

THE SUN LAMP APPLIED TO PHOTOGRAPHY.

Ever since lighting by means of electricity became practical, the idea has occurred to utilize it for photography. In fact, the new processes seemed to possess very great advantages over solar light, as the latter depends upon the state of the atmosphere, and is often insufficient in our latitude for full a third of the year.

The systems of lamps that were first used in the public streets, and which were consequently the best known, were the ones first employed, and for this reason it was the Jablochkoff candle that, in France, served to establish those photographic installations which were attempting to make progress in a new route. Every one will remember the little gallery which was conducted by Mr. Leibert in one of the salons on the first story at the Palace of Industry. Here the apparatus which served to contain the electric light (which consisted of a Jablochkoff candle), and to project the same, were as yet very primitive and difficult to maneuver. The large parabolic copper reflector was designed for concentrating the luminous rays upon a limited surface, in order to give sufficient luminous intensity to the parts of the subject to be reproduced; so nothing but busts could be taken, and, moreover, the lights and shades were extremely pronounced, and the flesh, on account of the vio-

present the lamp and machines are much superior to what they were at first, and it is indeed strange that this light has not found more applications in Paris, where it would give more satisfactory results than all those that are at present illuminating the great industrial and commercial centers and the theaters and other places of amusement.

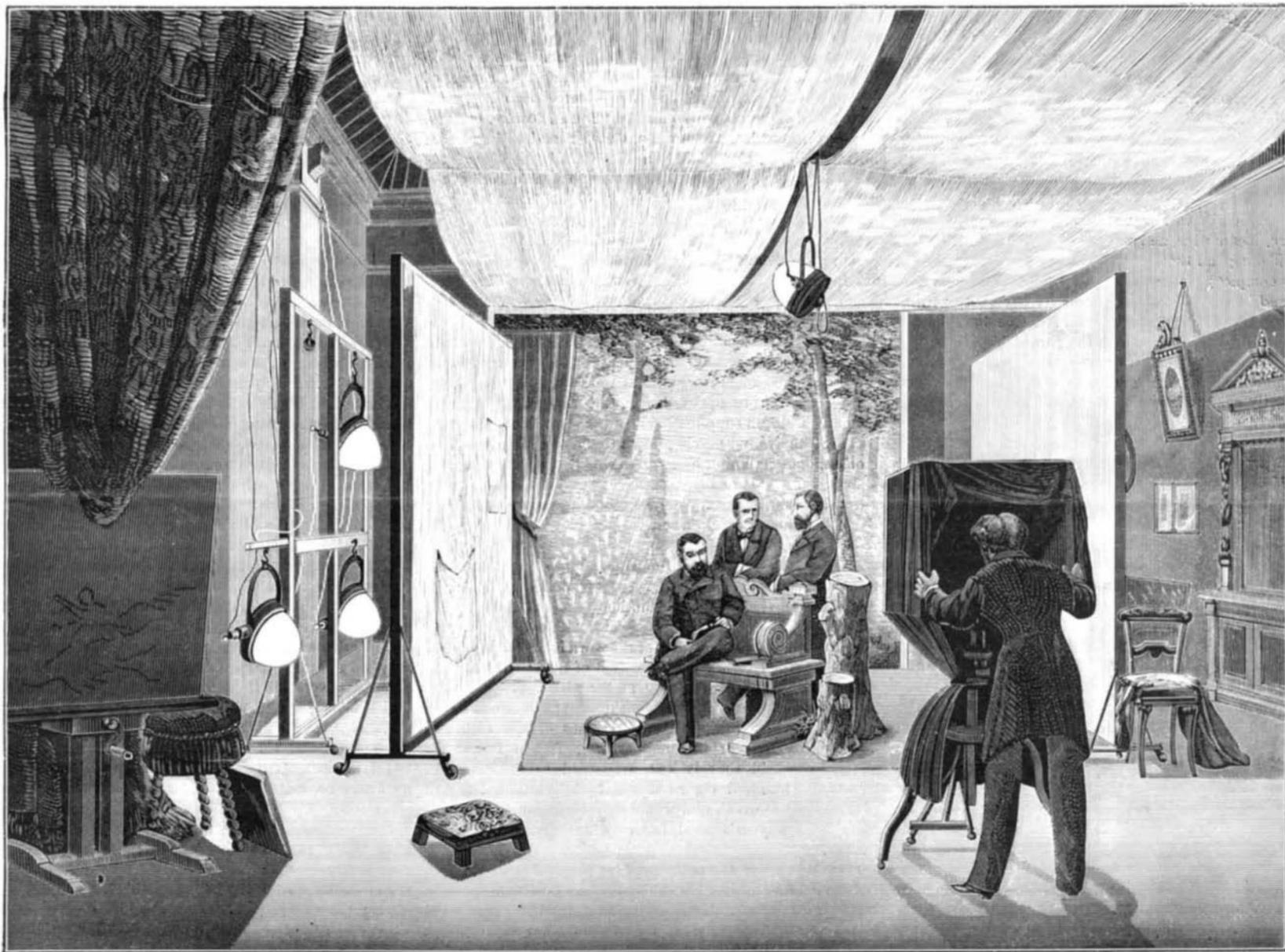
We give, in the accompanying engraving, the details of an application of this lamp to photography in Mr. Boscher's gallery. There are four of the sun lamps, and they are arranged as follows: The first is suspended from the center of the posing room, beneath a white drapery. The illuminating surface, which is covered with a slightly ground globe, is directed toward the drapery, and the latter serves to reflect the light. The lamp, which is suspended from a longitudinal cable, may be slid along by means of a pulley, and be removed from or brought near the subject to be photographed, in such a way as to well light the upper part. Two like frames, which are mounted upon rollers, carry three other lamps (provided with opalescent globes), which may be placed laterally so as to send the light toward the center of the body and that portion of the floor upon which the feet of the subject or of the persons forming a group are resting. In order to prevent the rays from falling too directly (which would give glaring whites, and shades without trans-

