In 1858 the gravity of the situation caused the French Academy of Sciences to appoint commissioners, of whom a distinguished naturalist, M. de Quatrefages, was one, to inquire into the nature of this disease, and, if possible, to devise some means of staying the plague. In reading the report, made by M. de Quatrefages, in 1859, it is exceedingly interesting to observe that his elaborate study of the Pébrine forced the conviction upon his mind that, in its mode of occurrence and propagation, the disease of the silkworm is, in every respect, comparable to the cholera among mankind. But it differs from the cholera, and, so far, is a more formidable disease in being hereditary, and in being, under some circumstances, contagious as well as infectious.

The Italian naturalist, Filippi, discovered in the blood of the silkworms affected by this strange disease a multitude of cylindrical corpuscles, each about $\frac{1}{1000}$ of an inch long. These have been carefully studied by Lebert, and named by him *Panhistophyton;* for the reason that, in subjects in which the disease is strongly developed, the corpuscles swarm in every tissue and organ of the body, and even pass into the undeveloped eggs of the female moth. But are these corpuscles causes or mere concomitants of the disease? Some naturalists took one view and some another; and it was not until the French Government, alarmed by the continued ravages of the malady, and the inefficiency of the remedies which had been suggested, despatched M. Pasteur to study it, that the question received its final settlement, at a great sacrifice, not only of the time and peace of mind of that eminent philosopher, but, I regret to have to add, of his health.

But the sacrifice has not been in vain. It is now certain that this devastating, cholera-like Pébrine is the effect of the growth and multiplication of the *Panhistophyton* in the silkworm. It is contagious and infectious, because the corpuscles of the *Panhistophyton* pass away from the bodies of the diseased caterpillars, directly or indirectly, to the alimentary canal of healthy silkworms in their neighborhood; it is hereditary, because the corpuscles enter into the eggs while they are being formed, and, consequently are carried within them when they are laid; and for this reason, also, it presents the very singular peculiarity of being inherited only on the mother's side. There is not a single one of all the apparently capricious and unaccountable phenomena presented by the Pébrine but has received its explanation from the fact that the disease is the result of the presence of the microscopic organism, *Panhistophyton.*

Such being the facts with respect to the Pébrine, what are the indications as to the method of preventing it? It is obvious that this depends upon the way in which the *Panhistophyton* is generated. If it may be generated by Abiogenesis or by Xenogenesis within the silkworm or its moth, the extirpation of the disease must depend upon the prevention of the occurrence of the conditions under which this generation takes place. But if, on the other hand, the *Panhistophyton* is an independent organism, which is no more generated by the silkworm than the mistletoe is generated by the oak or the apple-tree on which it grows, though it may need the silkworm for its development, in the same way as the mistletoe needs the tree, then the indications are totally different. The sole thing to be done is to get rid of and keep away the germs of the *Panhistophyton.* As might be imagined from the course of his previous investigations, M. Pasteur was led to believe that the latter was the right theory; and, guided by that theory, he has devised a method of extirpating the disease which has proved to be completely successful wherever it has been properly carried out.

There can be no reason, then, for doubting that, among insects, contagious and infectious diseases of great malignity are caused by minute organisms which are produced from pre-existing germs, or by Homogenesis; and there is no reason that I know of for believing that what happens in insects may not take place in the highest animals. Indeed, there is already strong evidence that some diseases of an extremely malignant and fatal character to which man is subject are as much the work of minute organisms as is the Pébrine. I refer, for this evidence, to the very striking facts adduced by Professor Lister in his various well known publications on the antiseptic method of treatment. It seems to me impossible to rise from the perusal of those publications without a strong conviction that the lamentable mortality which so frequently dogs the footsteps of the most skillful operator, and those deadly consequences of wounds and injuries which seem to haunt the very walls of great hospitals, and are, even now, destroying more men than die of bullet or bayonet, are due to the importation of minute organisms into wounds, and their increase and multiplication, and that the surgeon who saves most lives will be he who best works out the practical consequences of the hypothesis of Redi.

I commenced this address by asking you to follow me in an attempt to trace the path which has been followed by a scientific idea in its long and slow progress from the position of a probable hypothesis to that of an established law of nature. Our survey has not taken us into very attractive regions; it has lain, chiefly, in a land flowing with the abominable, and peopled with mere grubs and moldiness. And it may be imagined with what smiles and shrugs practical and serious cotemporaries of Redi and of Spallanzani may have commented on the waste of their high abilities in toiling at the solution of problems which, though curious enough in themselves, could be of no conceivable utility to mankind.

Nevertheless, you will have observed that, before we had traveled very far upon our road, there appeared, on the right hand and on the left, fields laden with a harvest of golden grain, immediately convertible into those things which the most sordidly practical of men will admit to have value—viz., money and life.

