment according to their age and severity. A quite recent one, seen at once before swelling has had time to appear, will be best treated by a firm wetted bandage put on at once, with a little cotton wadding to protect any prominent bones. An older sprain will need hot fomentations to reduce the swelling and relieve the pain. A still more chronic one will require the gentlest of rubbing and the most educated manipulations to remove chronic deposit in the sheaths of the tendons and to break up false adhesions. A well-educated surgeon and nurse ought between them to beat the so-called bone-setters in their own domain, and cure patients who have had old sprains without either danger or quackery.

CHAPTER IX.

TUMOURS.

WHILE it is no part of a nurse's duty either to diagnose or to treat a tumour, it still adds so much to your interest in your work to know something of the nature and dangers of morbid growths, that I venture to try, difficult as it is, to give you a general idea of what we call tumours, their varieties, and their possible effects, as these bear on surgical treatment. Anything like a scientific account of their nomenclature and pathology would be as unnecessary as it would be difficult; indeed, no one can understand any classification, however simple, without a full knowledge of anatomy, development, and the elements at least of surgical pathology. In one point you may be comforted, that most schools, and almost all teachers, have their own classifications, and that names given to-day, or here, you may be pretty certain will differ very much from those given to-morrow, and anywhere else.

What is a *tumour?* Now here, at first, is a difficult question to answer. Its etymology would answer, it is a swelling or swollen part; but many swollen parts are not tumours, and many so-called tumours are not even swollen. Inflammation may cause a swelling which will soon disappear, and is not a tumour. Many a cancerous breast is actually smaller to look at, though harder to the feel than the other one. A swelling will not do. One short definition has been given, "A mass of new formation that tends to grow and persist." Even that is not always true or even at any time exact, for if we look at the anatomy of tumours we find that all have their type in some natural tissue of the body, so that it is only by a stretch of words that we can call them new, and some, after a certain stage, do not grow at all. Let us, for want of a better definition, take that, however, to start with. We now find that one vital question meets us at once—Will the new formation in its growth and persistence do harm or not? Is it simple or benign? Or is it malignant? Practically, we have to ask that question of all tumours, and on the answer to this our treatment of each mainly hinges.

A malignant tumour is one that sooner or later will destroy tissue and shorten life. A simple one will grow and may be troublesome, unsightly, annoying perhaps, yet in its progress will neither destroy tissue nor necessarily shorten life. And, practically, all tumours can be classed under one or other of these heads. There may be a few on the borderland between them which may have symptoms of each.

What are these symptoms? Malignant tumours have certain definite characters which simple tumours do not possess—in fact, the simple may be described almost by negatives:—

1. Malignant tumours tend to *infiltrate*, *i.e.*, while the simple one grows in its own tissue, often surrounded by its own special covering or coat, which grows with it and keeps it isolated, so that it will still shell out if cut upon, the malignant tumour very early becomes adherent, sends out feelers, roots, claw-like processes (hence the name cancer, a crab), which insert themselves into the adjoining tissues, and soon complicate everything in an inextricable network of disease.

Hence 2. Malignant tumours tend to *recur* locally, *i.e.*, even after apparently complete

removal new tumours form at the spot. This really means that the removal had only been apparently complete and that roots had been left. Simple tumours rarely recur locally, because so much more easily removed completely.

3. Malignant tumours tend to spread, not only locally but along the *lymphatics*, to the nearest lymphatic glands, and by the bloodvessels, even to remote parts. You all remember how instinctively the surgeon, when he sees or handles a cancer of the breast, at once slips his hand into the armpit or above the collar bone to feel what the lymphatic glands are doing.

4. Malignant tumours tend, when rapidly growing, to *ulcerate* and *fungate*, *i.e.*, when the skin is stretched over and infiltrated by a malignant tumour, it will give way and ulcerate, the tumour will push its way through the aperture, project like a mushroom with a narrow neck and a flat top, will bleed and suppurate. A simple tumour, however big it grow, and though it stretch the skin nearly to bursting, will neither ulcerate nor fungate.

5. Malignant tumours, as a result of all these bad qualities and tendencies, sooner or later by

infecting the system, impoverishing the blood, and torturing the nerves, cause a peculiar *cachexia* or bad habit of body, which is soon both characteristic and fatal.

6. While some simple tumours, such as wens and fatty tumours, tend to run in families and be hereditary, there is no doubt that malignant tumours, or at least the tendency to the formation of malignant tumours, is much more of a hereditary possession or curse.

Having started with this great practical clinical division of all tumours which governs the prognosis and treatment, let me very briefly tell you of some of the more common, interesting, and typical varieties of tumours you will meet with in your work.

1. *Cysts of various kinds.*—By this we mean tumours which are membranous bags, with walls of greater or less thickness containing fluid, semi-fluid, or porridge-like contents, and sometimes other solid growths growing from their walls.

A very common kind is met with in *Bursal Cysts*, such as a housemaid's knee or a miner's elbow, in which, as a result of pressure, more or less severe and continuous, the little bag which,

in health, contains just enough fluid to let its walls play easily on each other, becomes tense and swollen, suppurates, or thickens into a hard tumour.

Another form you find in the ganglion, so common in the tendons of back of hand and wrist.

Another form, called Retention Cysts, you find in the hairy scalp. We call them Wens, and you must have often seen the surgeon remove the white glistening bag containing a porridge-like content, often horribly putrid. Another form is not uncommon under the tongue, to which the name of Ranula (little frog) is given. Ovarian cysts, though of many kinds and varied contents, give you a good idea of cysts and the different methods in which they may fill and develop.

Other cysts depend on the presence in the body of parasites in various stages of their life —hydatids, etc.

2. *Solid Tumours* of simple structure. *Fibrous* tumours, often seen in the uterus, in bark of bone, in sheaths of nerves.

