

tires is about half that of other engines, made with solid iron rimmed driving wheels, it will be seen that, unless very much greater durability than this can be shown for the rubber, the advantages of such tires are very nearly, if not more than, balanced by their disadvantages.

The fact that one set of tires wore out so soon does not prove a rule. There may have been causes at work which do not affect such tires generally, and it would be, we think, quite premature to form favorable or unfavorable judgment, of relative economy from such data as have been yet furnished.

The difference in the current expenses of running the two most prominent types of engines, with hard and soft tires, now in use, does not affect the question of rubber tires, unless it can be shown that these tires necessitate, *per se*, such a form of engine as requires a greater consumption of fuel, and greater cost of attendance, to perform a given amount of work.

#### CENTRAL SHAFT OF THE HOOSAC TUNNEL.

As many of our readers have evinced much interest and ingenuity on the question of the propriety of placing reliance upon the accuracy of dropping a perpendicular from the top to the bottom of a shaft 1,030 feet in depth, by means of an ordinary plummet, we take the earliest opportunity of settling the matter beyond dispute, by reporting the results lately obtained, through a series of experiments by the engineers in charge, for the ultimate purpose of laying down the correct line for the tunnel.

The perpendicular line has, of course, been dropped many times, and the main result taken. The plummet used is made of steel, properly balanced and polished, in shape something like a pineapple, and of about the same size, weighing fifteen pounds. It was suspended, with the large end downwards, by a thin copper wire, one fortieth of an inch in diameter, immersed in water, and, after careful steadying with the hand, occupied about an hour in assuming its final position or motion, which, contrary to the expectation and theories of many, resulted in a circular motion around a fixed point, the diameter of the circle being a mean of one quarter of an inch. The suspending wire in these operations was not quite the entire length of the shaft, being only 900 feet; and before the plummet had settled, the wire had stretched nearly twenty feet.

The suspension of the plummet in water was not considered necessary for any other reason than that water was continually trickling down the wire, and dropping on the plummet. The experiments so far have not been of the perfect character it is determined to attain, when the final alignment is made, as, until the headings east and west of the shaft have advanced to a considerable distance, any slight error would be of no account.

A neat and ingenious instrument has been constructed for determining the variation of the plummet, and will be used when great accuracy is desired; the plummet will also be suspended in oil.

The bearing of the tunnel is about S. 81° E.; but, independently of its near approach to the line of revolution described by the earth, it is not considered necessary to take into account any motion it may derive from this cause. In fact, the opinion is, that the motion of the earth will not practically have any effect.

On the whole, after the still imperfect experiments which have been made, enough is established to show there is no difficulty to be encountered, other than the accurate and delicate manipulation of the plummet and its attachments.

The shaft headings are progressing favorably. The rock is not so hard or varied as that met with at the west end workings. Already nearly 300 feet have been taken out, and, with the proved energy of the contractors, this great work will doubtless be prosecuted steadily and surely to completion, within the contract time expiring March 1, 1874.

#### A MUSEUM OF ART AND NATURAL HISTORY.

Our recent articles on "Scientific Destitution in New York" and "The Scientific Value of the Central Park," have called forth numerous letters from correspondents, and have been extensively noticed by the press. We now learn that the Legislature of the State has taken the matter in hand, and there is some prospect, with an honest administration of the appropriations, of something being done to relieve our city from the opprobrium that rests upon it. A bill is pending, before the Senate, authorizing the Park Commissioners to erect, equip, and furnish, on Manhattan Square, or any other public square or park, suitable fire-proof buildings, at a cost not exceeding \$500,000 for each corporation, for the purpose of establishing a museum of art, by the Metropolitan Museum of Art, and of a museum of natural history, by the American Museum of Natural History, two societies recently incorporated by the Legislature. This is a million dollars to begin with, and an ample site, without cost, to the aforesaid corporations.

