came pasty and thick. The gases were conducted through a system of stone flasks containing water, and in this way at first three fourths, afterwards eleven twelfths, of the nitric acid in the saltpeter was obtained. As the common salt in the saltpeter is not decomposed by carbonate of lime, at least at the temperature employed, the acid obtained was perfectly free from chlorine. The thick sirupy mass was drawn out of the pan while still hot, and the pan charged again. The mass, which contained caustic lime and carbonate of soda, when cold, was boiled with water to obtain caustic soda, the carbonate of lime being precipitated.

Since all the soda in the nitrate of soda is obtained in the form of caustic soda, and as a rule this covers the total cost of the saltpeter and chalk employed, this process would be a profitable one were not the costly vessels rapidly destroyed, as an eight months' experience proved, the operation often being interrupted to renew the pans.—*Carl Lieber.*

To Make Gold and Silver Inks.

Good bright gold, silver, and bronze inks are seldom met in the market; they are almost always of a dull color, do not flow easily from the pen, and the writing remains sticky. Hence architects and artists mostly prefer to use shell gold and shell silver (*Muschel-Silber*), instead of the corresponding ink. The latter, however, is so much easier and safer to use that I will describe its preparation.

For gold ink it is best to employ genuine gold leaf, but owing to the expense this is seldom used; sometimes mosaic gold (sulphide of tin) or iodide of lead is employed, but almost always Dutch leaf.

Owing to the relatively low price of silver, genuine silver foil is used for silver ink, false silver foil is seldom used, and is not so good. For other metallic inks, commercial bronze powders are employed. The genuine and false foils are also sold in a finely pulverized state; they are made from the waste of the gold beaters by rubbing it in metallic sieves to an impalpable powder.

In consequence of the beating between gold beater's skin, it has particles of grease and other impurities attached to it which must be removed before it can be used for ink. For this purpose the whole sheets, or the commercial bronze powder, are triturated with a little honey to a thin magma on a glass or porphyry plate with a pestle, as carefully as possible, as the beauty of the ink depends essentially on this. The finely rubbed paste is rinsed into a thin glass beaker, boiled for a long time with water containing a little alkali, frequently stirred, decanted, well washed with hot water, and dried at a gentle heat. By boiling this powder with water containing sulphuric, nitric, or hydrochloric acid, different shades can be imparted to it.

Next, a solution of 1 part of white gum arabic in 4 parts of distilled water is mixed with 1 part of potash water glass, and triturated with the requisite quantity of purified metallic powder. Gold ink will bear more liquid than silver ink, since gold covers much better; on rough paper more metal is necessary than on sized paper; on light paper more than on dark, to make the color of the ink appear equally intense.

In general 1 part of foil is enough for 3 or 4 parts of the above liquid. In preparing large quantities of ink, a low porcelain measure is used for transferring it to the small glass vessels where it is to be kept, and it must be continually and thoroughly stirred so that it will always keep well mixed. It requires frequent stirring also when in use. It is best to mix the dry powder with the liquid immediately before using. The ink can be used with a common steel pen, and flows very well when writing slowly, but it is better to use a pencil.

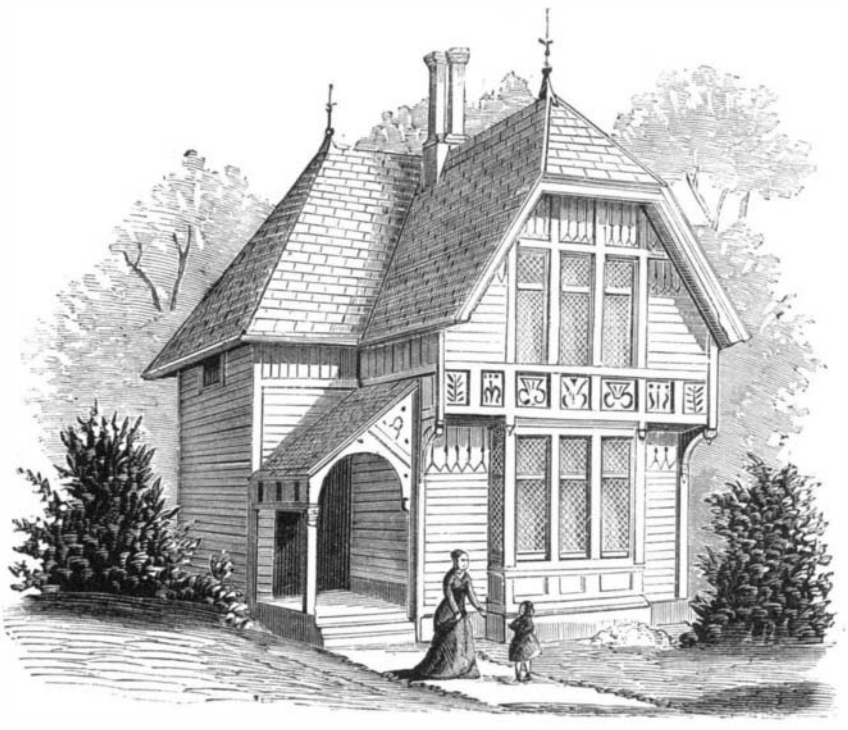
I consider the use of potash water glass of great importance. It greatly increases the metallic luster on paper, prevent its looking dead, protects the writing from being discolored by the action of the atmosphere, and also prevents its penetrating too far into the pores of the paper, without rendering it very viscid. Although the writing of itself possesses a high metallic luster, it may be increased by gently polishing with a polishing steel. Inks made with mosaic gold, mosaic silver, iodide of lead, etc., are not nearly so beautiful.—*C. H. Viedt.*

HARDY AZALEAS.