Fatty tumours growing in the ordinary subcutaneous fat in parts of body liable to pressure, such as shoulders, waist, neck ; often very

numerous, and perhaps unsightly, and yet capable of free and safe removal.

Cartilaginous or enchondromata, growing from bone near joints, seen in children and youths, smooth, hard, firm, often multiple.

Osteomatous, bony, and from bone, exostosis. *Neuromata*, or tumours made up of nerve tissue. *Angiomata*, of bloodvessels, capillaries, etc., such as nævi and mother-marks of all kinds. *Myomata*, from muscles.

Malignant solid tumours are of two great classes, Sarcomata and Carcinomata—clinically, that is from our point of view as to how to treat them, and what is to come of the patient, they closely resemble each other; though under the microscope, and in some little details of their ways of wickedness, they vary much.

Practically now you will be ready to ask one or two questions,—1. What causes tumours? 2. What are we to do for them?

1. *Causation.*—Some of the simple ones, especially the cysts, we can try to explain. Some of the malignant ones seem to start from the blood effused after a blow, or from the irritation of some permanent or frequent irritant. Thus certain cancers of lip and tongue

seem to be caused by irritation of a hot or dirty pipe. Chimney-sweep's cancer has ceased since sweeps no longer climb chimneys but sweep them with a brush, and thus can keep their bodies clean. I have described elsewhere a form of epithelioma, the result of the irritation of certain paraffin products on the skin. But when all is said and done, our knowledge of the causation of tumours is both small and unsatisfactory.

2. *Treatment.*—I think we may sum that up in a very few words. Given a tumour, the sooner it is removed the better, for the sooner a simple tumour is taken away the easier is the operation and the less the risk; and if it is malignant, if you do not remove it early you need hardly remove it at all, for it soon infects the part, the glands, the bloodvessels, and the whole system, and we may formulate it as a rule, that if you cannot completely clear away a malignant disease, it will in most cases be safest to leave it alone. There may be exceptions to this rule, but they are rare. We may sweep away a great bleeding cancer to relieve pain or putrescence, but the operation will rarely prolong and may shorten life.

Nursing of incurable Cancer Cases.—Some of the most trying and difficult cases which may fall to a nurse in the course of her work are those of recurrent cancer in the breast and armpit, and cases of cancer of the womb. For the breast cases are apt to be very fœtid, often bleed, and when the glands in the armpit become enlarged and adherent, they press on the vein of the arm and cause great swelling from the fingers upwards. All these conditions will tax all a nurse's care and patience. For the fœtor of the ulcerated breast, poultices of boric lint, of charcoal, or of yeast may be tried in turn. For the bleeding you may have to use styptics of various kinds, pressure, and cold. For the swollen arm, the best regular treatment is support by very careful and neat bandaging. When it becomes very tense, frequent punctures in varying places by a fine needle or a Southey's trocar may be of temporary service.

In advanced cases of womb cancer, your great resource will be found in hot douching with boric solution, and in the most scrupulous cleanliness of the part, and great attention to the back and hips. The doctor will give you various disinfectants to use, both for the bed and the room.

CHAPTER X.

SPECIAL OPERATIONS.

FOR the intelligent nursing of certain important surgical cases and operations very special training is needed, which you must try to get from the senior staff nurses, from the residents, and even a few most precious hints from the acting surgeon himself; but there are certain operations of daily occurrence, and hence of vast importance, regarding which I may now give you a few hints.

Amputation.—A limb is obviously doomed, and you have sent for the surgeon—What are you to prepare? Patient, instruments, table, sponges, dressings, and bed.

Patient.—If you are warned the day before, see that his bowels are emptied, and that he gets no food for at least three hours before the chloroform begins. Wash him all if possible, and his limb specially. If it is a primary, and you have no warning, clean him as best you can.

Instruments.—In a large hospital, the house-surgeon and instrument clerk will take all the responsibility ; but often it is your work to lay the instruments out, and if so, I would advise you to have a list written or printed, and see that everything is on the tray that is in the list. Above all, see to their absolute perfect cleanliness, and have your antiseptic solution ready to dip them in.

Table.—The table will be your care. See that you have dry, warmed blankets and macintosh sheet ready, and plenty of pillows.

Sponges.—After what I said before, I hope you will remember about the absolute necessity that your sponges be antiseptic. If a sponge falls on the floor or into the sawdust-box, do not hand it again to the surgeon ; put it away. Hand sponges quite dry. In many hospitals no sponges are now used, gauze and wood-wool pads or sublimate wadding taking their place.

Dressings.—Leave nothing to chance ; have everything that the surgeon can possibly ask for ready; do not need to rush to the press in a hurry. Note one trivial detail in preparing a gauze dressing for a thigh-amputation : remember to make it big enough, measure the circumference, and make the dressing at least one-third larger.

Bed.—Have it prepared for his return whenever the patient is lifted off it to the table. Have your macintosh sheet under the draw sheet. Have a small pillow to lay under the stump, also covered by some waterproof material. Have your hot bottles ready filled to lay near the patient ; in fact, have them lying in the bed where he is to lie, but, remember, do not put them too near him or too hot. After the chloroform and the shock *he* will not notice that they are too hot or near, and you may inflict a dangerous burn by inattention to this. If the amputation is a primary one, involving much shock, have your hypodermic needle and the ether bottle ready, and the enema syringe, with beef-tea, brandy, and hot water ready. You will not have time to run for them when needed.

