

elevated. The secretion from the original sore was now again inoculated on a second female already affected with constitutional syphilis.

Aug. 24th. One of the inoculations on the boy had a slight tendency to ulcerate; the others were desquamating and losing their colour.

The single inoculation on the first woman had assumed the form of a small red pimple. The redness gradually faded into the colour of the surrounding skin. The cuticle at the inoculated part was thickened and elevated.

The inoculation on the second woman, already affected with constitutional syphilis, was less marked. There was only a slight redness and elevation at the inoculated part.

The particulars of these last two cases we may follow out on a future occasion. From the facts which have already been brought under notice, the following very important points are proved.

1. That some primary syphilitic sores cannot readily be inoculated in the ordinary way upon the patient who has them, either during the period of progress or afterwards.

2. That the sores which are not capable of being thus inoculated, as far as we have hitherto seen, are those affected with specific adhesive inflammation, and which do not, except under conditions of artificial irritation, secrete pus.

3. That these sores, although not capable of being inoculated in the ordinary way, will nevertheless, when irritated, furnish a secretion which is capable of being inoculated upon a patient already affected with syphilis.

4. That the inoculations thus produced do not give rise, as a rule, to either suppuration or ulceration, but to some adhesive form of inflammation.

The inoculations to which attention has now been directed, and the results of which may be seen in two other patients now in the hospital besides those to whom I have above referred, have all assumed a remarkably uniform character. There are many points of the greatest interest connected with this newly demonstrated form of artificial inoculation, which must be carefully distinguished from the effects of inoculation upon a patient not previously diseased. Here, after a certain period of incubation, a well marked Hunterian chancre would probably have been the result of each inoculation performed for the first time.

DR. WINSHIP OUTDONE. Dr. Winship, the celebrated Massachusetts athlete, who was asserted to be the "strongest man in the world," has met a superior in the person of one William Thompson, who is connected with the Chicago Gymnasium. The test of strength occurred in that city one day, at a gymnastic tournament, at which Dr. Winship performed his great muscular feat of lifting nine kegs of nails, weighing 1000 pounds, and raising, with the aid of harness on his shoulders, 1517 pounds. He was succeeded by Thompson, who, commencing with the last lift of the Doctor, then went on adding weights, and lifting with harness on shoulders and hips, until the numbers stood successively, 1536, 1636, 1736, 1836, 1936, 2036, 2136 pounds—a very remarkable lift the latter, to be sure. He also experimented with dumb-bells weighing 100 and 165 pounds. Another competing gymnastic, named Curtis, "pushed" first 130 pounds, and then 150 pounds in each hand with the pulley, and, lying down upon his back, put up 110 pounds in each hand. (*American Paper.*)

Original Communications.

THE GALVANO-CAUSTIC APPARATUS: ITS APPLICATIONS IN SURGERY.

By THOMAS JAMES WALKER, M.B.Lond., late Assistant-Physician and Pathologist to the Queen's Hospital, and Demonstrator of Anatomy in Queen's College, Birmingham.

The galvano-caustic apparatus is extensively used in Vienna for the removal of morbid growths, as well as for other purposes. Owing to the absence, during the greater part of my stay last year in the Austrian metropolis, of Dr. Adolph Zsigmondy, *Primararzt* in the Hospital, who is the great advocate of the galvano-caustic mode of operating, I saw less of it than I should otherwise have done.

In the skin wards for the treatment of lupus, I several times witnessed its employment as a caustic by Professor Hebra. To all the parts affected, the instrument was applied at a white heat; thus, in a case of lupus of the ear, the porcelain cauteriser was deliberately applied to the whole surface of that organ. During the operation, which was necessarily a slow one, the size of the instrument being about that of an ordinary lead-pencil, the patient, a nervous female, continued shrieking violently. In another case, almost cured, the small pointed platinum cauteriser was applied to the numerous points, where new centres of the inveterate inflammation were appearing upon the healed parts. During this process, the patient, a boy, scarcely uttered a groan; but it is hard to say whether this depended on absence of suffering, or on the fortitude produced by the prospect of one or two *ten-kreutzer* pieces which the professor gave him for his good behaviour, when the operation was completed. Similar courage, or freedom from pain, was manifested by a young man in another case, where the cautery was applied round the edges of the several large patches of lupus non exedens, which existed about his body.