Manhattan Square extends from Seventy-seventh to Eighty-first streets, and from Eighth to Ninth avenues, and contains about eighteen acres. Until it was set apart by the late Board of Commissioners, for the purposes of a Zoological Garden, it was proposed, by a number of enlightened citizens of New York, to devote it to the uses of four of our leading corporations, giving to each one a corner, and an equal share in the allotment of space. The societies were, "The Academy of Design," for art, "the Historical Society," for public records and libraries, "the Lyceum of Natural History," for science, and "the American Institute," for technology. These have been incorporated for many years, and are known to include the leading artists, men of letters,

science, and the arts, of the city, on their lists of members. The committee went so far as to have plans of the building drawn by competent architects; but, like many other well-meant schemes, want of money compelled the originators of the plan to abandon any further attempts. In the meantime, the Legislature chartered the American Botanical and Zoological Society, and gave the Commissioners of the Park authority to set apart a portion of it, not exceeding sixty acres, for the use of the Society, for the establishment of a zoological and botanical garden. This society was duly organized under the act, and Mr. Hamilton Fish was made its president, and considerable sums of money were subscribed. But, according to the sixth annual report of the Board of Commissioners, "the society never manifested its desire for an allotment of ground." It appears to have died, and made no sign. Some of our citizens, fearing that the Central Park would go the way of every other public work in the city, made strenuous effort to revive the Zoological Society, for the purpose of obtaining a perpetual lease of a suitable site, on which to establish a zoological garden, similar to those in London, Paris, Amsterdam, and Cologne. Their object was to remove this part of the Park beyond the reach of political intrigue. Subsequent events have shown that the fears of these gentlemen were well founded. The Legislature of the State, on the 25th of March, 1862, gave ample powers to the New York Historical Society to establish a Museum of Antiquity and Science, and a Gallery of Art, in the Central Park. They have submitted designs for a building, but, for some reason, no decisive steps have been taken towards its construction.

The Lyceum of Natural History was also negotiating with the Commissioners, for the use of the upper rooms of the arsenal for its collections, and there is no doubt that an arrangement to this effect would have been made, if a fire had not destroyed the entire collections of the Lyceum. The Lyceum made great effort to raise money to purchase a new collection, but without avail; and, although this is the oldest scientific society in New York, and has inrolled in its list of members, nearly every professional scientist of the city, it is probably the poorest, in income and resources, of any academy of sciences in the world. We do not know that the Academy of Design has ever applied for a home in the Central Park; and we cannot speak for the American Institute, nor for the Geographical Society, in this particular. As we stated in our former article, the old Board of Commissioners appears to have become weary of the unsuccessful attempts on the part of numerous societies to divide up and apportion the Central Park, and they applied to the Legislature for authority to conduct matters in their own way. An act was duly passed, authorizing the Board "to erect, establish, conduct, and maintain, on the Central Park, a Meteorological and Astronomical Observatory, a Museum of Natural History, and a Gallery of Art, and the buildings therefor, and to provide the necessary instruments, furniture, and equipments for the same."

Here would seem to be ample power for the establishment of museums of science and art, but nothing is said about the manner of raising the money. One would suppose, however, that, by means of the "Central Park Improvement Fund," abundant means could have been raised. The bill now before the Legislature puts matters in a new light. If it does not conflict with previous enactments, nor destroy vested rights, it has the appearance of being a thoroughly practical way of solving the question of art and science for the city. The Metropolitan Museum of Art and the American Museum of Natural History are in the hands of the most respectable citizens of New York. It would not be possible to find a body of men of more unimpeachable integrity and greater worth, than the gentlemen who have founded these two societies. It is impossible that they should lend their names to anything that will not bear the closest scrutiny; hence the proposition, now before the Legislature, to put up buildings for them, at a cost of a million dollars, must attract unusual attention. If the State would appropriate the money to these corporations, giving them the control of its expenditure, we should have considerably more confidence in its honest administration than we are grieved to say, we can feel under the present circumstances; and if we knew what other institutions are to have the remaining portions of Manhattan Square, it would be a great relief to our minds.

"We fear the Greeks bringing gifts," but are willing to accept the gifts, if the officers of the two organizations are certain that it is all right.

The need of a Museum of Natural History, and of a Gallery of Art, in New York, is so pressing that there is some danger of our accepting the appropriations without a proper regard to consequences. The Court House is not yet finished, and the foundations of the Post-office are scarcely laid.

