



NOTES ON GENERAL PLEASANTON'S BOOK.

BY THOMAS GAFFIELD.

[For the Transcript.]

It is pleasant to know that the blue-glass discussion has led so many invalids, probably for the first time, to test the long and well-known healing efficacy of the sun's beneficent light and heat. Even with a large proportion cut off by blue glass, many will be aided and some restored to health, the loss by the blue screen being sometimes made up by the presence of a strong faith and a warm and vivid imagination. Until this class of the community is supplied with what is called "the medicated glass," the glass-makers and dealers will be busy, and no words here written can have the effect to stop their demands.

But there are others who have not this strong faith and imagination. There are cases also of failure to be cured, which are not recorded in the newspapers. And occasionally a word is spoken like that of the St. Paul physician, who prescribes as follows: "Blue glass, one part; faith, ten parts; mix thoroughly, and stir well until all the common sense evaporates, as the presence of a minute quantity will spoil the mixture; if the preparation be not strong enough, add more faith."

But no sarcasm is necessary, and no controversy need be made, with facts related of wonderful cures under the influence of "the associated blue and sunlight."

But a knowledge of all the circumstances connected with each case would in many instances remove or modify any feelings of wonder. On the seventeenth page occurs one well illustrating this remark, and showing that a state of convalescence, or approaching recovery, has often much to do with the cases of complete restoration to health.

After stating the particulars of a certain case, the general goes on to say—

I addressed a note to the attending physician in this case, asking from him a statement of the case, with its diagnosis, etc. From his reply I make the following extract, viz.: "Mrs. H. had been sick some two or three weeks with excessive spinal irritation amounting to partial paralysis of the right side, with intense neuralgia from the occiput down to the foot, including the right arm. This condition was greatly improved before the blue glass was used. She was almost free from pain, but nervous irritation remaining at this time, I made use of the galvanic battery, which she thought did her a great deal of good. I think it was some two or three days after that the blue light was used. She says that she took it about twelve times altogether, from a quarter to a half hour each time. You can draw your own conclusion if there was any benefit derived from blue light." * * *

It is known that, although fifteen years have elapsed since the general commenced his experiments, few, if any, institutions in Philadelphia, or any part of the world, have put his theory into practice.

The experiments of Dr. Ponza in Italy in the treatment of the insane cannot be quoted in this connection. Dr. P. used colored glasses entirely, unassociated with colorless glass, and he placed his patients in apartments whose walls were also colored. The effects were clearly those of a mental character only; for, according to accounts published, he had equal success with different patients with glasses of different colors, with red, violet and blue. These experiments, however, have not, to our knowledge, yet been so numerous or decisive as to lead to their repetition or general adoption elsewhere.

General Pleasanton's patients use the direct sunlight minus the considerable portion which is cut off by blue glass, and when they are cured, they are cured undoubtedly by the beneficent and wonderful influence of its genial warmth and heat, seconded by an equally strong faith and a warm and vivid imagination.

Good medical authority assures that many wonderful cases are on record, especially of nervous diseases, which have been cured simply by the effect of the imagination, or the exercise of faith in the skill of a physician, or the efficacy of certain nostrums. Any intelligent member of the medical profession will indorse this assertion. The following is inserted from a scientific journal, to show the force of the imagination:

The Thermometer as a Curative Agent. The following, from the London Student's Journal, shows what healing power the thermometer, assisted by the imagination, may have: "A young woman, who was convalescent, and whose temperature had long remained normal, had a slight relapse, which she attributed to having had 'no glass under her arm for a week.' A man suffering from acute rheumatism, obstinately refused to have his temperature taken any more, 'it took too much out of him; it was drawing all his strength away.' A man had been in the habit for some time of having his temperature taken daily under his tongue, with a thermometer that had just been doing severe duty in the axillæ of other patients. One night a brand-new thermometer was applied to his mouth; next day he declared he was not so well, and said 'the glass was not so strong as usual; he felt at the time the taste was different, and it had not done him so much good.'"

It would be easy to occupy column after column, giving cases to match and overmatch all the wonderful cures cited by the general and his followers. Readers are simply referred to their physicians and their books. In regard to the many cases cited, of cures of baldness under blue glass, the best medical authority assures "that hair lost by illness almost always, if not always, returns when health and strength are restored."

The general states as a most remarkable case, his own recovery by a few blue and sunlight baths from the effects of a fall in simply stepping out of his vehicle. The vivid imagination of the general is never more completely revealed than in the curiously minute particulars given by himself in a letter to the New York Mail of Jan. 29. A few sentences are quoted to show the nature of the accident:

In the latter part of October last I met with a very serious accident in alighting from my vehicle in this city. In leaving my wagon from the front, I incautiously placed my foot on the movable crossbar to which the swingletrees are attached, instead of the fixed bar. When I lifted my other foot from the bed of the wagon, the crossbar moved; I lost my balance, and in endeavoring to recover, *threw myself into the arms of my coachman*, who was on the footwalk to receive me as I might alight. My weight, which is not less than 180 pounds, was too much for him, and he was thrown to the pavement. In some manner which I cannot understand I was turned round and fell with all my weight upon the pavement from a height of about three feet. * * * Fortunately my head did not strike the pavement. The concussion knocked the breath out of my body, and it was a considerable fraction of a second before I could have an inspiration of air. Some gentlemen kindly picked me up and assisted me into the nearest store. At the expiration of an hour, I was sufficiently recovered to be enabled to call upon my family physician, who lived about a square distant, by whom my body was carefully examined. He said that there had been no fracture of ribs or bones, but that I had received a very severe contusion, the effects of which I would feel for some time at my age.

The following sensible remarks of the New York World are cordially indorsed:

We have no desire to appear unduly sceptical; but inasmuch as his "serious accident" consisted, by his own account, of a fall from a height of three feet, broken by his being received in the arms of his coachman, and inflicting neither fracture, dislocation, sprain, nor any injury more severe than a "shock" distributed over the entire surface of his right side, it may be permissible to question whether the after results would have been more disastrous and permanent without the bath of blue light.

To show that the opinions of this series of articles are seconded by competent scientific authority, the reader is referred to the essays on "The Blue Glass Deception" in the last three numbers of the Scientific American, from which the following quotations are made:

To recapitulate in brief, General Pleasanton's claims, of any superior powers for blue glass on account of the color which it produces in transmitted light are, when tested by the result of previous investigations, unfounded. In some instances, where it is desirable to reduce the intensity of the light, blue glass may be used; but any other mode of shading the light, as by ground glass, thin curtains, etc., would without doubt serve equally as well. The cures produced are ascribable to two causes; first, to the healthy influence of the sun bath, and secondly, to the very powerful influence of the patient's imagination. There are abundant cases known where imagination has so powerfully affected the body as to cause death.

Experiments upon criminals have shown that in one instance, where a person was placed in a bed which, he was informed, had just been vacated by a cholera patient (but which had not), he exhibited all the symptoms of that disease. Another person is reported to have shown all the signs of collapse from loss of blood, from the supposition idea that he was bleeding to death. As regards the animals fattened under the glass, all the circumstances go to show that the result was due to their enforced quiescence, their shelter from the weather and their free exposure to the sun.

It is hardly necessary to add that, in our opinion, the use of blue-glass, as advocated by General Pleasanton, is devoid of benefit. * * *

It has been suggested to us, by a sceptic in patent blue glass science, that it is difficult to perceive how the blue violet rays, which were already in the sunlight before it was filtered by the glass, can be augmented in their influence by such filtration. If they are thus augmented, as is claimed, then it logically follows that the present compound of sunlight is a very inferior production, in which certain ingredients serve to diminish the value of the others, and that the Creator has blundered badly in its manufacture.

