Mr. Smith's reply was that it was for the interest of inventors that worthless patents should be put out of the way. "It is important that inventors should have the opportunity to protect their inventions if they think them worth protecting. If they do not deem them worth preserving, it is important that they should not stand in the way of other inventors, and the requirement of a small fee after the lapse of a few years will make it necessary for the owner of a patent to decide for himself whether he thinks it is worth preserving, and, if it is, the profits of the patent will enable him to pay it."

Judge Foote's objection to periodical fees arose from the simple fact that the Patent Office fees were already unnecessarily high. The office is now accumulating one hundred thousand dollars a year over and above its expenses; and if the object is to encourage invention, the fee should be made as light as possible. He preferred the issuing of a preliminary patent, at a low fee, to run three or four years, and a completed patent on the invention, as perfected, at the end of that time, should the inventor choose to apply for one.

We have recited the arguments of these gentlemen at length and with many repetitions, that our readers may see how few they really are. Boiled down, they amount to these two, and no more: 1st. Speculators have bought up and misused neglected patents. 2d. Inventors have been inconvenienced by pre-existing patents; in other words, they have been barred the free use of devices they wanted, or have been made to pay for such use, owing to the inconvenient fact that some one had patented the thing before they thought of it. Let these arguments be granted their fullest weight. Admit that designing speculators have been able to buy up and do mischief with rights apparently abandoned by the original patentees. Admit that inventors, as well as manufacturers, have found it unpleasant to have to pay for or let alone the fruits of other men's brains. Shall we, therefore, subject the entire class of inventors to charges not needed for the support of the Patent Office? Shall we open the door to gross injustice to worthy inventors of limited means, as shown in our issue of March 16? Shall we emasculate our patent system, as shown in our issue of April 13? In short, shall we punish the deserving many that we may forestall the wicked designs of a few?

It seems to us that the attempted justification of this Section 11, as a matter of policy even, hinges on the two assumptions that all patents not speedily developed are worthless, and that four or five years, or even ten years, are sufficient in every case to develop the value of an invention and bring it into profitable use if it is worth using—assumptions by no means justified by the history of great inventions, as we propose to show at length hereafter.

A NATIONAL SANITARY PRECAUTION.

A sanitary measure of more than ordinary importance, not only to the Southern seaboard States but to the country at large, has recently been passed in the form of a bill to be known as the "National Quarantine Act of 1878," the object of which shall be, by means of an efficient, uniform, national system of quarantine, to prevent the introduction of contagious or infectious diseases into the United States. It is to be understood, however, that while it may assist, it shall in no wise interfere with, the present or future rules, regulations, or workings of any State or municipal boards of health. The diseases against which the provisions of this bill are more particularly designed to guard the people are those two scourges to humanity—Asiatic cholera and yellow fever—the ravages of which have frequently been so appalling. The hope that the measures proposed in this act—vigorously carried out, and aided by the coöperation of local State officials—may in time succeed in shutting out these two diseases from the country, is encouraged by the fact that science has conclusively demonstrated that both are of foreign origin, and that there is no place within the United States where they have been naturalized.

In Asiatic cholera we have a disease caused by the access to the alimentary canal of a specific form of organic poison, which is portable, communicable, and capable of reproducing itself in every body in which it obtains lodgment. It always has its origin in Hindostan; and whenever it appears outside of the limits of that country it is absolutely certain that is an exotic. It was in 1756 that the fact was first recognized that the disease is a periodically returning twelve-yearly epidemic, connected with the twelve-yearly Hindoo festivals at the great temples. The prevailing direction in which the epidemic always advances from its birthplace is to the West and North, always proceeding along the lines of the greatest and most rapid travel; and, at each periodical recurrence, extending its limits and spreading itself over an increase of territory. It made its first visit to the United States in 1832, starting from Quebec, where it had been introduced by ten or twelve Irish emigrant ships. From this time on, its periodical returns have been pretty uniform; and judging from the past, we should expect another outburst either during the present or next year.

In our next contest with the epidemic, our whole safety lies in efficient quarantine and thorough disinfection.

As of cholera, so we may say of yellow fever, it comes in every case from without; there is no spot in the United States where it is indigenous. Its birthplaces are the West Indies, the South American coast, and, possibly, Vera Cruz in Mexico. From these neighboring countries it invades, almost every summer, our sea-board cities, and occasionally produces a desolation such as words fail to describe. This disease made its first appearance in this country in 1668; and from that time down to 1877 it had visited us seven hundred and forty-one times, spread its ravages to two hundred and twenty-eight cities and towns, and extended to twenty-eight States of the Union, causing 65,311 deaths counted—besides the innumerable deaths of which no record was made. Of all these numerous appearances of the disease among us, 45 per cent are directly traceable to foreign origin.

