[For the Scientific American.]

Electro-Chemical Baths.

Some late criticisms on my Electro-Chemical Baths, on page 299 SCIENTIFIC AMERICAN, by a correspondent, displays so little knowledge of the facts, that I wish to make a few remarks, to correct such errors.

The fundamental principle of my Baths, is simple, and without mystery; but requires, nevertheless, a full knowledge of chemical laws, and considerable practice to successfully and even safely administer them, for, like the scalpel, it is, when in skillful hands, capable of great good, but when badly managed it is extremely dangerous. I have preferred to make its application a public benefit, little thinking, however, that such a course would create enemies, where I had reason to look for friends.

My application of electricity in baths consists in immersing the patient, or sometimes simply the suffering member, in medicated warm water, contained in a tub of pure copper, which communicates with the magnetic pole of a voltaic pile, and by resting the hand of the patient upon a bar of iron covered with wet linen, to which is attached a wire, placing it in communication with the positive pole of the pile. The body of the patient is separated from the copper of the tub by wood, so that when the hand touches the iron, or positive pole, the electric current enters the body by the arm, and causes its whole surface to irradiate. To produce this irradiation, it is necessary that the liquid of the bath should be composed of substances, less in their conductive power than the tissues of the body.

It is easy to conceive that I can, by this arrangement, with judicious compositions, extract positive substances from the body, while on the other hand I can introduce highly electro-negative ones, such as oxygen, iodine. etc.

I do not place the wood in the tub for the purpose of isolating the patient from the copper, but to prevent any portion of the body from touching the metal, for the electricity, in case of contact, would all pass by the one point in contact, and thus deprive the rest of the body of its salutary influence.

I make this remark because several persons in their wisdom, having discovered that the wood, when wet, acts in a measure as a conductor, have substituted glass to more effectually isolate the body, not knowing that by so doing they hinder the radiation from its lower parts.

Some few of the critics pretend to have made the discovery that entire immersion is useless, and that the electricity entering by the arm, immediately leaves the body upon reaching the liquid of the bath, to seek the copper. One endeavors to prove his statement by the following experiment. Without interrupting the communication of the voltaic pile with the tub, he places under the feet of the patient a plate of copper, suspended by a wire covered with gutta percha, which connects with a galvanometer, in communication with the negative pole of the battery, and because the galvanometer does not appear to be much affected, he concludes that no electricity passes. By this arrangement the man of science leaves two passages for the electricity, the strength of the current in each depending upon three things: 1st, the nature of the body. 2nd, the extent of its surface; and, 3rd, the length of the current. In considering the surface of the plate of copper, in comparison with that of the tub, it requires no great intelligence to perceive that the galvanometer should be exceedingly sensitive to appreciate the current passing through it from the copper plate.

The nature of the bodies being the same, suppose, a, to be the surface of the plate, and B the surface of the tub, then, as bodies conducting electricity are to each other as the square of their dimensions, it follows that the current passing through the galvanometer, is to that passing by the tub, as a is to B. Let L represent the length of the wire attached to the galvanometer, and suppose l to mark the length of the current which passes from the tub to the battery; then the inverse ratio of the two currents is as l to L, which makes the ratio of the two currents$=\frac{a\times l.}{B\times L}$ Suppose, now, that $a=1$, $B=500$, which is within bounds, and that $l=10$ feet, while L, taking into consideration the coil of the galvanometer=60 feet, we then have for a numerical ratio

$$\frac{l\times 10}{500\times 60}=\frac{1}{3000}$$

from which we see that the current passing through the galvanometer, is 1÷3000 of that passing from the tub to the pile, thus requiring a very delicate instrument to perceive its action.

I will not trespass further upon your columns, by exposing other absurdities of these gentlemen, for their statements are so incorrect that the public will now easily perceive this. I will therefore only describe an experiment, which may easily be tried, and which proves that when electricity traverses a liquid body, it does not polarize, but reaches every part of it.

Fill a copper vase with a solution composed of nitrate of silver, cyanide of potash, and of carbonate of soda; attach the vase to the negative pole of a voltaic pile, then touch the liquid with the positive pole, and it will have the effect of instantly covering the entire interior surface of the vase, with a layer of silver. V.

[We have also received a communication from O. H. Wellington, M. D., of the Water Cure Establishment, No. 32 East Twelfth street, confirming the views of Professor Vergnes, and endorsing the effective action of electricity in expelling injurious substances like mercury from the human system, by the "Electro Chemical Baths."

Notes on Patented Inventions.—No. 12.

