Scientific American.

NEW YORK, OCTOBER 15, 1853.

Colors of Calico---Chemical Questions.

A correspondent propounds the following questions. First, " what is the reason that blue figures on the muslin prints of ladies' dresses, will, when exposed to the sun, lose their color, which will be restored again when the goods are hung up in the shade? Second, is there anything known which can be put into the water in washing calico, or other dresses, which will make the goods retain their colors?—Such knowledge would be a great blessing to every mother and housewife."

These are very plain and apparently very simple questions, and as many think that those who are acquainted with the sciences, should be able to solve any question in science; it may be expected that we should be able to answer the above, to explain the phenomenon described in the first question, and tell how to fulfill the desires expressed in the second. No man can give a direct answer to the first question, and we cannot give an affirmative answer to the second. The more knowledge we acquire, the more fully are we impressed with a sense of man's ignorance of *causes* in the physical world. If any person were to ask of us, " what is color?" we would have to answer, " it is something, nothing." We are cheered with the prismatic glories of the lovely bow which arches the heavens above us; we are delighted with the hues of the rose, the violet, the dahlia, the tulip, and the modest daisy; we drink in pleasure by feasting our eyes on the foliage of the forest, the dancing butterfly with his variagated beauties, the humming bird on azure wing, and the purple and golden clouds which mantle the western sky. And yet these delights and pleasures are derived from that which has no material existence in itself. Color is a quality with which the Great Author of Nature has endowed matter, to give his creatures pleasure, and to enable them to distinguish between different objects; it may be called the chemical quality, as form is the mechanical quality, to distinguish objects.

The *blue* on the goods referred to by our correspondent, is one with which we are not acquainted; we have seen indigo, copper, logwood, and prussian blues exposed to the sun and never saw the colors destroyed by such exposure, and again restored by transferring them to the shade. There are various kinds of blues, both printed and dyed; that is, they are produced by different substances, such as indigo, copper, prussiate of potash, and logwood. The sun affects every color on goods; it bleaches turmeric and annatto yellows in a very short time, but indigo blue is what is called a fast color. Those colors which are called "fugitive," cannot resist the action of soap and hot water, and sun exposure; those named "permanent" can stand both of these tests. Colors on goods are formed by substances which adhere with great mechanical tenacity to the goods on which they are printed, and reflect the different rays and sub-rays of light. There are only three primative colors, namely, red, blue, and yellow; these mingled in different proportions, form all the tints and hues which adorn Flora's mantle. We do not know *why* it is that the sun light affects colors in the manner it does, we only know by experience that it does so. It would have been as puzzling for us to answer a more radical question than the first one propounded; namely, " why is it that there is such a color as blue," or why is it that two yellow substances, when combined together, will produce a salt which will reflect the blue ray of light—a blue color—or why two other yellow substances when combined together, will produce a black solution. A solution of the oxyde of iron and the prussiate of potash will produce a blue; a solution of the oxyde of iron and sumac will produce a black solution. The action of the rays of light—actinism—as it is now named, in relation to color, is something respecting which but little is known, excepting such experience as that of our dyers, calico printing chemists, and photographers.

There is no substance which can be put into water during the washing of calicoes or dresses to prevent the color from fading, but we will give some directions for the washing of delicate colors, in muslin or other textile fabrics, which we have no doubt will be a benefit to many. Never wash goods having delicate colors in warm suds; nor rub bar soap on them at any time.—Dissolve some soap so as to have strong suds, and set it aside until it is quite cold; wash the goods in this, and when the dirt is all removed wring out and rinse well in clean cold water; be sure and not have the suds too weak, or the soap will be decomposed and stick in the goods like hard tallow. After wringing, finish out the dress or goods in a vessel containing some alum dissolved in clean water, or some alum water stirred among the starch. Wring out well and dry in the shade. Strong bran water—bran boiled in water and left to cool—is very excellent for washing delicate muslin dresses. Some use ox gall for washing fine woolen goods, but cold strong soap suds are better. Be sure and rinse the soaped goods or dress clean in soft water, and squeeze well, so as to take all the soap out. Soap has a tendency to *blue* red colors, and to fade the blue in green colors; alum restores the color; in other words, so combines with the substances in the calico, to reflect the green, which is a mixture of the blue and yellow rays and also the red ray, which is a primitive color.