Hernia.—Another surgical malady frequently requiring operative interference is Hernia, regarding the recognition and nursing of which I would like to say a few words. A hernia or rupture is a protrusion of a portion of the contents of the abdomen through the wall. The most common contents of a hernia is a loop of small intestine, and the results of such protrusion are, under certain conditions, apt to be danger-

ous, and if unrecognised and unrelieved, quickly fatal. The protrusion takes place either in the groin, in the lower part of the front of the abdomen, or at the navel. A very dangerous protrusion may be small in size, so as not to be readily observed, and from its situation, a female patient, from motives of delicacy, is apt to try to conceal its existence ; so I want you to remember that, in every case where certain symptoms are present, it is a nurse's duty to think of the possibility of a hernia being the cause, and in the female at once to search for it. Now, what are these symptoms?—1. Vomiting, if prolonged or severe, is the most important. The vomiting of a hernia is characteristic enough, for it is not the mere stomach emptying of a catarrh of the stomach or an indigestion, but it is persistent—first, food comes up, then bile and mucus, and then the contents of the intestine, always becoming more and more fæcal in character and appearance. 2. Pain, a twisting, burning pain, referred not so much to the special seat of the rupture, but to the umbilicus. 3. Constipation—medicines, if given by mistake, will not act, and enemata will relieve only the lower bowel. These symptoms, then, being present, you must

at once ask the patient if she has any lump or tumour, however small, in groin or belly, and at once proceed to examine ; and if you find one, however small, even not bigger than a filbert, at once tell the doctor. You may save many a life by never forgetting this.

Having discovered the tumour and sent for the doctor, can you do anything in the meantime? Yes ; put an ice-bag on the tumour, and see that the patient puts as little as possible into her stomach,—a morsel of ice to suck, no food, no big drinks of water, and, above all, no physic. The doctor will come and probably operate. What are you to attend to afterwards? Well, nothing very special,—absolute rest, and pretty complete starvation for a day or two. He will tell what physic to give and not to give, but remember never to give any purgative medicine without special orders.

Fanciful patients who beg for little luxuries, foolish friends who bring in rubbish, are both dangerous in hernia cases. If the doctor has given leave for a grape or two, see that neither skin nor stone go down by chance. Watch the children's relatives if your patient is a child ; for remember that in every case of hernia operation

you have peritonitis as a risk in the immediate background, and a very small indiscretion may either cause it or increase it.

Harelip.—You all know the varieties of this deformity, and before you have been long in hospital, and you have probably seen the operation for its relief. One or two points of importance when the child is handed over to your care. It is probably a very young infant, and will need to be held in your arms a good deal for the first few days; indeed, a bad case needs a special nurse. One danger at first is that the child's respiration is apt to be interfered with. It began life with a mouth that it couldn't shut, with a very large opening for air. Often the nostrils are in these cases very small, and the surgeon has now closed the upper lip, and possibly blood has clotted in and diminished the room in the nostrils. The child is weak with loss of blood, and still partially under chloroform—see that it does not die. Make quite sure that the mouth opens to let in lots of air. This is easily done by pressing gently on its chin, so as to pull down the lower lip. One ward sister has suggested a piece of plaster should be fixed on lower lip, and fastened below the chin. Three cases at least have died

from above cause. The feeding of a child after the operation for harelip is sometimes very difficult and troublesome, to avoid stretching the sutures uniting the cleft. If the feeding-bottle does not draw easily, then a spoon must be tried, keeping the lower lip well depressed.

Tracheotomy.—Above all other operations tracheotomy is the one of haste and emergency; done in hospital often by the resident surgeon, at any hour, and at a moment's notice, with perhaps only nurse for an assistant, it is an operation of considerable difficulty and great danger in some cases, needing the most careful and efficient nursing if it is to be successful.

We do it for croup, diphtheria, laryngitis, foreign body in the windpipe, etc., but the nurse's cases are the croup and diphtheria ones. Let us suppose, then, you are left as night nurse in special charge of a case of croup or diphtheria. The child is in its little cot or tent; the steam kettle is going; you are on the watch. What symptoms will make you call the doctor? The breathing is laboured, the voice is harsh, the cough when it comes clanks and clangs with a brassy bell-like note,—all this you know; but if you see the eyes becoming lustreless and the

whites reddish, the lips blue, and, above all, if you see at each breath the ribs lifting and the side of the chest tucked in, then see that the doctor is sent for. Are you to help him? Your chief and most important duty will be to hold the child and steady the head and neck. Wrap it up in a sheet, so that by pinning the sheet you can restrain its hands and limbs; bare the little fat neck to the chest; hold the head absolutely straight, watching the cleft of the chin in the same line *exactly* with the upper cleft of the breast-bone; and to project the neck forward, if you have not a little round pillow to put behind, make one of a folded sheet or of your own left arm. Remember absolute steadiness of your hands and of the patient's neck.

If you have all the necessary instruments in your apron pocket, as I have seen my own staff nurse have, so much the better; but such promptitude is not for all. Still, have all ready on a tray, with sponges of different sizes—one or two on small handles may be useful.

The operation is successfully over: that you have not to do with; but the harder task, the nursing, falls to you under three heads:—

1. *The Tube.*—The silver tube is in, both outer

and inner. You have to keep the outer firmly fastened, and yet not too tight to hurt the neck, and you have to take the inner out every few minutes to clean from it the thick mucus, and keep the breathing free—a troublesome, tedious task.

2. *The Room.*—It must be kept both warm and moist: warm, you must watch your thermometer and your fire, and keep it perhaps to 70° ; moist, your little kettle must be kept going.

3. *The Nourishment of the Child.*—You will be told what to give, but you have to give it regularly, gently, and cleanly, and it is not an easy task. No selfish or careless woman ought to nurse a tracheotomy case.

One word now on your duty to yourself. No nurse or doctor either should think much of self or of self-preservation. That is not our business, which is to cure our patients. Still no unnecessary risks should be run, and in tracheotomy for diphtheria it is right to remind you that both nurse and doctor run risks of infection, if by any chances the membrane or mucus be blown out of the tube with force, and thus enter either mouth or eyes. When the tube is being inserted there is generally a great rush of bloody mucus,

most infectious, so keep back your head, it is just the moment when you are apt to put it forward most eagerly; also when cleaning or changing the tube, just keep your face out of the direct line of fire. Do not kiss the child at all, as your tender heart may wish to show your sympathy.

