

health and comfort in crowded neighborhoods, have a lower death rate than many districts where the inhabitants are wealthy and the number of people to the acre small; and this alone shows that the exceptionally great mortality in New York and other large cities is not due solely to density of population.

But the chief faults in city architecture are to be found in the smaller and cheaper houses. Although many of these are well provided with modern contrivances for saving labor and adding to the convenience of their inmates, they are characterized by two bad practices, namely, disregard of hygienic laws and flimsiness of construction. The excellent system of heating by furnaces placed in the basement is vitiated by making the heaters too small, so that they are overdriven in cold weather, and the air passing through them becomes too dry, thus rendering the lower rooms of the house unhealthy; and it has been shown by the experiments of General Morin, Director of the Conservatoire des Arts et Métiers in Paris, that air currents in contact with red hot iron become absolutely poisonous. It is safer, says Mr. James C. Bayles in an excellent paper on city architecture in the *International Review*, to keep the temperature of the surfaces of a heating furnace below 500° Fah. Again, by faulty construction, many of these furnaces carry carbonic oxide and sulphurous gases into the apartments.

Ventilation is a subject on which much has been written, and yet it is little understood. That provided by the open fireplace is nearly perfect; and difficulties on this subject are found mainly in small houses heated by hot air. Draughts of air in such houses are frequently kept out with weather strips, and air is only admitted by chance opening of doors. The plumber's work is another defective element in these houses; and the dread zymotic diseases which arise from sewer gases bear terrible witness to the truth of this statement. These diseases cause nearly 30 per cent of the total mortality of New York city. And the difference between good and bad plumbing, says Mr. Bayles, is so slight as to escape the notice of any but a trained expert, and here the responsibility of the architect becomes of the utmost importance.

The want of solidity in the building of cheap houses is the cause of the destructiveness of fires in this country. Mr. Bayles averages our annual losses by fire at \$100,000,000. Structures in which cheapness was the only consideration of the architect are in many places so numerous that solitary buildings considered fireproof are destroyed by the fierceness of the conflagration which rages round them. That this can readily be remedied is shown by the example of many European builders, whose cement floors and well plastered woodwork are unflammable, and in whose houses fire seldom spreads beyond the room in which it originates.

THE WORKING OF PATENTS IN CANADA.

A section in the patent law of Canada requires that the manufacture of the invention or discovery must be commenced within the realm within two years from the date of the patent, or the latter becomes void. Another clause in the same section declares that a patent shall be void if, after the expiration of twelve months from the granting of a patent, the patentee or assignee causes to be imported into Canada the invention for which the patent is granted. A clause was subsequently added, however, granting the Commissioner the privilege of extending the time for introducing an invention beyond the two years if application is made to the Commissioner not less than three months previous to such expiration, and if ample evidence is adduced that it has been beyond the patentee's control to comply with the two years' requirements.

Some parties who took patents two years ago have supposed that it was sufficient to hold the patent by importing into the country various parts of the entire machine, and putting them together in a Canadian manufactory. The able Commissioner, Mr. Taché, decides that such importation does not accord with the spirit or intent of the law; but in a case which recently came before the Commission, he rules "that the respondent having refused no one the use of his inventions, and that the importation, assented to by him to be made, being inconsiderable, having inflicted no injury on Canadian manufactures and having been so countenanced, not in defiance of the law, but evidently as a means to create a demand for the said inventions, which the patentee intended to manufacture, and did, in fact, offer to manufacture in Canada, he has not forfeited his patents."

It is evident from this decision of the Commissioner that he intends to construe the laws in a spirit of liberality towards the foreign patentee when it can be done without prejudice to the interests of Canadian manufactures.

THE BLUE GLASS DECEPTION.

An open letter addressed to us by General Pleasonton, of blue glass notoriety, has appeared in the columns of an evening journal of this city. The missive relates to our recent criticisms on the writer's alleged discoveries. It is altogether too lengthy for reproduction here, nor is such publication otherwise necessary, inasmuch as it clearly shows that its author has not perused our articles with any degree of attention, or else that he totally misapprehends the nature of the facts and arguments we have advanced.