Every single color can be produced by many different substances, some of which make fast and some fugitive colors, and it requires a great knowledge of practical chemistry, to tell what color is fast, and what is not, on a piece of goods. The application of chemistry to the arts of coloring textile fabrics, encircles the largest area of practical chemistry, and yet the teachers of chemistry in our colleges, are in general very ill-informed about it.

American and Foreign Reaping Machines.

Although the British reaping machine of the Rev. P. Bell, as noticed by us, in its trial this year before the Royal Agricultural Society in England, in competition with our countrymens', McCormicks and Hussey's, bore off the prize, we are of opinion that in many respects it is not equal to the American Reaping Machines. There is also no resemblance between them, and those who have said the Americans borrowed, because Bell's was some years older, have been entirely mistaken, Bell's reaper cuts with a clipping shear motion, the American machines cut with a sawing action. Bell's machine is driven before the horses (which push it) the American machine is drawn by the horses. The Scotch reaper uses a reel and carries the cut grain away by an endless apron, but McCormick's machine lays down the cut grain in gavels at one side. In the late trial before the Royal Agricultural Society, the judges were pleased with Bell's reaper because the horses did not tread down the grain, and really because it cut better than any machine on the ground; but we are inclined to believe that this was greatly owing to the superior construction of a single machine, for in a trial before the Highland Agricultural Society, in Scotland, on the 6th of last month, although Bell's again took the first prize, the second was awarded to McCormick's, who had only a single machine, while there were three of Bell's, two of which were surpassed by the American one. There can be no doubt but Mr. Bell deserves great credit for his invention; we would not pluck a single chaplet from his brow as a most deserving inventor, and we do not when we say "the American reaping machine is superior to his in many respects;" we only do justice to the latter. For example: it is very difficult to set and keep Bell's knives in order; his machine is also heavier and more complicated, and certainly all our reapers are heavy and clumsy enough. The American machine therefore is less expensive at first, and is easier kept in repair, and these are very important considerations for all agriculturists. The judges of the Highland Agricultural Society speak of McCormick's machine in the most flattering terms, and do not seem to be tinctured with the least prejudice as to its American birth. With respect to all the reaping machines we have yet seen; it is our opinion that there is great room for improvement on the very best of them.

By English and Scoth papers recently received by us, we perceive that Mr. McCormick has arrived in Scotland, and challenged Bell's reaper to another trial. The challenge is not in the form of a bet, but couched in the respectful language of a lover of fair play, and one who has confidence in his own invention. We have also received a very able paper on reapers, which was read before the British Association of Science; an abstract of this will be presented in a future number of the Scientific American; it is full of interest to our readers.

Anthracite Coal for Locomotives.

With very few exceptions, wood is the only fuel used for locomotive engines. It is becoming so scarce and dear that some substitute must be sought. Anthracite coal suggests itself first, because it is the cheapest and most free from smoke, waste, &c. An impression, however, has prevailed among those connected with railroads, that this fuel destroys the steam fire box so quickly, that it cannot be used with economy. Other objections are understood to exist, growing out of the intensity of the heat, such as starting the bolts of the boiler, &c. But all of these objections have been removed by the Millholland engine, of which we have made mention on more than one occasion during the past two years. There are now in daily use on the Reading Railway, Pa., (running between the Schuylkill Coal Mines, and Philadelphia) twenty-eight first class locomotives on the Millholland plan; these use anthracite coal exclusively.—Two of them carry passengers at the rate of thirty miles per hour, and each of the rest draws 980 tons of coal—a load—at the rate of twelve miles per hour. The average consumption of coal per engine for the trip, down and up (190 miles) is only four and a half tons, in place of nine cords of wood. The monthly consumption of coal on this road is 2,000 tons. No engineer will run a wood burning locomotive if he can get a coal burning one. The coal burning engines cause far less work to engineers and firemen than wood burning ones; they also make better time. We are not making statements relating to mere experiments, but stating facts respecting an adopted system on one of our railroads, and presenting proofs of its constant practice for three years. Every new engine built for the Reading Railroad for the last three years, burns anthracite coal, as will every new engine constructed for it. Six new locomotives on Millholland's plan, are now being built at the Company's workshops at Reading, their cost being the same as other locomotives. By a very simple contrivance the fire box is protected from injury, and by the arrangement of a gas chamber behind the bridge, most of the carbonic oxyde which escapes, is caught by jets of hot air and consumed. Within two years every wood-burning engine on that road will be altered to burn coal. These facts, derived from reliable authority, will tend to convince those interested, that anthracite coal has proved to the satisfaction of this great railroad company, to be the best fuel for locomotive engines in every respect; and by far the cheapest for them. As coal bears the lowest freight charge, this company has to work with a closer economy than any other, it therefore seems reasonable that other railroads should place some confidence in the judgment of its managers, in the settlement of this important question, "which is the best fuel for locomotives?"

