But, whichever is employed, let it be given in large and frequent doses. I make this appeal in the interest of the heart as well as of the joints. Let every case of acute rheumatism be regarded and treated as one in which heart-complications may possibly be prevented, and it is probable that in some cases they will be prevented. But every hour is of importance, for it needs no argument to show that the danger to the heart is less in a case in which the course of the disease is arrested within 24 hours, than it is in one in which three or four days are expended in the process.

The fact has never been accepted by the profession that the course of acute rheumatism may in many cases be arrested within 24 hours of the time that treatment commences. The recognition of that fact is the keystone to all possible success in the prevention of cardiac complications.

CHEMICAL ANALYSIS OF WATER AND WATER SUPPLY.

BY CHARLES T. KINGZETT, F.I.C., F.C.S.

ATTENTION has been recently directed in this JOURNAL to certain investigations, from the results of which it is apparent that "polluting material, potent for harm," may be present in a water, the analysis of which would indicate it as of "extraordinary organic purity." I believe that this fact is recognised by all chemists, and most chemists will admit that an infected water may as readily pass one method of water-analysis as another. There can be no doubt that, while chemical analysis may throw much light upon the history of any particular water, and particularly if an investigation be made (as it always should be) of the source of the water, the methods at present employed by chemists are powerless to discover the presence of disease-germs in water.

Since discussion of this subject has in a manner been invited in these columns, I venture to make reference to some remarks upon Organic Matter in Water, which I published at the time when Dr. Tidy was endeavouring to obtain the confidence of chemists and others in that particular process of water-analysis which he prefers to employ. I pointed out (*Chemical News*, vol. xli, p. 254), upon the basis of new experimental evidence, that it was possible to add a certain amount of organic matter to water, after which it would pass Dr. Tidy's process as of "great organic purity," and yet could subsequently become putrid (and therefore pernicious); in which state, judging by the sense of smell alone, or that and the use of the microscope, it would be unhesitatingly condemned by all analysts. Some time before this, I had been investigating some points in the chemical history of putrefaction (*Journal of the Chemical Society*, 1880, p. 15), and, in course thereof, I had come into contact with facts which seemed to me to destroy the very ground upon which the "oxygen process," as defined by Dr. Tidy, rests. For instance, he says (*Journal of the Chemical Society*, "At any rate, it (the oxygen process) undoubtedly furnishes us with exact information as to the relative quantities of putrescent and easily oxidisable matters, and of non-putrescent or less easily oxidisable matters, present in the water." Now, my experiments clearly proved that the oxygen process can do nothing of the kind, for they demonstrated the fact that a water may contain at one time organic matter (extract of meat) in a non-putrescent condition; and that, when these same matters—excellent food originally—shall have become pernicious, the water will absorb far less oxygen than originally. My contention was supported by Mr. Charles Ekin, but neither then nor since has Dr. Tidy in any way confronted this difficulty; he has contented himself with what, for all that can be proved to the contrary, seems to be a merely accidental coincidence between the general indications of the permanganate method and Dr. Frankland's combustion process as applied to water-analysis.

My experiments showed that it is possible to introduce 50 fluid grains of a putrid extract (such as I had described) into a gallon of chemically pure water, without taking it out of Dr. Tidy's class of "waters of great organic purity." Similarly, 170 fluid grains could be introduced with the result of obtaining a water of "medium purity," and 255 fluid grains would only make the water of "doubtful purity." The putrid extract here referred to was swarming with organisms, and doubtless contained sepsin, which Dr. Burdon Sanderson has proved to be a blood-poison. In the face of these facts, what reliance can be placed upon the oxygen process of water-analysis? Having asked the question, I will also answer it by saying, None.

Apart from that general information which the chemist may ob-

tain from the examination of waters by the well known methods, he can get no information of a precise character. Which way then shall we take to arrive at the information we seek? At present the way is not clear, but Dr. Angus Smith, in his extremely interesting paper (*Sanitary Record*, February 15th, 1883), has, I think, wandered near to it. Unfortunately, the method which he describes, admits, so far, of no quantitative expression. If we could take a measured quantity of suspected water, and introduce it into a medium in which such organisms as it contained would effect certain decompositions, the products of which we could determine by measure or weight, we should be well advanced in our task, although not at the end of it; for it would still remain to ascertain if any particular product of decomposition or fermentation may be taken as indicative of the work of a particular organism, and finally, we should have to determine if such organism, being thus far identified, is to be feared as the propagating cause of a particular disease.

Forced back in this way upon well ascertained general truths, the policy to be pursued as concerns water-supply, above all things should not be experimental. We well understand the danger of contaminating our rivers with filth which breeds disease, and we also well understand the enormous difficulty and cost of finding and using another source of supply for the metropolis. In this quandary it is not surprising if we involuntarily turn to the system of water carriage now almost universally in use (thanks to engineers), as the source of all this trouble, and I, for one, think that the shortest way out of the difficulty is to return to the dry closet system, taking advantage of chemical means (of which there are plenty) to prevent the excreta from becoming a source of pollution and disease. Our water-courses would then, in due time, reassume their original purity; we should be no longer exposed to the puffs of gas, loaded with disease-germs and poisons, which escape from the sewers into our houses, and from the ventilators into our streets, and we should cease to commit the enormous folly of throwing into the sea those valuable substances which, in the natural order of things, should be immediately returned to the soil which grows our food.

SURGICAL MEMORANDA.

GUNSHOT-WOUND OF THE ABDOMEN.

IN his very interesting history of a case of penetrating gunshot-wound of the abdomen, published in the JOURNAL of May 31st, Professor Buchanan states that he has been unable to find an example of "a bullet entering near the umbilicus, and making the half circuit of the body." As I came across a case somewhat of that nature a few years ago, I venture to send the following brief particulars.

During the engagement which followed the successful surprise of the village of Suppri, on the north-west frontier of India, on February 15th, 1878, a sowar of the Queen's Own Corps of Guides was struck by a bullet in the back. I saw the man, who was but two or three yards from me at the time, stagger, and expected to see him fall. He remained standing, however, and called out to me that he was wounded. Having given directions to the hospital-assistant as to his disposal, and mentally noting that the wound could be only a slight one on account of his being able to walk down a steep hillside with but little help, my attention was soon directed elsewhere. Some hours later, when the force had recrossed the frontier, and I could make a detailed examination of the wounded, I found the sowar above mentioned in bed, lying on his back, with his legs drawn up, and his face expressive of acute suffering. My first impression on seeing him in this state was, that the bullet had penetrated the abdominal cavity. There was not, however, the marked collapse usually attending so grave an injury. The bullet had penetrated the lumbar muscles on the right side of the spine, an inch from the middle line. Having stripped the abdomen with a view to a careful examination, as my fingers passed over the hepatic region, a slight prominence was encountered, of such firm consistence as to at once lead to the conclusion that it was the bullet. A small incision over the spot was at once made, and a round bullet extracted, to the great delight of the patient, and the immediate relief of his suffering. Both wounds healed in a few days, without any suppuration of the track made by the bullet. In this case, a round bullet, travelling most probably with slight velocity, was deflected by the lumbar fascia, and very nearly made the half circuit of the body, as the site of extraction was two inches from the middle line in front, immediately below the false ribs.

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