The direct loss to France caused by the Pebrine in seventeen years cannot be estimated at less than fifty millions sterling; and if we add to this what Redi's idea, in Pasteur's hands, has done for the wine grower and the vinegar maker, and try to capitalize its value, we shall find that it will go a long way towards repairing the money losses caused by the frightful and calamitous war of this autumn.

And, as to the equivalent of Redi's thought in life, how can we over-estimate the value of that knowledge of the nature of epidemic and epizootic diseases, and, consequently, of the means of checking or eradicating them, the dawn of which has assuredly commenced?

Looking back no further than ten years it is possible to select three (1863, 1864, and 1869) in which the total number of deaths from scarlet fever alone amounted to 90,000. That is the return of killed, the maimed and disabled being left out of sight. Why, it is to be hoped that the list of killed in the present bloodiest of all wars will not amount to more than this! But the facts which I have placed before you must leave the least sanguine without a doubt that the nature and the causes of this scourge will one day be as well understood as those of the Pébrine are now, and that the long-suffered massacre of our innocents will come to an end.

And thus mankind will have one more admonition that "the people perish for lack of knowledge;" and that the alleviation of the miseries and the promotion of the welfare of men must be sought, by those who will not lose their pains, in that diligent, patient, loving study of all the multitudinous aspects of nature, the results of which constitute exact knowledge or science.

It is the justification and the glory of this great meeting that it is gathered together for no other object than the advancement of the moiety of science which deals with those phenomena of nature which we call physical. May its endeavors be crowned with a full measure of success!

COSTUME AND ART.

[From The Building News.]

Costume may be usefully divided into *three* kinds or modes of clothing the "naked animal man." The first may be typified by the old Greek dress, where the evident object was to hide the figure as little as possible, *i.e.*, to so clothe and fit the human frame as not to hide or smother, but to show the form. The next other mode was the precise reverse of this, and was well typified in the magnificent costume of the ancient Mede, in whom the whole figure was clothed in flowing drapery, the object being to exhibit the splendor of the dress, and to add to the dignified presence of the wearer by its shape and folds. These two modes of dress may be said to represent the two opposite ways of clothing the human form, both equally good in their way, and obviously equally suitable for different people and avocations. It must be observed in passing that under these two heads there are a vast number of costumes and modes of dress all the world over, and in all ages, which will equally well typify the two systems; and a work of no small interest might be written on the subject if thus simply divided. The third mode we would venture to call the mode of *quaint* costume—the word quaint being used for want of a better. It may be represented by the dress of the Japanese, where the object would seem to be neither of the two above mentioned—neither to show the form of the wearer nor the grace of the dress, nor even folds of drapery, but simply to cover the body with some quaint device, almost like the strange figures on a common playing card. It is, perhaps, the very strangest costume that was ever invented by man; the patterns, the colors, and the odd cut of the several parts making up a gorgeous show, not a little strange and quaint, and unlike everything else. There are, under this head, too, a number of different costumes from different countries and in different ages; and much of the costume of the middle ages is of this type, and has come down to us in the glass painting in the windows of cathedrals and on the walls of churches. To this class of dress belongs that of the end of the last century and of the days of Hogarth, where a sort of odd quaintness redeemed it in a great measure from contempt. Indeed, as we see it in the paintings and prints of Hogarth, it is impossible not to be struck with its oddity; and the wig and great horseman's coat, long waistcoat, short breeches, and heavily buckled shoes, make up together at least an harmonious whole, and the word quaint seems to be the only one which can well characterize it.

It is from this strange idea of a human dress that our modern costume of to-day comes by regular descent; and it of right must come under the same general heading, for it certainly does not belong to the Greek idea of dress, nor to the Median robe order of costume, nor, indeed, if the truth must be told, to the quaint, but is truly a thing by itself. It is simply the very stupdest thing ever yet invented by the ingenuity or perverseress of man. It comes under neither of those two leading principles which should regulate all costume, viz., either to show the form and actions of the human frame, or to exhibit the form and folds of the dress with which it is clothed; or, to go to the third and only other way, to show mere "quaintness," as we have ventured to call it, where neither of the two first requirements of dress are aimed at. It would seem, indeed, absolutely impossible to conceive anything more ungainly and inconvenient than the present system of modern fashionable male attire—the "sustained splendor" of Mr. Disraeli—for it does not allow of the form to be seen; it is nothing in itself, there being no folds or drapery, and there is in it no sort of quaint interest to make up in any way for the loss of the two prime ideas in all dress. To confine our remarks to the ordinary fashionable male costume, we may take it for granted that the dress-up of a smart waiter at a big hotel or club may be taken as fairly typical of it. The arms and legs of the old Greek were left bare, for not living under Mr. Gladstone's rule they knew nothing of the "anthropomorphic element" in fine art: so that when they wanted to draw the human arm they were content, poor, simple, ignorant souls, to look at one, and the old Greek dress allowed of it. In our improved modern system of clothing, this it is clear cannot be done, for the climate, it will be urged, compels the covering of legs and arms. Be it so. Neither, again, does the form of the dress allow of the dress to show itself, and to become a thing of beauty *per se*, or even one of convenience; for what can possibly be more ugly or awkward than the semi-tight fitting sleeve of a common coat, or the still worse and more fashionable trousers? Quaintness will not surely be charged upon them, so that neither form, comeliness, nor oddity belongs to it or to them, and certainly not mere and simple utility. Fashion does all the work.