Association of Steamboat Engineers.

The engineers of the South and South West formed a grand Union Association at Louisville, in the month of last March, by delegates from St. Louis, New Orleans, Louisville, Cincinnati, Nashville, Pittsburgh, Mobile, and New Albany.

In August the delegates again met and revised the grand constitution, and adopted a constitution and by-laws for the regulation and government of the subordinate associations in the several ports within the jurisdiction of the Grand Union. On the 29th of August a local Association was formed at Cincinnati, and the "Atlas," speaking of it, says:—" Since the passage of the United States law, for the better regulation and preservation of lives and property in steamboat navigation, a marked improvement has been observable in the character and fitness of the Pilots, Captains, and Engineers on our Western waters, and a disposition evinced by the worthiest of each profession to elevate the standard of their calling." At a recent meeting of the Cincinnati Association, Mr. Hall, Grand Pres't., was present and made an excellent speech. He stated that the rules were that the local Associations are to sign a recommendation for any one to receive a certificate from Government Inspectors as Engineer. After application has been made and referred to a standing committee, who, on examination and finding him worthy, may direct the President and Secretary to give the applicant a certificate of recommendation under the proper seal and signature of the Association. Associations may be formed whenever seven Engineers make application to the General Union. Many unworthy Engineers had obtained licenses, and were availing themselves of their licenses to reduce the wages of Engineers to such a standard that the Association could not recognize, and was too low for capable Engineers to live at. This evil, and the lamentable ignorance of the higher principles of the profession, it was the object of the Association to remedy, and to promote the safety of passengers and property on boats.

Captain Haldeman, one of the Government Inspectors, was called upon to give his views in reference to the Association, and congratulated the Engineers present, who were quite numerous, at the favorable change noticeable in their body, and at the indications of a higher appreciation of themselves as men and representatives of an honorable calling so intimately connected with the safety of the travelling community. He heartily sympathized in the objects they had in view, and wished them success. After reviewing his own experience as an engineer and captain for thirty-years, and bearing testimony to the practical and successful working of the United States law, as he stated that in twenty-five years there had been sixty explosions and a loss of more than three thousand lives, but that in this the Seventh District, since the enforcement of the late law, not one life had been lost by explosion.

This accords well with the views expressed in a letter from an engineer on another page. It affords us no small amount of gratification, that this New Steamboat Law, of which we were the sincere advocates, has done so much good already. To our engineers, let us say, never let down your standard but always keep elevating it higher and higher. Never cease to be vigilant; do not grow cool on the subject, and never suffer yourselves to be disunited,—" Union is strength."

Competitors for the $450 Prizes.

We hope none of the competitors for the liberal prizes offered for the largest lists of subscribers, will lose the object sought for, from want of proper vigilance. We notice that some who sent the largest lists at first, are being excelled by those who commenced by sending ten and fifteen subscribers,—thus showing that it is not safe to rest upon your oars, relying upon your fine start as surety for success. Some who started by sending only five subscribers, have now fine lists appended to their names on the prize book. We have no doubt more than one will feel chagrined when the names of the successful competitors are announced next January, that they did not exert themselves a little harder, and thus carry a prize. It stands you all in hand to be up and doing, Messrs. Competitors, or some of you will be likely to have feelings of remorse at your laxity, when the day of reckoning comes,—that day will not be extended beyond the time announced in the prospectus published on the last page of each number of this paper.

India Rubber for Steam Packing.

Lewis Martin, engineer and machinist, No. 57 Cherry street, Philadelphia, informs us by letter, for the benefit of others, that he has made a number of experiments with vulcanized india rubber for steam packing, in all of which he found it to fail signally. He tried it in a six inch piston, under metallic rings, and in many other ways, without success. It is too sensitive to heat. He found it, in many cases, to make a very good and tight joint, but not as the packing of a piston in a steam cylinder.

An American is erecting a large machine shop at Honolulu, in the Sandwich Islands.