#### REPORT OF THE JUDGES OF GROUP 1, DEPARTMENT V. OF THE EXHIBITION OF THE AMERICAN INSTITUTE FOR 1870. THE ALLEN ENGINE.

The labors of the judges in this department were much lighter in the last exhibition than in the preceding one, and we are happy to say, were, in our opinion, so far as the award of premiums is concerned, much more fairly performed. The award of two first premiums to two competing engines could scarcely be repeated this time, as there was in reality no competition. The Allen engine was the only important one entered, and of course received the first premium. The engine is, however, one that evidently could have competed favorably with those previously exhibited.

We are in receipt of advanced sheets of the judges' report pertaining to the critical examination of this engine, being a record and account of experiments performed under the

supervision of Washington Lee, C. E. The experiments were very comprehensive, and comprised approved tests, of each important detail, usually made by expert engineers.

The report is too voluminous for reprint or even for condensation in our columns. In looking it through, we are satisfied that the experiments were accurately made, and that the engine exhibited great working efficiency and economy.

As the engine has been recently illustrated and described in our columns, we deem it unnecessary to dwell upon the details of its construction. The water test of the previous exhibition was employed, the water being this time measured, with indisputable accuracy, in a tank, instead of by a meter as before.

The voluminous comparison of this engine with those previously exhibited, seems unnecessary, and we think not in good taste in such a report, however much it may possess of scientific interest. Moreover, the circumstances under which the trials were respectively performed, render the comparison difficult, if not unfair.

Mr. Lee concludes his report with a thorough endorsement of the theory of Mr. Porter upon the action of the reciprocating parts of engines, as set forth by the last named gentleman in recent articles in this journal. He says:

"Under the resistance of 125·375 horse powers at the brake, the motion of the engine was remarkably uniform; not the least diminution of speed in passing the centers could be detected, illustrating very satisfactorily the value, in this respect, of the speed employed, and of the action of the reciprocating parts of the engine in equalizing the rotative pressure on the crank through the stroke. The governor was, during the trials and through the exhibition, nearly motionless, while the load remained constant, and instantaneous in its action on changes of resistance, maintaining a steadiness of running which left nothing to be desired."

The judges—Prof. F. A. P. Barnard, Thos. J. Sloan, and Robert Weir—speak in their report as follows:

"The performance of this engine has exceeded that of the two fine engines which were on trial here last year. The results seem to be without precedent in such engines. The engine ran from 11 to 12 hours repeatedly without showing a sign of a warm bearing, displaying thorough perfection in all its parts. In all respects the engine is first-class, and from the fact of its presenting weight with speed, as a requisite for perfection in steam engines, it has opened a new era in this necessary branch—its economy having been clearly demonstrated in the careful trials, which ought to be published in full."

#### LYCEUM OF NATURAL HISTORY.

There was an unusually large attendance of members at the meeting of the Lyceum of Natural History, on Monday evening, the 6th inst., to listen to an address by Professor B. Waterhouse Hawkins, on the progress of the work of the restoration of the forms of extinct animals in the Central Park. Mr. Hawkins gave an account of the difficulties he encountered at the outset, in finding any skeletons of animals in New York, with which to make comparisons, and he was finally compelled to go to Boston and Philadelphia for this purpose. After much study and many delays, the casts of the *Hadrosaurus* were completed, and numerous smaller skeletons prepared. At this stage of the proceedings an entire change in the administration of the Park took place, and the newly appointed Commissioners decided to suspend the work upon the Palaeozoic Museum, and they dismissed Mr. Hawkins from their service.

The announcement that an end had thus been summarily put to one of the most important educational projects ever started in this country, was received by the Lyceum with profound surprise. For a few minutes after the close of Mr. Hawkins' report, no one felt disposed to make any comment, but as the truth of the great damage became apparent, there was considerable disposition manifested to have the Society give expression to its sense of the value of Mr. Hawkins' services in the cause of education, and their regret that so important a work should be suspended at this critical period. Remarks were made by Dr. Newbery, Professor Joy, Mr. Andrew H. Green, Professor Seely, Dr. Walz, Mr. E. G. Squier, and others, and the following resolutions were unanimously adopted:

*Resolved*, That the Lyceum of Natural History, in the city of New York, has learned with deep regret of the temporary suspension of the work of restoration of the forms of extinct animals, as hitherto prosecuted in the Central Park, under the able superintendence of Professor Waterhouse Hawkins.

