terior of the car. This novel vehicle has a double set of wheels, one set with flanges, intended for use when the machine runs on the street railway track, the other set being employed when running on common roads. Most railway cars and locomotives are useless when at the end of the track; but not so with this device. It can then steam off, independent of the track, through streets or roads, as far as may be desired. The axles of the flanged wheels are supplied with cranks and rods, and with a worm wheel and lever, under the control of the driver, who may, at any moment, raise up the flanged wheels, so that the vehicle will rest on the plain wheels, for running on common roads. The axles of the plain wheels have a screw steering device connected with them, so that the vehicle may be guided in any direction. The car is provided with seats on the top, and, as shown, has a capacity for some forty or fifty seats. But the end platforms, it appears to us, are too long. Taken as a whole, however, this device presents some good ideas, and is creditable to the inventor.

Correspondence.

Pisciculture in its Sanitary and Commercial Aspects.

To the Editor of the Scientific American:

Your reply, in your 18th of October number, to S. W. G.'s inquiry for information as to the best materials to be employed and mode of employing them in the construction of a dam for a fish pond, was read by me with very great interest, in connection with the general subject of pisciculture and utilization, especially in this form of enterprise, of small sheets of water in proximity to large centers of population.

I believe, most firmly, that a larger and cheaper supply of fish than that at present existing would be readily appreciated by every class, and prove most conducive to the more general promotion of health. Meat is good for food, but a vast quantity of meat, seemingly healthy to the utmost microscopic and scientific investigation, is really more or less the reverse, owing to the kind of food used in forcing the process of fattening, and also the habit, in order to accelerate it, of keeping the animal in a state of compulsory inactivity. We are indebted for the comparative immunity we happily enjoy from the natural, morbid consequences of consuming this, as well as many other kinds of really deleterious articles of food, to the benevolence of the *vis medicatrix naturæ*, or *vis vitæ*, to use the language of medicine. But when a man turns the age of 45 or 50 years and his vital power begins to weaken in its resistance to what is injurious, then does he begin (and continue, by an inevitable law of physical life, in accelerated ratio as his years increase) to suffer in one way or many ways, in one organ or many organs, as may be determined by congenital idiosyncrasy or acquired habit. The evil becomes deeper, more irradicable, and therefore more dangerous, by the slowness with which it grows. The remoteness of the effect from the cause throws suspicion into fatal sleep until awakened by the magnitude and seriousness of disease; the physician is called on and in vain invoked to exorcise by a drug the seven spirits which, insinuating themselves into the very citadel of life, refuse to leave until accompanied by that life which they expressly came to take away. But I must not allow myself to be carried away into inordinate length by my subject. I shall not, therefore, anticipate the answer that possibly might be urged—for assumption grows in extravagance with the extent of ignorance—derived from the easily accessible quantity of salt fish. Neither shall I touch on the admitted, because admitted, healthfulness of change of food. My object is simply to avail myself of the most potent of all arguments why our attention ought to be more generally directed to the utilization of our lakes for the propagation of fish—the commercial argument. I have been very much astonished by the reports in American papers (I am a Canadian, residing in Canada) of the wonderful financial results of a few private enterprises of this kind, notably on, I think, Long Island. One gentleman digs a pond, and builds a hatching house, at a total expenditure of $1,500, and after some two years begins to reap a clear profit of $3,000 a year, with a stock of fish on hand (I refer here exclusively to trout) valued at more than treble this sum. The reports of others are simply confirmatory of this. It is a crop that sows itself, that needs no plowing, harrowing, drilling or cultivating of the soil. The crop itself does all this. It is therefore nearly all profit. You are already beginning, with that intelligence and foresight now indigenous with you, practically to appreciate the enormous pecuniary as well as sanitary value of this industry: why should it more especially urge itself on me? Because I live within a few miles of a country—the northern bank of the river Ottawa—abounding in lakes, large and small, some teeming with the finest trout, but nobody cares to catch them; open to all, or rights may be purchased for a comparative trifle by any person, waiting for some enterprising and intelligent person to come and occupy and enrich himself as well as others. The land is, for the most part, rocky, mountainous, wild, but healthy in the extreme and picturesque. In eager exploration for minerals, the mind cannot, it would seem, appreciate the value of the living minerals which in vain, by their glitter, attract the eye and fearlessly invite attention to their numbers and their beauty.

