

sists of three parts milk and one of water; if at Fig. 2, half and half; if at Fig. 1, three parts water and one of milk (and here water means added water); if the milk be pure, the lactometer stops between the letter M (milk) and the Fig. 3. This is just a rough outline of the subject; of course you make allowances for intermediate distances on the scale; thus the scale might measure three and a-half parts of milk to one of water, or *vice versa*. But the simple point we aim at when we buy milk for our sick or our young is to find out its *purity* as regards *strength*; every drop of added water is weakness as regards its alimentary nature. There are other graduations on the scale of the lactometer; they have reference rather to analyses, and we need not enter into them here, as we are *testing* for water, though I may refer to them in a future paper.

(To be continued.)

## PRACTICAL LESSONS IN ELECTRO-THERAPEUTICS.

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### LESSON XII.

(1) *Indications for Use of Electricity in Medicine.*  
(2) *In Surgery.*

(Continued from page 90.)

IN the section on electro-physiology, we discussed the methods in which electricity, either continuous, interrupted or alternating, is supposed to act. It is unnecessary here, therefore, to do more than remind the reader of the catalytic, cataphoric, and electrolytic functions of the continuous current, and of the stimulating, sedative, and vasa-motor actions of the interrupted current, whether primary or secondary.

Some recent writers on electro-therapeutics have thought proper to disparage the use of the term *catalysis*. But bearing in mind the definition so clearly given to this term by Remak, we fail to see that it is other than most convenient, serving to obviate the use of much verbiage, in the matter of naming individual "effects" of the applications of the continuous current.

It is now-a-days the fashion to object to the use of terms introduced by the masters of our science, but until something better is brought forward, we are content to follow in the wake of so great a leader as the celebrated German electro-physiologist.

Catalysis then may be used where we desire to improve nutrition, to promote circulation, to absorb effusions, to disperse glandular or other enlargements. In the latter instances the cataphoric function of the continuous current is probably of considerable aid in the process, and in all these cases it is advisable that a comparatively low current strength, with considerable electrode area, should be used for short periods. Particularly should this be remembered when applications are made to sensitive portions of the nervous system, or when the brain itself is the part under treatment.

Disregard of these points may induce unpleasant effects—headache, nausea, giddiness, trembling, &c.—and thus defeat the objects sought to be attained. In parts where skin, muscles, or abdominal viscera are to be influenced, the current strength may be larger, but even here most of the beneficial results may be obtained with currents under twenty milliampères.

But where the chief object is simple *cataphoresis*, it is not only permissible, but sometimes necessary that stronger currents should be employed. Again, where it is desirable to pass drugs, such as iodides, bromides, mercury, quinine, cocaine, chloroform, or others, through the skin, it is useless to attempt the process with any hope of satisfactory results, unless large electrodes (particularly the negative pad), and a current strength of twenty milliampères upwards to thirty, or even more, is used, for from twenty to forty minutes or longer. In this manner it is possible with cocaine solution (ten per cent.) so to anaesthetise the skin, that a patient is able to bear the galvano-cautere without flinching.\* In cases of local parasitic growths (ringworm, &c.), solutions of parasiticide salts have been passed by this plan so satisfactorily that a few sittings have sufficed to cure disease of considerable standing.

In rheumatoid arthritis and similar cases, treatment by cataphoresis is indicated, and the authors have found that this method has given results satisfactory to an unexpected degree. Further practical developments of cataphoric medication are in progress, and it is believed that by its aid it may become easy to apply *local* remedies in the treatment of disease, to a much greater extent than has hitherto been possible.†

\* In a recent case of rachialgia, Dr. Harries anaesthetised the skin in the region of the lower cervical and upper dorsal vertebrae so completely by this method, that he was able to apply the galvano-cautere deeply to six intervertebral spaces without any complaint of pain by the patient, either during or after the operation.

† It has just been brought to our notice that, at the recent International Medical Congress in Berlin, Mr. Edison, of New York, has described an experimental case of gout treated by this plan. It is only fair to ourselves to say that, previously to the experiment thus described, we had for months reduced this matter from the experimental to the practical stage, and both before and since Mr. Edison's attempt, have adopted "cataphoric medication" as a part of our daily work.

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