In Dr. Zsigmondy's practice, I had an opportunity of seeing the employment of this instrument, as a cautery to various ulcers of the leg. The galvano-caustic instrument in these cases, where the surface to be treated was large, did not avail for the completion of the operation; the aid of the ordinary actual cautery being called in, on account of the much larger heated surface which the iron heated in a charcoal fire affords, as compared with the small portion of platinum or porcelain which can be heated by the galvanic current. The first application of the glowing cautery to these parts appeared exquisitely painful, there being of course no particular virtue in the heat produced by electricity which should prevent its causing pain; but, in comparing the actual cautery as usually heated with that heated by the continuous voltaic current, as regards the pain caused by their application, we find that the latter, possessing in itself the source of heat, is not cooled by the tissues of the body, consequently it quickly and completely destroys their sensibility and vitality, producing only a momentary pain; while the former, however massive it may be made in order that it may retain its heat, is, on its first application to the tissues, so cooled by them, that it requires a longer application in order completely to destroy the structures with which it is in contact, and may in many places only half burn them, causing therefore pain of some duration. This I would advance as a general rule. To the eschar left where the instrument had been once applied in these cases of ulcer, it might immediately afterwards be reapplied without producing

any pain. In pointing out what I conceive to be comparative merits of the galvanic cautery, I do not wish it to be supposed that I am advocating what appears to me an unnecessarily harsh and cruel treatment of a disease which does not require the use of the cautery at all. It may be that in gangrenous ulcers of the leg, and also in cases of hospital gangrene, many English surgeons would be inclined to adopt the treatment by the galvanic cautery; but for varicose and indolent ulcers, none of us, I think, would employ it.

In a case of large epulis growing from the outer side of the gum opposite the left wisdom tooth of the lower jaw, I saw the application of the cutting noose (*Schneideschlinge*), an instrument which consists essentially of a platinum-wire ligature heated to a white heat by the galvanic battery, and capable of being gradually tightened by means of a screw. In this case, the wire noose being thrown round the tumour, and drawn so as to surround its base closely, the galvanic circle was closed, and the wire, becoming white hot, was slowly tightened; it gradually passed through the tissues until the tumour dropped into the mouth; to the part of the gum where it had been attached, the porcelain cautery was applied, and the operation was complete. As to the amount of pain caused by the removal of the growth, I am unable to form an opinion; for, although no chloroform was administered, the patient had fortified himself for the operation by drinking a quantity of wine sufficient to make him noisy and talkative. Very little coughing was caused by the smoke which the burning of the tissues produced in considerable quantity, the patient evidently respiring chiefly by the nostrils; the bleeding was very slight indeed, the patient spitting out once or twice only a little burnt blood and saliva. The wooden spatulas which were employed to protect the tongue and the sides of the mouth did not quite answer their purpose, as the tubes containing the platinum wire, becoming heated during the operation, blistered both the tongue and the cheek. In other cases which I saw, the mode of proceeding was so much the same, that I will not detail them.

The galvano-caustic mode of operating has been brought to so much higher perfection in Germany than here or in France, and of the plan pursued by Mr. Marshall and other advocates of the proceeding in England so little is generally known, that I shall describe at some length the instruments employed by Dr. Zsigmondy in Vienna, which are almost the same as those employed by Professor Middeldorpf of Breslau, differing only in certain small points, which are, however, very important in their effect in improving the working of the apparatus. The essential part of the instrument is, of course, the galvanic battery; it is necessary that this be a constant one and very powerful. After many attempts to avail themselves of simpler and less expensive forms, the surgeons and instrument-makers have decided in favour of a Grove's battery as the most useful.

The communication between the battery and the instrument to be used must be made by means of wires sufficiently large to offer no opposition to the voltaic current, which must arrive in a full stream at the platinum wire which is to be heated; and these wires must at the same time be as light and flexible as possible, in order that they may interfere but little with the movements of the operator's hand. In Zsigmondy's apparatus, these conducting wires are formed thus. A bunch of capillary copper wires are carefully bound round with silk, so as to constitute a compound wire of about the twentieth of an inch in thickness; and from six to eight of these are again bound together to form a thicker wire. When the platinum wire of the instrument to be employed is very fine, so full a current is not required to heat it, and accordingly a lighter wire than that described may be used.