India Rubber Manufactures, (*Concluded.*)—Four patents were secured in 1850 for improvements connected with india rubber manufactures; two in March—one to F. D. Hayward and J. C. Bickford, of Connecticut, consisting of a combined method of spreading india rubber on cloth by pressure rollers, and grinding and fixing it, at the same time. And on the same date, John Pridham, assignor of H. H. Day, was granted a patent for combining india rubber with an oxyd of tin and sulphur, which, when submitted to a high heat, produced a fabric having a fine black surface. In April following, Fowler M. Ray, of New York, obtained a patent for making india rubber car springs in a peculiar manner. In December, Jonathan T. Trotter, of New York, received one for producing vulcanized india rubber without the use of free sulphur, by using the hypo-sulphite of zinc as a substitute.

In January, 1851, Jonathan T. Trotter secured another patent for another combination of zinc with india rubber, to obviate the use of free sulphur. In connection with these two patents, it must not be forgotten that sulphate of zinc was employed in combination with india rubber before sulphur was employed.

David McCurdy, of Newark, N. J., secured a patent in March for combining potash with sulphur and india rubber. Nelson Goodyear was granted one in May, for rendering vulcanized india rubber very hard, by combining it with shellac, or with lime, or a carbonate, or a sulphate of magnesia. The product is a strong, hard, and inflexible india rubber compound, of which a great variety of articles resembling horn, are now made.

In 1853, Richard Solis, of New Brunswick, N. J., secured a patent in February for a mixture of vulcanized metallic india rubber, with native india rubber in equal parts; the fabrics made from this were dried in the sun. In February, H. L. Morris obtained a patent for preserving the native caoutchouc juice, as it comes from the tree in a liquid state for any length of time, in air-tight bottles, by mixing with every pound of it one ounce of liquid ammonia; this patent was assigned to S. T. Armstrong, of New York. On April 12th, Charles Goodyear secured a patent for the use of powdered soapstone or other like granular adhesive substance, to cover the surface of india rubber molded articles that were to be submitted to a heat of from 200 to 300° Fah. The object of the soapstone was to preserve the form of the articles while being vulcanized. In September, John Chilcott and Robt. Snell, of Brooklyn, N. Y., were granted a patent for a superior method of securing the india rubber soles of boots and shoes. On October 11, Charles Goodyear was granted a patent for coating metals with india rubber or gutta percha. The rubber or gutta percha was mixed with about eight ounces of sulphur for each pound, then pressed on the surface of the metal, and afterwards subjected to a heat of 260° for seven hours.

On the 28th February, 1854, L. O. P. Meyer, of Newton, Conn., was granted a patent embracing the vulcanizing of what is called *hard* vulcanized caoutchouc or other gum, by immersing it in a hot liquor of 300° Fah. during the process of curing. In April following he secured another patent for covering the embossed surfaces of *hard* india rubber, with tin foil, during the curing process, to preserve its form. On the same day a patent was granted Charles Goodyear for covering the surfaces of india rubber fabrics with sheets of paper or cloth, and placing them between plates of metal during the curing or heating process, to protect their surfaces. On the week prior to the granting of the two preceding patents, one was obtained by E. D. S. Goodyear for partially filling india rubber balls with water, which water, during the process of vulcanization is converted into steam, and exerts an interior pressure to give the hollow elastic article its desired form. In August following Daniel Hayward obtained a patent for remolding worn-out india rubber goods, by the use of a steam jacket surrounding the molds or dies. On Nov. 7, E. E. Marcy was granted a patent for the use of selenium, as a substitute for sulphur in curing india rubber. On the same day Wm. E. Rider and John Murphy obtained a patent for the use of hydrogen gas in the curing oven, to remove superfluous sulphur from india rubber goods. On the succeeding week a patent was obtained by Julius A. Pease, for making india rubber overshoes with an inner ribbed and corrugated surface, to allow of a circulation of air between the boot and the overshoe.

On the 2nd January, 1855, H. T. Tuyre and John Helm, secured a patent for a peculiar mode of preparing india rubber shoes and on the 30th following they obtained another patent for making elastic india rubber cloth without cement, and without threads, to supersede the shirred india rubber goods.

On the 24th of May, 1855, Sigismund Beer, of New York, was granted a patent for a very important discovery in the india rubber art, namely, the restoration of vulcanized india rubber, so that old goods could be used over and over again, like paper. He extracted the sulphur by the use of potash lye and oil, and then submitted the mass to the action of turpentine or any like solvent. This was a discovery long sought after, before it was made.