These are flowers so fresh and fragrant that they ought to be more generally grown in shrubbery borders than they are. The colors are rose, buff orange, and orange buff; and when intermixed with tender young foliage, it is difficult to imagine anything more beautiful. In every variety of this plant, when grown well in any deep rich soil, intermixed with rhododendrons, the different tints of yellow, red, and orange have a pleasing effect among the white, rose, and purple tints of the latter plant. Another attraction possessed by these azaleas is that the foliage becomes bright yellow and crimson in the autumn. Our illustration represents the so-called Ghent azalea, a fine specimen of the hardy class.

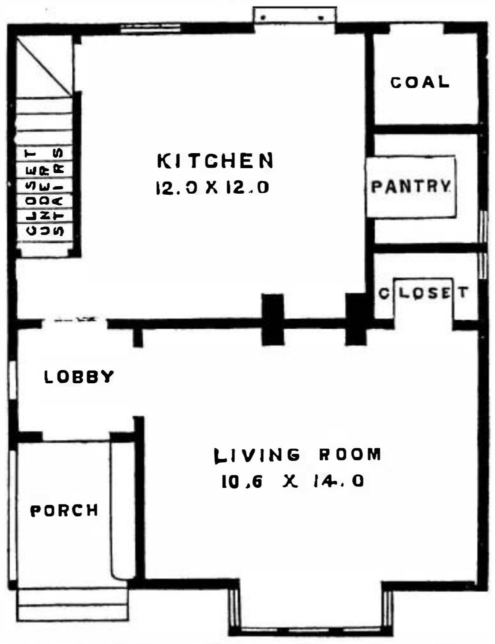
COTTAGE ARCHITECTURE.

The accompanying view and plans (Fig. 2), designed for a gardener's cottage, show a building, small, but very picturesque in appearance. It would be very suitable for a gate lodge or a sea-side or summer cottage, and would look extremely well among the trees of a camp ground. The porch (with its seat) is large and roomy; the living room is of good size, well lighted by a square bay window. The kitchen is well supplied with closets. This first floor could be very much improved by adding a one-story kitchen at the rear, making the living room into a parlor, and the kitchen into a dining and sitting room; the additional cost would be very small. The second floor contains three bed rooms, very conveniently arranged and each provided with a closet. The two downstairs rooms and the large front bed room are supplied with open fireplaces, the value of which for ventilation is so often overlooked in cheap houses; besides this, there should be ventilating tubes or shafts in the chimney sides, with registers opening from each room, thus insuring a good system of ventilation. The roof should be ventilated by openings under the projecting eaves. The estimated cost of this building is from $1,200 to $1,800, according to locality and style of finish.



AN ORNAMENTAL COTTAGE.

Fig. 2.



The view and plans are taken from "Wooden and Brick Buildings," the latest and best work published by Messrs. A. J. Bicknell & Co., of 27 Warren street, New York.

Smith College.

By the endowment of a charitable lady, now deceased, a new and splendid college for the higher education of young women has lately been constructed at Northampton, Mass. The students, instead of congregating in one large boarding house, are divided into small families, residing in separate cottages, scattered about the college grounds.

The general character of the institution has been determined by its founder, whose will provides that the trustees shall furnish young women the "means and facilities for education equal to those which are afforded in our colleges to young men." The fund for the institution was not given to establish an ordinary school, but to found, in the truest sense of that term, a college, which should give young women an education as high and thorough and complete as that which young men receive in Harvard, Yale, Amherst, and other colleges.

The college was dedicated in July last, under the presidency of Professor L. Clark Seelye, formerly of Amherst College, Mass.

On the Paraffins of Pennsylvania Petroleum.

Morgan, under Schorlemmer's direction, has made an examination of the normal hexane and heptane from Pennsylvanian petroleum, to test the question of the presence of isomers. The normal paraffins were chlorinated, and then converted into olefines by treatment with alcoholic potash. These olefines were treated with cold hydrochloric acid, each of them being thereby separated into two fractions, one of which dissolved in the acid, while the other did not. The latter fractions yielded secondary alcohols when suitably treated, that from the hexane being methyl-butyl carbinol and that from the heptane being methyl-pentyl carbinol. It hence appears that the derivative olefines are normal, and have the constitution $CH_2 = CH—C_n H_2 + 2n1$. The former olefines, or those soluble in hydrochloric acid in the cold, yielded alcohols which appeared to be secondary, but which need further investigation.

