

value of the former can scarcely be overrated; and of late years the varied forms in which it has been presented add much to its powers. Many of its preparations, indeed, are what might be called elegant; and the certainty with which, in most cases, it acts cannot be doubted. Physiology, too, has shown that it is on the red corpuscles it chiefly shows its powers, and these are constituents of the blood to the state of which Salisbury has drawn particular attention. Similar remarks might be made about the cod-liver oil.

Were this the place for it, I might also draw attention to other drugs capable of altering the state of the blood; and where animal food could neither be used in large quantity, nor be obtained, it is a matter of considerable moment that we have other measures to which we may have recourse. I may instance hemlock, the mineral acids, *uvæ ursi*, *liquor calcii chloridi*, &c. The first of these I would specially mention. The rapidity with which it acts is very striking; but having spoken of it on another occasion I need not do so again.

In concluding these remarks it seems scarcely necessary to say that the physician is to confine his treatment neither to food nor yet to medicine. A judicious combination of the two must be the plan from which he may hope to obtain the best results.

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ART. VI.—*Case of Carbolic Acid Poisoning.*<sup>a</sup> By ROBERT S. ARCHER, A.B., M.B., Univ. Dubl.; Physician, Netherfield Fever Hospital, Liverpool.

CASES of carbolic acid poisoning naturally gravitate into two classes, with respect to the means by which the noxious substance has been introduced into the system. The first of these will include those cases in which the toxic effects become manifest during the period in which this substance is being employed as a surgical dressing to extensive wounded or abraded surfaces, or when large cavities, such as those produced by abscesses of considerable dimensions, are being washed out with a solution of this drug, or where it has been used in enemata. Of this class I have never seen an instance. Under the second heading are to be classed those cases in which it has been taken into the stomach; and under this division there will be usually found two subdivisions—viz. (1), those cases in which the drug has been taken

<sup>a</sup> Read before the Liverpool Medical Institution.

accidentally, and (2) when it has been taken with a view of destroying life on the part of the patient. Under the latter of these subdivisions the case I am about to relate falls. Under the former are included those in which it has been administered through the carelessness of the patient or of his attendants:—

CASE.—A woman of about forty years of age was seen three and a half or four hours after having taken a wineglassful of the crude, brown, syrupy carbolic acid, such as is used for disinfecting purposes. I am inclined to think the patient was not strictly temperate. About half an hour after swallowing the acid (as was subsequently learned) she complained of epigastric pain, and said she would go and lie down. Nothing further was known of her condition till half an hour before I saw her, or about three hours after having taken the poison. At this time she was found by her sister lying on the floor in a back room, perfectly unconscious. On my arrival she was in bed in another room, to which she had been removed. She was in profound coma, breathing stertorously; the conjunctivæ were totally insensible, the pupils were contracted to the size of pins' heads, and there was complete relaxation of the entire muscular system; there were some abrasions about the inside of the lips and cheeks; the palate was dry and pale, as if parboiled; skin cold and clammy; pulse 120, very feeble and thready. On this occasion I detected no peculiar odour from her breath, and her sister could give me no clue as to what she had taken. No trace of a bottle or any other vessel containing poison could be found. It was only conjectured that she had taken poison of some kind, and from the symptoms I had a strong suspicion that it was carbolic acid in some form. After her recovery she informed us that she had procured a pennyworth of the fluid in a cup at a neighbouring druggist's, as soon as the shop was open in the morning, and that after drinking the whole of it she destroyed the vessel. After taking the acid she told us that her "lips first became white and then black."

All our efforts to arouse the patient were entirely ineffectual. There was not the slightest approach of response to various stimulants applied to the cutaneous surface—she lay a heavy-breathing insensible mass. An emetic of mustard and warm water could not be administered, and we gave up the attempt to do so after several failures. The length of time that had elapsed since she swallowed the poison seemed to preclude any hope of benefit from this proceeding, even if successful, and the use of the stomach-pump also appeared likely to afford no relief to the urgent and very grave symptoms. There was no apparent effect produced by strong liquor ammoniæ applied to the nostrils. I ordered mustard poultices to the epigastrium and the calves of the legs, more as a matter of routine than anything else, gave a most unfavourable