The statement of newspaper correspondents led to a mistake in the second article in asserting that the general is not pressing his theory or using his patent for purposes of profit. This is not in accordance with the circular of General Pleasanton himself, dated Feb. 12, 1877, and now sent with every copy of his book. It recounts, as follows, what can be accomplished by blue glass, and states that he is ready to negotiate for licenses:

Spinal meningitis, hemorrhages from the lungs, nervous debility, partial paralysis, rheumatic affections of all kinds, inclusive of gout, have yielded to this treatment. * * *

As my letters patent cover all these subjects, persons desirous of converting my discoveries into utility as a business, can negotiate with me for licenses therefor in any of the branches of industry mentioned herein, as for instances:

1. In treating diseases in hospitals, lunatic asylums, or medical practice by physicians and surgeons as a profession.
2. In purifying the vitiated atmosphere in public schools, halls of legislation, etc.
3. Increasing domestic animals for sale.
4. In rearing poultry and other birds for sale.
5. In rearing fishes of various kinds for sale.
6. In the cultivation of flowering plants and ornamental plants to be matured in winter.
7. In horticulture for food.

Specific licenses can be procured from me, with directions for the use of my discoveries, and for the proper kinds of glass to be used.

This change in the general's idea of reaping profit from his theory will not probably lead many shrewd Yankees to take any stock in the patent until he explains its curious and contradictory workings in regard to pigs and insects.

It is interesting to read the first sentences of the circular of the general. After giving the long title, he says—

The above is the title of the most remarkable book that has ever been published in any country—in any age. This is the boldest of assertions, but it is nevertheless true, for it deals with every subject that concerns the life and health and prosperity of the human race in every part of our globe.

Some might wish to affix other adjectives to this "remarkable" work, but intelligent readers must have anticipated this, and so must be closed this review of the general's book. It has been a task requiring some expenditure of time and thought. But the reading of the volume has given amusement and caused many a healthy laugh. The studies necessary to treat the subject properly have led to a new perusal of many interesting books on light, heat and color, and fixed in the mind more firmly the results of scientific investigations. It has revealed anew the truth of the following beautiful saying of Sir John Herschel in one of his lectures: "A ray of light is a world in miniature, and if I were to set down all that experiment has revealed to us of its nature and constitution, it would take more volumes than there are pages in the manuscript of this lecture."

If these humble efforts and essays have not tired the patience of readers, and have given them but a portion of the satisfaction enjoyed in performing what was felt to be a duty, the writer will retire with feelings not at all typified or colored by the subject which has been considered.

To the Editor of the Transcript: It may seem an ungracious thing for one who has retired from the glass trade to do or say anything which in these dull times shall in the slightest degree check any temporary rush of business occasioned by what we have called the "Blue Glass Mania." Was it less ungracious, while yet in the business, to publish to our customers and the world that the result of experiments had proved that almost every kind of window glass in commerce would in some degree change its color or shade after sunlight exposure? Our sufficient answer to many valued friends of our old guild is, that we cannot in justice to ourselves allow our loyalty to truth and conscience to bend to any feelings, however warm, of personal friendship and regard. Like General Pleasanton, we have a hobby. It is glass. We will make no pretensions to any superior knowledge on the subject, but humbly acknowledge, as we think every student of any specialty should be willing to do, that the more we know and the more we discover about our subject, the more we find out that we do not know. And so, although nearly two score years have elapsed since we first began to sell and handle glass, we try to learn something every year and every day, and if we live to the age of old Cornaro, so long as our health holds out, we expect to be as enthusiastic in our investigation, and as earnest for more light, as when in 1862 we stood side by side with young lads to recite our lessons in chemistry at the Lawrence Scientific School, and listened to the teachings of Professors Eliot and Storer, and strove to learn if there was not an intellectual and scientific, as well as a financial side to our business. We have always been ready to welcome any new light on our subject, and to examine carefully every matter brought to our attention. And so, when in Philadelphia in the autumn of 1875, a friend called our attention to General Pleasanton's experiments, of which he could give us no account, we immediately made a call on the general with a view of obtaining a copy of his pamphlet. We had a pleasant interview, and the general not being able—as it was out of print—to give us a copy of his book, recounted his theory and some statements of wonderful cures of rheumatism. He endeavored to explain our experiments on the action of sunlight on glass, and on sensitive paper under colored and colorless glass, by his theory of magnetic, electric or electro-magnetic action, but we could not understand it, and so waited for the publication of his volume, which did not appear until last summer. As soon as we received the new edition of the book and had an opportunity carefully to examine it, the whole question of the value of the general's theory was solved and dissolved at once by the analysis of the first comparative experiment with animals, and the ease with which the general could accommodate it to kill one class of insects and to promote the growth of others.

Our call on General Pleasanton impressed us with the opinion that he was an enthusiast, carried away with one idea, and not thoroughly understanding, or able clearly to elucidate the subject which he tried to explain to us. We wish also to add that he is a gentleman who is not seeking wealth and profit by his theories—for he does not need them,—but is animated by the most worthy desire to gain fame as a discoverer; and far be it from us, improperly, to pluck one laurel from his crown. He would not intentionally deceive the public, but has begun by deceiving himself, and has formed a theory to meet his ideas, and has bent the theory to meet the facts, as in the case of the destruction of the insects and flies, and has bent the facts to meet his theory, as in the case of the pigs. But the general has published a book, and he cannot complain of the results of candid and honest criticism. Our first impression was most thoroughly confirmed by a perusal of the volume which he issued last summer. We felt that its plain contradiction of itself, and of the facts of nature and science, ought to be criticised by some of the writers of our scientific journals. But reading the opinion of the Scientific American, quoted in our last article, and noticing any favorable mention of the volume at home or abroad, except in newspapers, we felt assured that it was not going to attract any more attention than it deserved. The late unexpected revival of interest in the subject in many quarters, on the part of people who could never have seen the general's book, but only incomplete and inaccurate accounts of some of the first experiments in newspapers, has led us to take up the pen, and give a correct analysis in our first article, and today to put before your readers a few of the deductions which the general has set forth in the first and second parts of his work.

We feel confident that the simple publication of the crude, unscientific and ludicrous statements in these pages will be their own refutation, and will show in peculiar light the author of the blue-glass theory, whose consideration is now attracting the attention of so large a portion of our community. We should not have made this long and somewhat personal introduction, but for the question of a friend in the trade as to what induced us to undertake our present task.

We have gone over the eccentric book again with great care, and pencilled passages, of which we shall make an index in our copy of the book, for future reference and recreation when we are overcome with the blues. We have really been quite perplexed with "embarrassment of riches," and scarcely know where to begin, what to omit and where to leave off. But we must begin somewhere, and so, premising that the general tries to explain almost everything by his theory of electricity, from the creation of man by God to the whipping of a child by its parent, we will show that this is no sarcastic or fancy statement, by making our first quotation (page 128, part 2), giving the general's opinion of Solomon's maxim

concerning corporal punishment. We think that fond mothers and loving children will object to this theory:

Solomon, the wisest of men, has left, as one of his legacies to mankind, the maxim, "Spare the rod and spoil the child." Now let us examine this. When children were misbehaved, were destructive in their inclinations and conduct, rebellious to authority, and were otherwise troublesome to parents or others having the charge of them, Solomon being a keen observer of effects, recommended personal chastisement with the rod, and naturally attributed their better deportment after the punishment to the fear of the child of its repetition, and perhaps with greater severity. This was possibly a natural conclusion on his part, at the age in which he lived, and may be so considered even at the present time, but there is another explanation, more philosophical and more scientific. It is as follows, viz.: When people are in good health, they are usually cheerful, in good humor with themselves, and amiable to those around them; they do not think of or attempt to perpetrate mischief to others, their electricities are in equilibrium, and they deport themselves properly. Now let one or other of their electricities be in excess, immediately their dispositions become changed; no longer amiable, they see every thing and person through a disturbed medium; they become sullen, cross, crabbed, quarrelsome and disagreeable; the least disappointment ruffles them, and they proceed to behave ill. Now with children, when the rod is applied vigorously to their persons, the friction produced by the blows evolves electricity of the kind necessary to restore the healthy electric equilibrium of their bodies. When that is reestablished there is an end of the trouble; they become amiable and gentle. This salutary method of correcting "les enfants terribles," has greatly fallen into disuse in our times, from the overweening maternal instinct of mammas, which is horrified by the cries of the suffering little ones, and hence they decry against it. This punishment is also well adapted to the adult human animal, if we are to believe a statement recently made in some of the London newspapers. It seems that the British Parliament, within a few years past, had reestablished corporal punishment with the cat-o'-nine-tails at a whipping post for a certain class of criminals, whose crimes had become alarmingly numerous. Since the reintroduction of the whipping post and its accompanying punishment, these crimes have almost ceased to exist. Let other people profit by the example.