In all cases when you have to dress or touch poisonous and putrid cases, just be careful first to see that you have no abraded cuticle, no rag-nail, needle-prick, or raw blister; wash your hand in ammonia, or some such fluid that will nip a scratch; it will soon tell you if any exist, and if they are present, see that they are made safe.

You will ask, How can we make it safe? Protect it, either by getting a scab on it, as by touching it with a piece of solid caustic, or by making an artificial impervious covering. A fingerstool of protective does well, but requires frequent renewings and dressing. A solution of guttapercha in chloroform painted on pretty thickly will last well, and flexile collodion will also do. Above all things, attention to the general health, fresh air, and exercise will keep you in such a condition that you will have comparatively little risk of such poisoning.

Many a good nurse has been off duty for weeks, and perhaps had a shattered constitution, from neglect of such simple precautions. And, above all, if you have a scratch or poisoned wound, do not doctor it yourself, but let your matron or surgeon see it at once. A stitch in time saves nine.

CHAPTER XI.

THE SURGICAL NURSING OF CHILDREN.

IN a children's surgical ward one or two diseases deserve a special word or two.

Joint diseases, very frequent and very trying. Hips, knees, elbows, ankles, more rarely wrists and shoulders. Hips far the most frequent. Let us take a hip case, and try to understand it. The child has had a fall; perhaps a slight one and not specially noticed, and yet the child begins to limp, turning out its affected limb, and complaining of obscure pain, often in the knee. If there is a bed to spare, it is taken in; an extension apparatus put on; the foot of the bed is so much raised as to make the body a counter-extending force, and sufficient weight is hung over the pulley to make the limb straight and comfortable. If the case has been seen early enough, and the constitution is fairly good, possibly a rapid cure may follow. But, more probably, the case has been too long de-

layed ; and even after the weight is on, the night nurse will have to report that the new hip case every now and then, after falling apparently sound asleep, woke up with a start and a cry, and took some time to fall asleep again. Now what is this? How are you to explain it? It means that the delicate cartilage of the joint, or at least the bone immediately under the cartilage, and through which it is nourished, has become diseased. While the child is awake, it is able by a sort of involuntary guardianship so to watch and check the movements of its muscles as to prevent them jarring the tender cartilages against each other, but whenever this watchfulness is relaxed by sleep the muscles jump, and the joint is jarred, with the pain as a result. This, a bad symptom, will need a heavier weight, perhaps more elaborate splints and bandages, and also implies a further risk. Such cases will need very gentle, firm, and patient handling when they need to be moved in any way, and a well-taught strong nurse can do much to save pain.

Even at this stage things may get right, and the joint recover perhaps entirely, perhaps only as a stiff joint and withered limb; but many such cases go on from bad to worse, and the next

thing you will need to look out for and tell the doctor of is an abscess. Sometimes the child's look, high pulse, and jumping temperature will warn you of it; sometimes it is slow and insidious, and only to be recognised by feeling the fluctuation or seeing the swelling. Once recognised, it must be opened, and then the case is a more difficult one both to dress and to nurse.

In a former chapter I spoke of antiseptics. They vary in different hospitals and under different surgeons. Your duty is to use the one you are told to use, and to obey orders exactly; but as a nurse in the dressing of such a case as I have described you can do much to save pain. Realize the state of affairs: The child must be raised to get the bandages changed; try to raise it in such a way that the diseased joint or the excised joint shall not be moved. To do this you must raise the body, while with your hand, or still better, by your assistant nurse, the affected limb is firmly but gently extended. When the child is older or heavy, a well-padded little stool to rest the loins on will make the weight easier to support.

The other joints are to be nursed on the same

principles, but are all much easier to manage. You are often ordered to put dressings or splints on the knee-joint. Remember to pad well the splints over the prominences of the bones, often thin enough in little delicate children; and especially remember that at the back of the knee-joint over the hamstring tendons the skin is very thin, and apt to be chafed, and even ulcerated. So is the back of the heel in a delicate child who has to lie long on its back. When the surgeon is dressing an excised elbow you will have to hold the limb; and it is not an easy business, for, when holding the forearm by its middle, unless you take care the weight of the hand will tend to displace the upper ends of the bones of the forearm whenever the dressings are shifted. Keep your mental eye steadily on the three bones' ends which compose the excised joint, and determine that they are not to move. You are standing on the far side of the bed, and have to lean over the patient, so your back will be tired enough often before the dressing is over.

Spine diseases are also very common, and you must early learn to distinguish the two great classes of such cases, for they need very different

treatment and care. In one you have a curve generally from side to side, involving the greater part of the bones of the back, making it look like an S, connected with weakness and subsequent alterations in shape of bones, muscles, and ligaments. This is often associated with rickets in other bones, is frequently recovered from after more or less distortion and deformity has resulted, and does not cause much pain at the time, nor of necessity imply ill-health in the future. Such cases are to be treated by diet and regimen, suitable apparatus, corsets, etc., combined with muscular exercises, movements, and drill of all kinds.

Far different, both in nature and result, is the other form, which depends on disease of the bones and joints of the vertebral column. In it the deformity is much less extensive at first, limited perhaps to one point, at which the spine bends at a sharp angle; but in such cases pain is often intense, and sooner or later an abscess will form either in the neck, the back, loin, or groin, according to the position of the disease. These cases require the most absolute rest, and when far advanced, most careful nursing; and it is a matter of great importance for the little patient

that a correct opinion as to the nature of each case be early made, as the treatment which would suit the one is very bad for the other.