The main point of General Pleasonton's letter is an objection to our use of the word "deception," a term which we employed, advisedly, since we believe that General Pleasonton deceives both himself and the public, a view which we can hold without casting the slightest imputation on the gen-

tleman's personal integrity. General Pleasonton, then, in support of his theories, triumphantly claims that they must be well founded, because "the highest scientific authority in the country"—to wit, the Commissioner of Patents—has granted a patent on their application. That the above official is *ex officio* the greatest of American scientists will be amusing news to our readers. It raises the question as to who is the highest scientific authority now, the Commissioner who signed General Pleasonton's patent or the present incumbent, or which one of the numerous gentlemen who have adorned that office for brief periods in the past. Besides, to claim that, because something is patented, it is necessarily scientifically sound and of major importance, betrays but a small acquaintance with inventions in general. The Patent Office does not indorse any device. The patent is simply granted on *prima facie* evidence that the idea is new and useful; and in endeavoring to extend the benefit of the protection to inventors, the examiners favor the latter, or should do so, in the highest degree, acting favorably whenever there is a possibility of the existence of even a germ of some future better conception. As it is, the Patent Office rejects very many more applications than it ought to; and on the other hand, it is constantly erring, often egregiously, in granting absurd claims. Because the Commissioner of Patents, in allowing General Pleasonton's patent, made a very sorry blunder (which, by the way, we are inclined to think is chargeable to the examiner, as of course the Commissioner knows nothing of the immense majority of patents to the documents of which his signature is appended in advance), certainly the General cannot convince sensible people that his abnormal theories obtained any indorsement.

The remainder of General Pleasonton's letter is but a reaffirmation of his interpretation of his alleged results; and the assertion that blue glass alone does not produce the beneficial effects claimed, but that they are wholly due to "associated light." Associated light in his graperies came through one eighth blue glass and seven eighths clear glass. Sunlight through blue violet glass, spectroscopically examined, as we previously explained—and a distinguished physician of this city has since corroborated our statement by further experiment—is nothing but sunlight diminished in intensity. Therefore General Pleasonton's claim now is based on pure sunlight, one eighth of which is diminished 90 per cent: in other words, sunlight weakened $\frac{9}{10}$ in intensity, according to Mr. Gaffield's data, elsewhere noted. As General Pleasonton devotes a considerable part of his letter to informing us on what we based our own criticisms—a favor on his part quite unnecessary, as well as wholly mistaken in its premises; and as a still larger part is given up to mere assertion, mingled with curious misunderstandings of our very plain statements, we think that no further notice of his epistle is required. For the benefit of sundry blue-glass-crazed contemporaries, we would add, however that we see no necessity of repeating the large number of experiments—some dating back two centuries—which very positively disposed of the whole subject, even if by not doing so we earn the imputation of closet theorists. Our long experience in dealing with circle squarers, perpetual motionists, Keely motor people, and now blue glass adherents, besides all the other deceptions rife in the mechanical and scientific world, enables us to bear such animadversion with unruffled equanimity.

POINTED LIGHTNING RODS.

The important question as to the proper form of lightning rods occupied the minds of many savants some 75 years ago, and filled part of the scientific journals of that period. It has lately been renewed, and, as formerly, there are defenders and antagonists of the pointed rods. It is argued by the latter that the object of a lightning rod is not to attract the thunderclouds to the building to be protected, and induce discharges there, and it is claimed that long, upward-projecting lightning rods do this very thing, and that, although they are a protection in one sense, giving a ready path to the discharges, they become a source of danger by attracting the electrically charged clouds, and making discharges more frequent. Let us test this reasoning by the well known laws of electricity.

The amount of electric attraction depends on the extent of the attracting surfaces, and on their distance. If a series of clouds, say of a square mile in extent, floats over the earth's surface, these clouds being charged with positive electricity, they will induce, in that part of the earth's surface within the attractive influence, negative electricity. This charge will increase as the distance decreases, as the clouds follow the direction of the attraction; until at last, when the distance becomes small enough, an explosive discharge takes place, the stroke of lightning consisting in the simultaneous discharge of positive electricity from the cloud to the earth, and of negative electricity from the earth to the cloud. The manifestation of light and heat is the simple result of the neutralization of the two electricities, and will be greater in proportion as their quantity and intensity were greater.

Looking at the subject exclusively from this point of view, all that appears necessary is to provide a ready path to the electric discharge, such as a rod made of good conducting material, of sufficient capacity to be uninjured by the strongest current, and well connected with the ground, so as to establish at the moment of discharge a perfect communication between the cloud and the earth, which, previous to the stroke of lightning, were charged with opposite kinds of electricity. If we consider the function of elevated points on lightning rods, we find that Benjamin Franklin was correct when he recognized the gradual absorption or discharge of

electricity as the main duty of lightning rods. Projecting points do not attract the thunderclouds; but elevated portions of the ground, as well as trees and houses, when in conducting communication with the earth, become charged by induction, and then exert attraction, whether there are pointed rods in the vicinity or not. The latter will, by their property of silent gradual discharge, serve to diminish the electric tension; and in place of being a source of attraction they will diminish this attraction, and take from the impending discharge a great deal of its violence.