To show that no trouble need arise from a scarcity of blue glass, we quote from the patent specifications, which show us that any one of three colors will answer, and also that screens of any kind will produce good results:

I prefer, as a transmitting medium for the electric rays of the sun, blue glass, violet and indigo; but I do not confine myself to the use of glass, as the sun's transmitted rays convey these colors through other media, producing in degree the same results.

That the general acknowledges the value of "blue curtains" as producing even more remarkable effects than blue glass, will be seen by the following quotations. It will be noticed that Commodore Goldsborough refers to the general's experiments on domestic animals. Is it improper to ask if he referred to the experiment with the pigs?

I will also relate to you what I imagine to be another remarkable circumstance having relation to this subject.

On the 29th of January, 1872, the wife of one of the gentlemen on the station gave birth prematurely to a very small child, which weighed at the time only three and a half pounds. It was very feeble, possessing apparently but little vitality. It so happened that the windows of the room, in which it was born and reared, were draped with blue curtains, through which and the plain glass of the windows, the sunlight entered the apartment. The lacteal system of the mother was greatly excited, and secreted an excessive quantity of milk, while at the same time the appetite of the child for food was greatly increased, to such an extent indeed, that its mother, notwithstanding the inordinate flow of her milk, at times found it difficult to satisfy its hunger.

The child grew rapidly in health, strength and size; and on the 29th of May, 1872, just four months after its birth, when I saw it, before I left Mound City, it weighed twenty-two pounds.

Whether this extraordinary result was the effect of the associated blue and sun light, passing through the curtains and glass of the windows, or not, I do not profess to determine, but I give you the facts of the case, which are in complete harmony in their developments with the results of the experiments on domestic animals that you yourself have made. With great regard,

I remain, very truly, yours,
JOHN R. GOLDSBOROUGH.

It will be seen from this statement that this child had grown 18½ pounds in four months, or 4½ pounds per month, and considering its apparently slight hold upon life, at its birth, we may unite with the commodore in believing it to be "a remarkable circumstance."

On another page, he reiterates his surprise with additional suggestions. We submit their value to our friends of the medical profession, although it seems to us that they assume too much:

In the case of the child whose premature birth occurred at the naval station at Mound City, in Illinois, Commodore Goldsborough was informed by its mother, a short time since, that it had continued to improve in health, size and vigor since the commodore had last seen it, and that it was then a perfect specimen of infantile development.

The case of this child, described by Commodore Goldsborough, is a very remarkable one, for, having been prematurely born, it may be presumed that its organization was not as completely developed as it would have been had it fulfilled the entire period of its gestation—and consequently it would seem that the association of the blue and sun light had repaired all the deficiencies in its organizations existing at its birth.

If all be true that is claimed, ought not our houses and hospitals to be draped with blue curtains, and the rush for blue media be to the dry-goods houses rather than our old associates in trade, the glass dealers? Blue curtains certainly ought to go up as well as blue glass.

Below we give an interesting enunciation of the formation of the diamond, which must be new to our townsman, Mr. Morse, and his friends in Amsterdam:

The diamond, about whose origin so much mystery has always existed, it is likely, is the product of the decomposition of carbonic acid gas in the higher atmosphere by electricity, liberating the oxygen gas, converting it into ozone, fusing the carbon, and by the intense cold there prevailing, which is of opposite electricity, crystallizing the fused carbon, which is precipitated by its gravity to the earth.

A new and most unique argument in favor of temperance is given below. It changes a man's electricity from negative to positive:

The sexes are oppositely electrified—hence their mutual attraction for each other. Now give them the same electricities, and mutual repulsion immediately results. Let us pon-

der awhile on this subject. Every one must have observed in the press of this country, almost daily, and in every part of it, accounts of the most outrageous, cruel, and in some cases of diabolical attacks of men upon women, and occasionally of women upon men, generally when they bore toward each other the relation of husband and wife. When they have been first acquainted with each other, their electricities being opposite, they were mutually attracted to each other, their acquaintance grew into esteem, and ripened into affection and love, and they became man and wife. The animal system develops electricity, magnetism and heat in its functional actions—the kind of electricity and magnetism are dependent upon the habits of life, the diet, the occupation and association of the individual. When these are similar similar electric and magnetic conditions of the body will result. It has been shown that the negative or masculine electricity of the man is reversed, and becomes positive like that of the woman under the excitement of alcoholic stimulants—in other words, for the time being the man becomes a woman, and is converted into the only thing which the British Parliament, in all its great potentiality, could not do, viz., make a man a woman, or a woman a man. This, alcoholic stimulants have always done, and are now doing every day. When this change in the condition of his electricity has occurred, his attributes become feminine; he is irritable, irrational, excitable by trivialities, and when opposed in his opinions or conduct, becomes violent and outrageous, and if, in this mood, he meets his wife, whose normal condition of electricity is like his present condition, positive, they repel each other, become mutually abusive, engage in conflict and deadly strife, and the newspaper of the next day announces the verdict of the coroner's jury on the case. How many such instances are occurring daily in almost every part of our extended country; and who would expect to find the discovery of the moving cause of all these terrible crimes in the perspiration of the criminal? And yet science has shown that the metamorphosis of a man into a woman by changing the negative condition of his electricity into the positive electricity of the woman, with all its attributes, is disclosed by the character of his perspiration, superinduced by the use of alcoholic stimulants!

It is noticeable that he calls man's electricity negative, whereas on another page he calls it positive.

He has peculiar theories about the sun and planets. No heat comes from the sun, according to the following. The sun is a magnet:

The sun, the planets, the stars and all the bodies that stud the expanse of heaven are doubtless all magnets, to which magnetism was imparted when the Creator uttered in Heaven the words without parallel in sublimity, "Let light be made." This then is the origin of all the physical forces of the universe. Let us consider for a moment the nature of heat, and it will be apparent that terrestrial heat cannot be directly derived from the sun.

The tendency of heat is always to ascend into the atmosphere, when it is derived from combustion on the surface of the earth, or from radiation within it. The flame of a candle is vertically upward, on every part of the earth's surface, when the air is still. The effort of heat is to depart from its source with a rapidity proportionate to the intensity of the combustion. This is a repellent force—at the same time from its being associated with positive electricity, it is attracted to the upper atmosphere by its negative electricity, always associated with cold, which is opposed to positive electricity. The diffusion of heat, laterally or downwards, is very inconsiderable, as is constantly manifested in our rooms, where the fire in the grate emits very little heat below the bottom of the grate, and parts of the room distant from the fire are very imperfectly heated by it. The sun in its daily course being above the earth, if it had any caloric rays, could not send them to the earth below it, through a space of ninety-two millions of miles, which, according to calculations of Pouillet, has a temperature of minus 142° of Centigrade thermometer.