*Resolved*, That the Society considers the proposed palaeozoic museum not only a valuable acquisition to the scientific treasures and resources of the city, but also as a most important adjunct and complement to our great system of public education.

#### WARMING AND VENTILATING RAILROAD CARS.

There has been enough of denunciation against the present general method of warming and ventilating railway cars. It produces no effect on the corporations who could, if they would, adopt appliances that would not burn people to death in cases of accident, nor regularly and persistently poison them with bad air.

There is no lack of ways and means; the problem is simple and easily solved; nay—a not very extensive search through the Patent Office records will show that it has been solved already; perhaps not in the most practical and perfect manner, but still solved so well, as, were it not for corporation cupidity, would greatly add to the comfort and safety of passengers.

The real problem is how to compel corporations to recognize the fact that the public has rights they are bound to respect. It is the disregard of these rights that fills our cars

with smoke, dust, and exhalations, and puts box stoves full of hot coals in the corners, ready to cook the human stew whenever a frisky car shall take a notion to turn a somersault. The invention needed is a conscience for corporations—an invention, by the way, scarcely less difficult than the one advertised for in our last issue, namely, a plan for preventing the sale of intoxicating liquors and tobacco in New Jersey.

The *Railroad Gazette*, imitating the English ideal of prolixity in discussion, for which *Engineering* has recently patted it on the back approvingly, treats us, in its issue of February 11th, to a page article, to be continued, under the title of "Warming and Ventilation of Railroad Cars." In this article the writer takes the ground that people in general are ignorant of the effects of pure air, and not being able to "see the foulness," they "therefore do not believe it exists." It is quite possible they may not be able to see the foulness, but if in the majority of railroad cars run in this country, they are not able to feel it in gritty, grimy accumulations on skin and linen, and smell it in suffocating stench which serve, with sneeze-provoking dust, to stifle anything like comfort, their skin must be thicker, their linen more neglected, and their noses less sensitive than those of the majority of fellow travellers it has been our fortune to be cooped up with for a day's railroad journey.

The *Railroad Gazette* makes this wholesale charge of ignorance and insensibility the excuse for an essay on the physiology of respiration, mostly extracted from Huxley's "Elementary Lessons in Physiology," and therefore excellent in its way, though having a somewhat remote bearing upon the subject as announced in the title of the article. We trust that before this journal concludes its series of articles thus commenced, it will tell how to breathe into the breasts of the corporations which choke us in their human packing boxes, something resembling the soul which they are universally acknowledged to be destitute of. When this is done, carbonic acid, ammoniacal smells, organic exhalations, smoke, and dust, will be invited to shun the interiors of railway cars, and comparative comfort will descend upon the perigrinating public.

THE MINERAL RESOURCES OF MISSOURI.

The incalculable wealth, which lies hid in the bosom of Mother Earth, in our vast possessions of the West, is undoubtedly centered in the State of Missouri; and the development of this fund of riches must add to the national prosperity, not only by its immeasurable intrinsic value, but by its affording occupation to armies of laborers, the latter being the highest and most important consideration.

In 1852-3, a geological survey of the State was wisely decided upon, and a liberal provision for its execution made. Two valuable reports, by Professor Swallow, have been printed, in the year 1855, but the notes of his subsequent investigations have not been made public.

In the session of 1869-70, further action, in this important public work, was taken by the State legislature, and arrangements made for a still more accurate and detailed examination, under the direction of Professor A. D. Hager, of Vermont.

The distribution of metals all over the State will be seen in the following figures, taken from the *St. Louis Journal of Commerce*, which show the number of counties in which the various ores are found: Iron in 46 counties, lead in 43, coal in 36, copper in 24, marble in 11, zinc in 27, fire clay, in 16 barytes in 10, nickel in 6, granite in 4, tin in 4, plumbago in 2, gypsum in 2, alum in 1, antimony in 4.