We must, therefore, come to the conclusion that elevated points are desirable as upper terminals of lightning rods; and experience fully verifies this conclusion by practical results. One of the oldest instances took place in the tower of the cathedral of Siena, in Tuscany, which had been very frequently damaged by lightning. In 1776, a lightning rod was erected; but the people objected, and some of the priests called it an impious contrivance, invented by a heretic; but when it was found that the tower was rarely struck, and that once during a heavy thunderstorm the stroke followed the lightning rod without doing the least damage, the heretical contrivance came into proper esteem. The starlike terminations of some lightning rods are injurious. Faraday has proved that a single point discharges and absorbs electricity faster than a bifurcated or trifurcated terminal; if more points are added, still slower becomes the discharge, by their mutual interference; until at last, when the top is surrounded with an infinite number of points, a ball is the result, and the silent discharge ceases altogether.

But the upper pointed terminal is not the main part of the lightning rod; because it may be omitted altogether, although it is better to attach it. The main part is the ground connection; and as this is out of sight, it is often shamefully neglected. Much ignorance prevails in this respect also; hence it frequently happens that the electric current leaves the rod, to enter the house and pass off by the gas, water, or sewer pipes; and in its course it sometimes causes considerable damage. A connection with a water course, a well (not a cistern), or at least with the moist ground, is not imperatively necessary. If the soil is silicious and naturally dry, it is best to drive some pointed iron bars into the ground in such places as they are most likely to reach moisture, and connect all their upper ends with the conducting rod. The rule that requires a conducting surface equal to that of the roof to be protected, to be buried in the ground, given by some would-be authorities, has no foundation either in theory or practice. It is not the electric charge of a roof which has to be disposed of, but that of a cloud over it; and the latter has sometimes an extent of several square miles. All reported failures of lightning rods may be traced to defective connections, especially ground connections. Rods that are faulty from the outset are often made useless by subsequent neglect: as we found some years ago at the village of Gilboa, Schoharie county, N. Y. The church was situated on a hill, and quite exposed; the under end of the lightning rod, which in its upper end was connected with the spire, was pulled out of the ground, and lay on a pile of firewood in the rear of the church. If this church had been struck and burnt down, it might have been pointed out as an example of the utter uselessness of lightning rods.

Excitement the Stimulus of Business.

There are a numerous class of men who live almost entirely upon excitements. In a calm dispassionate flow of life and business they are stupid and powerless; but stir up the placid sea until it surges with violence, and they are then ready for a mission—armed and equipped for the toil of life. Such minds are the martyrs of this age of enlightenment—the life they lead is a consuming one, and vitality is spent with a prodigality more than heroic. The requirements of business are making this method of living more imperative, and without it success is beyond a reach. Half a century since the rivalries now experienced in all departments of human industry were then unknown. A new order of mind and new energies are called into requisition. The business man of the last generation would hardly be recognized by the prevailing caste. Flesh and blood are capable of enduring many hardships, but the delicate nervous organization, its accompaniment, breaks down at length under the incessant tension. Disregarding the friendly premonitions of temporary illness, the exhausted mind holds on its work by the necessary and agreeable stimulus of fresh excitements, until a sudden reaction crushes its vigor, and then comes on the weakness, satiety, and sorrow of hopeless infirmity.

It is not without a shade of melancholy that we notice in almost every daily journal the record of a faltering in the ranks of business men. This successful merchant or manufacturer has impaired his health by overwork, which means too much nervous excitement, and he starts for Europe in the hope of building up his health on a broken foundation. Another professional man is aroused from his dream of ambition with the frightful conviction that phthisis has fastened its deadly grasp upon his vitals, and the grim images of weakness and decay henceforward fill his vision. There has been an alarming increase of disease within a few years, having its origin in the causes we have named, and the effect of it should be to produce greater moderation. What if the profits are less? They can be continued longer and life made happier.

There is no necessity for this waste of life—it is a sheer delusion, the effect of a foolish ambition. Better accept the heritage of poverty or a moderate success than the infallible necessity of an early disease.—*Hunt's Merchants' Magazine.*