You have an equal share with ourselves already in our salt water fisheries. It must be because you are ignorant of the extent, perhaps the existence, of our fresh water fish that I suppose you are not already catching and exporting them. You have invaded our forests and are rapidly cutting them down and carrying them off, and profiting by the operation. I think I may safely promise your appearance with rod and bait a very warm welcome, and a very profitable result. But I must desist. I do not know if you will consider this a suitable subject for your paper; if so, I shall gladly hail its appearance in the interest of my aim, the extension of a valuable industry and the promotion of our physical well being.

These remarks embody the views of our very intelligent Deputy Minister of Fisheries, enunciated some time ago in a conversation with me. The subject is, with him, one of scientific as well as practical interest. CANADIAN.

Magnetism and the Nodular Form of Iron.

To the Editor of the Scientific American:

Those much acquainted with magnetism are familiar with the magnetic curves described by iron filings, when shaken about a bar magnet. If we lay on a bar magnet a pane of glass, and shake upon the glass some fine iron filings, and gently strike the glass, the filings will distribute themselves after a certain uniform manner in obedience to a force operating them from the magnet. If our magnet be a square bar, and we turn it one quarter of the way over, and again try the experiment, a similar distribution of the filings will ensue. What must we conclude from this? Obviously that the force of the magnet does not exert itself simply in the plane in which the filings lie upon the glass, but in an infinite series of planes, extending in every direction about it. If the magnetism were sufficiently strong to counteract or annul the force of gravitation, or the filings were free to move among themselves, they would arrange themselves about the poles of the magnet in an elongated globular form. Furthermore: If the atoms of iron of which the bar itself is composed, and which are magnetized, could overcome the force of cohesion, or were alone acted upon by the force of magnetism, they would arrange themselves in accordance with the law governing the magnetic curve. Hence, in all magnets, the atoms of which they are composed are under a strain, which is in proportion to the degree of magnetism by which they are influenced.

I deduce from the foregoing the following corollary: The best shape for a magnet is that in which the circumscribed boundary of any part of its surface will exactly coincide with the exterior magnetic curve, considering the curve to extend in every direction from the center of either pole. I also find in the above theory an explanation of the fact that iron which has been deposited from solution (as in the clay basins of Missouri) has assumed a globular shape, and is almost universally found in nodules. The atoms of iron have been deposited in obedience to the magnetic force; and being in solution and free to move, the atoms, in aggregating, have arranged themselves on the magnetic curves. While this was going forward, the nodules were probably in pairs. Subsequently, violent action has rended them asunder, causes have operated to demagnetize them, and oxidation and attrition have modified their primary form.

Louisville, Ill. C. H. MURRAY.

Coal Tar Products.

To the Editor of the Scientific American:

Allow me to add, to your list of the products of coal tar, rhigoline, which is now used in the artificial manufacture of ice. There is also a beautiful black varnish for iron, which dries quickly and produces a gloss almost equal to Japan; this is made by dissolving the pitchy residuum of coal tar in the heavy oil that distils from the same, being the only liquid which will dissolve it. This varnish is known to the trade as paraffin varnish, but this is a misnomer, as that article, although a product of coal tar, does not enter into its composition.

A few years ago I was connected with the coal tar pitch interest in such a manner as to lead to a series of experiments. In the years 1861 and 1862, I was engaged in the manufacture of a cheap quality of sealing wax for capping fruit cans. Cincinnati at that time enjoyed a monopoly in that trade, supplying dealers at all points. In the years named the price of rosin advanced (owing to the war) from $1.80 to $40.00 per barrel, and was difficult to obtain at that price: which caused the manufacturers here to look for a substitute, which was found in coal tar pitch. So well did it answer the purpose that at least fifty tuns were cast into suitable shape and sold for sealing wax, the only objection to it being the odor.