There is probably no country in the world so endowed as this. Of iron alone, according to the State geologist's report for 1855, there is ore of the best quality, sufficient to furnish 200,000,000 tons of iron; and this quantity lies in a small space, in the vicinity of Pilot Knob and Iron Mountain, and within 100 miles of St. Louis.

The quality of the iron is highly spoken of by the manufacturers, and the capacity of the smelting appliances has reached to over 150,000 tons per annum. The coal is well suited for reduction of ores, either by hot or cold blast treatment. The Scotia Iron Co. commenced operations in January, 1870; and, although the materials for building blast furnaces had to be carried 80 miles into a desert, the first furnace was blown into blast in August, 1870. This furnace will run about 24 tons per day. The company procures ore from a hill, near the furnace, in which there is an apparently inexhaustible supply of red oxide and brown specular. This ore yields 60 per cent of pure metal. The erection of mills for making wrought iron is contemplated, and the high quality and prodigious quantity of the raw material will justify and reward any outlay of capital in this direction.

The shipment of ore to other States goes on constantly, the last year's account showing that 246,555 tons were dispersed over Indiana, Ohio, and others. The furnaces at Kingsland, South St. Louis, Lewis Iron Co.'s Works, Carondelet, and Maramec are all well situated as to coal and limestone, the Maramec Works having a most valuable water-power. These latter works also ship about 40,000 tons red hematite ore yearly.

SCIENTIFIC INTELLIGENCE.

According to *Petermann's Mittheilungen*, the new German empire, including Alsatia and Lorraine, will embrace 9,901 square miles, with 40,148,209 inhabitants. Russia alone will exceed it in extent and population, for Russia in Europe has 100,285 square miles with a population of 69,379,500. France, after the loss of Alsatia and Lorraine, will have 9,588 square miles of territory, with 36,428,548 inhabitants. Austria will number 35,943,592 inhabitants spread over a larger extent of

country, namely, 10,880 square miles. Great Britain and Ireland has 5,732 square miles, with 30,838,210 inhabitants; and Italy, including Rome, has 5,376 square miles, with 26,470,000 inhabitants. In the order of population, the Governments will stand: Russia, Germany, France, Austria, and England; but in military power, the first position must henceforth be accorded to Germany.

AMERICAN INSTITUTE OF MINING ENGINEERS.

A circular has been issued by several mining engineers, proposing a meeting at Wilkes-Barre, some time in April or May next, of all persons interested in the general subjects of mining and metallurgy, for the purpose of establishing an association, to be called "The American Institute of Mining Engineers." The Institute will hold meetings periodically "in the great mining and metallurgical centers, when works of interest, such as mines, machine shops, furnaces, and other metallurgical works, can be inspected, and the members exchange their views, and consult, for mutual advantage, upon the difficulties encountered by each." There will be the usual publication of "Transactions" and "Proceedings."

The idea of forming an association of persons thus mutually interested in each other's occupations, is an excellent one; but it has been suggested by a number of scientific gentlemen that the American Association for the Advancement of Science offers every facility for the accomplishment of the objects set forth in the circular, while it affords the very great advantage of an assemblage of men learned in all departments of knowledge, whose acquaintance mining engineers would do well to make, and from whom they could learn much, while at the same time imparting of their own knowledge.

As a section of the American Association, the mining engineers would have more influence before the country, and it would perhaps be well for them to stop and consider before establishing a separate institute.

CONSUMPTION OF SUGAR, COFFEE, AND TEA.