Brazilian Diamond Mines.

The diamond beds of Bahia and Minas Geraes, in Brazil, are very similar in character as regards the minerals composing them and their plateau form, or situation on water-courses. A new bed has been recently opened on the Rio Pardo in Bahia, which presents some differences to those hitherto known in Brazil. The country around is low and marshy, and covered with forests. The working of these forests has led to the discovery of the diamonds, which are found in a white clay along with beds of decomposed leaves. The deposit appears of modern formation. The minerals of the clay accompanying the diamond are, according to M. Corceux, quartz, silice, monazite, zircon, disthene, staurolite, grenat almandine, corindon, and some oxides of iron. There are no oxides of titanium, or tourmalines, as is frequently the case in diamond beds. The clay appears to be from its character and situation the debris of the granite mountains bordering on the Bahia coasts.

Easy Method of Reducing Bromide of Silver Residues.

M. Scola communicates to the *Bulletin* of the French Photographic Society an easy method of reducing waste bromide of silver to the metallic state, and not only obtaining



A PHOTOGRAPHIC GALLERY LIGHTED BY THE SUN LAMP.

let rays emitted by the lamp, exhibited livid reflections whose coloration and intensity varied according to the caprices of the unstable light.

The sun lamp, which possesses all the qualities of coloration and steadiness of the incandescent light, and, at the same time, a luminous intensity as great as that given by the arc light, ought to be admirably adapted for photographic purposes. But, while waiting for carriages to a distance and distribution of electricity to enter the industrial domain (which it will ere long), the management of a truly practical gallery for utilizing Mr. Clerc's invention would have necessitated too great an expense, and it was a mere accident that permitted the installation to be arranged that we now have under consideration.

Alongside of the sun lamp works, in Wagram Avenue, is situated Mr. Boscher's photographic gallery, and it was therefore easy to arrange a few meters of cable to carry the current to lamps arranged for photographic operations. The steam engine is running all day long in the lamp works, and, in the evening, it is only necessary to notify the engine man to continue his work in order to have a beautiful light that permits of taking, just as in broad daylight, the most varied negatives.