The beautiful gloss of this wax, together with its strength and the facility with which it could be cast into molds, led me to make some experiments as to its value as a material for decoration, picture frames, statuary, etc. This resulted in my securing a patent on the 5th of August, 1865, covering its use for the manufacture of a variety of useful articles. From that time until the present, I have endeavored to develope my invention, being convinced that it will be as useful as vulcanized rubber in time. I send you a blacking box, cast of the material, which please accept as a curiosity, being another link in the long chain of useful products of the unsightly and formerly despised article, coal tar.

Cincinnati, O. J. T. PEET.

THE CURABILITY OF CONSUMPTION.—This is the attractive title of a very excellent article in the *Deutsches Archiv fur Klinische Medicin*, June, 1873, by Dr. Massini. He shows, first, that true tubercular consumption is curable, as post mortems of persons dying with other diseases prove. That it is communicable he also attempts to prove, and hence he disapproves of consumptives marrying. The means of prevention are general and special. His enumeration of them includes nothing novel; but with most of the later German authorities, he is strongly in favor of elevated health resorts—pure mountain air.

ALUMINA, FROM THE CLAY TO THE SAPPHIRE.

READ BEFORE THE POLYTECHNIC CLUB OF THE AMERICAN INSTITUTE, ON DECEMBER 18, 1873, BY DR. L. FEUCHTWANGER.—CONCLUSION.

It has been stated that alumina is the oxide of the metal aluminum. We will now proceed to describe the process of obtaining this peculiar metal, and its qualities and applications.

It is an earthy metal, like cerium, zirconium, glucinum, erbium, and yttrium, and was first prepared by Wöhler in 1828; it is one of the most important metals on account of its usefulness in the arts. Its extraction from its mineral compounds, however, is not very easy, or it would ere this have been the great rival of the precious metals; in fact it possesses some qualities superior to them. Several methods have been proposed for its extraction, all of which depend upon the use of metallic sodium. Common clay, cryolite, and other aluminous minerals may be employed, but the mineral called bauxite, from France, containing about 60 per cent alumina and 40 per cent silica, is now principally employed by the large manufacturers in Europe. The process is as follows: Pulverized bauxite is mixed with powdered soda ash, and fused at considerable heat, during which process the aluminate of soda is formed, and carbonic acid escapes; the fused mass is dissolved in boiling water, and the clear solution evaporated; then the redissolved aluminate is neutralized with hydrochloric acid, whereby a chloride of sodium is obtained, and the alumina is converted into a hydrate of alumina, which, being mixed with charcoal and common salt, is formed into balls and heated in earthen cylinders, dry chlorine gas being passed through the heated mass. Chloride of aluminum and chloride of sodium are thus produced, going over into the retort, the carbon abstracting the oxygen from the alumina. Metallic sodium is now mixed with the two chlorides, and heated in a reverberatory furnace. Metallic aluminum is then found at the bottom of the melted chloride of sodium; this is now separated from the fused mass, and may be remelted, cast in bars, and then rolled out into sheets and wire. The chloride of aluminum is as yet the only vehicle suitable for the extraction of the metal; it may be easily produced by fusing the ammonio alum with charcoal and then passing a stream of chlorine gas through the mass; the chloride goes over in the form of vapor which condenses in a receiver as a solid crystaline mass. The metallic aluminum is now largely manufactured in France and England; the business has been attempted in the United States (from cryolite, by Monier and Parmele), but has not been carried to any extent.

Aluminum possesses the following remarkable properties: It is of white color, resembling silver, and is very sonorous, more so than any other metal; it is the lightest metal, having a specific gravity of 2·5 (while silver has a specific gravity of 10·53); this property renders aluminum very valuable in the arts, such as for making small weights used in chemical analysis, for dentists in the manufacture of plates for artificial teeth, and many ornamental purposes, particularly as it resists so well the action of a moist atmosphere. It even resists boiling nitric acid; this property puts it on equality with gold and platinum; but hydrochloric acid attacks it. It is, however, not blackened by hydrosulphuric acid. It is infusible in cast iron heat by exclusion of air, but burns in the same with brilliancy, and in oxygen gas the combustion is so fierce that the eye can hardly bear to look on it; it is then formed into the earth alumina. It dissolves readily in dilute caustic alkali, such as ammonia, and in dilute sulphuric acid; it is not attacked by cold sulphuric or nitric acid.