He thus summarily disposes of Newton and his theory of gravitation:

Light, electricity, magnetism and heat, the vital forces of the universe, all treat gravitation with great contempt. The atmosphere surrounds and envelops the earth. It has what is called gravity or weight, but it is not subject to what is called the law of gravitation, since when its lower strata become warmed, they ascend into the upper part of the atmosphere, and do not descend or fall to the earth, as having weight they should do; thus a difference in the relative weights of the same substance, in one condition or another, removes that substance from the influence of gravitation. The vapors or clouds in the atmosphere, which are heavier than air, float in many directions, and do not fall to the earth.

Now, if what our astronomers tell us of the inconceivably high temperature of the sun be true, there can be no gravitation towards its centre from its photosphere, its chromosphere, or any of its possible envelopes, the heat expanding, rarefying and driving off all such material substances. Heat disintegrates solids, separates their molecules, destroys their densities, and consequently is opposed to gravitation, which is the attraction of densities. Alas! for poor Sir Isaac Newton and his grand theory of centripetal and centrifugal forces! A ray of light passing through a narrow chink, and through a glass prism, has done the business. The incandescent metallic gases and the transcendent intense heat of the sun which has vaporized the metals (the supposed discovery by the narrow chink and prism) have demolished Newton and his erratic fancies. *Sic transit gloria mundi!*

The navies of the world are floated by electricity:

Flotation, heretofore attributed to the lightness of the floating body compared with the weight of the liquid in which it floated, is due to magnetic repulsion, and not to gravitation. Now let us look at the condition of this water when it has changed its character by crystallizing into flakes of snow, of whatever diversity of form, or of hail, or of surface or dense ice. These forms of water at temperatures below 32° of Fahrenheit, are all magnets, and their minutest atoms are all magnets, also; each endowed with its two poles, one at either extremity of the atom, and each with opposite attributes.

The commerce of the world, therefore, is sustained on its oceans by the repellent force of magnetism; while the mariner directs his course over their trackless wastes, in darkness and in storm, guided by that opposite quality of the magnet which attracts it to the poles of the earth.

Far be it from us to indulge in any improper criticism of General Pleasanton's book. We only desire to let our readers know the theories which he puts forth on the subjects named. We have essayed as yet only to make some notes on this unique and eccentric volume. We have thought the best note on some passages was simply to quote them and let them speak for themselves.

But we must close. We trust that we have made quotations enough to show, by their own light, the curious nature of the general's theories and deductions. We shall at some future time examine his blue-glass theory by the light of the scientific studies and investigations of other philosophers.

THE BLUE-GLASS MANIA.

III.

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BY THOMAS GAFFIELD.

[For the Transcript.]

Having shown that some of the general's facts disprove his theory, and quoted some of his curious deductions, it can now be shown that the theory itself is discordant with the laws of nature, and the investigation of some of nature's most distinguished and trusted students and observers at home and abroad.

For the purposes of an examination of his blue-glass theory, the following extract is given from one of his last published letters.

Sunlight passes through plain, transparent glass with very slight obstruction, as it does through the atmosphere and ether of space; it produces no heat, for the glass remains as cold as the outside atmosphere, while the sunlight passes through it. When, however, the adjoining sunlight, moving with the same velocity as the first-mentioned, viz., 186,000 miles per second, falls upon the blue panes of glass, six of the seven primary rays of sunlight are suddenly arrested by it, only the blue ray being permitted to pass through it into the apartment. The sudden stoppage of these six rays of light with this enormous velocity produces friction; this friction evolves negative electricity, which is the electricity of sunlight, passing through the cold ether of space and our cold atmosphere, both of which being negatively electrified impart their electricity by induction to the rays of the sunlight as they pass. The blue glass is oppositely electrified. When these opposite electricities, thus brought together, meet at the surface of the glass, their conjunction evolves heat and magnetism; the heat expands the molecules of the glass, and a current of electro-magnetism passes into the room, imparting vitality and strength to any animal or vegetable life within it. When the atmosphere of the room becomes thus electro-magnetized, its inhabitants cannot fail to derive the greatest benefit from being in it.

He also asserts that the blue color of the sky, for one of its functions, deoxygenates carbonic acid gas, supplying carbon to vegetation and sustaining both vegetable and animal life with its oxygen.

Nothing need be said of the general's theory of electricity and magnetism and his remarks about the blue or violet rays being "the electric rays," except to repeat the criticism of many scientific men, that there is no known relation between light and electricity which will justify one in speaking of any ray of light as electric, and that it is absurd to speak of one ray as more electric than another. On the magnetic point made, the following is quoted from an article in the last Scientific American, entitled "The Blue Glass Deception":

The notion that light possesses a magnetizing power on steel was upset by Niepce de St. Victor in 1861. After removing every source of error, he found it impossible to make one sewing needle, solarized for a very long time under the rays of light concentrated by a strong lens, attract another suspended by a hair, whether the light was white or colored, by being made to pass through a violet-colored glass.

The second sentence in the general's statement contains the foundation error of his blue-glass theory and all its curious deductions, and the mistake sometimes also made by photographers who have used blue glass in their skylights in our city and elsewhere. He confounds the homogeneous rays of the solar spectrum with the mixture of rays transmitted by colored glass or any other colored medium.

He supposes that blue glass transmits only blue rays and stops all the other spectral rays, and asserts that in this fact lies the secret of its wonderful effects in generating electricity, magnetism and electro-magnetism, in promoting the remarkable growth of his grapevines and animals, and in producing astonishing cures of almost all the ills that flesh is heir to. Against this assertion, can be placed the simple fact that blue glass, instead of cutting off six of the spectral rays, transmits in some degree all the rays. While it cuts off in some proportion also all the rays, including even the blue, it cuts off greatly the yellow rays, which, according to the experiments of Professor John W. Draper of New York, published in 1844, and indorsed by most competent scientific observers at home and abroad, are just the rays most needed to promote the deoxygenation of carbonic acid, evolved by men and animals, and the assimilation of carbon by the plants, one of the prime essentials in their true and complete growth, which includes the germination of the seed, the formation of woody fibre, and the perfection of flower and fruit. It is not necessary to crowd your columns with proofs of this assertion, nor to ask these unsupported statements to be believed. In support of the assertion that the chemical processes in plants, so far as they are dependent on sunlight, are principally caused by the rays of medium or lower refrangibility and especially the orange and yellow rays, the words of Sachs in his "Text Book of Botany," can be quoted. He says, "The following additional result was also obtained from Draper's and Pfeiffer's observations and from mine already quoted; [only these rays of the spectrum which are visible to our eye have the power of decomposing carbon dioxide; and indeed those which appear brightest to the eye, the yellow rays, are alone as efficacious in this process as all the others put together.]"

In support of the assertion that blue glass does not stop completely any ray of the spectrum, and that it stops in great degree those rays which Draper and Sachs say are most needed to decompose carbonic acid, and provide carbon for the fibres of the plant, a most distinguished scientific man in one of the departments at Washington, to whom was sent for his experiments, in 1872, some cobalt blue glass three-sixteenths of an inch in thickness, observed that the glass transmits in some degree the whole spectrum, and owes its apparently pure blue color to the presence of several rather broad absorption bands in the yellow and red.

There is no colored glass in commerce, and Tyndall is authority for saying that "it is difficult, if not impossible," to make any of

color so pure that it "shall cut off all the spectrum except that which gives the glass its color." The red, which comes nearest to the demands of the general's curious theory, transmits a portion of the orange rays.