The sun lamp is well known to the public, which has, at various times, had an opportunity of judging of its merits during the experiments at the Continental Hotel, on the Jouffroy road, in the picture gallery of the Exhibition of Electricity, and in the grand foyer of the Opera House. At

parency), a large white screen of a thin, white fabric, upon which rose or other colored gauzes may likewise be placed, is interposed between the lamps and the model. Another opaque screen is placed alongside of the objective during the operation, in order to prevent the luminous rays from striking the gelatino-bromide plate too directly.

All the walls of the apartment, moreover, are of a very light tint, and, through the arrangements that we have just indicated, there is obtained a diffused light, whose intensity may be very easily varied at any given point. The time of exposure necessary in order to obtain good results is scarcely longer than with daylight, and the proofs of album cards that we have examined in Wagram Avenue demonstrate that hereafter lovers of beautiful photographs will not have to be dependent upon the caprices of the light of the sun.—*La Lumiere Electrique.*

A Great Meteor.

Mr. L. C. Yale, of Norwood, St. Lawrence Co., N. Y., writes to the *News* of that place describing a remarkable meteor which he saw there at 8:30 P. M., on July 3. It moved slowly from east to west, had a long tail, a nucleus like a globe, as large as the moon, surrounded by a bright ring, two dark lines crossing the nucleus in vertical direction, the lines larger in middle, straight on inside, curved on outside, tapering both ways to points. The tail was 30 degrees length. The general appearance was that of a gigantic sword of fire, moving handle first through space.

the bromide in a useful form, but also generating an electric current at the same time.

To separate the bromide of silver from the waste emulsion, M. Scola recommends that two or three per cent of sulphuric acid should be added, and the mixture should be boiled for some minutes, after which the bromide settles rapidly to the bottom of the vessel. It is now washed and dried, when it is ready to be cast into sticks for use in the battery about to be described.

The battery in which the reduction is effected is constructed on precisely the same principles as the chloride of silver battery of Warren de la Rue, and one form of this, as is well known, consists of a rod of amalgamated zinc immersed in acidulated water, and opposed to a similar rod of fused chloride of silver, a platinum wire being embedded in this latter to serve as a conducting terminal. When the plates of the battery are connected by a conducting circuit, the chloride of silver becomes reduced to the condition of metallic silver, while the chlorine unites with some of the zinc to form chloride of zinc.

If the negative plate of the battery is made of fused bromide of silver, reduction takes place quite readily when the terminals are united; and when the battery is exhausted it is merely necessary to fuse the resulting spongy silver in order to obtain it in a convenient condition for use in making a fresh supply of nitrate, while the whole of the bromine takes the form of bromide of zinc, and remains in solution.

A Genius of the Jack Knife.

BY DR. G. ARCHIE STOCKWELL.

Carving in wood is far from being a new or even recent art, though it has received vigorous impulse of late, owing to the "æsthetic craze" that replaces the stove with the open grate, and taboos mantels of slate and marble, substituting instead the product of our native forests, handsomely or uglily graven as the case may be. Economy cannot be claimed therefor, since grotesque carvings, unheard of pillars and pilasters, bideous heads, meaningless emblems, and zoological distortions are made to meet the requirements of the longest purse; their only utility, so far as discovered, being counter-irritants to the placidity of the housewife, and traps for the reception of dust and dirt.

Wood carving, however, can be made both beautiful and ornamental; and I was recently delighted by an examination of a host of such, not one of which was from the hand of the professional artist, but the product of an illiterate cripple, whose only tool, aside from a carpenter's saw, is a single-bladed pocket knife.

"Whittling William," for such is the pseudonym bestowed upon him by his neighbors, was introduced to my notice while sojourning in the little village of Kirkwood, twelve miles out of St. Louis, Mo. The accounts I had previously received of the man, coupled with the exhibition of specimens of his work in the way of busts of Sir Walter Scott, Napoleon the Great, Lord Byron, etc., further whetted my curiosity, and accordingly I made it in my way to visit the little old church occupied by him as a workshop and domicile.