prognosis, and left, not at all expecting to see her alive again. Calling in about two hours, I found her, if possible, in a more precarious condition. Pulse had now increased to 140, running and thready, hardly perceptible. There were slight twitching movements in the feet, particularly localised in the great toes; a faint odour of carbolic acid was perceptible from the breath, and my conjecture concerning what she had taken was confirmed. Whilst pondering over the case, it flashed across my mind that I had read somewhere or other of ether being employed subcutaneously in a case of coma, &c., from carbolic acid, but, if I recollect aright, with no good effect. Nevertheless I determined to make a trial of the remedy, believing that it could possibly do no harm, but, still having little faith that it would act as a restorative, I determined merely to use it experimentally. I accordingly injected 40 minims of pure ether, such as is used for producing anæsthesia, by four punctures on the flexor aspect of the right forearm. After each injection she seemed to revive slightly, and the pulse appeared to become somewhat stronger. On making another visit after four hours had elapsed, I was not a little astonished, and considerably gratified to find that my patient had quite regained consciousness, and that her condition was very much improved in every respect. I learned that about two hours after my last visit she had vomited a small quantity of glairy mucus, through which were scattered coffee-ground-like particles, and having a strong odour of carbolic acid. Before the vomiting set in she had some convulsive movements in the superior and inferior extremities, more marked in the latter. Her pulse was reduced in number and stronger. I ordered her to have draughts of olive oil, and a little milk at times. In two hours more her pulse was reduced to 84, consciousness continued, and the pupils were dilated and acting. There was a loose gurgling cough, as if caused by some secretion lodging in the larynx and trachea. She dozed at times. There was a complaint of soreness in her chest, as she expressed it herself, "inwardly." To continue the olive oil and to have half an ounce of castor oil. Next morning her pulse was 95, full and strong, and she had slept well during the night. She complained of soreness in her throat and chest. Thirst; skin warm; tongue coated with a white fur, some white shreddy material hanging about its edges and on the inside of the cheeks. I could not get a satisfactory look at the throat, owing to spasm of the lingual muscles when an examination was attempted. After my departure last night she had a copious motion from the bowels, and passed some urine, which was reported to have been "quite black."

At my visit on the third morning she was reported to have had a good night; pulse 110. She seemed feverish; skin hot; temperature probably between 101° and 102°. Lips brown and parched; tongue cleaning; soreness in chest continuing; cough troublesome; and some

moist râles were detected over the chest. Vomited some milk and oil on two occasions since my last visit. Ice, which she had been ordered to suck, proved very grateful. Urine was passed freely, and in tolerable quantities, of a greenish-brown colour, with small oil-globules floating on its surface.

During the next four days progress towards recovery was sure and steady. There was now scarcely any soreness in the chest, and much inconvenience was not caused by swallowing. Condition of lips and tongue improved. The fauces were found to be congested all round. Pulse about 90. Sleeps well. She now complained of numbness at the seat of punctures. On testing this condition I found limited areas of anæsthesia surrounding the puncture marks, but especially defined at their distal sides. The urine had regained its normal colour. Bowels regular. Coughs occasionally, and brings up small quantities of thick greenish mucus, at times streaked with blood. Some râles still audible in the chest. Vomiting has ceased.

During the next three days there was still further improvement. Towards evening there was a complaint of dryness and soreness of throat. Pulse had now settled down to 80, full and regular. The anæsthesia about the seat of punctures was replaced by soreness and a slight amount of induration, both of which subsided shortly. From this on convalescence progressed uninterruptedly.

There are several circumstances connected with this case which appear to be worthy of consideration, and to which I would briefly direct attention.

Recovery after so large a dose of carbolic acid calls for comment. The very concentration of the dose may have contributed in no small degree to this favourable issue. This assertion may appear anomalous, when it is considered that, as a rule, poisons act more energetically, and with a more rapidly fatal result, in proportion to the largeness of the dose. But this case seems to be an exception to the rule. I will endeavour to explain this apparent anomaly.

Now, the effect of a strong solution of carbolic acid upon the external cutaneous surface is to produce a brief primary sensation of pain, followed at a larger or shorter interval of time, in proportion to the strength of the solution by anæsthesia, attributable to the coagulation of the albumen of the tissues. If this be true with respect to the skin, arguing from analogy, how much more likely is it to be so when the delicate mucous membrane of the stomach is subjected to its influence. The severe toxic effects were probably produced by the absorption of a certain definite

quantity of the acid before the stage of hardening and anæsthesia had been established, and after this had occurred the absorptive process ceased. If this theory be correct, it will be observed that up to a certain point concentration of the poison has a preservative influence as regards the final result, provided that the patient have vital energy enough to tide over the primary profound shock to the nervous system. Now, granting that there is some reason for the soundness of this view, you will readily perceive how impossible it would have been for the hardened and benumbed mucous membrane to absorb stimulants introduced into the stomach, and therefore the utter uselessness, if not absolute harm, of thus attempting to revive the failing powers. Under these circumstances, ether used subcutaneously, and stimulants applied to the skin, would appear to be the means to which we should trust. It is, I think, not at all unlikely that these measures had some effect in bringing about reaction.

Should it ever fall to my lot again to have to treat a case similar to this one, I should pursue the same course of treatment, with the addition of the use of the pump, and the washing out of the stomach with olive oil.

A consideration of the several points in this case seems to warrant the following conclusions:—

1. That the nervous centres are profoundly affected shortly after the reception of the poison into the stomach.
2. That a large dose of the poison, when concentrated, may be protective as regards the final result, by rendering the mucous membrane of the stomach non-absorbent.
3. That a moderate dose, considerably diluted, may prove fatal, the gastric mucous membrane retaining its absorptive powers.
4. That when the dose is concentrated, the introduction of stimulants into the stomach is not likely to be of any use, but stimulants used subcutaneously may prove beneficial in bringing about reaction.
5. That no permanent injury follows as a necessary consequence from a concentrated dose.