THE WEST SIDE ELEVATED RAILWAY.

The construction of what is known as the West Side Elevated Railway, extending from the Battery to Thirtieth street, New York, has been a difficult piece of engineering. As our readers have hitherto been informed, the track is raised to the level of the second story of the buildings along the line, and is supported upon iron pillars of peculiar construction, the pedestals of which are embedded in the earth below the action of frost.

The pillars are not arranged in pairs, but are placed in single file on the central line of the road. They are branched at the top, and support continuous girders upon which the rails are laid.

The cars are propelled by endless wire ropes, actuated by a stationary steam engine and drum. The rope carries travelers placed at proper intervals, and rolling upon small rails. The travelers are composed of four miniature car wheels, and carry projecting studs, which, engaging with a lever arm on the car make the connection. The connection is broken by a lever movement when it is desired to stop the car.

The jar caused by the impact of the stud on the traveler is taken up by wire ropes wound upon spring drums, much after the manner of the main spring movement of watch-work.

Some experimental trips have been made over the road during the past week, at one of which we assisted. The trip from Cortlandt street to Twenty-ninth street—about three miles—was accomplished with ease in fifteen minutes, to the general satisfaction of the party present.

The Company are entitled to great praise for the perseverance with which they have met and surmounted difficulties, and a large proportion of the cost of the road, as it now stands, has accrued from costly and elaborate experiments. It is estimated that the expense of constructing the present section has been about one million of dollars.

It is proposed, we understand, to continue the road to Yonkers, about fourteen miles up the Hudson from the Battery. The present section of the road will, however, when opened to traffic, be sufficient to determine the financial success of the enterprise, and we should think it probable the future extension of the road to the proposed distance would be postponed until the working qualities of the present section can be fully demonstrated.

Our impression is, that the rapidity with which the transit from the lower to the upper part of the city can be made will render the road very popular, and the current expenses of working must certainly be much less than that of the horse car lines for the same amount of traffic.

As to the safety of the road to passengers there can be no doubt; in fact, there seems even less danger than in the horse cars, as the elevated railway cars are exempt from all danger of collision.

The engineer under whose direction the work has been done, is Mr. Charles E. Harvey, of this city.

THE PARIS OBSERVATORY.

The Director of the Paris Observatory cannot complain of want of work. The following is the programme of his duties as given by Louis Figuier:

"Unremitting direction of all the labors relative to pure astronomy involving the use of the meridian circle and equatorial; calculation of all the astronomical observations and publication of the results; organization of the geodetic survey; recording and publishing all observations made in the observatory relating to the meteorology and physics of the globe; reception, calculation, and classification of the meteorological observations coming from different points of Europe; editing and printing daily charts and bulletins giving a *résumé* of all observations, to be forwarded the same day to correspondents and to all the ports of France; direction of the observatory at Marseilles and constant relations with the observatory at Greenwich; and, finally, active participation in the labors of the bureau of longitude. Such is the programme, truly frightful, and such the tremendous responsibility devolving upon the direction of the Imperial Observatory at Paris."

The former head of the observatory was the famous Leverrier, but he contrived to render himself so obnoxious to all of the subordinates that they petitioned to have him removed, and were finally successful. He was summarily dismissed, and M. Delauny has been appointed in his place.

For a long time efforts have been made to get rid of Leverrier, but he was so popular with the Emperor and Empress that the ministers were afraid to move in the matter, and he was a man of such violent temper that everybody kept out of his way. They tried to keep him in check by appointing a board of advisers, without whose consent and recommendation nothing could be done. There was not a member of the board with whom Leverrier was on speaking terms. He refused for six months to have anything to do with this body; but finding that this would not do, finally, on the seventh month, attended a meeting. It is said that this meeting ended by three of the advisers kicking M. Leverrier out of the oom.

All of the meetings he attended ended in a row, and the scientific men began to be very tired of such a state of things, and all of the assistants employed in the observatory sent in their resignations, accompanied by the worst accusations and complaints that could easily be imagined. There was nothing left after such an exposure but a summary dismissal.