In a commercial point of view, likewise, have the losses to the country been incalculable. In a memorial accompanying this bill, from a convention of representatives of the Southern seaport towns, held at Jacksonville, it is asserted that the losses produced by the epidemic which raged in the city of Savannah in 1876 amount to $5,800,000, or nearly one half the present value of the whole taxable real estate of the city. Multiplying this particular loss by the many similar ones occurring annually in our other cotton ports, the result will be found to be startling indeed.

Since, then, the fact is so well established that these two fearful diseases which carry such destruction to life and property in their trail are entirely of foreign origin; that they must cross oceans before they can obtain a lodgment on our shores; that they must be brought in ships, hidden in clothing, bedding or personal luggage, or actively at work on the systems of passengers, and they thus become a part and parcel of our commercial intercourse with other nations, surely Congress—which has authority to regulate this commerce—can, and probably will, with the earnest coöperation of local authorities, aided by the provisions of this bill, control the visits of these terrible concomitants of our foreign trade.

TEACHING SCIENCE.

Professor W. K. Clifford has recently published an essay on the teaching of science, reviewing Virchow's address on the same subject, delivered at the jubilee meeting of German naturalists and physicians last year. Professor Virchow's utterances have attracted marked attention, both on account of their forming one of a trio of reviews on the present state of science, the other contributors being Häckel and Nageli, and also on account of their dealing with many important questions which have long vexed the minds of unprejudiced thinkers.

Häckel devoted his discourse to the present position of the evolution theory, the evidence supporting it, and its bearing on morals, education, and mental science. Nageli followed with a discussion of the limits of natural knowledge, pointing out the restricted nature of our senses, and suggesting that, "if we will be satisfied with such kind of knowledge as we can get, we do really know something, and may come to know a great deal more." Lastly, Virchow dealt with the liberty of science in the modern state, and in that portion of his admirable address, on which Professor Clifford bases his equally admirable review, he referred to parts of the evolution theory which are not yet established scientific doctrines in the sense that they ought to be taught dogmatically in schools. Of these he specially named two—the spontaneous generation of living matter out of organic bodies, without the presence of previously living matter; and the descent of man from some non-human vertebrate animal. These, he said, are problems our solution of which we may consider never so probable, and that the evidence will shortly be forthcoming to establish the same; but we must not teach them as known and established scientific facts. We ought to say, "Do not take this for established truth, but be prepared to find it otherwise; only for the moment we are of opinion that it may be true."

Professor Clifford puts this doctrine before the world in its practical bearing by applying it at once to the broad question of what should be taught to children, and in so doing, as we have already intimated, we believe he enters upon a subject which has been a source of incalculable doubt and misgivings to thousands of earnest people. Some idea of the evolution theory is now possessed by every one of ordinary intelligence, and to have any reasonable idea of it is also to perceive its conflict with the Mosaic hypothesis. It is perfectly true that many anchoring their faith to the latter decline, as is their undoubted right, to think on the question of antagonism at all, or to countenance any discussion thereupon; but on the other hand, while they can thus escape the consequences of their own reasoning, it is manifestly impossible for them to check the reasoning process in others. A knowledge of the evolution theory must come from the teaching of any department of natural science. To teach it is likely to exhibit its antagonism to the opposing hypothesis, and to excite thought and question. The parent, firm in his own faith, may well gravely view the alternative of what appears to him the dangerous knowledge on the one hand, or the equally dangerous ignorance on the other, which confronts the child, and eagerly seeks the middle ground in which he may reach a decision satisfactory to his own conscience. It is just here that Virchow's doctrine is illusory, for it is easy to take refuge in his caution, not to teach any but known facts, to brush aside the whole question with the assertion that the evolution theory is only a probability, and hence not to be taught; but then the same reasoning must apply to the Mosaic theory, which is equally based on other than positive fact, and in brief, it might be added, to anything whatever resting on faith.