For spine cases you have to make, or help in making, plaster jackets, and in this connexion you must remember how delicate a child's skin is, how easily it will chafe, so that you will never neglect the least indication given by the child that the jacket is causing pain.

When the later stages of acute spine disease come on, when there are abscesses and wasting, then is the risk of bedsores of a most severe kind. The paralyzed lower limbs will easily ulcerate, or even become gangrenous over every projecting point of backbone or hip; and in such cases a good nurse's patience, sense, and watchfulness will also be severely tried.

CHAPTER XII.

GENERAL ADVICE TO NURSES.

HAVING been connected for many years with the training and employment of Nurses of all kinds in Hospitals—General, Children's, and Incurable—and also in private practice and district work, the author of this book ventures, in answer to many requests, to add a short chapter of general advice to Nurses in their varied relations as pupils and as workers in wards or in private families.

Remembering the infinite importance of the commonplace, he aims at nothing striking or even new.

1. *To the Probationer of a day.*—You have looked forward to this day for months and years; you have, it is to be hoped, a very high ideal of the nature of the work and the manner you are to perform it. Perhaps you are looking forward, with dread, to sights and sounds which will distress you, and you fear a break-down. It is

much more likely that this first day you may be sadly impressed by the little notice you excite and the trivial work that is set you to do. You may be asked to quiet a restless child, or to cut her dinner for some uninteresting old woman; possibly you may be sent to your dormitory after no more exciting work than polishing some tins. Never mind, keep your eyes open, and *your mouth shut*, and you will learn something. Prompt, unquestioning obedience to your staff-nurse or ward sister, and a cheerful, anxious desire to oblige your senior probationer, are absolutely essential. Once you have learned these primary accomplishments, all else will come easily. Do not try to master the whole ward work in a week. Just do what you are bid, and every day you will learn something practical; and if you want to learn, every one will soon help. After a day or two comes the trying time; your hours are long, and so are the corridors, your feet are sore and ankles weary, patients are annoying, and staff-nurse is very unemotional, and pays you little attention. All will be well, however, if you can fight through the month of probation; you have managed to face your first operation in the theatre, perhaps

have been trusted with the lotion basin, and possibly have been allowed to watch the case coming out of the chloroform.

Your duties and difficulties will vary much according to the hospital you are in. In a small county hospital much will depend on your ward sister as to whether you learn little or much, on a good system or a bad. You will very early learn much practical nursing, and perhaps in a few weeks get work to do that in a large hospital would fall to a staff-nurse. In a large teaching hospital you will have lectures to attend, and much drudgery to go through before ever you have reached the privilege of dressing even an ulcer. The students will do most of the work that the probationers get in the smaller hospital. But you will be better taught, and probably better grounded in the larger hospital. The students are sometimes a snare, and all wise matrons take most rightly severe views of such apparently small delinquencies as gossiping in the corridors or discussing a patient's case. However, remember the medical student of to-day is not the rowdy swaggerer of the early Victorian novels, but a highly-educated, hard-working, and courteous gentleman, who, as a rule, regards

a probationer as a very unimportant and uninteresting person. While your happiness in the ward will depend considerably upon your fellow probationers, your progress will depend mostly on your staff-nurse or ward sister. You may take it as a good general rule that a probationer must believe, as an article of her faith, that her staff-nurse is the best in the hospital, and take a pride in her, in her tins, in her patients, and this will react in the happy way that the staff-nurse will do her best to make her probationer the smartest in the house. Believe also in your matron; do not expect her to make a pet of you or to spoil you. It is absolutely essential that you make up your mind loyally to obey your matron and all the hospital authorities, whose embodied voice she is. Many of her rules may appear to you unnecessary, but you cannot appreciate her difficulties. Always go direct to your matron in trouble; never go outside the hospital walls with a supposed grievance. You hope some day to be a matron yourself; treat her now as you would wish your probationers to treat you. If the nursing is to be well done, the matron must excite a certain amount of awe as well as any amount of love. Even a young

probationer must learn to think as well as obey. Do not put an empty kettle on the fire. Remember discipline. Do not report any ward matter to the house-surgeon, or, still worse, to the chief, but report to your staff-nurse. Be courteous to every one. A very young probationer once sat by a patient's bedside writing a letter, and neither rose nor answered when a quiet, plain old gentleman asked her a question, but explained, on a second request, that staff-nurse was off duty, and it was not a time for visitors. The plain old gentleman was consulting surgeon to the hospital, and one of the Board of Governors. Every nurse should aim at receiving every one, gentle or simple, with a pleasant word and smile—especially the patient's friends, who are entering these dreaded hospital wards, perhaps for the first time in their lives, and there leaving some one dear to them. A sympathizing word or question will turn the scale in their minds, and make them feel that they are leaving their sick ones at a home. Also remember to be very kind and courteous in your reception of nurses, district or private, who may bring a patient into hospital, or come to visit one whom they have nursed outside.

The staff of a hospital for incurables have difficulties and trials peculiar and permanent, and must be women with high ideals, and should possess good health, temper, and spirit; for the work is depressing and monotonous. The patients are fixtures till death mercifully frees them from their burden; their cases are always serious, often most offensive, and demanding personal attentions which are constant, and so loathsome as to be almost unbearable except when done from the highest motives. Though often wonderfully brave, the poor patients can hardly help being at times exacting.

While she is to be gentle and sympathetic, all wise matrons of such hospitals will bear me out in saying that the nurse, especially in the male wards, must never be familiar. She must maintain her own position by a manner distinct from that possible in the rapid changes of a surgical accident ward in a general hospital. For the poor incurable is apt to think of his dignity, his privileges, his little luxuries, which he always expects to be increased, never diminished; and his very permanence and his misery are apt to make him presume. Many plans may be tried to make the situation less irksome, none

better than frequent changes of the nurses from ward to ward. Probably, except in the case of very gifted and gentle ward sisters, no nurse should remain for more than two or three years in an incurable hospital. But all when in it should remember that here the poor patient is a life inmate, that it is the only home he has to look to except the grave, and that foibles and fancies, impertinences and selfishness, should be very gently dealt with both in thought and word.