A gentleman, of New York city, who had occasion to go to the observatory in Paris to carry a present to M. Leverrier of the superb photographs of the moon, taken by Mr. Rutherfurd, relates his experience on the occasion. He was informed by the gatekeeper that M. Leverrier was within, and was directed to the proper stairway. He rang the bell, and instead of asking for Leverrier, sent for one of the assistants to whom he had cards of introduction. The assistant came, and when it was proposed to speak to Leverrier, so many objections were raised, and the assistant appeared so frightened that the visit was abandoned on condition that the photographs were to be handed in due time to Leverrier. Other copies properly directed were also left for Foucault and Faye.

The impression left on the mind of the American gentleman was that the assistants, all of whom he saw, were as afraid to pass Leverrier's study door as good Christian was to go near the castle of Giant Despair.

The visitor was entreated not to speak so loud and the place had the air of a prison rather than of a scientific establishment. But the worst picture of the affair remains to be told. Leverrier bagged the photographs of the moon, and tried to make better ones himself; and it was not until nearly a year afterward, when another print was sent directly to Foucault, that the pictures were presented at the French Institute and became known to its members. They attracted immense attention, and Mr. Rutherfurd received due honor for his valuable contribution to science. M. Leverrier, who was present at the meeting, also greatly admired the photographs, but said nothing about having pocketed three copies of them a year previous. No wonder that all France is delighted at his overthrow.

SHUT YOUR MOUTH.

This piece of advice is sometimes given in an abrupt and insulting manner, and occasions an outburst of temper that produces the opposite effect from the one intended; but when given kindly and on scientific grounds, it ought to be attended to and followed by all persons. Professor Tyndall has just told us of the dust particles, the spores, life germs, fevers, and miasms, that float in the air, and has said in tones of warning "Shut your mouth!"

The Board of Health, of this city, through one of its accomplished officers, Dr. R. C. Stiles, has published a most important report upon the dangers that lurk in closed rooms and crowded halls, and have also said to us "Shut your mouth!"

Finally, Mr. Catlin, author of "Notes of Travels among the North American Indians," has given us a book published by Wiley & Son, called "The Breath of Life," in which the same advice is freely given, sustained by ample facts and startling illustrations, for the benefit of all mankind—"Shut your mouth."

We cannot do better than to refer to these various publications, for the purpose of calling the attention of our readers to the importance of securing proper ventilation in their dwellings, and of acquiring the habit of breathing through the nostrils rather than through the mouth.

There is no doubt that "man's own breath is his greatest enemy," and every precaution should be taken to prevent its inspiration after it has once passed from the lungs. The report of Dr. Stiles contains the result of much original research, and displays a zeal in the service of good health, and an amount of exhaustive labor that is worthy of the highest commendation, and his results and statistics ought to be published in permanent form for the consultation and warning of all classes of society. The amount of carbonic acid produced by respiration has been variously estimated, but Dr. Stiles puts it at the rate of 1,032 cubic inches, or three fifths of a cubic foot per hour. From this the ratio of vitiation of the air in a given space can be easily computed" Every hundred persons would vitiate in three hours 4,200 cubic feet of air to the extent of 4·3 per cent of carbonic acid, or 18,000 cubic feet, to the injurious proportion of one per cent of carbonic acid."

The products of respiration are more dangerous than pure carbonic acid. It has been found that while two per cent of carbonic acid evolved in a chemical way could be endured, one per cent produced from the lungs rendered the air irrespirable. The volatile organic products of respiration concentrate the poison. The report of Dr. Stiles discusses the amount of carbonic acid produced by the combustion of illuminating gas, and shows by actual experiment that a single five-foot burner can produce 2·45 cubic feet of carbonic acid in one hour.

The danger from leakage in heating apparatus, the subtile nature of carbonic oxide gas, and from coal fires in open braziers, is clearly presented. "The poison attacks the red particles of the blood, and its prostrating effect is experienced long after the occurrence of exposure."