E. Behm gives in his geographical year book, for 1870, the following estimate of the consumption of sugar, coffee, and tea, *per capita*, in various countries:

COUNTRIES.	Sugar, lbs.	Coffee, lbs.	Tea, lbs.
Great Britain.....	35.96	0.90	3.190
United States.....	24.03	5.63	.....
Holland.....	14.86	7.03	0.800
France.....	14.30	2.33	0.018
Norway.....	11.04	6.92	0.060
Sweden.....	9.80	0.80	0.060
Switzerland.....	9.60	5.28	.....
Germany.....	9.42	4.03	0.035
Denmark.....	9.00	3.40	0.400
Belgium.....	7.18	8.59	0.018
Portugal.....	6.33	0.69	0.040
Italy.....	5.20	0.90	0.020
Austria.....	4.93	1.30	0.012
Spain.....	4.23	0.01	0.040
Russia.....	2.40	0.007	0.160

The entire consumption of sugar in Europe, has averaged, during the last few years, three thousand four hundred and ten million pounds (3,410,000 pounds), and for the whole world it is set down at nearly twice that amount. It is estimated that three fourths of the sugar is made from cane, and one fourth from the beet.

The consumption of coffee has doubled in most countries during the last twenty years.

Unpleasant Discovery in the Patent Office--Levying Black Mail.

"The Patent Office has been, during the past week, in a high state of excitement, occasioned by the discovery of the operations of E. W. W. Griffin, clerk in charge of the draftsmen's division, who, it appears, has been levying black mail on the lady employes of the office, for nearly two years. During the administration of Colonel Fisher, late Commissioner of Patents, a large number of ladies were employed, for the purpose of recopying drawings, when ordered by the inventors, of patents already on file.

"These ladies were placed under charge of Griffin, with power to retain them in office so long as their services were satisfactory. It has been proved that Griffin hired the ladies at regular salaries of \$1,000 per annum, the most of whom he blackmailed to the amount of \$400 per year each. It is estimated that he has made \$1,000 per month for the past two years.

"The matter was brought to the notice of Commissioner Duncan, and an investigation ordered, which resulted in the dismissal of Griffin.

"It is thought that there are other cases of this kind, and the Commissioner expresses his determination to ferret them all out, and make a clean sweep of all parties in his department engaged in swindling operations, against the government or against individuals.

"The Patent Office has for a long time been considered a rich field for operations of this kind, and investigations have often been suggested, but passed unheeded by the proper authorities.

"It is openly stated that an investigation into the relations existing between certain examiners of patents and certain patent agents, would disclose a more fearful state of blackmailing than exists in all the other government departments combined."

[We find the above sensational paragraph among the recent Washington items of the *Evening Mail*. We are in a position to say that "the high state of excitement" alluded to has existed only in the brain of the newspaper correspondent. The facts, in brief, are these: In July, 1869, a lady, and wife of one of the clerks in the

draftsmen's room, made application to Commissioner Fisher for a position in the copying division of the same department; and, upon the urgent solicitation and recommendation of Mr. E. W. W. Griffin, chief of the division, she was appointed, and has held the position from that time until now, receiving as salary \$1,000 per annum, which, with the full knowledge of her husband, she has divided with Griffin, in consideration of his services in procuring for her the appointment. About a month ago, one of the lady's friends got hold of the matter, and reported it to the Court, which resulted in an investigation and the subsequent dismissal of Griffin. This is the only case of the kind that we have heard of, and we have no reason to believe that there is any other, or that corruption exists in the Examining Corps, as alleged. —Eds.

A METHOD of testing the purity of samples of water, by watching the rapidity of its action on soap and similar compounds, has been introduced by the French savants, MM. Boutron and Boudet. The experiment tests, at the same time, the purity of the soap. Dissolved in water in which lime is held in solution, the soap is precipitated in hard white flakes. If the quantity of soap put in the lime water be noted, it will be found that the smaller the quantity producing precipitation, the purer the soap. The *Journal de Pharmacie et de Chemie* (of Paris) reports some experiments, on this subject, by M. F. Schulze.

LOUISIANA STATE FAIR.—The fifth State fair of the Mechanics, and Agricultural Fair Association of Louisiana will commence in the city of New Orleans, on Saturday, April 8, 1871, and continue nine days. Over \$20,000 in premiums are offered. Rules, regulations, and schedule of premiums may be obtained of the Secretary and Treasurer, Luther Homes, Esq., New Orleans, La.