Here a perfect wilderness of oddities met my eye, the walls and shelves being covered with an incongruous assortment of curiosities, from chains, frames, statuettes, miniature copies of mechanics' tools, carved frames, brackets, boats, canoes, steam and sailing craft, architectural designs, flutes, toy houses and furniture, animals, birds, and a cuckoo clock, to models of various forms of machinery, including stationary, locomotive, and marine engines, looms, thrashing machines, etc.; and though all were in wood, they were apparently complete even to the most minute details. Even flowers and leaves were in some cases imitated with scrupulous fidelity, and after viewing a carved tree branch, with nest and eggs of a thrush, with the parent bird close by, I could readily believe that no undertaking was too difficult or too chimerical for this genius to undertake; though he subsequently acknowledged that "scroll work was long the great bother" of his life.

Rather prone to reticence, and withal somewhat shy and modest, it was with some difficulty that I succeeded in obtaining Mr. Yoe's history, which after all proved uneventful enough, even quite commonplace. Born in the city of St. Louis, he was early apprenticed to a millwright, from whom he ran away, forfeiting his indentures, while still in his teens. With the breaking out of the Civil War he entered the army, from which he was discharged after the lapse of eighteen months, having suffered amputation of his right foot as the sequel to a gunshot wound. Though always considered "handy" with the knife, it was not until his twenty-third year that he became fully aware of his peculiar talent, which was then brought out in the construction of a doll's house undertaken to please a younger sister. This excited so much praise and admiration that he at last conceived the project of turning it to profit, and accordingly adopted his present occupation, which, he assures me, is fairly remunerative.

His first essays were of rather a low order, consisting, for the most part, of walking sticks, chains, puzzles, and non-descripts put together in narrow neck bottles so as to fully occupy the interior—feats by no means uncommon among the rural youth of New England. Later, on viewing a so-called model of "Bingen Castle," he was seized with a desire to duplicate it, which he accomplished successfully, including its six hundred windows and doors and many odd shaped towers and turrets. For this piece of work he realized the munificent sum of \$20.

His next feat was a model, four feet long, of the celebrated Bristol, of the Narragansett line of Sound steamers, his only guide being one of Endicott's colored lithographs; and in this he was so far successful as to find a purchaser as soon as completed in the person of a gentleman from Texas.

Other steamers and ships innumerable have since left his hands, wonderfully perfect and complete in detail, though he is devoid of all nautical knowledge save as gleaned from various models, drawings, engravings, and from the "Kedge Anchor; or, Young Sailor's Assistant." How his eye and hand so readily master secrets that frequently puzzle the initiated is a mystery, since he understands neither the principles of proportion or perspective, nor the art of delineation with pencil and pen!

Recently a miniature ocean steamship was constructed to order for parties residing in Great Britain, which on being fitted by the purchasers with miniature machinery in brass, including engines, boilers, and screw, is said to have developed a speed on her trial trip equivalent to sixteen miles per hour; this statement, however, may be taken with some allowance, since the craft was less than five feet in length over all, and the scene of her performance a pond scarce twenty rods in diameter. For this he received a trifle less than two hundred guineas.

Mr. Yoe boasts, in his modest way, of his ability to duplicate with his knife alone any piece of work undertaken by joiner, cabinetmaker, wheelwright, professional carver, or

other worker in woods with a complete outfit of edged tools, if only allowed his own choice of material; also that the Patent Office at Washington contains more than three hundred models, the product of his skill in behalf of would-be patentees. He is ambitious also in certain ways; he desires to visit Europe to view and study certain celebrated and historical structures which he desires to imitate, such as Westminster Abbey, St. Paul's, St. Peter's, the Cathedral of Cologne, Tower of Pisa, Escorial at Madrid, and tomb of Napoleon. This seems to be about the sum and substance of his knowledge of architecture abroad; to found a museum of jackknifery, so to speak, in St. Louis or some other large city that will afford him encouragement, which will astonish the world; and finally to be considered and known as the "Champion Whittler of the World," and, if possible, meet some other would-be champion in contest of pine and shavings.

One of the designs now latent in his brain is a copy of each of the capitol buildings of the original thirteen States, artistically grouped around the National capitol. The State houses of Missouri and Texas have been imitated with flattering success, the former yet in Mr. Yoe's workshop awaiting a purchaser, while the latter has passed into the possession of a gentleman at Austin.