The methods employed in the determination of the amount of carbonic acid in the air are generally of too bulky or refined a nature to admit of easy transportation, and Dr. Stiles invented a neat portable apparatus that is worthy of notice. It consists of a wide-mouthed glass flask holding 150 cubic centimeters and graduated so that each division of its descending portion holds one ten-thousandth part of the capacity of the apparatus. A delicate glass bulb, holding a cubic centimeter of a solution of caustic potash, is introduced into the graduated flask after the air to be analyzed has been transferred to it, the mouth of the flask is immersed in water—the potash bulb is broken by a smart blow against the side of the flask—the water rises in the apparatus in proportion to the vacuum produced by the absorption of the carbonic acid by the potash, and the amount in 10,000 volumes can at once be read off. Fifteen minutes are all that are necessary to perform the analysis, and the accuracy of the results was found to be sufficient for all practical purposes by comparative tests according to other methods. With this simple contrivance, Dr. Stiles collected a large number of samples of air from churches, theaters, school houses, private dwellings, and tenement houses, which he has analyzed and tabulated along with similar results obtained by Pettenkofer, Roscoe, and others.

The following are the results obtained in schools of Brooklyn by the method of analysis described above:

	Carbonic acid in 1,000	Times the normal am't,
Public School No. 1	1·00	2·0
Public School No. 1, another room	1·05	3·0
Public School No. 15, Tenth Ward	2·00	4·0
Public School No. 15, another room	4·00	8·0
Clarke's Commercial College, 16 Court street	2·04	5·0
Clarke's Commercial College, another portion of room	0·05	1·0
Clarke's Commercial College, class room	0·75	1·5
College Grammar School, 18 Court street	2·00	4·0
College Grammar School, another portion of room	0·08	1·6
College Grammar School, another portion of room	1·33	2·7
College Grammar School, class room	0·66	1·3
Polytechnic Institute, third story	1·11	2·2
Polytechnic Institute class room	0·05	1·0
Polytechnic Institute, second story	0·66	1·3
Public School No. 13, Degraw street	3·01	6·0
Public School No. 13, another room	2·05	5·0
Public School No. 13, another room	1·66	3·3
Public School No. 27	2·07	5·4
Public School No. 27, another room	2·02	4·4
Public School No. 27, another room	1·02	2·4
Public School No. 29	1·06	3·2
Public School No. 29, another room	2·02	4·4
Public School No. 29, another room	1·04	2·8

In estimating the proportion of carbonic acid in the air of schoolrooms to that naturally existing in the atmosphere of the city, the latter is supposed to contain a constant average of 0·5 parts in 1,000.

The following analyses of the air of theaters have the credit which belongs to the distinguished experimenters against whose names they are recorded:

	Carb. Acid. in 10,000 Parts.	Times, the Normal Proportion.
LeBlanc, Opera Comique, parterre	15·04	3·76
Le Blanc, Opera Comique, gallery	28·12	7·03
Loppens, theater in Ghent, parterre	46·03	9·03
Loppens, theater in Ghent, gallery	53·06	10·07
Roscoe, theater in London, parterre	24·08	7·01
Roscoe, theater in London, gallery	30·04	8·07
Angus Smith, theater, parterre	40·00	8·00

Dr. Letheby is authority for the following averages, as given in the *Chemical News* for January, 1868:

Theaters in London	14·09	3·07
Theatres in Manchester	14·08	3·07
Theatres in Paris	33·00	8·02

The theaters examined in the course of these investigations were, in Brooklyn, as follows:

	Carb. Acid in 1,000 Parts.	Times, Normal Quantity.
Academy of Music, balcony	1·06	3·02
Academy of Music, gallery	1·00	2·00
Academy of Music, gallery	2·05	5·00
Park theater, gallery	1·04	2·08
Olympic theater, gallery	3·06	7·02
Hooley's Minstrels, gallery	3·02	6·04

In New York the following proportions were obtained:

Booth's theater, parterre	1·00	2·00
Booth's theater, parterre	0·75	1·05
French opera, 14th st., parterre	2·00	4·00
Wood's theater, parterre	0·06	1·02
Tammany theater, parterre	3·01	6·02
Bowery theater, parterre	7·06	15·02
Bowery theater, parterre	6·01	12·02
Bowery theater, parterre	2·05	5·00

The particles floating in the air and falling in the form of fine dust were made the subject of patient investigations. Specimens of dust from nearly all the places of public amusement in New York were examined by the microscope, as detailed on page 176, current volume, in a paragraph entitled "Opera House Dirt."

