

to the Romans (ix. 20, 21), as well as the message of the Prophet Jeremiah, "O house of Israel, cannot I do with you as this potter? saith the Lord. Behold, as the clay is in the potter's hand, so are ye in Mine hand, O house of Israel" (Jer. xviii. 6).

The services of the Eastern potter are always in requisition for the Goulah jars used by the women for carrying water from the well. These are made of fragile burnt or sun-dried clay, and have therefore to be constantly replaced. The potter may be seen to-day in Palestine, sitting just as he sat in ancient times, at his wheel, fashioning the domestic vessels, whose shape is probably as unchanged as his own occupation.

In English potteries the clay is usually prepared in a circular pit, the mixing and kneading being partly carried out by horse-power; but in the East the potter treads his

clay, as we learn from a verse in Isaiah: "He shall come upon princes as upon mortar, and as the potter treadeth clay" (Isa. xli. 25). Even when the potter's vessel is broken and apparently useless, the fragments are collected and gathered into a heap ready to be crushed into powder. From this powder, when mixed with lime, a valuable kind of cement is made, which is much used for repairing cisterns, wells, and aqueducts, because it possesses the excellent property of hardening with age, until it becomes as hard as the rock to which it adheres.

In *Palestine Explored*, the Rev. J. Neil describes the manufacture of this cement, called in Arabic *Ihomrah*, and says that every autumn the fellahen may be found busily occupied in the Valley of Hinnom. They sit with a heap of this party-coloured broken pottery before them, pounding the fragments

with a stone-crusher, which they roll backwards and forwards over the pots herds until the whole is bruised finely enough for the required purpose. The writer expresses his belief that this is the process referred to in Isaiah xxx. 14 (Rev. Ver.): "And he shall break it as a potter's vessel is broken, breaking it in pieces without sparing; so that there shall not be found among the pieces thereof a sherd to take fire from the hearth or to take water withal out of the cistern."

The work of the potter suggests to a spiritual mind many precious lessons upon which I will not now enlarge; but I would suggest that whenever they have the opportunity, my young readers should visit a pottery and see for themselves what I have endeavoured to describe. May it be the desire of each one of us to become "a vessel unto honour, sanctified, and meet for the Master's use" (2 Tim. ii. 21).

## THE MEDICAL SIDE OF ELECTRICITY.

By "THE NEW DOCTOR."



profession of all others in which the quack can reap handsome profits is the profession of medicine. For the medical quack is in an unusually fortunate position, which he has obtained partly by his own industry and partly by the help of the general public, the law, and even the medical profession itself. And of all the means which have been practised by medical quacks to fleece those who are foolish or ignorant enough to become their victims, none has proved such a mine of wealth as the "cure" of disease by electricity.

If we had been writing against quackery as a whole, we should scarcely have mentioned electricity at all, but should have confined our attention to the many dangerous poisons which are sold indiscriminately to the public under the name of patent medicines. For the person who lives by selling sham electrical apparatus to the believing public is only a criminal in so far as he fleeces his victims out of their cash; unlike the vendors of so many

patent medicines, he does not affect the health of the individuals on whom he practises. For most of the electrical appliances which are offered to the public are harmless and useless.

We say that these appliances are useless, and we base our assertion on two facts that cannot be gainsaid: first, they do not produce sufficient electricity to have the slightest effect upon the body, and secondly, because if they did produce electricity, the electricity produced would be no good.

"Electricity is life." How often do we see this above advertisements for patent belts, rings, corsets, boots, etc.! "Electricity is life." No statement could be more utterly false than this. Electricity is not life, nor are the processes of life at all like the phenomena of electricity, nor is the fundamental principle of life in any way to be compared with electricity.

Yet we must remember that this utterly false assertion did not originate from the quacks themselves, for they obtained it from a long forgotten chapter in the history of physiology, when that science was in its early infancy. For certain of the old physiologists believed that the phenomena of the central nervous system and the processes of the mind were the outcome of electrical force. We now know that this is untrue, although we can follow their reasoning much closer than they could themselves, because we possess a much greater knowledge of all departments of science. And the mistake which was made by those who believed that life was electricity, was the same mistake that has been made in every science at every age—the mistaking the effect for the cause.

The contraction of a muscle is a most elaborate phenomenon. It is associated with one of the most complex chemical reactions with which we are familiar, and by the discharge of physical energy in the forms of work, heat, sound and electricity. But the electricity which a muscle produces during its contraction is no more the cause of that contraction than is the sound or the heat which is produced at the same time—it is one of the by-products which result from the discharge of vital energy.

