no doubt has some relation to the food; but there is in this disease a breaking down of healthy tissue, and hence there may be more eliminated than can be accounted for by the food. That the muscles are affected in this disease, is shown by their state of weakness. The conditions observed in diabetes appear at first to throw doubt on the relation between the elimination of nitrogen and the development of heat. But there are circumstances which tend to reduce the temperature: the tissue-metamorphosis is very slow, and, after all, the extra amount of eliminated nitrogen is small. In some cases, where a diabetic patient has been attacked with fever, it has been observed that the sugar disappeared from the urine, as if there were an increase of the process of oxidation.

It has long been supposed that in diseases characterised by muscular contractions there must be an increase of urea in the urine. In tetanus, however, the urea is decreased. Senator has found that, in dogs affected with severe spasms, little urea was eliminated. This is in favour of Dr. Parkes's view, that the excretion of urea is diminished during the time of muscular action, and increases afterwards. There is no relation between the high temperature and the excretion of urea in tetanus. The heat is greatest in severe and fatal cases. May it not in this disease have some other origin than tissue-change?

In chorea, it is not well known whether and how far the process of elimination of nitrogen is modified. Probably there is but little increase, and when this does occur, it is during rest.

A recapitulation of the main points of the lectures completed the course.

SHORT TOUR THROUGH THE AMBULANCES OF BRUSSELS AND PARIS DURING THE EARLY PART OF MARCH.

By HERBERT COOPER, M.R.C.S., Wootton Bassett, Wilts.

IN Brussels, through the kindness of Dr. Smith, I received a card of admission to the ambulances. I was exceedingly anxious to ascertain to what extent a limb might be injured without having recourse to the expediency of amputation. My wish was in every way gratified. Amputations were seldom performed without excessive injuries to joints.

In the Ambulance de la Plaine des Manœuvres, built after the American system, and situate about two miles out of Brussels, I saw many cases of compound comminuted fractures of thighs, legs, and arms, the result of injuries from rifle-bullets and pieces of shell, and for the most part of a healthy appearance. In one case (a compound comminuted fracture of the leg), fifteen separate pieces of bone had come away; in another, a fracture of the thigh, five large pieces. The dressing principally consisted in the application of lemon-juice; which, though at first very painful, seemed to exercise a beneficial influence on the tissues. A very generous diet and a liberal allowance of stimulants were given to all. In several cases of wounds penetrating the shoulder-joint, ankylosis had occurred. One poor fellow had received a shot in the right buttock; the ball had passed from right to left through both buttocks, fracturing in its course the right tuber ischii, and passing through the rectum. To my astonishment, no pain or great inconvenience was felt in the act of defecation; probably from a fold of mucous membrane going before and closing the wound; and he could creep very slowly along the ward on crutches. He slept well, but will probably never again sit down. All the sufferers seemed happy and contented; and several showed me with great glee the flattened instruments of their destruction. The death-rate varied considerably. I was informed that in the ambulance inside the town, situated in the Rue du Progrès, they lost forty out of three hundred and fifty wounded. In the American ambulance outside the town, ten only died out of three hundred and fifty wounded.

In Paris, through the kindness of Dr. Mercier and Dr. Wood, I visited many hospitals and ambulances; but I could not get the true ratio of deaths from any of them. The percentage at the Grand Hotel had been enormous. All the wounded that were able to be moved had gone to the South of France.

The American system of ambulance, however, proved by far the best in every way at both places; and the comparative mortality was very small. On the whole, I could not help thinking that there had been a great improvement in the treatment of surgical cases within the last ten years; as, on a former residence in Paris and acquaintance with the hospitals, I had entertained but a very indifferent opinion of French surgery compared with our own.

REMARKS ON SKIN-GRAFTING.