Private Nursing.—A large proportion of trained nurses will naturally, after their training is over, find themselves compelled to take private nursing. For many reasons,—in the first place, every training hospital passes a large number of probationers through their different stages, for whom no post can possibly be found in hospital. Ward sisters and staff-nurses are fairly permanent, and vacancies by marriage, resignation, or death are fortunately few. Again, private nursing is better paid than hospital work, and those nurses who have to try to help their friends or lay up for their own old age have a much better chance of earning money by attendance on rich people.

Private nurses may be classed under three heads. The first, and probably the most numerous class, enter a Nursing Home, and are sent out in turn to private houses to nurse under a doctor. The Nursing Home pays a definite yearly salary, provides a room or share of a room to the nurse when not employed, and receives her earnings from the patient. The second class, generally experienced and successful nurses who have established a connexion with good families, or who have the backing of doctors for whom they have worked, live alone or in couples in lodgings, take their chance of work, and receive their own remuneration, and make their own terms with their patient. Both these methods have their advantages. The Home ensures that the young, inexperienced girl, fresh from hospital, gets a fair start, and shields her from the risks and temptations of a lonely life in lodgings waiting for work that does not come, and protects her from patients who may be unreasonable or even dangerous. These advantages certainly outweigh the comparative smallness of the earnings in the early years. Again, the experienced nurse, who is sure to have plenty of work, likes the independence and

privacy of her lodging, and can make a very much larger income. While the Home nurse's salary will vary from £28 up to £40 a year, a private nurse in a good connexion can often make £100, or even more, and thus can save for a rainy day.

A third class of nurses engaged in private work are those who act as nurses for single patients in Home Hospitals, chiefly surgical, which are now so common in every large town, and which have saved many a patient from the discomfort of being ill in a lodging-house or a hotel.

A few words to those who nurse in private families, and my advice is chiefly to the younger ones sent from Nursing Homes. The older ones who have their own rooms could probably give advice rather than take it.

Your position and your treatment will vary in different houses in the most extraordinary and inexplicable manner. In some, not always the largest house or with the richest inmates, you will at once find yourself honoured, cared for, and happy. I know no better test that the friends of the patient are gentlefolk, to use our good Scotch word, than the manner in which they treat the

nurse who comes in so suddenly and at such a trying time into their home. You have not only your patient to consider and your relations to him or her, but you have the anxious relatives, who probably think they have been doing the nursing very well, and the servants, who are apt to regard you as an interloper and their natural enemy. The patient may not have wished a nurse ; if a child, it will certainly be strange to you, and need some time before it is won. Don't be in a hurry. If possible, get the doctor to introduce you, and come into the room ready to help, ready to take orders, and to study the case, but do not think it necessary just at first to change methods or clear the room of the relatives who have done the work up till now. Often you will wisely retire and arrange the bottles in the dressing-room after your introduction is over. You will have plenty of time before you are relieved in the morning to show what an excellent nurse they have got.

While introducing your own good methods of feeding and washing or case-taking, do not disparage or despise the amateur's work. Your reward will come as the patient discovers how quickly and comfortably you have moved her,

and with what little fuss the change has been made. The mother may not wish to leave her sick child's room the first night ; she will do so the second, but not if *you* press it. Give all consideration and respect to the faithful old family piece who has done her best in her own uneducated way. Ask her advice, not flaunt your own, as regards the patient's little ways. She will know more than you do. In a word, remember that you have not come to upset the coach, but to make its wheels run easy.

The Servants.—Your relations to them vary much with the size of the establishment ; but in a small middle-class family, where two or three female servants are perhaps worked to their full strength already, your coming may add to their labours. One or two hints. You will want many a thing brought up to your patient's room. Try to remember and note down on a slip of paper what you are likely to require, and let one journey do instead of many. If in winter you have to keep up a fire, do not ring for coals when needed, but have a well-filled scuttle in the morning, and then you yourself, with old gloves on, wrap up pieces of coal in soft paper, so that you can lift them

out without either noise or dirt. Once show the servants you are thinking of them and for them, and they will be your friends.

Now comes the very puzzling question of your meals. In good houses that is easily solved. You will have your own room, and probably your own servant to bring up all you need. But in the small middle-class house it is not so easy. Never take your meals in the patient's room, and, if possible, never with the servants. As a rule this rights itself. Often the relations ask you to join their own table; do not be churlish and refuse. Sometimes a nice old housekeeper may keep you company. Of course, in the word "servants" I do not include her, or the maid of many years' service, who are rightly regarded by the family as friends. Be pleasant to them at once, and they will see that your comfort is well attended to, and welcome you to their domain. But, remember, don't be starved. If you are to do your work rightly, you must be properly fed. In difficulty, tell the doctor; or, as a last resource, write a letter to the Superintendent of the Home. Be sure you get your two hours' open air for walk, or drive, or seat in the garden every day.

About Sleep.—Aim at regularity and sufficiency. If the doctor knows his business he will see that you get eight hours for sleep and at least two for a walk. But, remember, don't expect all this in your first twenty-four hours, and don't grumble if everything does not come quite straight and accurate as in hospital. A bad case may need two nurses, and then each can have eleven hours off duty. Half an hour morning and evening you should both be on together; but be sure to avoid losing time in gossiping and wasting strength by both being in the sick-room at once. It is a good plan to take night and day work week about, unless the patient has his preference, or unless one is much more experienced than the other, in which case the experienced one should take general charge of the case, and in most cases should take the night.