At this writing, he is engaged upon a momentous undertaking, which, if successful, he believes will be the masterpiece of his life—an automaton water and landscape of nearly 300,000 pieces and 1,100 movements, to be put in motion by means of an overshot wheel driven by a stream of sand falling from a hopper. This will occupy a space of forty-eight by sixteen feet, is already more than half completed, and embraces windmills, light houses, towers, bridges, railways and trains, canal boats, steamers and sailing crafts, hills, dwellings, etc., besides a Noah's ark, a copy of the Strassburg Cathedral and its wonderful clock, model of the New York, West Shore, and Buffalo Railway Depot at Buffalo, and a host of moving and performing figures.

Of these, a brig weighing less than half a pound and complete in all details, contains 1,800 distinct pieces; Noah's ark, forty inches long, 3,400 pieces; the depot, eleven by fourteen and nine feet high, is a wonderful piece of work, out of which trains will dart at intervals, the same movement putting in motion some ninety figures on the platform and in and about the building. Besides the ordinary features of the Strassbourg clock, the chimes in the spire, on striking, cause the Virgin to appear before the cross on the altar of the cathedral in a supplicating attitude; two hundred figures leave the choir, and moving down the main aisle pause for a moment contemplating her, and then disappear behind the altar piece. At stated periods, also, the inhabitants of the ark sally forth by a gangway, and defiling down the side of the hill, return by a circuitous route, entering in the same way at the opposite side. Canal boats pass up the river; vessels in harbor toss upon the water; figures in door yards pursue their usual vocations, while in one instance a man constantly saws wood, while another as monotonously plies the ax.

One of the peculiar features of the work is that each subject is complete in itself, and independent of the others—may be used separately or connectedly at the will of the operator. Again, aside from paint and cloth nothing but wood enters into the construction, saving the chimes of the cathedral and the iron shaft of the main wheel. When I saw the affair, I was told that it had proceeded to the extent of twenty-five hundred cigar boxes and eight hundred feet of pine and white wood, and would require as much more and more than a year's hard labor before arriving at completion.

It would appear too ponderous for removal or exhibition, but the builder asserts his ability to take down and pack in small compass suitable for transportation in less than three hours, and again to unpack and put together again in less than half a day. All in all it is a queer combination, and in spite of its incongruity and possible defects—for he is forced to draw upon his imagination for many of the details—it is a most interesting piece of mechanism.

That the man is a prodigy cannot be gainsaid, and he is far from being the egotistical character one would suppose, except in his desire to be considered a "champion" etc., but "champions" are all the rage now. He claims his gift as a natural, inborn one, as it doubtless is, and declares he is often lost in astonishment and wonder at the completeness and results of his labors, and the ease with which difficulties are surmounted when once fairly reached. All offers of instruction in drawing, mechanics, or mathematics he obstinately refuses, since he is just superstitious enough to believe they would tend to mar his genius, if not cause it to altogether desert him. Undoubtedly half way instruction would have some such effect by causing him to mistrust the ability of which he is now so confident.

After viewing the many evidences of Mr. Yoe's handiwork, I can readily conceive how many a boy may work out a future by the aid of a knife, provided he has patience, perseverance, aptitude, and endurance; it may lay the foundation of a career in mechanics or architecture, as a designer and inventor, or one of a host of other useful arts. I feel this the more in that, though moderately skillful with the pencil and to a degree familiar with the pen, I could never develop sufficient genius to mend my own quills or manufacture a respectable toothpick. Edison, who has gained some fame as an inventor, I knew well, even intimately, in his boyhood, and he was an unwearied, insatiable, devotee of the jack knife!

Prevention of Yellow Fever Mortality by Vaccination.

Dr. Freire, of Rio Janeiro, in a recent letter to the *Sanitary News*, writes as follows:

In compliance with your request, I will give you an account of the chief points of interest connected with my studies on yellow fever. I can, of course, give you only a very brief summary, and for further information may refer you to my two memoirs—"The Cause, Nature, and Treatment of Yellow Fever" and "The Contagion of Yellow Fever." An extended report on all the theoretical and practical bearings of my researches is now in press, and a copy will be sent to you as soon as issued.