In some remarks upon this paper, Schorlemmer says that the above results do not necessarily prove the presence of a third isomeric heptane in petroleum. Heptane when treated with chlorine yields one primary, and may yield three secondary, chlorides. If the heptenes from two of these combine with hydrochloric acid in the cold, the alcohols from them would yield on oxidation ethyl-butyl ketone and dipropyl ketone. These on further oxidation would yield propionic and butyric acids. Since Morgan obtained the latter, and as the acetic acid he obtained came probably from the presence in his heptane of a lower boiling isomer, it is probable that, owing to the method he employed, the propionic acid was overlooked. To decide the question, an absolutely pure paraffin is necessary; and the author proposes to make additional experiments with hexane from mannite.

Snuff for Insects.

The so-called tobacco meal, the *Kölnische Zeitung* says, has been successfully used in agriculture for the destruction of noxious insects, but it has not yet been applied largely on account of its high price, which is caused by heavy import duty. The only obstacle lies in the fact that the meal might be used forthe manufacture of snuff.

COMBINED PORTABLE AQUARIUM AND WARDIAN CASE.

The accompanying illustration, selected from the English *Garden*, represents a simple and tasteful little parlor aquarium, in which many small exotic aquatics and some of our native water weeds will grow as well as in a contrivance of greater dimensions. It consists simply of a glass vessel, similar in shape to an ordinary bell glass, but furnished with a stand, and covered either with another bell glass or an ordinary glass shade. A handful of sandy soil or gravel and a few shells at the bottom serve to hold the roots of vallisneria, aponogeton, chara, and other water plants. Soft water is best for filling the glass if it can be obtained, and one or two goldfish add brightness and life to such an arrangement, and give motion to the water. Aquatic plants, or such of them as will grow in a vase of small dimensions, very rarely produce flowers; and in order to counteract this want of brilliancy, a vase of cut flowers may be introduced, as shown in our engraving, and they will last fresh and beautiful for a much longer time than when they are fully exposed to the heated atmosphere of the sitting room.

The Meteorite of February 12, 1875.

BY ARTHUR W. WRIGHT.

This meteorite fell in Iowa county, Iowa. It is of the stony kind, not greatly differing in its general appearance from others of the same class. Numerous small grains of metallic iron and of the magnetic sulphide of iron, or troilite. are scattered through the mass, the iron grains ranging in size from the finest particles, like mere powder, to those of the size of a fig seed, with occasionally one as large as a grape seed. The mass of which the meteorite probably once formed a part was of great size.

The recent investigations of Professor Newton, Schiaparelli, Oppolzer, and others, in respect to some of the great meteoric streams, have resulted, on the one hand, in establishing the identity of their orbits with those of certain well known comets, and on the other, in showing that the bodies belonging to these streams are probably of the same nature as the sporadic or occasional meteorites. It seems probably, therefore, that an examination of the gases yielded by a freshly fallen meteorite would be likely to furnish important information respecting the tails of comets, and these anticipations were found to be not unwarranted by the results.

The examination showed that the gaseous contents differed in a marked degree from those obtained from iron meteorites hitherto examined, inasmuch as they contained a very large percentage of carbon di-oxide, with a smaller proportion of carbonic oxide, and a large residue of hydrogen, the two oxides of carbon making about one half of the gaseous mixture.

The whole amount of gas given off was about two and one half times the volume of the solid portion of the meteorite employed, but this was not the whole, for the heat was discontinued before its evolution had entirely ceased. If referred to the iron alone, it would be about twenty times its volume.

The following table gives a comparative view of the relative proportions of the gases obtained at different temperatures, the nitrogen being determined as a residue:

	At 100°.	At 250°.	Below red heat.	At low red heat.	At full red heat.
CO_2	95·46	92·82	42·27	35·82	5·56
CO	0·00?	1·82	5·11	0·49	0·00
H	4·54	5·36	48·06	58·51	87·53
N	0·00	0·00	4·56	5·18	6·91
	100·00	100·00	100·00	100·00	100·00

No hydrocarbon compounds of the olefiant series, capable of absorption by fuming sulphuric acid, were found, nor any marsh gas. A very small percentage of the latter would have been readily detected. Tests were applied for sulphurous oxide, hydrogen sulphide, and chlorine, but there was no indication of the presence of these gases. A small amount of water vapor was drawn off by the heat, but not apparently more than the ordinary quantum of hygroscopic moisture which such a substance would absorb from the air.

It will readily be seen, on reviewing the above results, that they showed a marked distinction between the iron and the stony meteorites, as to the gases they contain. For, while hydrogen is the principal gas of the irons, in the Lenarto specimen amounting to 85·68 per cent, in those of the stony kind, if the one examined may represent the class, the characteristic gas is carbon di-oxide; and this, with a small proportion of carbonic oxide, makes up more than nine tenths of the gas given off at the temperature of boiling water, and about half of that evolved at a low red heat.