Do not be unduly distressed if, somehow or other, you do not impress the relatives or suit your patient. A very little word or look may do it. An admirable nurse left a patient within twenty-four hours in most natural dudgeon, for she had not been allowed to see the patient, and had been set to make a fire in a bedroom.

The real reason was, as the anxious mamma told me next day, "I wasn't going to have that woman in my house to nurse F. She was far too good-looking." Another didn't suit, and was asked to go because she had begun the campaign on a delicate child who had a joint abscess with "Don't be emotional, Eva"!!

A few more don'ts. Don't gossip about your last patient, and, above all, don't tell blood-curdling stories of similar operations if you have a nervous surgical case. Don't get too familiar with the patient or relatives. Let them make the advances, as they certainly will, if you are a true nurse. Be very careful not to carry "tales" from one house to another; much mischief has been done by this. A nurse often sees and hears things not intended to go beyond the walls, and she must show her loyalty to her patient and the friends by her reticence.

As to your report to the doctor, try if possible to see him alone at least once a day. You may have to tell him, and he may have to tell you, things the patient need not know. But don't talk low or in whispers outside the door; and, above all, remember to give the patient a daily chance to see the doctor alone. He may have

to tell him what he does not want a nurse to hear. He may even want to report some of your misdeeds!

Nurses in Home Hospitals.—These have many advantages, especially if they have first had a complete training in a general hospital. This, which should always be the case, is not by any means invariable. They have a cheerful, busy life, with, as a rule, hours as regular as in hospital, and a less fatiguing and more instructive life. They probably have only one or at most two patients, always operation cases of interest, probably done by the specialist who has the highest reputation. They are allowed to assist at the operations, prepare the instruments and dressings,—in fact, in many Homes, to do the work of the dresser in a teaching hospital. They attain remarkable dexterity as assistants, and special experience as nurses. The risk is that they get too much into a groove, and they are apt to regard their patients rather as cases than as sick creatures. They must always try to be very considerate to the friends of the patient, who often have worries and difficulties in managing to fit in their visits into the ways of the Home. The patient is very much at

the mercy of his or her special nurse, and the head of the Home, if a wise woman, will visit each patient at least twice a day to hear his story. In these Homes no names should be ever mentioned, only the numbers of the rooms. No. 1 may send in flowers to No. 3, but No. 1 should not know who No. 3 is, or what operation has been performed.

Probationers in such Homes begin at the wrong end of nursing, and learn too much and know too little. Unless they wish to remain mere highly specialized assistants, they must go to a big hospital.

Nursing of Sick Children either in Hospital or Private.—Many people have a vague idea, possibly not actually expressed in words, that any nurse, however inexperienced, will do for a children's ward, and that probationers unsuited, by want of age or sense, for a general hospital, had better try at the Hospital for Sick Children. No greater mistake could be made, for sound health, inexhaustible patience, nerves so well strung as not to be wearied by cries and tears, hearing acute to notice the feeblest moan, and eyes quick enough to appreciate every sign of illness or suffering, will all be needed for the good

children's nurse. You cannot reason with small children, and such children should not be punished in any way; so many a time both nurse and surgeon are fain to close their ears and run away from the noise. And yet you must always have the one great rule to guide you about such children, that they don't cry or moan for fun, but because they are ill and in pain, or from a nameless weariness if not in actual pain. Healthy children may yell and scream as an evidence and result of original iniquity, but sick children don't. Accept the principle that a sick child or a hurt child in hospital is always good unless there is something that you or I can remedy. Perhaps its hip is uneasy, see if the pulley is right; perhaps its wound is sore, has it removed the dressings? It may have a pain in its stomach, which a poultice or a drink of milk may relieve. Our theory may not be absolutely and invariably correct, but, at least, it is a good one to work on, and, as a rule, has a quite infinite reward. For if you once get a child's confidence and love, it is marvellously loyal and utterly trustful. In a very long experience of sick and hurt children, I have never known one that could not

be won over by nurse and doctor, if only a little trouble is taken to win their trust. You must also amuse them; adults can read and amuse themselves, but a child's convalescence will often be much hastened by toys, cheering words, and, in short, fun of the mildest type, but still to show your interest in them.

Children's diseases, both surgical and medical, differ in some respects, or at least in some degrees, from those of adults. In the first place, all their stages are more rapid. Death is imminent before you are aware; yet, if staved off, recovery is like a miracle. They stand loss of blood very badly, and yet they remake blood very quickly. They may have every possible evidence of deep-seated constitutional disease, and yet with good nursing and food, and very few drugs, they make the most marvellous recoveries. They need special care on the nurse's part to regulate the temperature of the ward, and to admit as much air and sunlight as possible without draughts or sunstroke. They require very special wisdom in arranging the hours of food and sleep—even the feeding of a sick or hurt child must be made a study. Remember never to feed a small child too

quickly, even if the one in the next bed is squalling for its turn.

Remember, also, that a child is nearly as reticent about its own symptoms as a horse or a dog. Not one of them can tell you where it is pained. The nurse must watch every symptom—condition of bowels and of urine; its appetite, its sleep, heats and chills; how often it sweats, and where it sweats. Watch the ones who are out of bed for their meals; the child will not tell you or the doctor if its food is untasted—it will probably conceal its want of appetite by passing its food to its next neighbour. A wise sister or staff-nurse may often help the doctor much by watching the child's preferences for food, and suggesting alteration or addition. Some very odd kinds of food may be relished and do good when the ordinary routine rations will be sent away. For example, children suffering from diarrhœa of a wasting type sometimes take a strong fancy for old green-moulded cheese, and devour it with the best effect. Is it possible that the germs in the cheese are able to devour in their turn the *bacilli tuberculosis? ! ! !*

Never deceive a child; tell it honestly that the

dressing or movement you are going to make will hurt it, but also that you will hurt it as little as possible, and it will help you loyally. Don't make favourites; children are much sharper than you think, and a quiet, uninteresting child may soon get a sore heart and a feeling of being injured if you take less notice of it than of the more cheerful one in the next bed.