To avoid breathing all of this dust, Professor Tyndall recommends the use of a mouth piece of tufts of cotton, but such an arrangement, besides being unsightly, would soon become very wet and uncomfortable. Mr. Catlin's idea of keeping the mouth shut and breathing through the nostrils, is easy of execution, and more in accordance with scientific principles. Mr. Catlin states that the Indian mother presses the lips of her infant together as it falls asleep in the open air, and thus teaches the habit of breathing through the nostrils; while the careful, tender mothers of civilized life cover the faces of their infants in over-heated rooms with their little mouths open, gasping for breath; and he traces the increased mortality among infants very largely to this cause.

He says: "The air which enters the lungs is as different from that which enters the nostrils as distilled water is different from the water in an ordinary cistern or a frog pond. The arresting and purifying process of the nose, upon the atmosphere with its poisonous ingredients, passing through it, though less perceptible, is not less distinct, nor less important, than that of the mouth, which stops cherry-stones and fish bones from entering the stomach. It is a known fact that man can inhale through his nose, for a certain time, mephitic air, in the bottom of a well, without harm; but if he opens his mouth to answer a question, or calls for help, in that position, his lungs are closed, and he expires." It is a well-known fact that fishes will perish in a few moments in their own element if their mouths are kept open in any way—they must breathe through their gills or die.

Geologists tell us that at one period in the world's history, the amount of carbonic acid on the surface of the earth was vastly greater than it is at the present time; and in studying the structure of the animals of those early ages, it is found that they are provided with gills, or some special apparatus that enabled them to live in an atmosphere of carbonic acid. The accumulation of evidence goes to show that we cannot be too careful, not only in the quality of the air we breathe but also in the manner in which we draw it into our lungs, The nostrils are provided with a natural sieve and filter, and it is possible, on the principle of dialysis and the laws of the passage of gases through membranes, that the nitrogen and carbonic acid are excluded while the oxygen is permitted freely to pass. The warning of such authorities as Professor Tyndall and Dr. Stiles ought not to be disregarded, and we are disposed to concur in the sentiments expressed by Mr. Catlin, where he says: "If I were to endeavor to bequeath to posterity the most important motto which human language can convey, it should be in these words:

Shut your Mouth."

COMPARISON OF TURBINES WITH OTHER WATER WHEELS.

We find the following translation from *Weisbach's Ingenieur-und-Maschinen Mechanik*, in *Van Nostrand's Engineering Magazine*, for April, which sets forth the relative advantages of turbines and other wheels in a very strong light:

A great advantage of turbines compared with vertical water wheels is that they work with any fall from 1 to 500 feet (German), while the latter cannot convert into work the power of a fall of more than 50 feet. It is true that the ratio of effective work of turbines varies for different falls; for example, for small wheels it is less with high fall than with medium or low fall, because in this case the resistances are proportionally greater than with larger wheels under medium fall. On the other hand, overshot wheels obtain a modulus from high fall of from 20 to 40 feet, which cannot be reached by turbines. Equal amounts of work are to be expected from both kinds only from a medium fall of from 10 to 20 feet; but if the fall is low, then turbines in every case give a greater modulus than undershot wheels under the same conditions. Poncelet's wheel can be compared with turbines for falls of from 3 to 6 feet only.

Turbines have another great advantage over vertical water wheels, in working with equal effect under different heads, and especially in not being hindered by back water, so that they work in water as freely as in air, and in some cases with greater effect. Vertical wheels always lose power if the head varies, although in no great degree, unless the fall is low or the wheel is in the water.