Aluminum bronze is an alloy of 1 part aluminum and 9 parts metallic copper. It has the color of gold, but becomes dull after a while, and it is as strong as iron; neither mercury nor lead, both of which generally attack other metals, has any effect on aluminum.

ALUMINA.

It has been remarked that alumina is found in Nature almost pure in the sapphire, corundum, emery, spinelle, topaz, diaspore, in the vast deposits of clay, and in all silicated minerals. In order to obtain the same pure and in a hydrate, the following process is adopted: Commercial alum, free from iron, is precipitated by a concentrated solution of carbonate of soda in excess; the precipitate is redissolved in hydrochloric acid, and again precipitated by ammonia; this precipitate is then calcined, and the result is a pure hydrate of alumina. A more simple method is by igniting the pure ammonio-alum, also by the decomposition of a solution of alum and chloride of barium. The pure alumina is colorless and tasteless, and wholly insoluble in water. If a little alum is dissolved in warm water, and some ammonia is added to the solution; the latter combines with the sulphuric acid, while the alumina unites with water so as to form a semi-transparent gelatinous mass, which is the hydrate of alumina; this has a great affinity for many coloring matters, forming the well known lake pigments.

SULPHATE OF ALUMINA

is also called porous alum, concentrated alum or alum cake. This very important substance, of extensive application in the arts, is produced either from common pipe clay, kaolin, shale, or cryolite. From clay, it is prepared by calcining the same and treating it with half its weight of sulphuric acid, until it becomes a stiff paste, which is then exposed to the air for several weeks; sulphate of alumina is produced, which is washed out with water so as to leave the undissolved silica behind; the clear solution is evaporated to a sirupy consistence and allowed to cool; it then solidifies into a white mass, and this is the cake or concentrated alum, which is extremely soluble. The alum shale is much employed for this pur-

pose in Europe by roasting it in heaps and setting fire in several places under them; the iron pyrites (a usual companion of all shales) produces a decomposition, and sulphurous acid is evolved. On exposure to the atmosphere, as above stated, the sulphate of alumina is obtained.

In Pennsylvania, the cryolite from Greenland is altogether used for the manufacture of the alum cake, by the following simple method: The cryolite is mixed with chalk and calcined, and a double fluoride of aluminum and sodium is produced; while the fluoride of calcium, first formed, gives off its oxygen to the sodium and aluminum, converting them into soda and alumina The soda is now crystalized out of a solution with the assistance of carbonic acid gas which is passed into it; and after setting the same aside, the soda as the carbonate crystalizes out of it, leaving the pure alumina in the mother liquor to be treated with sulphuric acid.

Sulphate of alumina has a sour taste, but also a sweet and astringent aftertaste; it is soluble in twice its weight of water. It is a powerful antiseptic and arrests animal putrifaction, and can be used for preserving bodies. Porous alum or sulphate of alumina is very extensively used by calico printers and papermakers, and is, in many instances, preferred to alum.

ALUM.

This, the chief compound of aluminum, employed so extensively in the arts, is obtained from the last mentioned substance, the sulphate of alumina. The solution is mixed with sulphate of potash, when, on evaporation, beautiful octahedral crystals are obtained. Sulphate of ammonia, as obtained from gas liquor, is now generally substituted for the potash: and instead of a potash alum, ammonia alum is now altogether put in market, although many manufacturers believe they obtain the old fashioned potash alum; but the ammonia alum answers as well in dyeing, calico printing, papermaking, etc., and in the manufacture of colors. In England, the chloride of potassium was formerly used in the manufacture of alum, this being a waste product from the soapboiler and the saltpeter refiner.

Ammonia alum is found native in Bohemia as a mineral, called tschermigite, which occurs in fiberous crystals, but not in such sufficient quantities to be of practical use. There are, however, many minerals from which alum can be extracted, and the localities may be seen all over the world: in Germany, particularly in the neighborhood of Halle in Prussia, on the island of Riga in the Baltic, in Bohemia, in Hungary, in England (where the deposits are most extensive), and in the United States.