At some time in the life of the plant undoubtedly all of the spectral rays are needed, and under colorless glass the plant obtains them all, almost as fully as under the canopy of heaven, in the wonderful and beautiful economy of nature. Every ray is endowed in some degree with light, heat and chemical influence, and the plant receives in its germination, development of stalk, and perfection of flower and fruit, just what is needed, and just at the right time. This opinion is substantially confirmed by M. P. Bert, who presented in 1871 an account to the French Institute, of careful and comparative experiments made with a variety of plants and seeds under colorless glass, ground glass and glasses of different colors. After witnessing the deleterious and retarding influence of various colored glasses, he announces as the result of his investigations that all the colors, taken separately, are bad for plants. "Their reunion, according to the proportions which constitute white light, is necessary for the health of vegetation. And finally, gardeners ought to renounce the use of colored glasses or screens for greenhouses and frames."

The intervention in any proportion of blue glass, or glass of any other color, acts as a shade to this white light, and in that proportion retards the normal growth of the healthy plant. Reference is not made to those exceptional cases of foreign or sickly plants where shade for a short time may be needed, in which event there is no more virtue in blue glass than in curtains, paint, paper, or cloth of green, red, or any other color, which will cut off the same amount of light and heat.

The general's foundation statement having been proved entirely incorrect, his theory, therefore, and all its deductions fall to the ground. Blue glass, as shown by photometrical experiments, cuts off about ninety per cent. of the light rays and a goodly proportion of heat and chemical influence. And yet the general contends that placing a large proportion of blue glass in windows, even one-half, instead of acting simply as a screen or shade against the light and heat, actually produces a greater warmth in apartments than the use of colorless glass alone. His statement on the forty-seventh page of his book is cited in proof of this assertion:

During the winter of 1871 and 1872, which in this city was a very cold and rigorous one, two ladies of my family residing on the northern side of Spruce street, east of Broad street, in this city, who, at my suggestion, had caused blue glass to be placed in one of the windows of their dwelling, associated with plain glass, informed me that they had observed that when the sun shone through those associated glasses in their window, the temperature of their room, though in mid-winter, was so much increased that on many occasions they had been obliged during sunlight to dispense entirely with the fire which, ordinarily, they kept in their room, or when the fire was suffered to remain, they found it necessary to lower the upper sashes of their windows, which were without the blue glass, in order to moderate the oppressive heat.

Is this a comparative experiment, and does the general think it settles the point? This occurrence in the genial climate of Philadelphia can be overmatched in the coldest days of a New England winter, if too hot a fire is kept in a stove-heated apartment in the sunny hours of the day. If it is to be fully believed, then the following humorous extract from a Western paper is in point:

If sunlight were a constant quality, we can see a plain way to smash coal monopolies and put an end to miners' strikes. All that would be required for comfort would be the insertion of blue-glass windows on the sides of houses exposed to the sun. * * *

Relief unions and other charities will take a new direction. Instead of sending a load of coal to a poor family, the glazier will be called in to insert a pane of blue glass in the window, and the sun will do the rest. Carriages, street and steam passenger cars, and other conveyances, will adopt blue-glass heaters, and it is not impossible that conveniences in the shape of umbrellas and parasols with blue-glass tops will be contrived for the use of pedestrians in winter weather. We shall all live in (blue)-glass houses, and pray for sunshine with the devotion of a Parsee.

How then, is it asked, can one account for the success of the general's graperies? In the light of the explanation given, it was accomplished by means of superior culture and care, and accomplished notwithstanding, and not in consequence of, blue glass used, which could only cut off a portion of the very blue rays he professes to need, and which he could obtain better under the colorless glass; for the darkest colorless glass transmits a greater amount of blue and all the colored rays than any, even the lightest, shades of colored glass.

Scientific and agricultural men in this vicinity do not indorse his theory; and how can they, when they read the contradictory statements of his volume?

But practice is better than theory. Some gardeners have tried, according to the general's recommendation, the blue glass or blue paint as used by Mr. Buist, and have given it up. It is asserted that larger grapes have been raised in Europe under colorless glass than by the general under blue glass, and that it is not an uncommon thing here in Massachusetts to raise fruit in from fifteen to eighteen months from cuttings in graperies. To match the general's rapid growth of vines, a well-known citizen has witnessed in one of his greenhouse vines a growth of four inches in twenty-four hours, and this without blue glass.

The general cites Mr. Buist as seeming "to be lost in wonder and amazement at what he saw" in his graperies in 1861 and 1862. It is well to put on record, side by side with the general's statement, what Mr. Buist himself has published, and which tells decidedly for the opinion that it is superior care and rich compost, and not cutting off the rays of sunlight by blue glass, which has caused the rapid growth of the general's vines and grapes.

In a communication, dated July, 1871, in Tilton's Journal of Horticulture for that year, and ten years after the graperies was

built, Mr. Buist says (and only a few sentences are quoted bearing on the position taken), "Whether it is the blue glass, the rich, high and dry borders, or his original method of pruning, that produces the result, I will not now decide."

In another communication, in August, he says, "The vines have received very simple pruning indeed, merely cut at random the past year or two. The outside borders are elevated, of the richest nature, and have air through them; the roots of the vines are all outside. The inside of the wall of the house has lately had a coloring of blue. I give the growth of the vines and the coloring of the fruit, that your many intelligent readers can judge for themselves. I make no conclusion."

"It must be admitted that the general is a very generous feeder to all his stock, trees, plants and vegetable crops, which is perfectly evident, independent of the prismatic influence of blue glass."

Mr. Buist underscores the fact that the vines were all outside. The other italics are ours. No newspaper, to our knowledge, has copied this portion of Mr. Buist's testimony. It is not referred to in the account given to the French Institute of the general's experiments in 1871. (See "Comptes Rendus," volume 73, page 1236.) But the comparative experiment with the pigs, which a correspondent thought an "insignificant" one, occupies a very significant position, and is very significantly misrepresented. Any reader can see the original at the public library. It will be remembered that three of the four pigs under violet glass gained twelve pounds more than three under the colorless glass; and that the fourth pig under colorless glass gained 26½ pounds more than his fellow under violet glass. The French account, as published, ignores the figures in regard to the fourth pig, but asserts that the result was nearly the same as with the other three.

What will the members of the French Institute say when they read the true analysis of the results of his experiment?

If any better proof is needed of the correctness of the hinted opinion of Mr. Buist, that the superiority of the general's vegetables and animals is owing to the superior care which they received, the general himself is his own and best witness that he has been successful in eclipsing the influence of the light and heat of the sun itself by the heat of his rich compost and dressing of the soil, and all without any blue glass. Here are his own words:

A wide-spread error in agriculture exists in Europe, as well as in this country, and has ever been maintained in books of science. It is "that underneath large trees vegetation droops and languishes, even when the shade is not very intense." Some years ago I had occasion to plough up the sod which covered a small orchard of apple and chestnut trees on my farm. All the trees were old and large. I caused the field to be well manured, even to the bottom of the trunks of all the trees. When the ground was well broken up, I directed my farmer to mark out drills for sugar beets, and to plant the seed close up to the trunks of all the trees. He looked at me with astonishment, and said, "Why, sir, plant so close to the trees? Nothing ever grows under the shade of trees!" I replied that I had heard such a statement before, but that I did not think it to be well founded.

The general's rich compost did the work without any blue glass. And he goes on to say—

The same kind neighbors who had visited me in the previous spring to advise me against planting my seed under the shade of the trees, were gathering their autumn crops in the adjacent fields. I went over to them and asked them if they would like to see my beet crop, and on their expressing a desire to see it, I invited them to accompany me, and we proceeded to the field. On our way I asked them where they thought the best beets would be found. "In the open sunlight, to be sure," was the answer; "nothing ever grows under the shade of trees!" I made no reply, and soon after we entered the field. As we passed along I was amused at the astonishment depicted on their countenances as they examined the beets in different parts of the field. Presently one of them, nudging another, said in a low voice, "George, did you ever see anything like that before? Why, there are no beets in the sunlight, and the big ones are under the trees." This was the fact: the plants in the sunlight were few, scattered and spindling in their growth, having a long, slender taproot and were valueless for food, while there was a luxuriant growth under the trees of large-sized and excellent quality.