On the other hand, variations in the overfall upon vertical water wheels are attended with less loss of work than is the case with horizontal wheels. In an economic point of view this fact is in favor of the vertical wheel. If it is necessary to increase the effect of a vertical wheel already in motion, especially if it is one upon which the water acts mainly by pressure, it is done by supplying more water; and to diminish the effect the supply is partly cut off; in neither case is the actual modulus greater or less. The relation is altogether different in the case of a reaction turbine. This works with most effect when the sluices are wide open and when the charge of water is the greatest; now if less work, and therefore less water, is required and the sluices are partially lowered, it happens that the work is diminished by decrease of supply, but partly by the loss of the living force of the water or by diminution of the head, so that the effective force is lessened. This destruction of living force may be compared with the braking or dragging of a wagon, which is applied in going down hill, when there is an excess of living force. Consequently, while the lowering of a gate only cuts off superfluous water from a vertical wheel, which can be used for other purposes, in the case of the reaction turbine the shutting off a part of the overplus subtracts from the living force of the other part remaining in the wheel.

In pressure turbines which do not run in water, so that the channels are not entirely filled, the modulus of work is more favorable, since the water issues through the channels without causing an eddy.

There is not a great difference between horizontal and vertical water wheels in respect to the change of the velocity of revolution; in both the normal velocity may be increased or decreased about one fourth without material loss of effect. But there is certainly a very great difference in the magnitudes of these velocities. All vertical wheels, with the exception of the undershot (Poncelet's especially), have a maximum velocity of from 4 to 10 feet, while turbines generally have far greater velocities, varying greatly according to the heads. For this reason, and because they have smaller radii, turbines generally make many more revolutions than vertical water wheels. It follows that the choice between these depends upon the number of revolutions; in other words, upon the kind of motion, quick or slow, which is required in the motor. But it must be borne in mind that rapid motion in a machine is rather injurious than advantageous, on account of the great increase of hurtful resistances, such as friction and shocks; for this reason it is often better to increase the number of revolutions by means of some machine of transmission, and to employ the vertical instead of the horizontal water wheel.

If the load of a machine is variable, as in the case of tilt-hammers or rolling-mills, the vertical wheel is to be preferred; for, though it runs slower, yet on account of its greater mass it acts more as a regulator than the turbine, whose variable motion must often be equalized by a fly wheel. But for a constant load preference must be given to the turbine in this respect; because vertical water wheels, especially if of wood, often have a so-called "heavy quarter," *i.e.*, equal parts of the circumference are not of equal weight.

In an economic point of view, turbines rank at least equal with vertical wheels; and for high and medium falls and a great overflow they are preferable because they are cheaper In respect to durability, also, the turbine must have the preference.

On the other hand, it must be remembered that turbines require a clear overflow, and that their effect can be hindered in a very great degree by sand, mud, moss, weeds, leaves, pieces of ice, twigs of trees, etc., which do no damage to vertical wheels. Finally, it is to be considered that turbines, particularly those with guide-curves, are more difficult to construct, and that departures from the mathematical rules of construction are followed by worse results than in the case of vertical water-wheels. This is the reason that so many turbines failed in the early trials, and that they are not yet as extensively employed as their advantages warrant.

WHERE AND HOW CORKS ARE CUT.

We condense from the *Druggists' Circular* the present account of the way in which corks are manufactured.

In Europe the greater portion of corks are cut in the towns and hamlets in the immediate vicinity of the cork forests, and in the seaports of Seville, Barcelona, Oporto, Lisbon, Bordeaux, Lyons, Marseilles, and Gibraltar. In Germany the small homeopathic vial cork is largely cut, while it is safe to say that in most of the leading cities of the civilized world, cork-cutting is conducted as a branch of industry.

Throughout the whole cork-growing region the wood is cut by hand into the various sizes for use. For the common varieties, children are largely employed, while men of experience are engaged in cutting the finer qualities. After trimming the wood, slicing, and cutting into convenient-sized squares, the corks are cut, and then assorted in qualities and sizes. When assorted, they are then packed in bales varying from one hundred to three hundred and fifty gross each, and are then ready for shipment. In Germany they are frequently put up in small bails of twenty gross each. When cut in this manner the sizes must be judged by the eye, and there is consequently a lack of uniformity of size as well as imperfection in roundness of the corks. This will readily be seen by examining samples of imported hand-made corks.