The following sources of alum are mentioned, as they yield the mineral used for the production of alum and alum cake, independently of the pure clays or kaolins brought into market and used most extensively for the manufacture of porcelain, pottery, and Rockingham ware:

Alum earth, a mineral deposit in the brown coal formation.

The alum slate is a dull earthy black slaty mineral, of specific gravity 2·4; it contains some bituminous matter and fossil remains, and is found in England, the Netherlands, and Prussia.

The alum stone, called alunite, of obtuse rhombic form and white color. It has a vitreous and pearly luster, yielding: alumina 14 per cent, sulphuric acid 25 per cent, silica 24 per cent, potash 4 per cent, water 3 per cent; total, 100. In 1866, I found it between the gneiss and granite, in an efflorescent state, at First avenue and 51st street, in this city. The mineral is found in lava and trachytic rocks at Talfa near Rome, in Hungary, and in Auvergne, France. This material was used 1,000 years ago for producing the alum, and is called the Roman alum.

The aluminite, found abundantly in Prussia at Halle, and at Epernay in France, is also called websterite, and contains alumina 30 per cent, sulphuric acid 24 per cent, water 46 per cent. It is white and opaque; it adheres to the tongue, and has a specific gravity of 2·0. It is rather abundant in the localities named.

The many applications of alum in the arts are due to the alumina having great affinity for many coloring and other vegetable matters, for gelatin, etc.; and in the preparation of lakes, it forms an insoluble precipitate of alumina with vegetable colors. It is also used in preparing white leather by its action on gelatin, for clarifying water, as an addition to paste used by bookbinders, for preventing the depredations of insects, in fireproof safes as a filling, etc. Alum has been described by authors as early as Pliny and Dioscorides. Boerhaave gives a very extensive description of it, and says:

Alum is a real fossil, procured either from a hard flaky stone, found deep in the ground, and so pregnant with sulphur and bitumen as easily to take fire or form a bituminous and combustible earth, which yields a noxious flame and a sulphurous stench. If exposed for a month in the open air, it crumbles into powder, and thus becomes disposed for the generation of alum, which before it was not. If dissolved in water, it may be precipitated by adding a fixed or volatile alkali; and it then produces a new salt, which is the alkali and the fossil matter together. In England, Italy, and Flanders, alum is principally produced." He also says "that alum has a sharp, rough, styptic taste. Its crystals are octagonal, four of the sides being hexagonal, and the other four triangular, surfaces. In Italy (at Civita Vecchia and at Solfatara, near Patella), the alum is manufactured from the natural substance in summer time.

Let me add a few words more about alum and its physical and medicinal properties. Alum is a white, slightly efflorescent salt, it crystalizes easily in octahedrons, but may be made to crystalize in cubes, if an excess of ammonia is added to the solution, which must be carefully evaporated; it dissolves in warm water, say in three fourths of its weight of boiling water. It is insoluble in alcohol, and has a specific gravity of 1·71; it reddens litmus, and changes the tints of the blue petals of plants to green; it assumes an aqueous fusion when heated to 212° Fah. Exposed to red heat, it gives off oxygen with sulphurous acid. It forms pyrophorus when calcined with fine charcoal, and then spontaneously forms an inflammable substance. There are several varieties known in commerce, among others, the Roche alum, which originally came from Rocca in Syria, of a pale rose color; and the Roman alum, which has always been considered as the purest. Five thousand tuns are still annually manufactured.

Alum is incompatible with the alkalies and their carbonates, lime and lime water, magnesia and its carbonate, tartrate of potash, and acetate of lead. It is an astringent and antispasmodic; in large doses, it is purgative and emetic. In cases of hœmorrhage, sweats, diabetes, chronic dysentery and diarrhœa, it is used as an astringent. It is used as a purgative in the painter's and nervous colics. Alum is also sometimes used for the adulteration of bread, with a view to increase the whiteness, but in very small doses.

It may be stated, in conclusion, that a great many minerals, known by mineralogists as oxygen compounds, the unisilicates, hydro-silicates, and some bisilicates, contain the oxide of aluminum or alumina as one of the component parts. The family known as zeolites, such as laumonite, natrolite, analcite, mesolite, scolecite, thompsonite, gmelinite, phillipsite, harmotome, stilbite and many more of this class each contain from 20 to 30 per cent of alumina, pachnolite 25 per cent, and staurolite 50 per cent. Kyanite contains 64 per cent. Several mineral springs in the United States, in Virginia, contain the alum in solution from 20 to 70 per cent, and are used in medicine.