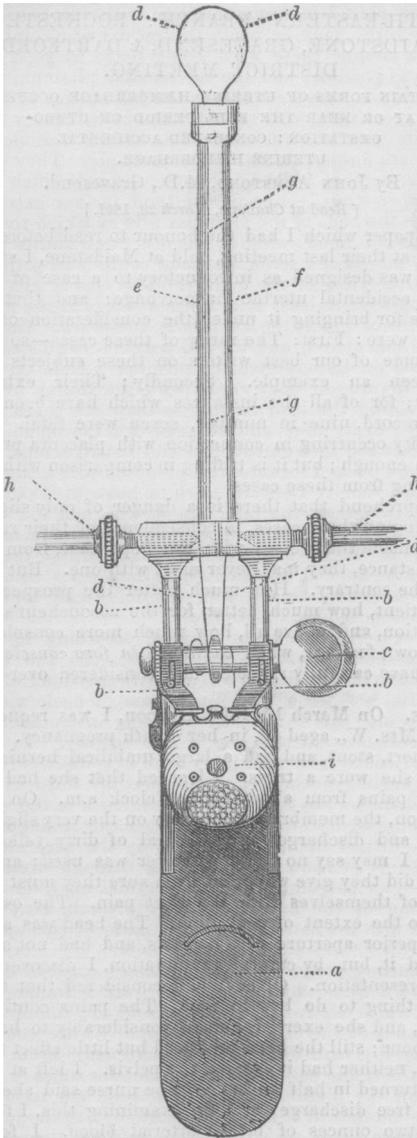
The instruments employed in these galvano-caustic

operations are the various forms of cautery and the cutting noose, to most of which I have had occasion to allude. The various cauteries, as well as the cutting noose, are instruments in which a fine platinum wire, by being placed in communication with the two conducting wires, may be made the means of closing the galvanic circuit; these wires being made as good conductors as possible, and the far smaller platinum wire being a much worse conductor, the full stream of electricity meets here with such resistance as causes it to heat the wire to whiteness. The several varieties of cautery are formed on the same principle. They consist essentially of a wooden handle, through which run two copper wires, connected by their further extremities with the ends of the platinum wire of which the instrument is formed; while by the other extremities they may, by means of a screw, be made continuous with the conducting wires of the battery. The copper wires in the handle are at least four times as large as the platinum wire of which the cautery is composed. One of them is cut across, and its two portions can be easily connected or disconnected, by pushing a slide on the handle upwards or downwards, with the thumb of the hand holding the instrument; so that, the combining disk being in its place, and all ready for the operation, we still see the instrument cool and inactive, until the slide being pushed forward, the platinum wire begins to glow, and rapidly rises to a white heat, at which it remains, when all the cells are in use, and the wire is thin, even while in contact with the tissues to be acted upon. So intense is the heat, that, unless the instrument be applied immediately to the tissues, so as to cool it somewhat, the wire will sometimes melt, high as is the melting-point of platinum.

The cauteries used are various, according to the platinum portion of the instrument. In the *Galvanokauter*, the platinum wire, one twenty-fifth of an inch thick, is flattened out into a form of blade with a beaked point; this is used as a cutting instrument, or its beak-shaped extremity as a fine cautery. In the porcelain cautery, the platinum wire is spirally twisted round a small porcelain capsule, about the third of an inch in diameter; to this the heat developed in the wire is communicated, so that a much larger cauterising surface is obtained than could be got by the wire alone. Other forms of cautery for burning through urethral strictures, for passing down the lacrymal duct, for the destruction of the nerve-pulp of the tooth, etc., are also sold with the battery and other parts of this apparatus.