Previous to 1855 all corks were cut by hand, and the exportation of corks from southern Europe was immense. Since the application of steam machinery to cutting corks in this country, the importation of fore gn h..nd-made corks has rapidly declined.

About thirty years ago an attempt was made by an enterprising New Englander to cut corks by machinery, and an establishment for that purpose was constructed in Boston; but they failed to carry out the project successfully. As near as I could learn, the failure of the machine was in delivering the corks with smooth ends and with sufficient rapidity. In 1855 cork-cutting machines were constructed that proved successful, and since that time the trade has been revolutionized. It was soon proved that corks could be cut more uniform with less waste of material, and with vastly greater rapidity. An average day's work cutting by hand, and having the wood already cut to the proper-sized squares, would rarely exceed ten or twelve gross, though in a few cases the most expert workmen would cut nearly twenty gross; while an average day's work by machine would be one hundred gross, and a single instance was told me of a lad that had cut one hundred and eighty gross in ten hours. The number cut by machine per day will vary with the kind of machine, and the dexterity of the workmen, as also the quality of the wood. There have been quite a number of cork cutting machines introduced from time to time, but I believe they are all of two general styles. The kind most largely used (I believe) is the punching and boring machine, originally invented by J. D. & W. R. Crocker, of Norwich, Conn., and since improved by them and others. This original machine cut only straight corks. Another machine was afterwards added which cut the taper cork. There have been some modifications of the machine and adaptations by other manufacturers, but it is believed that the credit for introducing steam machinery for cutting corks is due to the Messrs. Crocker. There are others who are entitled to praise for judicious modifications, but the writer omits names lest he should do injustice to some whose names are not known to him.

The principles of the two styles of machines used may be of interest, and I shall endeavor to explain them as clearly as possible. In the punching or boring machine there is a sharp steel cylindrical knife, revolving horizontally, being propelled forward to the block of cork-wood to be cut, and backward again, as rapidly as the skill of the operator desires it. The knife cuts through the block of cork-wood, and the cork cut by the operation passes through the cylinder and is carried off out of the way of the operator. This machine cuts only a straight cork, and it is ready for sale without any further operation, except sorting out those in which the wood is imperfect. There is another boring machine which bores at one operation a taper cork, but requires a separate handling to remove the cork from the block. The tapering machine alluded to previously has either a square of cork-wood or the round straight cork inserted in an adjustable lathe (which is a part of the machine) in which it revolves rapidly; it is then presented to the blade of a flat circular knife, from 24 to 30 inches diameter, which lies flat and revolves about five or six hundred times a minute. Two or more revolutions of the cork are made, which removes a thin shaving and gives the requisite tapering shape to the cork. This tapering machine is adapted to cut either a straight or taper cork, as it needs only a very slight alteration of the adjustable lathe to cut either style of cork. There are some minor details, but a five minutes' examination of the machines would convey more information than pages of written description. It is an exceedingly interesting mechanical operation, and those who have not seen it should embrace an early opportunity to do so.

In cutting the wood into corks, it is first steamed for a short time, then by a circular knife cut into strips suitable for either the length or breadth of the cork. If the boring machine is used, the smooth side of the strips is then introduced, and the corks are at once bored out as closely together as can be done. The corks need only sorting, to reject imperfect ones, when they are ready for sale. These corks are straight. If it be a taper cork, the straight ones are now introduced into the adjustable lathe of the tapering machine before alluded to, and a somewhat conical shaving is taken off, when the corks are sorted and put up for sale. It is asserted by those using this machine, that it is the most advantageous and economical. When the boring machine is dispensed with, the strips of cork-wood are cut into suitable squares by hand, and at once cut into either straight or taper corks by simply adjusting the lathe which holds the cork.

The corks, when offered for sale, are usually designated by numbers from one to twenty, and in addition are called straight or taper. The largest number of any one sold are those suitable for ale and soda-water bottles, while the vial corks of various sizes, except the two smallest, are in nearly equal demand. Of the other styles of corks, there are flat or specie corks of various sizes, enlarging by one-eighth of an inch.