By GEORGE H. B. MACLEOD, M.D., F.R.S.E., F.R.C.S.E.,

Professor of Surgery in the University of Glasgow; Surgeon to and Lecturer on Clinical Surgery in the Royal Infirmary; Surgeon to the Lock Hospital, etc.

IN all large hospitals, cases frequently occur in which M. Reverdin's proposal of transplanting skin can be put to the test; and the writer has within the last few months frequently had recourse to it, in order either to abridge the period of repair, to obtain a covering for large open sores, or to improve so far as possible the condition of the cicatrised surface. All surgeons who have to combat the usual obstacles to effectual and firm healing in extensive granulating surfaces can fully appreciate the advantages promised by Reverdin's process; and thus it has come about that skin-grafting has been largely practised in our public institutions. It in no way detracts from the merits of this plan, that the results obtained have not quite come up to the sanguine expectations formed of it. Extravagant anticipations are seldom realised; but that within certain limits skin-transplantation is capable of supplying most useful aid to the surgeon, cannot be denied by those who have fairly and perseveringly tested its worth.

It cannot be denied that, whatever practical value the surgeon is inclined to ascribe to skin-grafting, and whatever place it may take in our curative methods, it is in itself a most curious and interesting experiment. It wholly differs from the Taliacotian or any of the usual plastic operations in which a connection to the living body is retained by the graft. It resembles in its nature those old stories (but no longer "fables") of Fioravanti, Dionis, and Garengot, regarding the re-adhesion of separated parts; or the experiments of Hunter (which he, however, speaks of as "old and well known") of transplanting spurs, testes, and teeth from one animal to another—"the success of the operation being," as he tells us, "founded on a disposition in all living substances to unite when brought into contact with one another, although they are of a different structure, and even although the circulation is only carried on in one of them." Palmer tells us that Boronio, in his work, "*Degli innesti animali*," published in 1804, describes the successful transplantation of skin from one part of an animal to another; and it is well known how M. Ollier has, in recent times, transferred portions of the periosteum from place to place, producing masses of bone in unwanted parts. Reverdin's method resembles these in some measure, and is, in short, similar in principle to that of grafting in horticulture. In the following remarks the author wishes to describe shortly the results which he has obtained, without going into unnecessary details regarding special cases. With but few exceptions, all the patients operated on were treated in the wards of the Glasgow Infirmary, and the effects were watched by the surgical clinical class.

When the skin is destroyed throughout its whole thickness, and no "stools" of old tissue remain, it is of course to the edges alone that we can look for an epidermal covering. When thus the surface denuded is large, much time is required; the patient is disheartened, even if his health do not permanently suffer deterioration; and the resulting cicatrix must be tense, weak, and liable to destruction from slight causes. Deformity, too, by displacement and contraction, very commonly results from the same cause. To establish islets or centres of cicatrisation in various parts of the wide surface, and in this way to multiply the points of growth, and so to expedite the covering up of the wound, and also, it may be, to diminish tension and contraction, are the objects and aims of skin-grafting.

1. As regards the surface on which the graft is placed, it has been abundantly shown in the writer's cases, that the nearer it is brought to that of a "healing sore" the better; in fact, this is, perhaps, the chief element of success. The granulations should, in a typical case, be numerous, small, acuminate, pliant, and firm; well supplied (not excessively so) with red blood, so that the surface presents an even, regular, fresh blood colour. The discharge should be moderate and healthy; the sensitiveness not great, and yet apparent; the edges healthy, pliant, and shelving down; and the surrounding parts natural. No doubt in many cases, when such a condition of things is present, the battle is won; but we constantly attain to all this (or something approaching it), and yet, either from the great size of the breach, or the long period during which it has remained open, we should fail or be long disappointed in obtaining a satisfactory cure. In such cases, the utmost help is received from transplantation. If the granulations depart much from the healthy standard, success is doubtful or impossible.