Where then is the safe middle ground? Our author believes in the rule, "Before teaching any doctrine wait until the nature of the evidence for it can be understood;" and it seems to us that there is a world of sound sense in this. Nine tenths of all human antagonism is based on misapprehension, and that between science and theology is the reverse of an exception to the rule. The well-meaning "family" periodicals which cater to the tastes of their readers by assaults on what they are pleased to call "Darwin's ape theory," are ingenious in devising new evidences of their misunderstanding of the subject, and misapplication of its deductions. Ignorance even more profound is equally manifested by those who mistake their own incompetency to comprehend the great doctrines underlying religious faith, for flaws in the doctrines themselves, and who glory in their supposed stand on that summit of logical absurdities, atheism. It may be laid down as an axiom that it is not that which we do not know that retards progress, but that which we half know; better ignorance than wrong ideas which lead to worse error. It is intelligent education which lies at the basis of prosperity. The gulls of such men as Keely owe their gullibility to insufficient knowledge, and the same may be said of every enthusiast who formulates wild theories from his own consciousness and spends life and money seeking the impossible. The duty of science is to establish facts. Any one may make his own deductions; no one is bound to accept those of others. Facts once rightly established remain; conclusions based on them are always shifting; and the latter can never be right unless based on a knowledge of all the former.

Professor Clifford's rule has the especial merit of working both ways. "Much education," he says, "is required to enable the learner really to estimate the evidence for the many-toed horse; much more is wanted for the clear comprehension of the evidence for the simpler brained man." This evidence cannot be taught until a late period in education, otherwise the learner's head is confused with abstractions, which prevent his learning properly in the future. Finally, the writer elsewhere continues, "Teach your children to do good, and to eschew evil; if in later life they can find hope of an eternity of such action it will make them happier, and may make them better. But the experience of centuries condemns the practice of teaching the doctrine (of immortality) to little children, so as to make it familiar as an ill-understood conception, to weaken the power it might have for good, and to help the perversion of it to superstitious uses."

A READY MEANS OF ESTIMATING THE VALUABLE CONSTITUENTS OF CEREALS, ETC.

By means of a very ingenious method, first discovered by Mr. A. A. Hayes, of Roxbury, and Dr. Chas. T. Jackson, of Boston, it will be found that if a kernel of corn be split longitudinally, and immersed in an aqueous solution of sulphate of copper, the germ, or "chit," only, becomes colored green, thereby beautifully defining the limits of the phosphates by the formation of phosphate of copper. The same process may be applied to all seeds (except those of an oily nature), tubers, roots, and stems of vegetables for defining the parts containing phosphoric acid.

If a kernel of corn be split open, as before described, and thrown into a solution of sulph-hydrate of ammonia, the "chit" will soon be changed to a dark olive color, which is due to a change of the salts of iron in the seed to a sulphuret of that metal; a dark colored matter forming with the ammonia turns the vegetable coloring matter yellow, and the two colors combined produce an olive. Again, by taking split specimens of corn, or other grains, and soaking them in a tincture of iodine, the limits of the starch and dextrine will be distinctly defined—the iodine striking an intense blue with the starch, and a deep port wine red with the dextrine; so that, from this test, a rich violet (being the combination of the blue and red colors) will indicate the presence of both the starch and the dextrine in the grain. If the oil be extracted from the transparent horny part of the corn by means of alcohol or ether, the tincture of iodine will show the presence of starch in that part of the grain, associated with the gluten. By these means we may easily cause any of our cereal grains to represent to us the extent and precise limits of its phosphates, iron, dextrine, starch, and oil; and thus, by the eye alone, we may form an approximate estimate of the relative proportions of these ingredients.

Among other curious results of some experiments made by Dr. Jackson is the proof that the relative proportions of the phosphates in grain depend on the appropriating power of each species or variety; for, an ear of corn having been selected which had on it two different kinds, namely, the Tuscarora and a variety of sweet corn, and these seeds having been split and immersed in the same copper solution, soon gave evidence that there was more than double the amount of phosphates in the sweet than there was in the Tuscarora variety. Now since the kernels came from the same ear, and grew side by side, they obtained unequal amounts of phosphates from the same sap, derived from the same soil. A crop of sweet corn will take twice as much of the phosphates as the other variety, and consequently will sooner exhaust the soil of them.

Some interesting facts were observed, too, in the variable proportions of phosphates in different varieties of the same species of other grains. The fact that the smaller grains, such as wheat, oats, and barley, contain so much less than Indian corn would seem to explain their peculiar properties as food for animals; the more highly phosphatic grain being more likely to surcharge the system of adult animals with the elements of bony matter, producing concretions of phosphate of lime, like those resulting from gout. Perhaps that stiffness of the joints and lameness of the feet common in horses fed too freely with corn may be accounted for by this preponderance of the phosphates. Young animals cannot fail to derive more osseous matter from corn than from other food.

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