The spectrum of the gases was observed by means of a vacuum tube, of the kind ordinarily used for spectroscopic work, attached to the apparatus. As was to be expected, it consisted of the hydrogen and carbon spectra together, bearing a general resemblance to those of gases from iron meteorites, but differing from them in the greater relative intensity of the parts due to carbon compounds. At a few millimeters pressure, indeed, the hydrogen spectrum was almost overpowered by them, and was relatively weak. The three middle carbon bands, those in the yellow and green, were very bright, that in the green being most intense of all. In the broad part of the tube these constituted nearly the whole of the spectrum visible, the green hydrogen line being discernible with difficulty, and the others not at all.

These are precisely the three bands observed in the spectra of some of the comets, and they have the same relative order of intensity. This is a very significant fact, for it shows that it is quite unnecessary to assume the existence of volatile hydrocarbons for the explanation of cometary spectra, as is done by some writers, and that the presence of the two oxides of carbon in such quantity is quite sufficient to account for all that has been observed, taking into consideration the circumstance that the tension of the gases in the cometary appendage must be extremely small, and the energy of the electric discharge very feeble.

There is a high degree of probability that, if a large comet should hereafter approach near enough to the sun to have its nucleus intensely heated, the hydrogen lines will be found in its spectrum, in addition to the bands heretofore observed. One cannot help regretting that a comet like Donati's should have departed into space just early enough to escape observation with the spectroscope.

The spectrum of bright lines or bands indicates that the gas gives out some light directly, in addition to that which it reflects. The most obvious, and also the most probable, cause for this luminosity is electricity. Certainly a disturbance of the electrical equilibrium would result from the heating effect of the solar rays, and a change of electrical potential, with consequent discharges, would be produced by the motion of the gaseous molecules from the nucleus and from each other, as also by the change in the distance from the sun, provided either of the bodies possessed an electrical charge, as can hardly fail to be the case.

There is another supposable cause for the light, which suggests itself, however, in the property of gaseous bodies, that they emit light of the same character as that which they absorb. It is not altogether improbable that the solar radiations absorbed by the gaseous matter, though for the most part converted into heat, would also in part be emitted again as light, and that in the case of volumes of gas filling many cubic miles, the intensity might be sufficient to give a distinct spectrum of bright bands or lines, even though, on the scale of any possible experiment, no trace of such an action can be detected.

These results have thus an important bearing upon the theory of comets and their trains; and if this meteorite may be taken as a representative of its class, they warrant the following conclusions:

1. The stony meteorites are distinguished from the iron ones by having the oxides of carbon, chiefly the di-oxide, as their characteristic gases, instead of hydrogen.

2. The proportion of carbon di-oxide given off is much greater at low than at high temperatures, and is sufficient to mask the hydrogen in the spectrum.

3. The amount of the gases contained in a large meteorite, or a cluster of such bodies, serving as a cometary nucleus, is sufficient to form the train as ordinarily observed.

4. The spectrum of the gases is closely identical with that of several of the comets.

We consider a comet, then, as merely a meteorite of considerable magnitude, or a swarm of many of lesser size, containing large quantities of carbon di-oxide, with some carbonic oxide and hydrogen, and giving off these gases under the influence of solar heat. The gaseous substance in streaming away forms the train, which is visible, partly by reflected sunlight, and partly by its own light, due to some molecular or electrical action, which causes it to give the spectrum of the carbon compounds. The form of the train points to a repulsive influence of some kind, as has been shown by Professor Norton, but whether this is due to a specific action of the sun's rays, as is held by Faye, or is electrical in its nature, as maintained by Zöllner, must still be regarded as a subject for investigation.

The loss of the gaseous contents by the action of solar heat readily explains the loss of the tail and diminution of brightness observed in the case of several comets in their successive revolutions; and their final disappearance from sight will follow as an inevitable consequence, the number of revolutions necessary to deprive them of their gaseous contents depending principally upon their size and the nearness of their approach to the sun at their perihelia.

The combustion of the hydrogen and carbonic oxide contained in meteorites, when liberated by the heat caused by their entrance into the atmosphere, must contribute greatly to increase the intensity of the heat, and both in this way, and by the consequent sudden expansion of the imprisoned gases, may have much to do with the bursting of the masses, and the violent detonations which attend their appearance.—*American Journal of Scienc. and Arts, for July*, 1875.

Mothers of Scientific Men.

It is a saying, which is often repeated, that "clever men have clever mothers," and when people are inquiring into the pedigree of a man of intellectual mark, the question "what sort of a mother had he?" is one which may well arise in the mind. It is one, too, which not unfrequently elicits in reply the declaration that the mother was a person of some intellectual power—not always necessarily of a high degree of education, but still a woman who made a mark on the society in which she moved, of whatever rank in life she may have been. Genius and talent are, fortunately, not confined to any one station, although there are undoubtedly some circumstances much more favorable than others to the development of the intellectual powers.