2. As to the graft itself, it has done best, in the author's cases, when it consisted of no very minute portion of integument, but a piece large enough to be easily arranged and fixed on the granulations. Half the size of a threepenny-piece is the smallest size which has appeared con-

venient. Any pliant, well-nourished piece of skin will do. It has not seemed to the writer any better when taken from young persons than from adults, nor yet when sought from corresponding portions of the body to that to be healed. Thick hard bits do not thrive well.

Scrapings from the surface have not "caught" with the author, though they have appeared in a very curious and unaccountable manner to stimulate the neighbouring edges of the sore. This was markedly observed in the case of a long-shaped sore on a lad's arm, which resulted from a machinery accident, and had been three months open. Three days after such scrapings were applied at two points in its length, the sides of the sore had there (and there only) contracted and closed, so as to give the ulcer an hour-glass appearance.

The most reliable results were got from the employment of such a thickness of the skin as might be supposed to include the "stratum Malpighii," with such a thin section of the corium as served to give it consistence. If a deeper portion were taken it rarely succeeded, and the use of a less deep part has been already alluded to. That the succeeding growth is due to the cells of the "rete mucosum" appears probable. An experiment alluded to further on, in which the fluid from a blistered surface was used, would point in that direction.

3. As to the *modus operandi*, the required integument may doubtless be removed by a knife or scissors, with or without the aid of a pair of forceps; but it can be more expeditiously, and with greater certainty and neatness, be got by using the ingenious "forceps-scissors", made by Mathieu of Paris (of which a cut is here given), for paring fistulous openings.

By a mechanism at *b* and *c*, the claws of the forceps (*e*), seize and draw up the plait of integument between the cutting blades (*d d'*), as the handles (*a*) are approximated, and so the whole process is completed by one movement, without any other aid. By means of this instrument, such a portion of skin as is required, can be quickly removed without bruising. Almost no bleeding should follow its excision. If blood flows we have probably cut too deep, and have passed into the subcutaneous cellular tissue with its fat, which is not at all fitted for our purpose, as too thick a layer will be interposed between the rete Malpighii and the soil from which it is to draw its support. The bit of skin must be carefully spread out on the spot which it is to occupy; and this is best done by the aid of needles. When first removed, it curls on itself, becomes blanched, and looks as if hopelessly dead. The writer has not obtained any good from disturbing the granulations at the place to be planted—on the contrary, the bleeding and irritation thereby occasioned has seemed positively injurious. It is well to place the graft on the higher parts of the sore, so as to encounter the least amount of suppuration, and the minimum chance of displacement. For fixture, a strip of common adhesive plaster, so cut as to form a narrow portion over the graft, but to take a firm hold on each side and round the limb, has answered well. The part of the plaster in contact with the graft should be sufficiently narrow to allow of the bit of skin being seen on each side of it, and in this way we can always judge of its fate and progress. The plaster should be applied firmly, but not unduly so, and if it become prematurely loose another similar portion can be applied over the first, but no attempt should be made to remove the first strip till we are sure that the graft is secure—probably not for a week. All contact with lac, or any other plaster beyond that above described, has seemed injurious. No dressings are applied to the sore, but contact is avoided by building up a wall of dry lint all round, and covering the whole in by a roof of plaster. Harm has appeared to attend the use of any kind of wash (especially one containing carbolic acid) in the earlier stages of the process. Afterwards, when the adhesion of the graft is secure, it is desirable to employ whatever local applications the character of the granulations demands.

4. Rest in bed has always been enforced when the lower limb was the seat of the experiment. Whether such be absolutely necessary or not the writer's experience does not enable him to say; but, beyond this, absolutely nothing has been done to help the healing of the sores treated by grafting. The diet, etc., has been in no case altered or fortified.