The cutting noose (*Schneideschlinge*) consists of a handle (*a*), from which projects forward a framework (*b b*) in which an ivory screw (*c*) is fixed; round this the two ends of the platinum wire (*d, d, d,*) are wound, and, when it is turned, the wire is shortened. From the front of the frame pass forward two metallic tubes (*e f*), to contain the platinum wire; and these are isolated from one another by the ivory support (*g*); at the junction of these tubes with the frame between them and the handle are two screws (*h h*), by which the platinum wire at this situation is made continuous with the conducting wires from the battery. The noose of platinum wire, which is usually about the fiftieth of an inch thick, being thrown round the part to be removed, the combining disk is placed on the battery, and the course of the galvanic force must be by the conducting wire to the screw at one side of the base of the double cannula; and, the communication of the wires below being prevented by a portion of ivory projecting round the middle of the screw mentioned, up the wire in the tube of the same side, round the loop, and down the other cannula to the screw at the other side of the base, and so back to the battery. Not only the projecting loop of platinum wire becomes heated, but also to a certain extent that within the tubes; and it is on this account neces-

sary, in operating with the instrument at the bottom of the buccal, vaginal, or other cavities, to protect the neighbouring parts from contact with the cannula, or



with the fluids which flow from the seat of operation very much heated, for unless this be done, they will be burned, as in the case of epulis above described.

[To be continued.]

LONG INCUBATION OF VACCINATION. A correspondent writes to us: "One year and a half ago, I vaccinated a little grandchild of mine, six months old. It did not work, and the three incisions made rapidly healed up. She has never been vaccinated since; but about five months ago, all three places became sore, and she had the true vaccine pock. Her father vaccinated several children from her, and it worked well in every case. I saw the child last week, and found the well-marked, characteristic cicatrices." (*Med. and Surg. Rep.*)

TEN YEARS OF OPERATIVE SURGERY IN THE PROVINCES.

By AUGUSTIN PRICHARD, Esq., Surgeon, Clifton, Bristol.

V.—OPERATIONS ON THE EYE.

[Continued from page 386.]

Operations for the Removal of Opaque Capsule.
The eleven following cases could not well be classed under either of the former heads, and they differ a good deal from one another, having, however, this one point in common, that the operations were undertaken to remove portions of opaque capsule or dislocated lens from the eye.

CASE CCCLIX. M., aged 30, had amaurosis of the left eye for many years, and, as is frequently the case, after a long time, a cataract was developed in it. The day before I saw him, the lens slipped suddenly into the anterior chamber, producing pain. It was of a yellow colour, and looked very hard. I made a lower section, as for the extraction of cataract; and the knife, in its passage across the anterior chamber, thrust back the lens through the pupil. I removed it with the curette; and the eye was well in two days.

CASE CCCLX. M., aged 63, had met with an accident many years before I saw him, by which his right eye had been ruptured, and the sight destroyed, leaving a piece of membrane (the iris, probably) floating about in the eye; and six months before he came under my care, he received a thrust from a cow's horn in his other eye, which also ruptured the sclerotic, and squeezed out the lens; the conjunctiva being unbroken, it remained resting upon the upper part of the globe of the eye, like a round yellow tumour. The eye was excessively weak and intolerant of light. Upon dividing the conjunctiva, the lens escaped, and his eye became stronger in a few days. He went home in a fortnight with his eye sound, and able to see well with a four-inch lens.

We have, of course, met with a considerable number of these cases of dislocated lens, when it escapes through a fissure in the sclerotic, and remains under the conjunctiva until it is let out; but this one is peculiar, from the great length of time during which the lens was in this unnatural position, and the successful termination of an unpromising case. It is also a peculiarity in this case that the patient ruptured both his eyes accidentally at different times; and, although a little out of place, I am inclined to narrate here in connection with it another instance where a similar occurrence took place. It is probable that in each of these patients the sclerotic was very thin.

CASE CCCLXI. M., aged 61, received a blow in his only eye (the right) a few months before I saw him. The blow was inflicted by his wife, who beat him in this way, and left him; and he was quite blind, and obliged to go to the union. Upon asking him how he lost his left eye, he said it had been struck out by his "first queen"; by which we were to understand that he had formerly had another eye, and also another wife, and that she had ruptured it accidentally by a blow, as the second wife had the second eye purposely. I cannot but think that this man had also very thin sclerotics.

The right pupil was much distorted and very small, and I enlarged it by removing a portion of the iris; and when he had recovered from the effects of the operation, some opaque matter was found blocking up the aperture. This I removed at a second operation, and the pupil was easily cleared, but his sight was no better. I operated a third time, with the view of enlarging the pupil still more, and effected it satisfactorily, but he never saw any better.

CASE CCCLXII. M. The right eye had been lost by accident; and when I saw him, the left had become