It is the same with all the processes of the mind and of the brain; they are all accompanied by elaborate chemical and physical conditions, but it is neither chemical nor physical force which produces them, but a force which we term vital energy, the nature of which is unknown.

That life is not electricity and that nervous impulses are not electrical impulses have been proved to the complete satisfaction of everybody by physiological experiment. We have told you that the quack electrical appliances are useless, for two reasons, that they do not generate sufficient electricity to penetrate the skin, and, even if they did, they would still be of no good. We will now detail to you the reasons on which we have based these two dogmatic statements.

The human skin offers a great resistance to the passage of electrical currents. The amount of resistance varies very greatly both in health and disease, but it is always considerable. To give you a practical example of the resistance of the skin to electricity we have just been trying a few simple experiments. An electrical battery which gives sufficient current to light a two candle-power incandescent lamp will not penetrate the skin. That is, a battery giving a current of eight volts will give sufficient electricity to light a small lamp, whereas the two terminals may be grasped by the hands without the least effect being produced.

The amount of electricity which is given off by alternating discs of copper and zinc is very small, many thousands of pairs of discs being required to produce any appreciable current at all. Most of the electrical appliances sold to the public consist of a few strips or discs of copper and zinc, and so although it cannot be said that they give no electrical current, it may be stated as an absolute fact that it requires the most sensitive instruments to demonstrate that there is any current, and that the current is many thousands of times too weak to have the slightest effect upon the human body.

The action of electricity upon the body is a peculiar and an ill-defined one, and as a life-giver or energiser or suchlike it is as useless as is anything else.

But although the introduction of electricity into medicine bred a whole host of quacks, it has nevertheless given us many valuable appliances to help us in the legitimate cure or relief of disease. The electrical currents, both constant and faradic, are the most valuable measures that we possess for the treatment of diseases of the nervous system. Many and many a case of hysterical disease has been cured by electrical treatment, and many of the far graver organic diseases of the nervous system are rendered far better by its application.

Then electricity has given us the electro-cautery, and the still more valuable means of

illuminating the internal parts of the body by the introduction of the small electric lamp and suitable arrangements of mirrors.

Electrolysis has also proved of great value, and in the hands of many able surgeons has been extensively used to destroy birth-marks and other blemishes. But like all other electrical methods, it has been grasped at and misused by quacks and charlatans of all kinds. The hopes which we had from electrolysis have not been realised, and its application to medicine and surgery has fallen far short of what was prophesied for it. For cosmetic purposes it is very extensively used, and with a certain amount of success in certain cases, but here again it is not what it is said to be, and it has but limited scope.

The chief object which we had in view when writing this article was to introduce to your notice the application of the Röntgen rays to medicine and cosmetics. We hope in this article to forestall you against the machinations of the quacks, for in many departments of cosmetic medicine there is such a vast proportion of fraud that what is real and genuine is often lost sight of altogether.

We do not yet know where to class the wonderful discovery of Röntgen. We are undetermined whether or not it is an electric phenomenon, but as it is produced by electrical means we feel quite justified in introducing it into an article dealing with medical electricity.

The first application of the Röntgen rays to medicine was to determine the nature of injuries and diseases of bones by means of skiographs or shadow photographs. The reason why bones are brought out clearly by the Röntgen rays is because bones consist mainly of salts of calcium, a metal which the rays are unable to penetrate.

Like everything else that has ever been introduced into medicine, it has failed to give the results which were expected of it; it is not always trustworthy; it has but a limited application, and it has produced a great opening for the unscrupulous.

Anyone who is familiar with the science of "Radiography," or "Röntgen Ray Photography," can readily appreciate these grave drawbacks, and he can clearly see how difficult, if not impossible, it is to remedy them. In that the results fall short of the expectation, Röntgen photography but follows a line from which there are few exceptions in science. The idea that a Röntgen photograph—an exact representation of nature—can be untrustworthy would be scoffed at by everybody who knows nothing about it, but is almost an axiom to him who has any experience of the subject. Ordinary photography distorts, but the Röntgen photographs distort a great deal more, for they are not focussed like ordinary photographs, but are shadows cast by opaque substances, and they only resemble the original to the same extent as the shadow on a wall resembles the object which casts it.

Those of you who have seen exhibitions of shadows cast on a screen are in a position to understand how exceedingly erroneous a shadow can be, and they alone will be fully competent to understand us when we say that a skiograph may give you information which is absolutely false.

Probably all of you have read of persons taking legal proceedings against surgeons for malpraxis in not treating a broken limb correctly, the evidence against the surgeon consisting in a Röntgen ray photograph showing some swelling or displacement of the bones at the point of fracture.