5. The period of incubation has varied from a few days (four, apparently, though it is difficult accurately to determine) to twenty-three days. In one case, three grafts were lost (as was supposed), and yet one of them began to show on the twenty-third day. After they take

and desquamate (as they usually do), it may be many days (in one case a month) before they begin to grow. The outline of the new piece is apparent, or a small islet of prominent granulations marks its position, or a glazed point sunk slightly in the surface indicates its bed; but some day, as we uncover it, the delicate growing opaline line is found stretching itself out around, and covering in, as with a varnish, the crowns of the granulations. When this stage is reached, we can employ dressings direct to the surface of the sore; but it must always be remembered that we deal with the most delicate organisation, and no irritating application should be risked.

6. The general condition of the patient will affect the future growth of these new grafts, even more evidently than of any other part of the sore. Their vitality is long fragile; they have for a time but a feeble claim on the nutrition of the part, and so they become a delicate test of the patient's state of health. From this it follows that careful attention must be paid to the general health, secretion, etc., during the process of transplantation, otherwise failure will follow.

7. It is not unusual for a graft, after securing its hold on the granulations, and even after it has begun to grow, to cease augmenting and remain many days stationary. This will in general be found to depend on some temporary derangement in the patient's health, or on some irritation or violence to which the part on which the graft lies has been subjected. If the cause interfering with its progress be not removed, the vitality of the new skin may be completely compromised.

8. The writer has seen reason to believe that the cicatrix which remains after the healing of a large granulating surface into which grafts have been placed, and which consequently has formed from several centres, is considerably more distensible and supple than what would otherwise have been obtained. This has been very noticeable in several cases, and is a very important feature, as it follows that less displacement of parts, less deformity, and greatly less risk of subsequent deterioration or destruction of the cicatrix, will attend cases thus treated.

9. In the management of the cases on which these remarks are founded, no protection against cold by cotton-wool or other agent was employed; but a roof of strong plaster was put over the surface simply to guard it against contact. In all cases the grafts, when developed, have appeared to possess the usual endowments of integument, and to assume all its appearance, and the healing obtained has been as permanent as could be wished.

10. Grafts transferred from one person to another succeed perfectly. No attempt has been hitherto made by the author to utilise the skin of an amputated part.

11. Attempts have been made to heal sores by covering them over with the fluid from recent blisters. After vesication and the collection of the serum and the coagula in a test-tube, an ulcerated surface in a fit condition for its reception has been surrounded by a circle of gutta percha, made to adhere closely to the skin by a solution of the same in chloroform. In this way a cup-like cavity was formed, and into this the fluid referred to was slowly poured—the coagula being gently bruised down on the surface of the sore. A film was quickly formed over the granulations, and, as large numbers of epidermal cells were thus placed on the granulations, it was hoped that cicatrisation might follow. In the first case, in which the writer himself took charge of the experiment, the result was most remarkable; but in a subsequent case it wholly failed to produce a healing layer all over the sore, though otherwise the ulcer closed quickly from the edges. Further trials of this method will be made under varying conditions. The instance above alluded to, in which serum was employed, was a very striking one. A young woman, who had from early life suffered from a leg weakened and deformed by a cut, which had divided the calf, was admitted into the hospital on account of obstinate ulceration near the ankle. The leg was always cold, the seat of perverted sensation, and generally weak from deficient nutrition; and the ulcer, which on admission was foul and unhealthy, presented those characters which are seen in "menstrual" sores. For many weeks little improvement was obtained. Several times it seemed as if cicatrisation was to be attained, and then some trifling cause made it again open up, and the reappearance of the catamenia almost or altogether destroyed the progress made in the previous four weeks. Her sore was by far the most rebellious of the many treated during the year. When a few weeks ago the granulations had for the fifth time assumed a healthy appearance, and the sore was larger than a crown-piece, a small graft was put in its centre. This lived but did not grow. On Friday, Feb. 17th, the sore was covered with a layer of serum, taken from a blistered surface on the person of a patient in the next bed, and was kept exposed till the fluid partially dried, and was then covered up. When the cover was removed, on Tuesday, Feb. 21st, the sore was "healed to a point", and quickly became firm, allowing of the patient being dismissed in a few days thereafter. This case was at least curious and encouraging. A subsequent attempt, as was

before said, to accomplish the same thing in another patient, failed, but from what cause further observation must determine. Was the success in the one case a mere accident? Was the rapid healing due to anything specific in the fluid used, or to mere covering up from the air? The latter does not appear probable, as other agents which could only act by excluding the air when applied in the same way directly to the surface of a granulating sore have usually augmented the suppuration, and injured the sore. This, and other collateral points, will demand further attention.