This statement beats all the results of his graperies—which, in 1871, Mr. Buist says, were all rooted outside of his greenhouse—and it throws all his other contradictory facts, theories and deductions decidedly into the shade. The reader is left to contemplate this unwitting indorsement of the opinion advanced in this article, that the general's apparent success in agriculture is owing to his discovery of the wonderful power of rich compost and superior tillage to compensate for the loss of pure sunlight occasioned by the shade of large trees on his farm, or the intervention of any proportion of blue glass in his greenhouses.

In reference to any apparently successful experiment with animals under blue glass, that the general's care had much more to do with the result than the color of a portion of his glass, is also the opinion of Mr. George A. Shove, the author of the interesting article on "Life under Glass," in the Atlantic Monthly for March, 1863. He says in his little volume on the same subject (page thirty-six)—

"These experiments were not thorough enough to be conclusive on any point; and they certainly do not warrant the conclusion that the beneficial effect was owing solely to that portion of the glass which was colored blue. As far as they go, they simply coincide with the inference deducible from a commonsense view of the subject, which is, that domestic animals, whether sick or well, will thrive better when protected from the storms and cold of winter, if, at the same time, they can have the benefit of the sun's light and warmth, than they will in pens of the ordinary construction."

A brief word in regard to the use of blue glass in the treatment of diseases in the human family will close these notes on General Pleasanton's book.



THE BLUE-GLASS MANIA.

I.

NOTES ON GENERAL PLEASANTON'S BOOK.

BY THOMAS GAFFIELD.

To the Editor of the Transcript: In your paper of the 7th inst., you say that "the article on 'Blue Glass' will give about all the information regarding it at present attainable." May we be permitted, before the account is closed, and the verdict of the community made up, to put in a little evidence on the other side.

The blue-glass mania is now raging so fiercely, and so much of late has appeared in the daily papers of our own and other cities regarding General Pleasanton's theory of the efficacy of blue glass in promoting vegetable and animal life, that we have thought it a duty to show how much weight ought to be given to his statements and his book lately published on the subject. We will not premise any opinion of our own, but show from his own pages that his theory is disproved.

The general first published his ideas in a small pamphlet at Philadelphia, in blue ink on blue paper, in the year 1871. In 1876 he republished the same, with an appendix and a second part of about 200 pages, giving additional data and a most heterogeneous mixture of curious opinions on many subjects, actually beginning with the first chapter of Genesis, and essaying to controvert the opinions of Newton, Tyndall, and other distinguished scientific men, and to overthrow well-established theories of light, gravitation and the force of nature in general. We have seen sensational accounts by reporters in our daily papers of the general's theories, but, with few exceptions, no notice in any scientific journal. We think no man of intelligence or scientific attainments can take up this book and read it through, or peruse any ten pages in it, without coming to the conclusion, so well expressed in the Scientific American of July 1, 1876, as follows:

A good description of the purport and matter of this remarkable work appears in an article on page 388 of our Volume XXXIV. We have little to add to the description there published, except that the book itself is more eccentric than we could have believed, unless guided by a perusal of its contents. The incidents of the cure of rheumatism in a mule by putting panes of blue and colorless glass in the transom window of its stable; the cure of a woman suffering from a complication of undescribed disorders by a similar application; the cure of spinal disease by use of a bath of blue light, and many similar cases cited by the author, remove this book beyond the sphere of legitimate criticism, and place it among the many melancholy burlesques of science and inductive investigation, by the publication of which certain authors are now trying to obtain notoriety.

General Pleasanton, the author of the book in question, was not the famous cavalry leader during the war, as has been generally supposed, but his elder brother. The cavalry leader is General Alfred Pleasanton, while the author of the blue-light theory is General Augustus J. Pleasanton.

We do not propose to controvert the wonderful and curative effects of sunlight. Medical men in all ages have acknowledged its value, and special works have appeared in our day on this very topic. In a footnote to Forbes Winslow's volume on "Light, its Influence on Life and Health," it is stated as follows:

From the earliest periods in the history of medicine, solar heat was considered to prolong human life. "Old men," says Hippocrates, "are double their age in winter, and younger in summer." In order to obtain the full advantage of the light and heat of the sun, the ancients had terraces built on the tops of their houses called *solaria*, where they took what was termed their "solar air-bath." As the sun rose, disease, according to the ancients, declined.

The power of direct sunlight, unadulterated with any blue light, can be witnessed in the Beacon-street houses containing violet-colored glass, which was perfectly colorless when first placed in the windows.

Experiments carried on by the writer of this article for ten years under colorless glass and glass of all the spectral colors have demonstrated that while blue will transmit more actinic rays than any other colored glass—the others following in the order of violet, yellow, orange, green and red—yet the poorest and darkest colorless glass will transmit much more chemical influence than any colored glass, even the lightest blue.

What has General Pleasanton done? In 1861 he erected a new and exceptionally fine graperies and placed blue-colored glass in every eighth row of the sashes on its roof and sides, and his vines grew rapidly and produced an exceptionally large supply of fine fruit. Our first comment on the graperies experiment is that to any careful and accurate scientific man it means nothing and determines nothing in reference to the superiority of blue glass, without a comparative experiment, and a confirmation by various observers in other places of the same comparative experiments.

If General Pleasanton had erected two greenhouses side by side, of the same exceptionally favorable character with the one facing the title, and described in the first pages of his book, and made a comparative experiment at the same time, in one *with* and the other *without* the eighth row of blue glass, we think that he would have had nearly the same good effect in each, the only difference being in favor of the colorless glass.

The general did not do this. But he puts forth a theory which is thus curiously stated in the first edition of his book:

We have seen that blue light, and the violet ray which is a compound of it, and the red ray—which the most refrangible rays of the solar spectrum—excite magnetism—and electricity, by which carbonic acid gas evaporated from growing plants is decomposed and oxygen thereof liberated to be absorbed again in maturing the flowers, fruit and seed of the plant, thus stimulating the active energies of the plant into its fullest and most complete development. Now this is just what I think is done in the vegetable world by the blue light of the firmament. That blue light of the firmament, if not itself elec-

tro-magnetism, evolves those forces which compose it in our atmosphere, and applying them at the season, viz., the early spring, when the sky is bluest, stimulates, after the torpor of winter, the active energies of the vegetable kingdom, by the decomposition of its carbonic acid gas—supplying carbon for the plants and oxygen to mature it, and to complete its mission.

From the foregoing premises we deduce the following conclusions:

1. Heat is developed by opposite electricities in conjunction, and in proportion to the quantity and intensity of those electricities in contact with each other, will be the intensity of the heat.

2. The blue color of the sky, for one of its functions, deoxygenates carbonic acid gas, supplying carbon to vegetation and sustaining both vegetable and animal life with its oxygen.

It is reiterated with the following details in one of his last published letters:

Sunlight passes through plain, transparent glass with very slight obstruction, as it does through the atmosphere and ether of space; it produces no heat, for the glass remains as cold as the outside atmosphere, while the sunlight passes through it. When, however, the adjoining sunlight, moving with the same velocity as the first-mentioned, viz., 186,000 miles per second, falls upon the blue panes of glass, six of the seven primary rays of sunlight are suddenly arrested by it, only the blue ray being permitted to pass through it into the apartment. The sudden stoppage of these six rays of light with this enormous velocity produces friction; this friction evolves negative electricity, which is the electricity of sunlight passing through the cold ether of space and our cold atmosphere, both of which being negatively electrified impart their electricity by induction to the rays of the sunlight as they pass. The blue glass is oppositely electrified. When these opposite electricities, thus brought together, meet at the surface of the glass, their conjunction evolves heat and magnetism; the heat expands the molecules of the glass, and a current of electro-magnetism passes into the room, imparting vitality and strength to any animal or vegetable life within it. When the atmosphere of the room becomes thus electro-magnetized, its inhabitants cannot fail to derive the greatest benefit from being in it.