The notion that clever fathers have clever sons is not nearly so popular as the one that brain power is inherited from the mother. Mr. Francis Galton, as is well known, has undertaken to show, and has shown, that the popular notion is, to say the least, an imperfect one, and that clever men have often transmitted great intellectual power to their children, although the manifestations have not been always of the same kind in succeeding generations. In his most recent work on "Scientific Men and their Nature" (D. Appleton & Co.), Mr. Galton takes up a special class of distinguished men, and, by the help of information received from themselves, he gives an account of the influences which have been at work in the determination of their character, and in the direction of their intellectual tastes. He draws a large number of very sound educational deductions, which we would strongly commend to the attention of all those who have anything to do, either as parents or as educators, with the direction of the mental life of children possessed of unusual capacity, or of a decided bent in any special scientific direction.

Among the influences brought to bear upon the nature and nurture of scientific as of other men, undoubtedly that of the mother has much to do. Accordingly we find that many of the scientific men record of their mothers that they were possessed of considerable intellectual power; and one or two state that their first impulses toward the pursuit of Science were decidedly derived from their mothers, and distinctly fostered and encouraged by them. On the other hand, however, Mr. Galton remarks that, of all intellectual men, those following Science are least indebted to the maternal influence; in fact it may almost be said that the mother's influence in turning the son's mind in the direction of Science is scarcely felt at all. He declares that this could not be said so far as men distinguished in literature or in certain professions are concerned, and he ascribes the marked absence of the mother's influence over scientific men to the fact that the feminine mind does not care for Science, and that the ways of thinking of scientific persons are not those which commend themselves most to women's habits of thought. The fact is rendered all the more noteworthy because, in the great majority of instances, the influence of the father in directing the son's mental tendencies is clearly acknowledged.

It is to be noted that, where feeling, refinement, and even ambition are concerned, mothers have greatly influenced their sons; but where exact thought and patient investigation are involved, their influence seems to have been wanting. Instances being, however, on record that sometimes there has been a mother whose love for natural objects has had an effect on the mind of her son, it may be inferred that, were women generally of more scientific tendencies than they are now, the maternal influence might be as distinctly shown as in the cases of non-scientific men of intellect.

Science certainly has not at present the same attractions as literature for women, except in a few cases here and there. Perhaps that may result from the circumstance that so few possibilities of scientific instruction or work have, as yet, been open to them. But as time passes on, and chances of scientific education develope, women may come to find in the pursuit of Science something which will afford them interest, and will open up to them vast fields of intellectual usefulness, quite within the range of their powers. The day may come when some future Mr. Galton, making statistical inquiries as to the nature and uurture of scientific men of his time, will have to record that the maternal influence in the direction of the minds of scientific men is not, as now, conspicuous by its absence.—*Home Journal.*

Another Flying Machine.

A new air ship has been invented by Mr. W. F. Schroeder, which, so far as we are able to judge of it by the much muddled descriptions of the daily journals, appears to be a combination of all the various principles on which attempts at aerial navigation have heretofore been based. The inventor has been successful in obtaining pecuniary support, and therefore, unlike most schemes of similar nature, this one bids fair to exist elsewhere than on paper. At all events, we are promised a practical trial in the middle of next month, during the course of which Mr. Schroeder proposes to travel between New York, Philadelphia, Baltimore, and Washington, and finally, if successful, to crown his exertions with a transatlantic voyage, without the aid and assistance of that much discussed easterly current.

So far as we can make out the construction of the invention, it includes a boat, made of oiled canvas and wire, 65 feet long. This has two masts of steel, each 28 feet high, between which is extended an egg-shaped balloon, the points of the latter being held in a wire network. Around the middle of the balloon are girdles and nettings, the last of which come down and support the car, which, we suppose, is the boat. At each end of the boat is a propeller, also of wire and canvas. One screw pulls and the other pushes. These are independent, and drive the boat in either direction.

Besides, there are two large rudders, one at each end, and also independent. On each side of the boat is fastened by hinges a wing 35 feet long by 15 feet wide in front, 10 feet wide behind, and concave beneath. These wings are driven at the rate of 170 flaps per minute and the propellers at 1,200 revolutions, by an 8 horse hydraulic engine located in the car. We do not pretend to understand what generates the motive power. An engine run by water is the natural inference from the above; but whence the water pressure is to be obtained, we are unable to conjecture. Is it the Keely motor?

The whole machine is to weigh 1,800 pounds and the balloon to hold 80,000 cubic feet of gas; 12,000 pounds of load are to be transported at the rate of 70 miles an hour in still air, and the ocean is to be crossed in 50 hours. To the foundation for all of which assertions we shall be happy to bear witness after seeing the machine work.

Steam Street Car Construction.

Mr. Henry F. Knapp, in a paper recently submitted to the Rapid Transit Commission now in session in this city, makes some very practical and excellent suggestions relating to the subject of steam-impelled street cars and their machinery. Mr. Knapp is opposed to trains of vehicles, and believes that each car should be built to carry from 50 to 100 passengers, and be self-propelling. The machinery he would place beneath the floor, so as to leave the entire area of the latter unobstructed. The heat radiated from the generator would be shielded from the bottom of the car in summer, while in winter it could be utilized to warm the interior.