In conclusion, it may be observed, that the practice of grafting will always afford an hospital surgeon much subject for interesting study and thought, and cannot fail to suggest many useful practical hints of wide use in his profession.

NOTES ON CONSUMPTION.

By RICHARD PAYNE COTTON, M.D., F.R.C.P.,
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II.—VARIETIES OF CONSUMPTION.

ANOTHER form of phthisis, for which has been claimed a special classification, is that described by Dr. Andrew Clark (*Transactions of Clinical Society*, vol. i, p. 174) under the name of "Fibroid Phthisis". I must confess, however, that, notwithstanding its introduction by so well known and accurate an observer, I have as yet failed to recognise it as a distinct form of the disease. It may turn out, perhaps, that I differ from my friend Dr. Andrew Clark more verbally than essentially, as I quite admit the existence of such cases as he has described. I consider them, however, as differing in nothing from the more ordinary forms of phthisis, except in the presence of an unusual amount of fibrous development.

Few cases of consumption go through their several stages without the deposition of more or less of the fibroid element within and around the pulmonary tissues. Without such deposition, indeed, phthisis would run, much oftener than it does, a rapidly fatal and acute course. Fibrous material often serves both to bind down the lung to the thoracic walls and to strengthen the pulmonary tissue, thus preventing a rupture of the lung and consequent pneumo-thorax. It also serves to contract the diseased lung; and, by forming bands running into the pulmonary substance, contracts, and sometimes even obliterates, tubercular cavities. Such conditions, indeed, must be sufficiently familiar to all practical pathologists. Cases, however, now and then occur, in which this fibrous development is most unusually apparent. I have seen lungs thus contracted to less than a third of their normal volume, and causing such displacement of the heart and other organs as to lead to some difficulty in the diagnosis between phthisis and chronic pleurisy. In one case of this kind which I saw some years back with Dr. Walshe, the pleura was thickened to the extent of more than half an inch, the fibrous material having in some places undergone cancerous degeneration, apparently of a secondary character. Many cases, which have been described and figured as instances of healed-up vomicae, are, I believe, nothing more than examples of dense fibrous matter having been deposited upon and within the lung-substance, in order to contract its volume and strengthen its tissue. I agree, therefore, with Dr. Andrew Clark as to the existence of certain cases of phthisis accompanied with great fibrous development. I am at issue with his views only so far as he considers such cases as peculiar forms of phthisis, and as presenting a claim for special classification.

Phthisis is, in my opinion, one of the diseases of organic degeneration, consisting essentially in the development or deposition of a certain lowly organised and variously constituted material, which we call tubercle. In the great majority of consumptive cases, I believe that such deposition is not due to inflammatory action; any inflammation, whether pulmonary, bronchial, or pleuritic, which may accompany it, being of a secondary kind. In not a few cases, however, consumption has a completely different mode of origin. It may arise either from simple idiopathic pneumonia, or from that form of lung-inflammation which, either from its original association with a tubercular diathesis or from its tendency to develop it, has been termed phthisical, or caseous, or tubercular pneumonia. It may arise, too, although it does so much less frequently, from that form of low and congestive capillary bronchitis which so often simulates real pneumonia. In such inflammatory and congestive conditions, indeed, many of the most acute and intractable cases of consumption have their origin. It needs only that a simple and ordinary pneumonia, or an attack of congestive capillary bronchitis, should be imperfectly recovered from, and that the patient should then degenerate in health, or that one of these diseases should