We will not now examine the theory, but only say that the remarks of a distinguished scientific man who read it led us to know that his opinion agreed with that of the writer in the Scientific American quoted above.

We intend at some time to say a word about the theory, and also to add some information about experiments made in Europe on the comparative value of colored and colorless glasses in promoting the various stages of vegetation, but we hasten now to do, what no one has yet done, but which any reader of the book can repeat for himself. We propose to make an analysis of the first and almost the only comparative experiment in the whole book upon the influence of violet light in promoting the growth of animals. The results of the experiments completely upset the whole theory of the general, for the animals under the colorless glass gained more in weight than those under the violet glass, and yet it is so stated in the book that it has not been noticed by any writer, or if noticed, has been omitted in his account.

The very next, and almost the only comparative experiment in the whole book with animals, proves the truth of my opinions. In order to show how incorrectly the matter has been placed before the public, we will give the garbled account, with a portion omitted, as reported in the New York Herald of April 22, 1876, by a writer who had held a personal interview with General Pleasanton. The reader will notice that not a word is said in the results of the experiment about the pig under the colorless glass, who weighed forty pounds more than his fellow under the violet glass. Why was it left out? The reason is obvious. We reprint the statement from the Herald *verbatim et literatim*.

THE BLENDED LIGHT IN A PIGGERY.

General Pleasanton was so struck by the marked results attained with this blended light in the case of plants that he next determined to try it upon animals; convinced that, if efficacious here, the discovery would be of untold importance to the human race. His first experiment was in the autumn of 1869. At that time he built a piggery. The sequel is in his own words: "I introduced into the roof and three sides of it violet-colored and white glass in equal proportions—half of each kind. Separating a recent litter of Chester County pigs into two parties, I placed three sows and one barrow pig in the ordinary pen, and three other sows and one other barrow pig in the pen under the violet glass. The pigs were all about two months old. The weight of the pigs was as follows, viz.: Under the violet glass—No. 1, sow, 42 lbs.; No. 2, a barrow pig, 45½ lbs.; No. 3, a sow, 38 lbs.; No. 4, a sow, 42 lbs.; their aggregate weight, 167½ lbs. The weight of the others in the common pen was as follows, viz.: No. 1, a sow, 50 lbs.; No. 2, a sow, 48 lbs.; No. 3, a barrow pig, 59 lbs.; No. 4, a sow, 46 lbs.; their aggregate weight was 203 lbs. It will be observed that each of the pigs under the violet glass was lighter in weight than the lightest of those under the sunlight alone in the common pen. The two sets of pigs were treated exactly alike, fed with the same kinds of food at equal intervals, and with equal quantities by measure at each meal, and were attended by the same man. They were put in the pens on the 31 day of November, 1869, and kept there until the 4th day of March, 1870, when they were weighed again. By some misconception of my orders the separate weight of each pig was not had. The aggregate weight of the three sows under the violet light on the 3d of November was 122 lbs.; on the 4th of March, 1870, it was 520 lbs.; increase, 398 lbs. The aggregate weight of the three sows in the old pen on the 3d of November, 1869, was 144 lbs.; and on the 4th of March, 1870, it was 530 lbs.; increase, 386, or 12 lbs. less than those under the violet glass had gained. The comparatively small increase in weight of the pigs under the violet glass over their porcine friends under the white glass, is accounted for by the feebleness of the actinic or chemical rays of the blue sky at that time; but the time of the experiment was selected for that very reason. The animals were not fed to produce fat or increase of size, but simply to ascertain, if practicable, whether by the ordinary mode of feeding on farms usual in this country the development of stock could be hastened by exposing them in pens to the combined influence of sunlight and the transmitted rays of the blue sky."

How did it happen that the careless attendant weighed the three pigs together, and not the whole four? Our analysis will show. Perhaps the weighing of each one of the sows might have revealed in one or more of them a similar result with the barrow pig in favor of colorless glass. Why has not the general repeated the experiment during the past fifteen years with a more careful attendant, or weighed the pigs himself.

Mark what a slight percentage, with the three pigs (about three per cent.), appears in favor of the violet glass, which might have occurred from other causes not associated with the glass used. But even this slight advantage is swept away in the light of the true statement of the case, as shown in the

analysis given below, compiled by us from the general's book, pages 8 and 9:

Experiments with animals	Original weight under colorless glass, Nov. 3, 1869.	Weight under violet glass after experiments to March 4, 1870.	Weight under colorless glass after experiments to March 4, 1870.	Gain under violet glass.	Gain under colorless glass.
No. 1, sow pig, 46	38	520	520	386	398
No. 2, sow pig, 48	42	520	520	386	398
No. 3, sow pig, 50—144	42—122	530	530	386	398
No. 4, bar. pig,	59	45½	210	170	151
Total weights,	203	167½	740	690	537
Aggregate gain of the four pigs in favor of colorless glass, 14½ lbs.					
Gain of the barrow pig alone in favor of colorless glass, 20½ lbs.					

The whole litter under colorless glass started with a difference in their favor of 35½ pounds and ended with a difference of 50 pounds as stated above. The barrow pig alone, under colorless glass, started with only a difference of thirteen and a half pounds in his favor, and ended by weighing forty pounds more than his fellow deprived of sunlight by the intervention of violet glass, which, according to photometric experiments, cuts off about ninety per cent. of light rays and a large proportion of heat and chemical rays. What becomes now of the general's theory in the light of this analysis, which no one before has made?

That the simple statement from the general's figures condemns the book and the whole matter, was the verdict of many intelligent invalids who listened to a lecture on the subject at a celebrated sanitary establishment in New York State last summer. They greeted with laughter the manner in which the general, in the following statement, tries to get out of the predicament in which his figures place him.

We quote again from the book:

The large increase of the weight of the barrow pig in the common pen is to be attributed to his superior size and weight on being put in the same common pen with the three sows, and which enabled him to seize upon and appropriate to himself more than his share of the common food.

It seems the general did not, like a truly accurate scientific man, attend to the weights himself, but trusted an ignorant or careless subordinate, who did not carry out his orders. No general in the regular army, claiming to have made discoveries, which in the book are spoken of as "transcending in importance even that of Morse's telegraph," and as doing "no discredit to those of Franklin himself," would have been so careless about the data of his experiments as to overthrow his theory at the first start.

Perhaps we ought to give him a chance to speak again to explain away this dilemma of the figures which cannot lie. He says—

If the barrow pig under the violet light had increased at the rate of increase of the barrow pig in the common pen, his weight on the 4th of March, 1870, would have been only 161 8/11 lbs., instead of his actual weight of 170 lbs., showing his rate of increase of weight to have been 8.36 lbs. more than that of the other barrow pig.

If the barrow pig under the sunshine in the common pen had increased at the rate of increase of the barrow pig under the violet glass, his weight on the 4th of March, 1870, should have been 224.42 lbs. instead of 210 lbs., his actual weight at that date.

As may be thought by some to have fully explained the matter. But let us ask again, Suppose the case had been reversed, and the barrow pig under the violet glass had originally weighed the most, would the general have said that it had not gained so great a percentage as the other? We think not.