More than any other hospital a children's hospital demands of its nurses that they show great kindness and consideration to the friends who bring in the child, and leave it, probably for the first time in its life, to the care of strangers. Just try to put yourself in the place of the poor mother, who has to wait till next visiting day before seeing her child, and who in her heart envies you the privilege you will have in nursing her child, which to you is only one of a wardful.

What are we to say to the District Nurse, and especially to the type and model of them all, the Queen's Nurse, the happy short-name for those selected ones who are trained and employed by that most admirable charity, the Queen Victoria Jubilee Institute for Nurses? They are almost beyond advice, for after three years' hospital service, as many of them have, and a year in the

District Home, with midwifery instruction and fever training, many of them have had five years exceptionally severe and comprehensive nursing work, and should be past mistresses of their art.

But they need all their training and all their practice in patience and charity, for to nurse a patient in the dirty slum is a much more difficult task than to do the share of work in a bright hospital ward. With no one to advise except the hard-worked dispensary doctor, every appliance has to be carried up weary stairs in her little bag. Often when there are neither food nor fire nor water in the house, the city district nurse has a very arduous and sometimes a very thankless task.

The country one has trials of another kind. Lonely miles of moor or bog to trudge over with the inevitable bag, she has fresh air and pure water, and helpful, handy country folk, with sense and cheerfulness, when she gets to her patient. Her great difficulty is generally that being miles from the doctor, she may be confronted by problems that in hospital she never learned to solve; she may at times have to face responsibilities beyond her skill and out of her sphere of work.

It will need wisdom and tenderness. Wisdom

to keep her from even appearing to presume or trench upon the doctor's province; tenderness to let the patient and his friends see that the will is there to do all she can to help. Avoid gossip either about patients or their friends; never say in one house what you see or hear in another; a small country place is full of tales, and each house knows far too much about its neighbour already. Nothing that a nurse can do in either surgery, medicine, or midwifery should be neglected; hence the necessity for great experience, tact, and modesty. A district nurse in a lonely country district should be one who has learned everything and forgets nothing.

In towns the district nurse should be exceedingly careful never under any circumstances whatever to trench on the doctor's province,—help him as much as possible, take temperature and pulse, and leave a note of the case's progress on the mantelpiece; but never order medicine, criticise a prescription, or advise a change of doctor. In every case you attend make sure that a doctor has been sent for. If you are certain that none has been called, try to get the patient's friend to call one; or, as a last resource, get one yourself from the dispensary. But re-

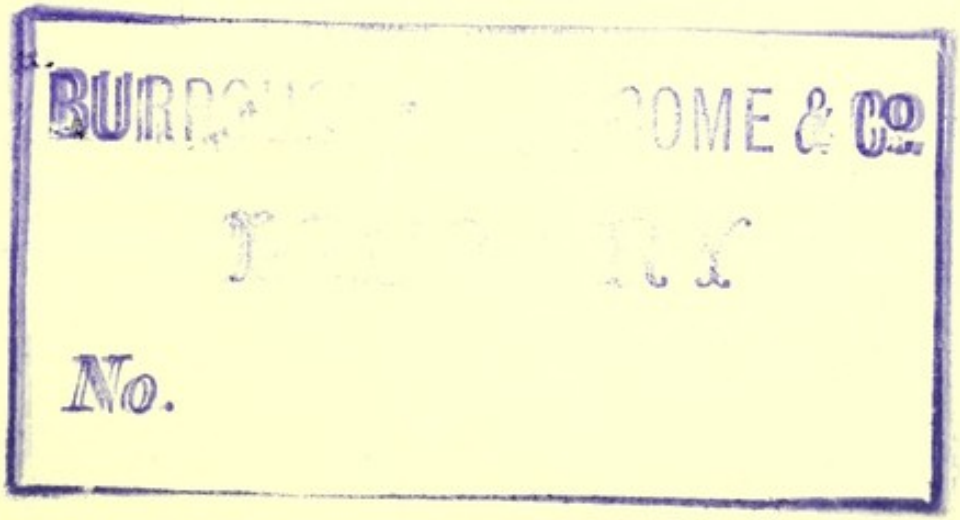
member that this is only a last resource; for in a well-doctored town like Edinburgh the chances are in favour of two or three dispensary students or parish doctors being in attendance at once, each without knowing of the others.

Progress of the work in outlying districts is sometimes very slow at first. Country people, till they know her, distrust the nurse, her uniform, her mania for cleanliness, and her ways in general. However, one case will soon tell another of your kindness, and in time your hands will be full enough.

One final word, applicable equally to every member of the nursing profession as well as to every other walk in life. Cultivate absolute accuracy in observation, and truthfulness in report. As John Goodsir used to say, "Let us have God's truth in everything." It is not so easy to be accurate as you think, but it is at times of great importance. Temperatures, for example: if you forget to take one, and mark it down on chance just before the doctor comes, you may be deceiving him to the patient's hurt; or if you mark on John's chart, which is nearly normal, the 105° you forgot to shake down after James' armpit, you also may make it hot in two

senses for John, unless the staff-nurse say, "Try it again." Far better say, "I don't know," than answer at random, when asked about some symptom you might have noticed. But inaccuracy is venial and common to many of us. Untruthfulness, intentional inaccuracy, is a mortal sin.

To terrify you against even an untruthfulness by omission, I give the history of an accident that followed one such sin in the practice of a distinguished surgeon, who reports it in these quiet words:—"I had ordered that the urine was to be drawn off before the operation. This had been done without difficulty before the patient was tapped, but now two nurses tried, but failed, to pass a catheter. They decided to say nothing about the matter, and the consequence was that I cut into the enormously distended bladder."



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