muscle wall is concerned. The tracings I give represent the average effects produced.

Now it is found that liquid containing 1 part of sodium nitrite in 1,000 of saline solution first quickens the action of the heart for two or three minutes, decreasing, however, the force of each contraction, but afterwards the heart beats more slowly as well as less powerfully, and in ten minutes stops in diastole. One in 5,000 also quickens the heart's beat for a few minutes, and slightly weakens it; then it slows it, but the heart will continue to live for two hours. One in 10,000 quickened and weakened the heart for twenty minutes, but in other ways it had very little effect.

When the nitrite is replaced by a saline solution the heart begins beating anew, and soon regains entirely, or almost entirely, its previous vigour. It is possible to start and stop the heart two or three times by alternately using a saline solution and a saline solution containing 1 part in 1,000 of nitrite. The following diagram illustrates the influence of sodium nitrite on the muscular tissue of the heart:—

Fig. 15.—Effect of barium nitrite on frog's heart, 1 in 2,000 and 1 in 1,000; 1, normal saline; 2, barium nitrite 1 in 2,000; 3, 16 minutes after; 4, 25 minutes after; 5, barium nitrite replaced by normal saline 45 minutes before; 6, barium nitrite 1 in 1,000; 7, 3 minutes after.

In no case have I found any actual increase in the force of the individual heart beats. Potassium nitrite acts like sodium nitrite, only the weakening effect is more marked.

When a molecule of calcium instead of a molecule of sodium is combined with the ONO group, a slightly different effect is produced. With 1 in 1,000 the action is much the same as with sodium nitrite of the same strength, except that the quickening is not so great. With 1 in 10,000 there was also very little quickening; the beats are squarer at the top. Calcium, as Professor Ringer has shown, prolongs the systole, and thus renders the top of the beats squarer—that is, as Professor Ringer has shown, it tends to prolong the heart's action. Here, as is usual in the lime compound with ONO, the effect of the calcium is best seen when a very delicate solution is used. One in 1,000 of barium nitrite at once shortens the height of contraction, and kills the heart rapidly.

When the heart is fed with 1 of barium nitrate in 2,000 of saline, the duration of systole is so much increased that full diastole does not occur, but soon the action of the heart is quickened and weakened. Eventually the barium nitrite acts as a poison to the heart. A tracing I show illustrates this:—

Fig. 16.—Influence of 1 in 4,000 of amyl nitrite in blood in the heart; 1, beats with normal blood; 2, blood containing 1 in 4,000 of amyl nitrite used for 48 seconds; 3, normal blood used 3 minutes.

The rapid decomposition which ethyl nitrite undergoes prevents its effects on the heart being determined, and in saline solutions even small quantities cause the fluid to

become acid. When blood is used, however, the fluid does not become acid, and the influence of amyl nitrite on the heart muscle can be determined. Fig. 16, taken with Kronecker's apparatus, shows well the influence of amyl nitrite on the heart muscle.

It will be seen that 1 in 4,000 of blood the beat of the heart is quickened; and though the height of the contractions is less, there can be little doubt that the heart does more work. When a larger quantity of amyl (1 in 2,000) is present, the contractile power of the heart is decreased, and the heart beat becomes slower. A still larger amount stops the heart in diastole.

The outcome of experiments on the heart muscle is as follows. The molecules of the ONO group in whatever combination, when present in even small quantities, tend to quicken the contractions but to weaken them. If the solutions coming in contact with the heart are very dilute, the quickening may make up for the weakened action, and the heart probably does as much, it may be more, work for a short time. Stronger solutions containing compounds of ONO, after quickening, weaken, slow, and arrest the heart's contractions. But susceptible though the heart is to the influence of nitrites, the evil influence is very evanescent if the nitrite molecules be removed.

TYPHOID FEVER AND ITS TREATMENT BY THE CARBOLIC ACID METHOD.

By R. COYLE, M.B., C.M.

On May 6th I was called to see a boy, aged 10 years, suffering from severe frontal headache, some abdominal uneasiness, and dull, aching pain in the limbs. The temperature was 100° F. I ordered the usual mineral acid mixture, with milk diet. On May 8th the symptoms were as before, only accentuated, the temperature being 102.5°. From this on I ordered antifebrin, 3 gr., every eight hours. On May 11th his temperature was 101.5° in the morning, in the evening 102.8°. The eruption was fairly well developed on the chest and abdomen; there was tympanites and marked gurgling over the right iliac region; the tongue was brown and furred. On May 12th the morning temperature was 102°, the evening 104°; there was low muttering delirium, and an appearance of complete helplessness. Previous to this I had a practitioner of wide experience to see the case; he agreed with my diagnosis and approved of my treatment.

On May 12th I began to be alarmed for my patient, and determined to try Professor Charteris's carbolie acid method. I took the temperature in the evening, and found it 104° F., and the boy was passing into what seemed to me a semi-moribund condition; the tongue was heavily coated and filthy. I gave him one of the pills¹ (2½ grs.) on that night, and one morning and evening for eight days after. On the morning of May 13th, the improvement was palpable; the lad was brighter, the tongue considerably cleaner, and the temperature 101°; the boy had slept well. In the evening the temperature was 101.5°, and there was marked general improvement. For the following days the temperature was as follows:—

	A.M.	P.M.
14th	100.0	100.5
15th	98.7	100.0
16th	98.6	99.0
17th	98.8	99.0
18th	98.0	98.0
19th	98.0	98.0
20th	98.0	97.5
21st	98.8	98.0
22nd	98.8	98.0

And so on up till present date, when the lad is convalescent and, with the exception of the weakness consequent on so severe an illness, as well as ever he was.

Indeed, I may say that from the very first the improvement was so rapid and so continuous that I was beginning to be doubtful of my diagnosis, and on May 15th I waited on my old teacher, Professor Charteris, and gave him a complete history of the case. He very kindly volunteered to visit the boy with me, and confirmed my diagnosis.

¹ The pills can now be obtained in two strengths, namely, 2½ grs. and 1 gr. of carbolie acid.