The only way of getting rid of exhaust steam, that terror of horses and bugbear of inventors, is to run it into a fan blower where it will be mixed with two or three times its volume of atmospheric air, which subtracts its heat and reduces it to water so quickly that a fine mist is ejected from the blower. The products of combustion (smoke), consisting of carbonic acid, carbonic oxide, steam, and such portions of carbon as may have escaped unburnt, may be most completely reduced by being forced through a reservoir or tank containing milk of lime by the blast that is used for feeding air to the boiler furnace. The lime takes up in combination all the carbonic acid, for which it has great attraction, and retains the particles of escaped carbon, cinders, etc., in suspension, besides entirely condensing the steam of the smoke to a liquid state, thus leaving nothing but free and invisible nitrogen to escape into the atmosphere.

The Antiseptic Properties of Compressed Air.

The investigations of M. Paul Bert relative to the properties of compressed air, details of which have already been described in these columns, were the means of discoveries as unexpected as they were important. So far from accelerating respiration and consequently vital activity, as was predicted, the gas caused an enfeeblement of all the natural functions, and, in cases of sufficient compression, death. With pure oxygen, like results were observed, with the difference, however, that the pressure might be five times less than that of compressed air in order to produce a given effect.

Starting from the point thus reached, and adopting the theory according to which fermentations are ascribed to the development of minute elementary organisms, M. Bert has recently undertaken to determine the question of whether air or oxygen in a compressed state does not constitute an antiseptic agent. The experiments made have led him to an affirmative conclusion. Meat submitted for a month to the action of compressed air became yellow and acquired a slightly acid reaction, but all its nutritive properties were found thoroughly preserved. The investigator cooked and ate mutton chops similarly treated and was unable to observe any signs of tainting. It is a curious fact that meat once submitted to the compressed air as above keeps indefinitely after the pressure is removed, care only being required to exclude the atmospheric dust capable of determining putrid phenomena. The only explanation which appears possible for this circumstance is that the compressed oxygen acts on the elementary organisms, in similar manner as upon animals and higher vegetables, and kills the animalculæ already formed within the apparatus, or the matter from which, by processes still unknown, they may be developed.

M. Bert placed some *mycoderma vini* on the surface of wine and applied the compression. The germs were killed instantly and fell to the bottom of the vessel, while the alcoholic properties of the liquid remained unimpaired. Cherries, strawberries, and other fruits, and also wet bread, were equally well preserved. Milk presented an interesting peculiarity. While the germs to which lactic fermentation is ascribed were destroyed, coagulation was not retarded. An explanation of this is perhaps found in the fact already noted concerning the slightly acid reaction observed in meat. A solution of glucose, however, to which brewer's yeast had been added, produced alcohol despite the compressed gas, and urine containing a fragment of a filter impregnated with uric ferment produced ammonia. It appears in these cases that the oxygen could not act quickly enough to kill the ferment before the latter had affected the material.

The subject would certainly have remained incomplete if the fermentation term diastatic—that is to say, determined by soluble ferments—had been neglected. M. Bert has studied saliva and pancreatic juice, and others of like nature, and finds that all, without a single exception, retain their activity in the compressed oxygen. So that a valuable means of preservation of numerous important medicaments is found in simply enclosing them in a tube with the compressed gas.

From these facts, M. Bert suggests, some light may be thrown upon physiological problems now very obscure. It is a question, for example, whether accidents caused by the inoculation of diseased blood are due to the organisms contained therein or to matter analogous to diastatic ferments. Both views are strongly defended; but it will be seen that the effect of compressed air will at once determine the matter, since the organisms, if existing, would be destroyed, while the diastatic ferments would be unimpaired.

In the absence of the complete record of M. Bert's experiments, we are left in the dark as to the degree of pressure to which he subjects the articles to be preserved. This learnt, it seems that we are at once provided with a means of keeping food, far easier to put in practice than any yet devised.

The hold of a ship, for instance, could easily be turned into airtight compartments and filled with meat, fruit, or other perishable material. These could be kept filled with compressed air by a simple air pump, at a uniform pressure, indicated by gages. This pump, if the vessel were a steamer, could easily be run by the engine. Similarly, airtight cars could be made, and the atmosphere within kept at a given pressure. The discovery would thus enable Australian or Texas beef to be transported over the longest sea voyages, and the fruit of the tropics could be brought to the most distant markets. Similarly it allows of the preservation of the dead for any length of time. The body, instead of being put by the undertaker on ice, would simply be enclosed in an airtight case, into which air or oxygen would be pumped and then all openings hermetically sealed. The results of M. Bert's investigations are certainly of a very high degree of importance. If, as appears probable, they are found susceptible to the extended applications suggested, they will bring the exactions of extortionate ice companies to a sudden conclusion, for ice as a preservative will no longer find an employment.

Importance of Mathematics.