In the foregoing brief history of india rubber manufactures, our readers will no doubt be somewhat surprised at the great number of patents secured, and some of these so similar in their nature. Some are of great importance, others of minor consequence apparently. The manufacture of india rubber goods, we understand has been very profitable in most cases. The name of Charles Goodyear, appears most frequent in the list of patentees. He has recently been residing in France, and has taken out a great number of patents in that country and England, for the application of vulcanized india rubber to the manufacture of various articles. In England and France a more liberal policy is pursued, in granting such patents, than that which characterizes our Patent Office; and such patents are also well sustained at law, and no doubt would be by our U. S. Courts.

Mr. Goodyear has lately secured a patent in England for ventilating india rubber overshoes, by making them with corrugations perforated with holes. His new patent is simply an appropriation of the main feature of J. A. Pease's patent, with the addition of making holes through the corrugations. A beautiful hard india rubber can be manufactured by mixing calcined ground oyster shells with india rubber and sulphur. It is adapted to the manufacture of bobbins, rollers, &c. Lamp-black is the coloring material for the black horn-like combs, ebony pencil cases, canes, &c. A greater variety of articles are now made of india rubber compounds than from any other plastic compounds. It possesses a plastic quality which enables it to be molded into any form; it is air and water tight, and very elastic—admirable qualities. Coats and combs, balls and buttons, canes and corks, pencil cases, penknife handles, sword sheaths, rollers, tubes, and tunics, dolls of dogs, donkeys, and dwarfs, shoes, gloves, and cloths of wonderful diversities, and an indescribable number of other manufactures. We do not suppose, for a moment, that the climax of improvements in india rubber manufactures has been reached; it will yet be applied to objects not now thought of, and as many difficulties have attended the production of cast and wrought iron instruments of war, perhaps the next great feat of gum elastic application will be *an india rubber gun.*

A Shoeing Stool for Blacksmiths.

MESSRS. EDITORS.—The following is a description of a stool for blacksmiths for shoeing horses, which I have invented and found to be very convenient and useful, and I present it for the benefit of the craft.

I make a light portable stool of the form of a common crutch with one leg, and put a cushion on the seat. To this is secured a strap, which passes around above the hips, and is buckled tight in front. The seat of the stool is about four inches thick, and is held to its place in the leg by an iron spur. The blacksmith puts it on behind and between his thighs and buckles it in front, and the horse's foot is placed on the seat; it thus supports the weight of the animal's leg, and relieves the back of the shoer from that severe strain which makes horse-shoeing such hard work. B. B.

New Russia, N. Y.

[This device of our correspondent is certainly very simple, useful, and worthy of extensive adoption.

A Wonderful Discovery.

A resident of Union Grove, Illinois, writes the following interesting fact, in a recent letter to the office of the Cooperstown, N. Y., *Journal*:

"One of my neighbors dug a well last fall, on elevated ground. After going down 27 feet, he came to a brush of willows; he dug four feet more and then struck the top of *another well*; which was stoned with cut stone, laid in cement, and in which there was a bountiful supply of water. Who dug that well?"

MESSRS. EDITORS—Must this pass off with the Moon Hoax of by-gone days? or is this the Land of Nod, in which Cain, going out from the presence of the Lord, settled; and, consequently these deep-buried wells are of antediluvian origin: if so, we fear the spirits of the giants are being revived these latter days, and hence the land is "filled with violence." J. C. ROGERS.

Grand Rapids, Mich., June 1, 1856.

We frequently see such paragraphs as the above, but presume they are manufactured for other purposes than "to point a moral or adorn a tale."

[The Pressure of the Atmosphere.

The barometer, it has been recently discovered, rises and falls twice every day regularly. It falls lowest at 45 minutes past 3 o'clock, A. M., and at 5 minutes past 4 A. M. It rises to its greatest hight at 37 minutes past 9 A. M., and at 11 minutes past 11, P. M. The cause of these barometrical oscillations, has not yet been discovered.

A Great Strike Ended.

A few weeks since, we noticed that 40,000 coal miners in Scotland, had struck for higher wages; which had been refused by the coal masters. The last news from England gives an account of the close of that strike, and are unfavorable, as we predicted, to the operatives. General strikes for wages, always end in evil to the workmen.

Fruit jellies may be preserved from mouldiness, by covering the surface one-fourth of an inch deep with finely pulverized loaf sugar. Thus protected, they will keep in good condition for years.

Great Submarine Cable.

The second submarine cable to unite New Foundland with Nova Scotia—telegraphically—has arrived at Halifax, from London, and will soon be laid down. We hope it will meet with better luck than its predecessor.

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