out, and it was filled with iodoform emulsion. Then the incision was sutured with silk, without drainage, and a dressing of sal alembroth gauze and wool was applied over all.

On the 9th some discharge had escaped, and this dressing was removed. Primary union was found everywhere except the lower angle, where there was still some leakage of serum. On the 11th the stitches were removed. On the 13th the edges at the outer angle were pared and sutured. On the 21st these sutures were removed, as primary union had taken place. From this a sound union persisted, and the patient was discharged well, and without swelling, on March 1st. The maximum temperature before operation was 99° ; after, 99.8° .

In this case boric solution was used, but the result was no better than with hot water; indeed, not quite so perfect. This, however, was Mr. Hill's first trial of this method, and some detail of dressing or pressure may have been overlooked. The amount of semisolid degenerated tuberculous tissue in this case was very striking, and it was quite evident, as Mr. Hill remarked at the time, that without some method of gouging and flushing, such as that employed, it could not have been dislodged adequately.

In addition to these two cases, which may be taken as types, I have had other private cases of extensive tuberculous abscesses in the neck, in which a similar operation has been followed by perfect union by first intention, and also without drainage. The resulting scar in each case has been almost imperceptible.

In both the first two cases it is probable that the bone lesion had healed. But, from what I have seen in the case of joints where the tuberculous process in the bones was still in progress, I should not despair of obtaining the same results with caries of the spine, by reaching up to the bone with the long flushing gouges which I have had made for the purpose. By means of these small sequestra might be dislodged, and the carious cavity be thoroughly cleansed. But, even if this were not to be done perfectly, the conditions of the abscess after flushing would be far more favourable to repair of the bone lesion than where the latter was bathed in broken down tuberculous *débris*. And should the abscess ultimately fill again a second flushing of the same kind could be undertaken. At all events, there can be no doubt that this mechanical scouring out of deep abscesses, by means of a large and continuous stream of fluid, enables the surgeon to attain his object with a minimum of scraping or other violence to the walls of the cavity. And, as the fluid employed is simply sterilised hot water, there is no limit to the amount which may be used.

My reasons for employing hot boiled water for some years past may, perhaps, be restated here with advantage, although already given fully in an original communication two years ago.¹

In the first place one used often to see considerable shock and carbolic intoxication in former years when using carbolic solutions even to irrigate large cavities of the kind in question, and the same effect was to be expected from other strong chemical germicides. For this reason it was impossible to contemplate the employment of the latter under high pressure, and in such very large quantities as were necessary for flushing, and, indeed, such germicides would be uncalled-for; for, really, what was aimed at was simply a thorough mechanical evacuation of the abscess with as little violence as possible, and this could be done by any fluid provided only it was sterile. This end then appeared best secured by using a copious stream of hot water under considerable pressure. This I thought would tend to peel off shreds of degenerated tissue without damage to sound structures, and would carry all *débris* at once clear of the cavity. The hollow hydraulic scoop simply carried this hot water to every part of the cavity, and loosened by gentle scraping any material too firm to be dislodged by the stream. In the case of the hip, it was used to gouge away diseased bone from the acetabulum, and help out any sequestra or semisolid material present. In the case of the spine it is possible that the bone could be similarly treated with one of the longer scoops, but this I have not yet tried for want of a suitable case.

Now no germicide could safely be used by the gallon in this way for a large abscess. Again, hot boiled water, besides being sterile, has a tendency to check oozing of blood from

granulating surfaces. Moreover, by its warmth it would tend to counteract shock, and this has been my experience with it. But after it had done its work, there was no reason why a limited amount of germicide should not be placed in the abscess to act upon any tuberculous foci accidentally left behind in it. For this reason the iodoform emulsion has always been used in these cases at the end of the operation, for I am one of the many who still believe in its beneficial effects in tuberculous troubles, all laboratory experiments to the contrary notwithstanding.

But to get rid of the drainage tube appeared to me to be very nearly the most important innovation of all. As long as an opening exists into a large abscess, so long must elaborate antiseptic dressings be employed. With a soundly closed external wound and a thoroughly cleaned cavity within, the processes of repair in the latter might be trusted to pursue their course to final obliteration with confidence. In extensive excision and arthrectomies of the knee, one has almost made it a rule to do without drainage. In excisions of the hip done by this method no drainage has been used. If these extensive wounds could be trusted to heal *per primam* and definitively, as has usually been the case, there appeared to be no reason why a psoas or iliac abscess should not do the same under allied conditions. The cases now recorded prove that drainage in properly treated cases may be dispensed with entirely without danger. In the earlier flushing cases I used the drain tube for a short time, but in the last never, and there has been every reason to conclude that the latter practice was the best.