I may say that alumina exists in the most common as well as the most precious minerals. White clay or kaolin is found in many localities in the United States to a very large extent. I have visited many deposits in Vermont, near Brandon, in Massachusetts, in Pennsylvania, at Jacksonville, Ala., and in South Carolina. At Bath I saw large deposits of a fine quality, and 10,000 tuns are annually brought to this city for papermakers' use. At Aiken, S. C., large deposits are yet undeveloped. At Perth Amboy, various qualities have been dug out for the last 50 years from strata 20 feet thick. It is found in the coal, tertiary, metamorphic and older formations. Stourbridge clay, so indispensable for glass pots, is principally brought from England. Alum is a very important branch of commerce. England produces annually 10,000 tuns, and Germany 10,000: and in the United States about 5,000 tuns are manufactured.

Death of the Big Rhinoceros in the London Zoological Gardens.

The "Zoo" is in mourning for one of its hugest and oldest inhabitants. The great rhinoceros, which had been from its earliest days a conspicuous object in the elephant house, has at last succumbed to the scythe bearer, or whoever the rhinoceral typical representative of death may be. For twenty-four years the creature had lived in comfortable quarters, and withstood the rigors of an English climate; for twenty-four years it had, day after day, partaken of its plain meals of hay and similar food, and day after day for twenty-four years it had thrust its snout as far as possible between the massive bars of its den, and opened its capacious jaws to receive the gratuities of its admiring visitors, in the shape of buns and biscuits, oranges and apples, and other titbits. The rhinoceros is liable to sudden outbursts of violent temper, and the late lamented individual was no exception to this general failing of its race.

Several years ago, in a furious attack on the rails of its den, it broke its jaw, and was for some time in rather a dangerous condition. It, however, survived the accident and has safely passed through the vicissitudes of English weather, and it may be considered that twenty-four years is about the average length of life among this species of pachydermata. The hippopotamus has bred in the gardens, but no success has attended the attempts to breed the rhinoceros in captivity, their violent tempers rendering it dangerous for them to be temporarily housed together. The skeleton and skin of the deceased creature are to be preserved, and valuable preparations will no doubt be made.—*London News.*

Railway Receipts and Expenses.

The proportion of working expenses to receipts is often put forward as evidence of the cheapness or dearness with which a line is worked; while in fact it proves nothing at all, either one way or the other. Recently a statement of the proportion of expenses on the Denver & Rio Grande Railway has been widely published at home and abroad as evidence of the cheapness of working a narrow gage line, the percentage given in the case before us being 48·5 per cent in August, and 45·4 per cent in September last. The proportion of expenses depends equally on two things: 1. The cost of transportation, and, 2, the rates received. Evidently, if it costs me two cents per mile to carry passengers and I get three cents for it, my working expenses will be 66⅔ per cent; while if I receive 4 cents per mile these same working expenses will be but 50 per cent. On the Denver & Rio Grande, we understand, ten dollars is charged for carrying a passenger 76 miles, and at this rate working expenses of 45 per cent give nearly six cents per mile as the cost of doing the work. This is no argument against the road and its management, for the traffic is light, and heavy charges would be necessary to support a road of any gage. The Central Pacific, whose charges are not half so high, is worked for 40 per cent of its earnings, its rates being still higher than those of most American roads with equal traffic. The Panama Railroad is worked for about 44 per cent, we believe, and one might think it wonderfully economical; but its charge for carrying a passenger 47 miles is twenty-five dollars, so the cost would appear to be something like 23 cents per mile.—*Railway Gazette.*

The Hours of Labor.