In former days a man was contented if he recovered from a broken bone with a limb as useful as the surgeon thought it possible to obtain, but now he must needs have a skiograph taken and abuse the surgeon even if the result is better than anyone anticipated. As a matter of fact, a broken bone never completely recovers its former symmetry, and in very many fractures perfect apposition of the ends of the broken bones is quite impossible. Moreover, the Röntgen photographs frequently grossly exaggerate any deformity, and so the person who imagines that his leg is as good as ever is greatly mortified to find that it is deformed and irregular. He then takes proceedings against the surgeon, of course loses his action, and makes himself wretched for the rest of his life.

The application of the Röntgen photograph for the recognition of diseases of organs other than bones is still in its infancy, and though it will probably never do very much, it may help us to lessen the almost insuperable difficulties of medical diagnosis. We need say nothing of the enormous value of this method for the detection of bullets and other foreign bodies, for during the last few months you have all heard a great deal about its application on the battlefield.

The light given out by the apparatus used for Röntgen photography is a very peculiar one, and those who have taken up "Radiography" as a profession have noticed certain effects produced upon themselves by the action of this curious light. From this has developed a new department of medical treatment which is especially applicable to diseases of the skin and certain microbic diseases, especially tuberculosis.

We do not know who started the idea that the Röntgen rays were inimical to the tubercle bacillus, nor do we know whether the opinion rests upon any scientific basis, nor even whether the rays do kill the bacilli. Nevertheless, there are now several institutions on the Continent where tuberculosis of the lungs (consumption) and of the skin (lupus) are treated by this means.

As far as our limited experience of cases treated in this way goes, we may say that we have not seen the least result from the treatment of the phthisis cases, and that in the lupus cases there has not been sufficient improvement to induce us to recommend the treatment to others.

But in connection with these and with other applications of the Röntgen rays, it must be remembered that the treatment is but a few days old, and many years must pass before anyone may dogmatise upon them. Here we can only give you our impressions based upon a few cases which we have ourselves seen, and upon the opinions of others whom we considered as reliable authorities.

To the reader of THE GIRL'S OWN PAPER the chief interest in the Röntgen rays lies in

its application for the relief of certain blemishes of the skin. It has been tried for many conditions, such as superfluous hairs, acne, acne rosacea, freckling, etc., and a certain amount of success has undoubtedly been obtained.

The treatment for superfluous hairs is so very unsatisfactory and so surrounded with fraud, that one feels sceptical at the outset when a new method for their removal is suggested. And, so far, results have justified one's scepticism, for all forms of treatment are unsatisfactory. Yet, for all that, there does seem to be something in the treatment of superfluous hairs by exposure to the Röntgen rays. The treatment is far too recent to give any definite records, and all that we can do is to discuss the possibilities of the treatment becoming successful and to discover the nature and force of its drawbacks.

The treatment is carried out in the following manner. The whole of the face—except that part upon which the rays are to act—is covered with a metal mask. The light from a machine is then allowed to play upon the part exposed for so many minutes or hours at a time. This is repeated every day until the condition is remedied, the subject has lost her patience, or the result is an obvious failure.

The Röntgen rays do destroy the hair, probably by interfering with the functions of the hair-roots. But the question to decide is whether the treatment is permanent. No man can give a definite answer to that question at present because the first cases treated are still too recent, but there is the strongest reason to believe that the relief is only temporary. It is almost impossible to believe that any treatment for any disease which does not remove the cause can produce any lasting benefit, and it is exceedingly unlikely that this new treatment will prove an exception to the rule.

The only case which we have seen of superfluous hairs treated by Röntgen rays was a failure—the hairs returning in two months.

Possibly there may be a way of permanently removing hairs by this method, and as every other form of treatment for the condition has failed, it should certainly be given a fair chance.

We have introduced this to your notice to let you know that it exists, and if there are any of you who feel disposed to spend the necessary time and money to try the experiment to be rid of unwelcome hairs, you will soon find out for yourselves whether or not there is anything in the treatment. Only see that you get proper treatment from a reliable person.

The Röntgen rays can do harm to the skin, as they sometimes produce eczema and other forms of skin disease, and occasionally they produce alterations in the pigmentations and texture of the skin.

In connection with the treatment of acne rosacea by the Röntgen rays, we may say that the only case with which we are acquainted was very successful indeed, and we believe that the improvement was more than the mere change of air and regimen would have accounted for. In other words, we believe that it really was due to the Röntgen rays.