KNITTED GOODS.—John Kent advertises, in this paper, valuable machinery for the manufacture of knitted goods, to which we invite the attention of all who are interested in this branch of industry. Mr. Kent has devoted many years to the perfection of these machines.

KAOLIN, a white clay, used largely in the adulteration of flour, starch, and candles, is found near Augusta, Ga., and is sent to the Northern States in large quantities.

We are indebted to James Vick, practical florist, Rochester, N. Y., for a choice variety of flower seeds.

NEW BOOKS AND PUBLICATIONS.

A COMPLETE GUIDE FOR COACH PAINTERS. Translated from the French of M. Arlot, Coach Painter, for Eleven Years Foreman of Painting to M. Eherler, Coach Maker, Paris. By A. A. Fesquet, Chemist and Engineer. To which is added an Appendix, containing Information respecting the Materials and the Practice of Coach and Car Painting and Varnishing, in the United States and Great Britain. Philadelphia: Henry Carey Baird, Industrial Publisher, 406 Walnut street. London: Sampson Low, Son & Marston, Crown Buildings, 188 Fleet street. 1871. Price, by mail, to any part of the United States, \$1.25.

This is another of the large number of practical works and industrial treatises issued from the press of Mr. Baird. It is intended as a practical manual for the use of coach painters, and we must say, upon examination of its contents, that we think it admirably adapted to meet the wants of that class of artisans for which it has been prepared. There is perhaps no department of decorative art in which there is greater room for the display of skill and taste than in coach painting. This work, however, does not deal with the subject of art, to any great extent. Its aim is to give information in regard to colors, varnishes, etc., and their management in carriage painting in the plainest manner, and in this way it thoroughly fulfils the intention of the author.

ON THE GENERATION OF SPECIES. By St. George Mivart, F.R.S. London: Macmillan & Co. 1871.

The Darwinian theory of the Origin of Species, has, perhaps, aroused more attention, excited more dispute, and won more converts in a shorter time among scientific and unscientific men, than any other of equal importance promulgated in the 19th century. It seems to be the rule either to swallow the thing whole, or reject it as unworthy of belief, and as conflicting with orthodoxy. The author of the work before us has, however, taken a middle ground, from which we opine it will be difficult to dislodge him, though it is within full range of the batteries of both the contending parties. While he admits the truth of Darwin's views regarding the operation of natural selection as a cause of the origin of species, he denies that it is the sole cause, yet maintains that if it could be demonstrated to be the sole cause, it would in no manner conflict with orthodox belief in the Scriptures as the revelation of God to mankind. The perfect candor of the author is one of the marked features of the discussion, and his style is a model of pure terse English writing, seldom, if ever, excelled by any scientific writer. The work is an octavo, most beautifully printed on tinted paper, and illustrated by many fine wood engravings.

THE ARCHITECT'S AND BUILDER'S POCKET COMPANION AND PRICE BOOK, Consisting of a Short but Comprehensive Epitome of Decimals, Duodecimals, Geometry and Mensuration; with Tables of U. S. Measures, Sizes, Weights, Strengths, etc., of Iron, Wood, Stone, and Various Other Materials; Quantities of Materials in Given Sizes and Dimensions of Wood, Brick, and Stone; and a Full and Complete Bill of Prices for Carpenter's Work; also Rules for Computing and Valuing Brick and Brick Work, Stone Work, Painting, Plastering, etc. By Frank W. Vogdes Architect. Philadelphia: Henry Carey Baird, Publisher, 406 Walnut street. Price by mail, postpaid, \$2.

This is a small work, but printed in small type, and containing a large amount of useful matter, thoroughly indexed for reference; bound in morocco; and provided with a clasp, so as to be conveniently carried in the pocket.

GAS SUPERINTENDENT'S POCKET COMPANION for the year 1871. By Harris & Brother, Gas Meter Manufacturers, Nos. 1115 and 1117 Cherry street, Philadelphia. Philadelphia: Henry Carey Baird, Industrial Publisher, 406 Walnut street.

We find in this pocket-book much of interest to gas consumers, as well as to gas makers. The subject of meters is fully discussed. The work is bound in pocket-book style, in flexible morocco binding. Price, by mail, postpaid, \$2.