

**DESCRIPTION OF A GALVANIC APPARATUS
FOR APPLYING CHLORIDE OF ZINC AS A COUNTER-
IRRITANT: WITH CASES ILLUSTRATING ITS USE.**

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ELECTRICITY and Galvanism having of late years occupied a prominent position in the treatment of several diseases, the following observations on the utility of Galvanism will, I trust, be found interesting. For the last two or three years, I have been in the habit of using Galvanism as a counter-irritant, finding it less painful than the usual modes, such as moxas, setons, issues, etc. The following is a description of the apparatus I employ, and of my method of using it.

A piece of perforated zinc is fastened or riveted to a piece of platinized silver, or, what will do equally as well, and which I generally use, a sixpence, shilling, or half-crown, according to the size required. The apparatus thus prepared is to be applied with the zinc surface next to the body, the silver being uppermost; over this I place a piece of spongio-piline, previously moistened in salt and water, and retain the whole in close apposition to the skin by means of a few strips of adhesive plaster. At the expiration of every twelve hours, the battery should be removed and washed in salt and water, and then re-applied as before. At the end of twelve days, a deep white eschar is formed, from the action of the chloride of zinc. This may easily be detached, or allowed to slough out of itself, which generally happens about the fifteenth day, leaving a healthy-looking sore. By reversing the galvanic apparatus, that is, applying the silvered surface to the wound, it will be found to heal up quickly; or it may be made to keep up a continuous discharge, by introducing split peas into the opening, or by dressing it night and morning with savine cerate. Where, however, time is an object, and it is desirable quickly to induce counter-irritation, this may easily and speedily be effected by first removing the cuticle either by means of liquor ammoniæ fortissimus, or of acetum cantharidis, and then applying the battery to the denuded surface, and afterwards proceeding as in the former case. In this manner, the same effects are produced in from four to six days, as would require twelve days by the other method. If the latter plan be adopted, it is not uncommon for the patient to complain of a gnawing pain in the part towards the evening of the third day, which, if not relieved, makes him restless and uncomfortable; a mild opiate, administered at bedtime, has generally had the effect of soothing the irritation, and preventing its future occurrence. In delicate females, where it is desirable not to create more pain than is absolutely necessary for the induction of counter-irritation, the first plan is decidedly preferable. I have observed, on three occasions, where the idiosyncrasy of the patient had previously rendered the exhibition of opium or its preparations inadmissible, that during the action of the battery they have produced the most tranquilizing effects. Acting upon this inference, would it not be well in such constitutions as are known to be susceptible to injurious impressions from a dose of any opiate, previously to irritate the cuticular surface by

Electricity or Galvanism? I subjoin a few cases illustrative of the efficacy of this mode of treating disease, in conjunction with other general treatment.

CASE I. In the autumn of 1847, I was consulted by a gentleman labouring under the more prominent symptoms of phthisis pulmonalis. He had already been subjected to a pretty active course of general treatment, among which repeated blisters, expectorants, cod-liver oil, iodine and its compounds, had formed a prominent part. After trying a variety of the more useful adjuvants in such cases without deriving much benefit, I recommended an issue. My patient objecting to the use of caustic, of which he had formerly had experience, I substituted a couple of batteries, made with a shilling and a piece of perforated zinc, and applied one under each clavicle. As soon as the eschar was removed, the wound was dressed occasionally with savine ointment for about two months. The batteries were then again applied to another part of the chest, in a line with the clavicles, and the old sores allowed to heal up. This process was continued for the space of fifteen months. He was ordered light nourishing food, to avoid all hot diluents and sloppy dishes, to drink moderately of malt liquor, and to exercise himself freely when the weather was favourable. To relieve the distressing cough, which occasioned racking pains and restless nights, I prescribed inhalation of the vapour of the water-hemlock seeds, made in the proportion of one drachm of the bruised seeds to half a pint of boiling water, with half a drachm of chloric ether, and the same quantity of tincture of squills. As tonics, he took occasionally preparations of iron, quinine, calumba, with bicarbonate of potash, and spirits of turpentine. When I last saw him he had regained his healthy looks. His cough had entirely left him; morning expectoration of a mucous character alone remained; the appetite had improved; and the perspirations had ceased. He had, within the last six months, gained fourteen pounds in weight. This I regard as a very favourable indication, though one on which too much reliance ought not to be placed. A slight dulness still remained on the inner third of the left clavicular region, together with increased expiratory murmur. These symptoms, I am in hopes, will ultimately yield; at present, the case wears a favourable aspect.