originate in a person already what is commonly called "below par", or otherwise predisposed to tuberculous affections, in order that the resulting lung consolidation or congestion may sooner or later become the seat of tubercular decay. In such instances, the material deposited in the lung, which under more ordinary and healthy circumstances would undergo absorption, either is from the first of a lowly organised or possibly even of a tubercular type, or it sooner or later becomes so, and gradually undergoes the same changes and gives rise to the same symptoms as a tubercular deposit which has been formed by the more gradual and uninfammatory process spoken of previously.

I have long been of opinion that true pulmonary consumption always arises in one of the ways above described: the chronic cases more generally from the slow and uninfammatory process of tubercular deposition; the more acute cases rather from tubercular changes consequent to pneumonia or bronchial congestion. I believe, however, that the greater number of cases combine during their career both of these pathological conditions, undergoing, in their progress, certain modifications depending upon the existence of either the one or the other. Many cases, for example, may commence in the slow and gradual deposition of tubercle of varying degrees of vitality, and may then be hurried onwards by a secondary pneumonia or bronchitis which gives rise to further tubercular degeneration. Other cases may begin in a degenerated pneumonia or bronchitis, which, becoming more or less quiescent, may be succeeded by the slower and more ordinary process of tubercular deposition. Every possible intermixture and alternation, indeed, of such conditions, must necessarily occur, affording another and a very simple explanation of the almost endless differences met with both in the symptoms and progress of consumption.

The practical bearing of this simple view of phthisis is sufficiently evident. If, in very many cases, we are afforded, by the slow formation of the tuberculous deposit, a fair chance of arresting the disease by the alteration of circumstances likely to favour such deposition, how important must be the recognition and the treatment, in all such cases, of any secondary congestive or inflammatory attack. And, again, if pneumonia and certain low and congestive forms of bronchitis be not only very possible, but also very frequent, causes of phthisis, how important must be the treatment of every stage of such diseases, and how essential the consideration that their danger does not pass off with their acute symptoms, but that in the consolidations and structural changes which these so often entail, and which are so apt to be either overlooked or disregarded, consists perhaps the greatest danger of our patients.

[To be continued.]

CLINICAL MEMORANDA.

REMARKABLE CASES OF REVACCINATION.

THE following cases of successful revaccination of persons who might have been supposed to be protected will be found interesting.

CASE I.—W. B., aged 40, Scripture reader, had been inoculated as an infant, vaccinated at 10 or 11 years of age, revaccinated at 18 on joining the Royal Marines, and had five good cicatrices. As he had to visit in a neighbourhood where small-pox was rife, I advised that he should be revaccinated, and was rather surprised as well as pleased to find that two out of three places took, and presented on the eighth day lymph-vesicles, surrounded by a red areola.

CASE II.—Mrs. B., aged 38, wife of the above, was never vaccinated, but had small-pox when eighteen months old, and is deeply marked. She was vaccinated in three places, all of which took, and resulted in lymph-vesicles, each forming on the eighth day a true "pearl on the rose".

H. NELSON HARDY, L.R.C.P., M.R.C.S., Senior Medical
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Fitzroy Square, W., March 1871.

TRACHEOTOMY IN YOUNG CHILDREN.

I WOULD supplement the case given by Mr. Cooper Forster by those noted by Meigs and Pepper in their work on the *Diseases of Children*. I myself have operated on a child under two years of age, but only to add to the "euthanasia" (all idea of averting the tendency to death being abandoned before I was asked to operate by the gentleman in attendance); and with such intent, I presume, Mr. Vincent Jackson would waive his objection to the operation even in very young children. To those who may not be acquainted with the work from which I quote, I would recommend it as an exhaustive treatise on the subject of which it treats, and I consider it a most valuable addition to the literature of