E. W. says: "I regret that A. B. Mullett falls into the very common error of accepting eight hours' labor as costing but twenty per cent more than ten hours, instead of twenty-five per cent more. Let me quote the following letter, written by me in June, 1872: 'If a piece worker asks 20 per cent advance to equalize wages, when the time worker has his hours reduced from 8 to 10, it does not make them equal in pay, as the former will find on experiment. The manufacturer, too, will find that, so far as the day hands are concerned, his wages account will be increased 25 per cent. If I have two hands at work, making shirts: to one I pay $4 per day, for 10 hours, and he makes 4 shirts per hour, or 40 shirts per day, costing me, of course, 10 cents each for labor; the other hand works by the piece, at 10 cents each shirt, makes 40 per day, and gets, of course, $4 per day. So far, so good; but the day worker now wants to work but 8 hours for $4; and he will produce for me, at 4 shirts per hour, 32 shirts, costing me 12½ cents each; certainly 25 per cent more. The piece worker then asks for 20 per cent advance over original price of 10 cents, and gets thereby 12 cents each for his 32, and, consequently, earns but $3.84, so that he does not equalize wages.' If, under the 8 hour programme, I have to employ five people to work 40 hours, when four now accomplish that much, am I not paying 25 per cent more wages?

"It has been asserted that a mechanic can produce as much work in 8 hours as in 10. If he can do that for his employer, why cannot the piece worker do that for himself, and not ask 20 per cent more to equalize?"

A New Floral Ornament.

A writer in *Les Mondes* suggests a new idea for floral decoration, which, it seems, may be readily put in practice. An ordinary earthenware flower pot is filled with water, the hole in the bottom of course being closed, and allowed to stand until its porous sides are completely soaked. The water is then thrown out, and the pot is repeatedly dipped until it will absorb no more, and its outside becomes thoroughly wet. On the outer surface fine seed is thickly sprinkled and allowed to remain sticking thereto. The pot is then refilled with water, and set in the shade under a bell glass. In a short time the seeds will germinate and throw out shoots, so that, to prevent their falling from the sides of the pot, some thread or wires must be repeatedly wound around the exterior of the latter. Eventually the entire vessel will become a mass of living vegetation, which is nourished by the percolation of the water contained within through the porous sides.

A non-porous receptacle may also be used, but some thick cloth must be wound about its exterior and the seed sprinkled thereon. This cloth is kept continually moist by repeated applications of fresh water.

The Wear of Gold Coin.

It appears from experiments made in St. Petersburgh that, contrary to the opinion generally entertained, gold coin wears away faster than that of silver. Twenty pounds of gold half imperials, and as much of silver copecks—coins of about the same size—were put into new barrels, mounted like churns, which were kept turning for four hours continuously. It was then found, on weighing the coins, that the gold ones had lost sixty-four grammes—the silver ones only thirty-four; but as the number of gold pieces was twenty-eight per cent less than those of silver, the proportion is of course greater to that amount in favor of the latter. The silver also contained more alloy than the gold.

Nickel in Missouri.

A correspondent, "Nick," writes to point out a slip of the pen in our issue of December 13, 1872, wherein we stated that the nickel mines of Pennsylvania are the only ones in the United States.

"In your paper of November 30, 1872, you have an article on American nickel, wherein you mention the mine La Motte tract, Mo.;" you also mention elsewhere that the ore is found in Pennsylvania and Missouri. The nickel mines of Mine La Motte are now being very extensively worked at the present time, and the owners, the La Motte Lead company, have turned almost their entire attention to raising and reducing the nickel ore to regulus, which is being shipped in large quantities. Recently 7,000 lbs. of nickel ore were raised in one day; it assayed 35 per cent metal, and was worth $1 per pound at the mine. The work was done by six miners, $7,000 being dug out for a cost of less than $25.

An Excellent Pen.

Messrs. C. M. Fisher & Co., of No. 102 Fulton street, in this city, have devised a new form of gold pen, known as the Paragon, in which not only the form but also the characteristics of the quill are closely imitated. To those who have been accustomed to write with the latter, and have experienced the trouble of mending it, the gold pen, as made by the above firm, will, we think, prove to be a welcome addition to the writing table. We have used one almost constantly for the past month or two, and at the present time it is perfectly flexible, shows no sign of wear, and is one of the best pens we ever used. The makers adapt each pen to suit the hand; and hence, any peculiarity of holding can be allowed for, and the habits of the individual writer consulted.