DEATH OF A CHILD FROM HYDROPHOBIA TWO YEARS AND FOUR MONTHS AFTER BEING BITTEN BY A RABID DOG.

By W. G. SPENCER, M.S.,

Assistant-Surgeon to the Westminster Hospital.

[From the Brown Institution.]

THE patient was under the care of Dr. A. C. Crane and Dr. R. F. Starkie.

G. C., aged $5\frac{1}{2}$ years, was bitten by a dog in Pimlico on August 25th, 1888. The dog, an adult Skye terrier, had been taken by its owner for a walk. The dog rushed wildly about, and became very hot. The owner observed that something must be the matter with the dog, and gave it water to drink. On the way home the dog attacked the child, to whom it was strange. The child either fell or was knocked down, and whilst on the ground the dog bit the child in the right popliteal space, which was bare.

A man who saw the accident, and had had some acquaintance with poisoned wounds in India, sucked the bite, and took the child home. It was taken immediately by its mother to Dr. Crane. He found two wounds, both caused by the same bite, on the right leg; one a deep punctured wound such as might be caused by the canine tooth over the insertion of the biceps tendon, and the other more superficial and nearer the middle line behind. He injected liq. hydrargyri perchloridi, *B.P.*, into the deepest parts, washed the surface with the same fluid, and then cauterised the wounds.

A boy applied to Dr. Crane on the same day who was said to have been bitten by the dog. There was a bruise on his leg, but the skin was not in the least broken. The owner, a man aged 80, came to Dr. Crane on August 27th, 1888. The dog had bitten his hand, and had entirely removed the skin from a surface as large as a sixpence, besides making some scratches and indentations. The bite had been inflicted half an hour before. The animal had been "strange in its manner," and, when he had tried to get it from under the bed, it bit his hand. The dog died in the night of August 27th-28th, 1888. Dr. Crane formed the opinion that the dog had died rabid. He took full notes at the time, and tried to get the carcass or a piece of the spinal cord sent to the Brown Institution, but his efforts were frustrated. The mother summoned the owner, who was fined £1 by the magistrate, and the man who had sucked the wound received a small pecuniary acknowledgment. The child's wounds healed in a few days. Dr. Crane treated the owner for several weeks with per-

¹ BRITISH MEDICAL JOURNAL, January 19th, 1889, pp. 121.

chloride of mercury, but the mother refused similar treatment for the child.

The child continued well, except that Dr. Starkie treated it for some trivial ailment in August, 1890, and at times it had screaming fits when excited. Dr. Starkie was called to the child at 6 P.M. on December 24th, 1890. She was sitting up in bed, apparently quite cool and collected, complaining of slight difficulty in swallowing and pain in the right leg. There had been a drunken quarrel in the house on December 22nd, which had excited the child, since which time she had not been well. Dr. Starkie, thinking that this might be the cause of the complaint, prescribed potassium bromide. He was called to the child again at 11 P.M., because swallowing was more difficult. He asked the mother whether the child had ever been bitten by a dog, and then she recalled the incident of August, 1888, which she had until then forgotten. Dr. Starkie gave the child a teaspoonful of the bromide mixture to swallow. At first she said she could not, but after persuasion, taking the teaspoon in both hands, she threw the fluid into her mouth. Immediately she was seized with a paroxysm of dyspnoea, convulsions of all muscles, and retching. Frothy mucus came from the mouth. The pain was referred to the right leg along the outer side from the great trochanter to the ankle. One scar over the insertion of the biceps tendon was one-eighth of an inch in diameter and circular in shape; the other scar, less well marked, was nearer the centre of the popliteal space.

Between 12 and 1 A.M. on December 25th the child became so violently delirious that it required two men to keep her in bed. At 7 A.M. she became quieter and died at 8 A.M.

A *post-mortem* examination was made by Dr. Starkie at 4 P.M. on December 27th. He found the sinuses and superficial veins of the brain engorged, and the cortex slightly congested, but there was no sign of meningitis, tuberculous or cerebro-spinal. The spinal cord looked quite normal, and there was no increase of cerebro-spinal fluid. The heart contained an *ante-mortem* clot, the lungs were congested, but showed no signs of pneumonia. The stomach and larynx were not examined. The cicatrices were carefully noted, as before described, and there were no other scars on the body.

The medulla and a piece of the spinal cord were placed in glycerine and brought to the Brown Institution. I inoculated a rabbit on December 31st, and it continued well until January 18th, 1891. On that day it showed slight signs of paraplegia. On January 19th the paraplegia was complete, and it died on the 20th. The stomach was congested, and dotted with many small hæmorrhages; the larynx and pharynx were also congested. These parts have been preserved. Two other rabbits, inoculated at the same time, have since died, also with typical hæmorrhages in the stomach.