It would be useless to go into the merits of the world-renowned swallow-tailed coat—that pride of the smart waiter, and last hope of those who glory in being dressed. Of its convenience or beauty, no one perhaps did ever yet boast, any more than they have done or do of the tight-fitting boot or tall chimney-pot and so dearly fashionable hat. They are all things which the tyrant fashion compels everybody to wear and to be perpetually inconvenienced by. It really all seems to be typical of the art of the time of this latter part of the nineteenth century, when all real and genuine art has disappeared and given place to machinery and manufacture. It would be impossible to sink lower than we now are sunk in this country—at least, in all matters appertaining to art, whether high or low; and one means of rescuing things from this most deplorable state would be, as we take it, some improvement, or say merely change, in costume; and it would seem that the only channel through which any such change or improvement is at all likely or possible is in that of our army, and in the dress and appointments of soldiers.

The tremendous and disastrous failure of that gallant and so perpetually victorious army of France has been so sudden and unexpected that no man has had time to think anything about it, or how it has ever come to pass that so magnificent a body could have suffered and lost as they have done. May it be allowed us in this place to suggest *one* cause of it—the excessive neatness, primness, and fit of the clothes of the men; everything bran new, and of the brightest and gayest colors. The man was lost in his smart tailoring. The course of the war has been so rapid that there has been no time for any one to grow shabby enough to work, or do anything, or to think of his own personal and bodily self. In the old Italian wars of the first Napoleon, the soldier wore off the smartness of his smart attire before he found himself on the battle-field, was ready for work, and thought of himself and not of his dainty clothing—all so tight, and awkward, and inconvenient, and unfit for its stern purpose. What more important subject, then, can there be than that of art combined with utility in costume, more especially in the dress of the soldier? In it most surely there ought to be combined the two prime requisites—utility and convenience, and ease of movement with sightliness and artistic beauty, and appropriateness and harmony of colors. Cobden used to say that the French were so artistic a nation, and so clever in making the most of what other people would despise and throw away as useless, that they levied a sort of tax on the whole world in the matter of setting the fashions and showing the rest of the world how to make a dress, and then how to wear it after it was made; not, by the way, so easy a feat as one might be disposed to think; but it is to be feared that they have paid a fearful price for their artistic superiority, for what with this world-taxing smart dressing and Hyde Park generalship, the nation itself is all but well nigh lost, and their Emperor quite. It cannot be amiss, therefore, to draw attention to the art of costume, and to the best possible way in which the human body may be clothed so as not to impede its movements, and yet that this costume shall be at the same time beautiful in form and harmonious in color. In military dress these two principles are fundamental requisites, as no soldier will be, or ought to be, satisfied unless he looks like a soldier. The old Greek went out to battle with his limbs as free as possible, and with a dress allowing of the utmost ease and freedom of action and movement; and may it not be a good and useful question, in case of any radical change of costume, either in the regular army or in the volunteer force, or in the formation of any new regiment, to depart a little from the conventional and fashionable type of clothing, and aim at something better and more workable and appropriate? Humanity itself is, as things now are, absolutely blotted out by the unsightly costume it is compelled to wear; and pictorial art is impossible all the time there are no living exemplars to keep the artist's eye and hand to the work he has to do. In either of the three systems of costume-making we have named there is to be found abundance of precedent and examples to go by; and the difficulty, if any there be, will be in the number, and not in the paucity of examples. Of course it will be understood that all that has been said of a required change in military costume applies equally—nay more—to civil costume; and it is in the hope of seeing some speedy change in the dress of the soldier, now generally admitted as desirable, that these few hints on the subject of costume, and the need of beauty and harmony in it, have been written.

BRONZING COPPER URNS.—The surface, first made thoroughly clean and bright, is covered with a thick coat of rouge and water; when dry, the article is placed in a clear hollow fire (say a chamber of bricks, red hot) for a short time until the rouge has turned to the desired shade of color. Then the article is placed on a suitable stand, and polished with a soft brush and rouge powder and afterwards with soft leather. The tinning and soldering are subsequent operations.