In the recent eloquent dedicatory address of President Seelye, of Smith College, Mass., the importance of mathematical knowledge was illustrated as follows:

"It would be easy to show the increasing importance of mathematics to practical life, the assistance it gives the sailor and the engineer, and our indebtedness to it for the most highly prized comforts of our civilization. But it is not for its practical utility that I advocate its place in the higher education. That utility, indeed, is due to the study, which had no thought of practical results. Nor does it owe its place to its importance as a mental discipline, although the estimony of many generations of educators bears witness to its value as an intellectual exercise. Rather would I justify the prominence of mathematics in the higher education because it is the study, above all others, which gives us a knowledge of the mind in Nature. To it, more than to any other source, we are indebted for what we know of the physical sciences. Long ago its importance in astronomy was recognized. It made familiar to our common schools the secrets of the earth's motion, of day and night, of the changes of the moon and the tides. Problems in the starry firmament, about which the wisest sages for centuries were hopelessly puzzled, mathematics has enabled school boys to solve. Yet its triumphs in astronomy represent only a fragment of what it has accomplished in the physical sciences. Sound, light, electricity, heat, have all become subject to mathematical formulas; and algebraic signs explain to us not only how the subtle forces, unrecognized by any human sense, make the music of the spheres, but how they interpret for us the music which we hear, the colors which we see, the warmth which we feel. So wonderful have been the results of mathematical analysis that modern scientific discovery has been forced to introduce it into all departments of physical science."

Four Million Horse Power from a Coffee Mill.

Many years ago, a civil engineer suggested to the French Academy the possibility of submarine railroads, claiming that, at a certain depth in the ocean, beyond the reach or influence of storms, the water is so dense that nothing of a tubular form can possibly sink. His idea, then, was to construct a double track railroad across the Atlantic ocean through a circular tunnel floated at this depth, and send trains thundering back and forth, to the consternation of the big fish and mortal terror of the little ones. But there was one insurmountable obstacle to the success of his grand enterprise at that time, which was that the smoke of the locomotives would suffocate the occupants of the train in that close, dark, and airtight tube. The advocate of this railroad cable claimed that, this difficulty being removed, there could not be a doubt as to the success of the undertaking, and all that was necessary was enough capital to construct the novel work. Since smoke-consuming engines have been invented, the only scientific drawback to the construction of a railroad to Europe has been removed. But now we have the solution of the problem which leaves no excuse why a submarine railway should not be the enterprise of the near future. The key to the French engineer's dream has been discovered—the Keely motor. There you are. A piece of machinery about the size of a coffee mill, with one teaspoonful of water administered once a year, or less frequently if you happen to forget it, and you have four million horse power continually on hand. No smoke, no vapor, no howling and screeching of steam, no beating the atmosphere from here to Europe with tuns of coal. Just spit in a little iron cylinder, if water is not handy, and leave the brakeman to do the rest. Now is the time for that French engineer to come forward. He was too fast for his age, but the age has caught up with him. All that is wanted now is the tunnel and the railroad track, which will require some capital. And just to dream, in this hot weather, of flying like a streak of lightning under the waters of the ocean, through a cool, comfortable tunnel three thousand miles long, in palace cars, rocking dreamily with the motion of those floating pipes! The idea reconciles us to summer, and cools us like an iced drink.—*Baltimore News.*

English vs. American Watches.

Sir Edmund Beckett, a scientific horologist, who is, perhaps, the highest English authority upon the subject, in his work upon "Watches, Clocks, and Bells," says:

"The liability of a watch, like any other piece of mechanism, to require repair is in the ratio of the number of separate parts which make up its unity. The English watch, with its fusee and chain, is composed of 638 more pieces than the American watch. Dispense with these 638 additional chances of breakage, and it is easy to infer the superiority of American watches, in this one respect at least. The fusee and chain are rejected in the Waltham watch, and the direct action of the mainspring adopted, because the fusee and chain add greatly to the cost of a watch, and its tendency to injury, and are of no practical value for good time-keeping. This change is advocated on the ground that there is greater simplicity of action, less friction in the transmission of motive power, increased facility for using a lighter and more uniform spring, and more room for play in the other parts of the movements."

In support of this view, Sir Edmund Beckett speaks very favorably of the American principle of omitting the chain. After alluding to what he calls the mischievous and common accidents of chain-breaking, and noting the tendency of advanced watch-making to do without fusee and chain, he says: "Accordingly, both in Switzerland and America, which are gradually stealing away our common watch trade, the fusee and the chain are almost universally omitted."

The Boat Race, the Horse Race, and the Human Race.

There are many good people who will not go to a horse race, because it is in their estimation vulgar and low, because bets are made on the speed of the horses, because liquor is consumed by the people who bet, and because the horses that run are strained and overstrained in order to make them accomplish the wonderful feats which are expected of them.

We have not much to say in favor of the horse race, even though the British Parliament take a holiday in order that its members may have an opportunity of joining in the general jam, and betting on their respective favorites; but we want to know exactly how much worse a horse race is than a boat race. There is much about boating that is delightful, healthful, and profitable. The idea in which collegiate boating originated was a grand one. Our young collegians had been denied proper exercise. They had slept in unventilated and gloomy dormitories, some of them hardly fit for lodging places for bats or owls. They had consumed midnight oil and eyesight and brain in pouring over their studies. They were growing lank and sour and nervous and dyspeptic. They were cramming themselves with learning, and not keeping up enough physical force to hold the learning in. It was seen that a change was necessary. Wealthy men gave gymnasiums to colleges. Boys bought boats. Professors opened windows. Pure air and exercise were discovered to be compatible with knowledge. Muscles were strengthened. Stooping shoulders were made erect. Flabby nerves were toned up. Flat chests, whose lungs had never known a healthy inspiration, were inflated. Spare arms became brawny. Vigor took the place of lassitude, and physical culture took its position alongside of mental.