In the manufacture of corks fully one-third of the wood is wasted. This arises from inequalities and imperfections in the wood, and the natural wastage in cutting circles out of any plane surface. This wastage has found some uses, among which the principal are in filling cushions, mattresses, the spaces between the roof and top ceiling of houses, as, also the spaces in the sides of frame houses and buildings for storing of ice, while in the cork factories the coarser wastage is used for fuel.

Foreign hand-cut corks are now in a great measure being superseded by American machine-cut corks, as they are much more uniform in size and quality, and can compete successfully in price.

NEW BOOKS AND PUBLICATIONS.

The Painter, Gilder, and Varnishers' Companion. Containing Rules and Regulations in everything relating to the Arts of Painting, Gilding, Varnishing, Glass Staining, Graining, Marbling, Sign Writing, Gilding on Glass, and Coach Painting and Varnishing, Tests for the Adulteration in Oils, Colors. etc., and a Statement of the Diseases to which Painters are peculiarly liable, with the Best and Simplest Remedies. Thirteenth Edition. Revised, with an Appendix, containing Colors and Coloring—Theoretical and Practical, comprising Descriptions of a great Variety of additional Pigments, their Qualities and Uses, to which are added Dryers, and Modes and Operations of Painting, etc. Together with Chevreul's Principles of Harmony and Contrast of Colors. Philadelphia: Henry Carey Baird, Industrial Publisher, No. 406 Walnut street. Price, by mail, free of postage, $1·50.

How a work of this kind, containing such a copious mass of information, can be made and sold for the price it is afforded is one of the mysteries of book-making we are unable to solve. It is, without exception, the best and cheapest work of the kind of which we have any knowledge. The chapter on the "Principles of Harmony and Contrast of Colors" is well worth the price of the book. Were it studied by painters in general, we should have less of those hideous combinations of color, in house and ornamental painting, of which we have so often complained in these columns.

A Manual of Electro-Metallurgy. Including the Application of the Art to Manufacturing Processes. By James Napier, F.C.S. Fourth American from the Fourth London Edition. Revised and Enlarged. Illustrated by numerous Engravings. Philadelphia: Henry Carey Baird, Industrial Publisher, 406 Walnut street. Price, by mail, free of postage, $2·00.

This work treats of electro-metallurgy in both a scientific and practi manner. It is, as its title imports, a complete manual upon the subject. It commences with a history of the art, brought up to date. This is followed by a description of the various galvanic batteries, with their peculiaritie and their applicability to electro-metallurgic operation. The miscellaneous applications of the process of coating with copper are next treated, after which follow in their order discussions of the various methods of bronzing, deposition of metals upon one another, electro-plating, electro-gilding, results of experiments on the deposition of other metals as coatings, theoretical observations, etc. The value of the book is enhanced by a copious index. So far as we can infer from an examination made with special reference to detect omissions of recent processes and discoveries, the work is brought entirely down to the present state of the art.

Modern Workshop Practice. As Applied to Marine, Land, and Locomotive Engines, Floating Docks, Dredging Machinery, Bridges, Shipbuilding, Cranes, etc., etc. By John G. Winton, Engineer. Strahan & Co., Publishers, 56 Ludgate Hill, London.

This is one of Weale's Rudimentary Series, intended to treat in a popular style, and in a practical manner, the departments of mechanical engineering named in its title. These subjects are viewed almost entirely from an English standpoint, yet the book contains much valuable information to the American engineer. A valuable feature of the work is found in its tables, the use of which will save much time and labor in calculations of all kinds pertaining to proportions of boilers and engines, bridges, etc.

Electro-Metallurgy Pratically Treated. By Alexander Watt, F.R.S.A., Lecturer on Electro-Metallurgy, etc., formerly one of the Editors of "The Chemist." New Edition. Strahan & Co., Publishers, 56 Ludgate Hill, London.

This work, besides treating in a plain and specific manner with the difficulties and the various modes of procedure connected with electro-metallurgy, gives much additional matter not contained in former editions, upon the production of a dead white surface on silver articles, whitening brass dials, coloring gold articles, reduction of solutions, etc, etc. This work will be found a great aid, not only to amateurs, but to the professional electro-metallurgist.