The method of culture which I have followed is Pasteur's. I withdraw blood, or any other organic liquid, from persons sick with yellow fever, or from the bodies of the dead, using the most scrupulous precautions, and introduce these liquids into Pasteur's flasks, previously sterilized, and containing a solution of gelatine or beef "bouillon." In these conditions the microbe develops abundantly, and becomes of itself attenuated by the action of the air, which filters through the tampon or amianthus with which the flask is corked. The purity of these cultures is demonstrated by microscopic examinations, of which you will find a good illustration in my memoir, "Experimental Studies on the Contagion of Yellow Fever."

The microbe appears in the form of little black points, like grains of sand (780 diameters); in the mature form it presents the appearance of round cells with an ash-gray or black rim, containing in their interior yellow and black pigment and some granulations which will be the future spores. These cells burst at a given moment, and pour out their contents, *i. e.*, the spores, the pigments, and a nitrogenous substance composed of ptomaines, which I have isolated not only from vomited matter, but also from the blood itself, and from the urine. The yellow pigment, being very soluble, produces the icteric infiltration of all the tissues by a sort of tinctorial imbibition which may go on even after death; the black pigment, as well as the detritus, resulting from the rupture of the cells, being insoluble, is carried into the general circulation, and produces obstructions in the sanguine capillaries, whence the apoplectic symptoms so common in yellow fever and in the urinary tubules, whence the suppression of the urine, a very frequent and terrible symptom in this disease.

I have described this microscopic organism under the name of *Cryptococcus xanthogenicus*; its development resembling that of this genus of algæ.

After having demonstrated the contagious nature of yellow fever by experiments upon barn-door fowls (see my memoir), I made experiments in preventive inoculations, first upon animals and afterward upon men; I did not fear to do this, because a multitude of experiments upon animals had previously convinced me of the perfect safety of inoculation with attenuated cultures.

Up to this date I have vaccinated 450 persons, for the most part foreigners recently arrived. Freedom from yellow fever has been pronounced among those thus vaccinated, for they have passed through a quite severe epidemic, and only six deaths have occurred among the 450 vaccinated persons, that is to say, less than two in a hundred, while more than a thousand deaths have occurred among the non-vaccinated, the mortality of the non-vaccinated sick being about thirty to forty per hundred. Thus, if we take one hundred vaccinated persons, under the most favorable conditions as regards receptivity, we have only two deaths during the entire epidemic; if we take one hundred non-vaccinated sick, we have thirty to forty decedents, which gives a mortality fifteen times greater among the non-vaccinated. Even if the mortality were only ten times or five times less great among the vaccinated, the preventive measure would be worthy of adoption. The protective inoculation for charbon gives an immunity to one-tenth, and that of vaccination for small-pox guarantees an immunity to one-fifth, according to the calculations of Bousquet.

DR. DOMINGOS FREIRE,

Professor in the Faculty of Medicine of Rio Janeiro,
President of the Central Junta of Public Hygiene.

A New System of Painting Iron.

A process, on a new principle, for protecting iron and steel from corrosion (especially when submerged) has been suggested by Mr. F. Maxwell-Lyte, F.C.S. The theory of the process is essentially electrical; and its utility is based upon the hypothesis that the oxidation of iron and steel is much accelerated by, if not wholly due to, galvanic action. The metal to be protected is first coated with one or two primings of an oxide of a metal electro-positive to iron, upon which any of the ordinary anti-fouling or oxide paints may be applied. These latter always contain the oxide of a metal electro-negative to iron; and this oxide will consequently always be reduced, and the iron oxidized in time. The priming employed by Mr. Maxwell-Lyte is composed of oxide of zinc or magnesia, particularly the latter; and this not only protects the iron, but keeps it from contact with the outer coat. It is claimed that something of this kind has always been used whenever painting of iron has been even partially successful; but that the guiding principle—the use in the first place of a material electro-positive to iron—has been overlooked. Red lead as a priming does fairly well for a time; because though lead is electro-negative to iron, it is only slightly so. Better protection is assured by the use of a distinctly basic material.