This was well. But we American boys cannot do a thing well without being so well pleased with it as to overdo it. The mischief of overdoing is what we have fallen into. There is as much betting and gambling on the strength of our collegiate boat races as there is at horse races. At horse races there is said to be cruelty to animals, in the urging of horses to run at a rate beyond their natural speed. We would like to hear the voice of the horse on this. We suspect that up to a certain reasonable point the horse enjoys running races. It is its natural habit. But in boat racing we have a palpable instance of cruelty to men, and some young men have been killed by it, while others have been wrecked physically for years or for life. We do not see that the Columbia College was a whit more of a college during the past year because its crew came out in last year's race a boat's length ahead of the crews of other colleges. Nor would we now take our boys from any other college to send them to Cornell, because the splendid athletes of that institution, came off victorious in the race about which so much interest has just centered.

There are to-day hundreds of college youths who are not taking half the exercise they ought to. They are those who see no probable success in their attempts at boat rowing, and who, therefore, row no boats at all. It would be well if the exercise were averaged more evenly. The desire for healthy exercise is noble. Exercise itself is magnificent. But let us have something which will tend to the development of yealthy constitutions, rather than that which will burry our ohung men into their graves, and saturate our institutions of learning with the accursed spirit of gambling.—*Christian at Work.*

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BOILER INCRUSTATIONS.—Protzen recommends the introduction of a piece of zinc into the boiler. This determines a galvanic current which protects the iron against oxidation and corrosion, and causes the mineral ingredients of the water to be deposited as a fine loose mud, entirely preventing the formation of "crock."

Inventions Patented in England by Americans.

[Compiled from the Commissioners of Patents' Journal.]
From June 4 to July 5, 1875, inclusive.

ROCK DRILL.—G. H. Reynolds, New York city.
SACK SEWING MACHINE.—H. P. Garland, San Francisco, Cal.
SELF-BALANCING BERTH, ETC.—W. Von Auer, Flatbush, N. Y., *et al.*
SEWING MACHINE.—R. Ashe, Boston, Mass.
SEWING MACHINERY.—J. E. Folk, Brooklyn, N. Y.
SPRING PLATES.—W. H. Porter, Bridgeport, Conn.
STEAM ENGINE, ETC.—E. D. Taylor, Jersey City, N. J., *et al.*
SUSPENDED BERTH, ETC.—T. P. Ford *et al.*, Brooklyn, N. Y.
SWIMMING SUIT.—Life-Saving Suit Company, New York city.
TELEGRAPH.—R. K. Boyle, New York city.
TELEGRAPH CIRCUIT.—W. E. Sawyer, Washington, D. C.
TOY.—W. Rose, New York city.
VENTILATING TUNNELS.—J. Dixon (of New York city), London, England.
WATCH CASE MACHINE, ETC.—C. L. Thiery, Boston, Mass.
WATERPROOF BAG, ETC.—L. F. Requa, New York city.
WATERPROOF COMPOUND.—L. F. Requa, New York city.
WORM DESTROYER.—G. W. Davis, Boston, Mass.

Recent American and Foreign Patents.

Improved Floodway for Warehouses.

John H. Morrell, New York city.—Pipes extending up through the building have the openings, in combination with sinks, covered by gratings upon each floor. The said pipes communicate with the eaves pipe above, the sewer pipe below, and with all of the sinks through the openings. In case of fire breaking out on any floor or room of a building, the damage by water may be confined thereto, as the water thrown into such room readily finds it way of escape into the sinks and down the pipes, thus keeping the floor of such room or compartment sufficiently free from water to prevent soaking through to the next floor below.

Improved Dryer.

Joseph F. Gent, Columbus, Ind.—This invention consists of an open hollow conveyer trough, and in a conveyer shaft having brushes (one or more) attached to it to sweep the surface of the trough, the heat for drying being supplied by exhaust steam discharged into the trough.

Improved Smoking Pipe Cover.

Frederick L. Suter, Brooklyn, N. Y.—This guard, retains the tobacco securely in the pipe, while allowing the free access of air and the ready compressing of the tobacco during smoking. The invention consists of a cover and guard, of bent wire, and provided with top handle and downward-extending spring-holding legs.

Improved Fastening for Egg and Fruit Box Covers.

Wendelin Weis, St. Paul, Minn.—The invention consists in providing the recessed side strips of the lid with double-acting band spring hooks, which are retained by cross wires and locked to staples of the side strips of the box.

Improved Case for Exhibiting Yarn.

Henry John Millmann, Milwaukee, Wis.—This is a case for keeping (secluded from dust) zephyr worsted, knitting cotton, and similar kinds of goods, for exhibiting them for sale, so that such goods may be examined without being handled until sold.