REMARKS.—The description of the case in detail is necessary because it exceeds the utmost limit—namely, two years—hitherto proved to have intervened between the bite and the onset of hydrophobia. The death of the child from hydrophobia has been proved. That the dog died of rabies is, I think, evident from its altered manner in rushing wildly about, and later on crouching in the dark, from the fact that it bit its owner, to whom it had been previously attached, and soon afterwards died. There was no evidence, neither before nor after death, to show that the child could have been inoculated with rabies in the meantime, and the occurrence in the limb bitten of pain as an early symptom confirms the conclusion that the hydrophobia was caused by the bite of a rabid dog two years and four months before. If, therefore, the rabies poison can lie dormant so long in a human being, why not also for a long time in the dog?

The protest against the withdrawal of the muzzling orders is supported by the whole weight of scientific opinion, but from the other side emotional arguments are brought to bear upon the Government and local authorities. The result of withdrawal will be a fresh collection of material for a future epidemic.

It would be foolish to suppose that rabies has disappeared. I have, during 1890, made inoculations for Professor Horsley, and six dogs were shown to have been rabid at the time of death; they came—one from Petersfield, Hants, two from Beverley, one from Melton Mowbray, one from Nottingham, and one from Dover, all since June, 1890. The last animal was reported by the veterinary surgeon to have run amuck

for four miles round Dover, and is known to have bitten on November 3rd two persons, one horse, seven dogs, one cow, and two lambs. The horse died rabid on December 22nd, and one dog on December 28th; and yet there is an agitation in Dover to withdraw the muzzling order. Further, during 1890 the medullas and spinal cords of two children have been received, whom I have proved by inoculations to have died of hydrophobia. The case at Poole, from which the cord was sent to Professor Horsley by Dr. McNicol, also shows how children are exposed to the attacks of rabid animals. One day in September a strange black cat entered the room, and the child, a boy of 4½ years, followed it into the street to give it a piece of cake, when the animal bit his hand. The child died of hydrophobia on November 19th.

Thus rabies and hydrophobia have occurred in seven widely separated places within the triangle formed by Beverley, Poole, and Dover. These cases have all happened during the last nine months, and are only those from which material has been sent to the Brown Institution.

THE OPERATIONS FOR THE RADICAL CURE OF HERNIA IN CHILDREN, AND THEIR VALUE.

By HENRY O'NEILL, M.D., M.Ch., Q.U.I.,
Visiting Surgeon to the Royal Hospital, Belfast.

IN considering the important subject of the operations for the radical cure of hernia in children, and their value, we should first consider the class of cases suitable for the operation.

To my mind, the most suitable cases for this operation are:—

1. The children of poor people who have not the means of buying trusses, and who have not the time to look properly after the daily application of the trusses when they are able to buy them, for unless a truss is properly fitted after the hernia has been reduced, it is worse than useless; it is dangerous, because the pad of the truss may bruise the intestine and cause peritonitis or enteritis.

2. In children where the hernia is so large that an ordinary truss is not sufficient to keep it reduced while the child is running about playing.

3. In most cases where a truss has been worn for at least twelve months without any improvement, but where the hernia is increasing in size.

4. In persons who are likely to become labourers, or artisans who may have heavy work to do.

5. In each case after herniotomy has been performed for the relief of strangulated hernia.

As regards the method to be employed, each case must be treated on its merits, and this cannot be decided until the sac has been exposed; then if the sac can be easily separated entire, and is congenital, I have found Macewen's method the best; if, on the other hand, the sac has been torn and the wound not easily closed by suture, Banks's method—ligaturing the sac close to the neck and cutting off the sac half-an-inch below the ligature, and suturing the upper end of the sac to the abdominal muscles above the internal abdominal ring—may be adopted; or Barker's method, where the sac is ligatured in two places and divided between the ligatures, the upper part sutured to the abdominal muscles (as in Banks's method), and the lower part being retained in the scrotum; or Ball's method, who twists the sac several times before ligaturing it close to the neck.

The conditions to be observed to ensure success are: (1) prepare the patient several days before operation by giving him a warm bath each day, keeping the bowels free with a mild purgative, giving milk food, and keeping him in bed. On the morning of the operation, thoroughly cleanse the skin of the injured region by washing the parts with soap and water, then turpentine, ether, rectified spirits of wine, and lastly, carbolic or creolin lotion (1 in 30). (2) Arrest all hæmorrhage (which is trifling) by forcipressure forceps (Spencer Wells's are good). (3) Drain the wound with decaidified chicken bone drainage tube. (4) Use chromicised catgut sutures for all the sutures and ligatures. (5) Bandage