Let us suppose a case. Suppose the barrow pig under violet glass had weighed twenty pounds, and gained fifty pounds, and the one under colorless glass had weighed fifteen pounds and gained forty-five, would the general say that the latter had gained 300 per cent., and the former 250, and therefore the verdict was in favor of the colorless glass by fifty per cent? We think not. He would have been justified in saying that one gained five pounds more than the other, and that the pig under violet glass had borne off the palm.

If there is really any value or significance in the general's efforts at explanation, why is it omitted, not only in the New York Herald of last year, but in the New York Mail of last month (Jan. 24), copied from the Chicago Tribune, from which we print verbatim the whole account which is given of this experiment with the pigs.

His first experiment was with a litter of pigs, which he placed in a pen which was lighted by blue and plain glass inserted in the roof in equal proportions. This litter gained wonderfully in weight, size and strength, and, at the end of a few months, were found to weigh very much more than a similar litter raised in the usual way.

The general's separation of the pigs by sexes in weighing and the different and opposite results observed, suggests that he might have started a new and interesting theory, sustained by the facts recorded, that violet glass is good for the rearing of female pigs, and colorless glass for the gentlemen of the same family.

Let us now examine another singular refutation of the general's theory and the claims of his patent. The title of his book includes "the influence of the blue ray of the sunlight and of the blue color of the sky, in developing animal and vegetable life"; and his patent specifications say that "the transmitted blue light of the solar rays in its different degrees of intensity of color, in combination with natural sunlight, imparts vigor and vitality to the vegetation and life-growing principle in nature, heretofore unknown and never before utilized and applied to practical results of incalculable value to stock growing, to agriculture and horticulture, both as it relates to time, labor and economy."

What says the intelligent reader to the following statement on a subsequent page?

A professional gardener in Massachusetts (near Boston) had been trying for several years to protect his young plants, as they were germinating, from various minute insects which fed upon them, sometimes as soon as they were formed. For this purpose he adopted nearly every expedient of which he had any knowledge, and even used the primary rays of sunlight separately. Nothing succeeded, however, in these experiments, but the blue ray, which proved itself to be a perfect protection against the attacks of these insects. He made a small triangular frame, similar in form to a soldier's tent, covered it with blue gauze, such as ladies use for their veils. Having prepared a piece of ground, he sowed his seed in it, and, covering a portion of the ground thus prepared with his little blue frame and gauze, he left the other parts exposed to the attacks of the insects. His plants outside of this frame were all eaten by the insects as soon as they germinated, while those under it escaped entirely from their

depredations. This experiment was tried many times, and always with similar results.

The explanation of this phenomenon, I think, is this: The sunlight negatively electrified in passing through the meshes of the blue gauze of the frame, which is positively electrified, excites an electro-magnetic current sufficiently strong to destroy the feeble vitality of the eggs or of the insects themselves, which are in the soil with the seed, leaving the seed to germinate more rapidly under its influence. One remarkable circumstance in these experiments was that the combination of sunlight with blue light, while it destroyed these noxious insects injurious to vegetation, at the same time stimulated the development of the growth of the plants it had preserved.

Very remarkable, indeed!

On one page, the wonderful discovery "imparts vigor and vitality to the vegetation and life-growing principle" power in nature, and, on the other, "it destroys the feeble vitality of the eggs, or of the insects themselves." The statement is certainly very remarkable, as well as that which follows:

Having introduced blue glass into the windows of the sleeping apartments of my servants in one of my country houses, it was observed that large numbers of flies, that had previously infested them, were dead soon after its introduction, on the inside sills of the windows. This effect seemed to be produced by a like cause to that on the insects injurious to vegetation as described by the gardener of Massachusetts in his experiments.

We have a faint recollection of seeing dead flies on many a window sill behind colorless glass. Have not our readers also?

And now the general, having told us how his discovery will work like a charm in killing the innocent flies, takes another turn on his blue-glass pivot, and on another page tells a story of the saving powers of the same in developing the eggs of the silk worm.

Why should the glass destroy one set of eggs and insects and promote the vitality of others?

What value can be given to the statements or theories of any man who is so color-blind as to write and publish a book in 1871, and call the colored glass he uses *violet glass*, and not to our knowledge publicly correct his error until 1876, as he does in a very lame and curious manner in the preface to his last edition, as follows:

In the previous editions of my memoir "On the Influence of the Blue Color of the Sky in Developing Animal and Vegetable Life," an erroneous impression has been created by the ambiguity of the language employed in describing the results of my experiments with light. From the tints reflected from the outside of the colored glass, upon certain localities in my terraced garden, I fancied that the glass itself was of a violet tint, and so attributed the remarkable results within the graperies to the violet rays. Upon my attention having been called to this apparent discrepancy, I investigated the matter, and found that the glass was of a dark mazarine blue—owing its color to a preparation of cobalt, which had been fused with the materials composing the glass during its manufacture—and that the reflection of the violet ray on the outside was due to the irregular surface of the glass itself upon which the light of the firmament, as well as of the sunlight, had fallen, and had been thus reflected. Whatever effect may be produced by the use of violet-colored glass is to be attributed to the proportion of the blue ray which enters into the composition of the violet rays of light, and not to those composite rays themselves.

This edition, begun in the summer of the year 1873, has been prepared at intervals snatched from the occupations of a busy life, which will account for any incoherences that may appear in the subjects as they are treated herein.

All readers will readily acknowledge his "incoherences," but not the validity of the excuse for any man, who pretends to have made a discovery "so surprising that men were lost in amazement," and "welcomed it as a long step in advance in the knowledge of the great truths in physics which mankind are so anxious to acquire." Certainly they will not pardon him for describing the color of a glass by the color reflected from its surface, especially those persons who have been puzzled by his indiscriminate use of the words blue and violet, and have finally placed the latter in their greenhouses in pursuance of his directions.

All blue sheet window glass in commerce is made by the use of cobalt, and all violet glass is made of an entirely different composition, by the use of oxide of manganese, and cuts off about double as much chemical influence as the other.

We know from the numerous inquiries made of us personally about blue and violet glass, that the general's mistake has given rise to a great deal of confusion and trouble.

In the present edition of his book the general speaks of *violet colored* glass in his greenhouse. We have called it *blue* glass in our notice, because it is colored blue in the plate facing the title page. We have called the glass over the pigs *violet* glass, just as it is printed in his work.

We give below the last words of the general in sending forth his curious volume, which will probably go down the ages as one of the "curiosities of literature," and rank side by side in authority and value with Lord Timothy Dexter's famous production, "A Pickle for the Learned Ones":

The reflections I have made on this subject have induced my investigation into the physics of nature. I have not been satisfied with what I have been taught in the schools. Their explanations are not consistent with the known or presumed facts. I have ventured, therefore, to form my own conclusions, irrespective of dogmas that have been thrust upon mankind for centuries. I do not profess to teach any one; but as a human atom among the masses of mankind, for whom all knowledge should be disseminated, I venture to impart to the public the conclusions to which I have arrived on these subjects, and that public may attach to them whatever value they please.

In order that the public, who now seem to be a little excited and credulous on the matter, may not be deprived of having a word on the other side, we have followed the advice of some scientific friends, who thought that the publication of our humble essay might do some good in allaying the glass fever, which is now at its height.

As light is one of the most ethereal, and yet most powerful, of the forces and elements of nature, one good result may follow from the present discussion on blue glass, if it call the attention of the people to the real value and proper use of unadulterated sunlight. We believe in the blessing and beneficial influence of sunlight in every way; in the sunlight of God's love, illuminating the world above, below, and all around us; in the sunshine of a human heart and of a happy, genial countenance, sending light, heat and joy upon all within its influence; and we don't believe in cutting off any of the sunshine of heaven or earth by the intervention of the blues in our dispositions or in our windows.

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