CASE II. A lady, aged 38, the mother of six children, tall, of spare habit, and sallow complexion, applied to me in November last, respecting an affection under which she had been labouring for some months, and which had latterly increased considerably in severity. Her principal symptoms were, pains and giddiness in the head, excessive appetite, almost amounting to bulimia, and when in the horizontal position, throbbing of the carotids and temporal arteries to an extremely uncomfortable degree. Heart's action, 80 in the minute—strong, but not immoderately so; no abnormal bruit; radial pulsation regular, easily compressible, synchronous with heart's action, but weak and small, as compared with the pulsation in the carotids. Mouth frequently clammy; breath of an unpleasant odour; tongue furred in the morning, gradually becoming clean as the day advanced, eyes clear; breathing short and easily accelerated, 22 when quiet, but rapidly increased by motion to 30 and upwards, without a corresponding increase

of the arterial circulation; frequent sighing; countenance at one time deadly pale, and at another very much flushed; sensation of cold water running down the back; occasional tremors; coldness of the feet, and blueness of the extremities; hands very subject to chilblains in cold or frosty weather; skin mostly cold, harsh to the touch, rarely perspiring; urine scanty, showing a copious deposit of the yellow lithates, with an occasional iridescent pellicle; pain in the loins; has been troubled with leucorrhœa and hæmorrhoids; bowels very costive, rarely acting without medicine; fæces cylindrical, variable in colour and consistence, some parts very dark, others clay-coloured; great disinclination to muscular exertion; tottering in the gait; difficult progression; frequent attacks of hysteria. The treatment previous to my seeing her, had, for the most part, consisted of such medicines as were thought best adapted for dyspepsia, and for the relief of the more prominent hysterical symptoms. My impression being, that there was something wrong in the spinal column, I endeavoured to satisfy myself where the latent mischief lay. Percussion along the spinal tract, and hot water applied with a sponge, afforded no positive indication. The tenderness complained of on smart percussion was as evident in other parts of the body, if attention were earnestly called to it. Electro-Galvanism I had so often found useful in assisting my diagnosis in similar cases, that I determined to make trial of it; but not having a machine by me at the moment, and the lady being too ill to attend at my house, and expressing also a great dislike to the contemplated operation, I was compelled reluctantly to defer it to a future occasion. In the meantime, I contented myself with prescribing mild aperients to regulate the bowels, and turpentine rubefacients to be applied to the back. Perceiving little benefit to result from these remedies, and not feeling justified in adopting a more active line of practice until I had obtained more definite information as to the condition of the spinal marrow, I again urged the propriety of allowing me to examine it by means of Electro-Galvanism. This time she consented.

With one hand she held one of the brass tubes of the battery, whilst I, to divert her attention, passed the other rapidly and frequently over the chest and sides of the body. The usual starts witnessed on similar occasions were only apparent; but on suddenly running the rubber, without previous warning, from the nape of the neck down the spine, the moment I reached about the fourth dorsal vertebræ, she suddenly fell forward, and complained of a dreadful sensation in the pit of the stomach. This experiment was repeated with the like result. It is one which I have always considered as pathognomic of spinal irritation, when applied to that particular region of the spine. In myelitis, or meningo-myelitis, intense burning heat is generally experienced, and an involuntary shriek not unfrequently ensues. I have never been able to trace any injurious effects farther than the temporary ones above alluded to, from the employment of Electro-Galvanism in the detection of these diseases. Rough or prolonged manipulation might, and no doubt would, exasperate the latter malady; but I have seen so much benefit from Electricity and Galvanism in the former affection, that I do not hesitate to resort to it whenever I am in doubt as to the true nature and exact locality of the disorder. With the clue thus afforded to my

patient's complaint, I at once resolved to apply two galvanic batteries of the size of a shilling each, above the seat of mischief, immediately over the spine, in the manner advised in the former case. The aperients were continued, and Donovan's syrup of bark in half-drachm doses, with five minims of dilute hydrocyanic acid, P. L. 1836, was prescribed to be taken twice daily. On the seventh night she complained of a good deal of pain in the back. To take morphinæ hydrochlor. gr. ss. at bedtime. In the morning had passed a good night. Eschars forming, covered with a white powder. In twelve days they separated, and were then dressed with savine ointment.

From this day my patient became rapidly convalescent, and in a few weeks returned home quite well.

I could easily multiply cases of the good effects of counter-irritation judiciously applied. I do not attach much importance to the galvanic action produced by the apparatus, but merely recommend it as being an excellent substitute where the more formidable remedies, such as potassa fusa, moxæ, or the potential cautery, may be objected to on account of the suffering they entail, and which in some constitutions is an insuperable bar to their use.

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CONTRIBUTIONS TO THE PATHOLOGY AND TREATMENT OF CHOLERA.

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III. PARTICULAR SYMPTOMS ORIGINATING IN THE PERVERTED FUNCTION OF INDIVIDUAL ORGANS.

Gastro-enteric Discharges. In fever and common Cholera Morbus of the autumnal months, the discharges from the stomach and bowels consist of vitiated secretions of the abdominal viscera; but in the disease known under the name of *Asiatic Cholera*, running into the asphyxial form, the several gastro-enteric secretions are suspended, though there be copious intestinal discharges, consisting, according to the best chemical examination, of effused *blood plasma*, exuding from the capillaries after normal secretion has ceased. The occurrence of these discharges, which bear, as I have said, no relative ratio to the severity of the other symptoms, seems, however, secondary to the blood lesion, from which those abnormal changes in the respiratory, circulating, and nervous systems, which constitute the phenomena of Cholera, derive their origin. The vomiting was not so constant a symptom in the first stage of the disease as was the diarrhoea, but generally appeared with the development of the second stage. Both have been considered, by some observers, as curative efforts of the system, to relieve the congestion of the abdominal venous capillaries; but this opinion is irreconcilable with the beneficial therapeutic effect of astringents, in combination with medicines that allay irritation, to restrain the excessive intestinal exhalation