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### The Construction of Chimneys.

Much trouble is experienced everywhere with smoky chimneys, but more in some parts of our country than in others. Thus we have been informed, by a practical mason residing in Illinois, that no part of his business has bothered him so much as the construction of chimneys for farmers' houses on some of the prairies in that State. He has tried various plans of constructing them, to improve their draft, but during high west winds none of them draw well, and he would like to know the reason why. A smoky chimney is certainly a great infliction, and we pity all those who suffer from such an evil.

One question to be considered in building a chimney is its hight. The principle involved in this is, "the greater the hight the better the draft." Why? Because, when the column of air is forced out of a chimney by the smoke, the vertical pressure against the ascending smoke, is removed in proportion to the increased hight of the chimney.

The testimony of mechanical and civil engineers respecting the chimneys of steamboats, and those of factories, is uniform in regard to an increased draft being obtained, with an increase of elevation, and this opinion is founded on scientific data.

But another principle is also involved in the construction of chimneys, namely, that of maintaining the heat of the smoke or combustion gases, until they make their exit at the chimney top. The ascending force of smoke or heated gas, in a chimney, is just according to the difference of density between it and the column of air outside—the elevation of the temperature of the smoke above that of the air.

By reducing the temperature of the gases in a chimney to that of the air outside, its draft may be entirely destroyed. This explains the cause of retarded draft in new and damp chimneys, and flues, also in tall factory chimneys, in wet weather; the moisture absorbs the heat of the gases rapidly, and reduces their ascension force. The advantages of a tall chimney, may therefore be nullified by the rapid cooling of the gases in it, during their ascent.

There is a variety of opinions respecting the relative area of common chimneys, in proportion to their hight, but not a single author that we have consulted gives a rule or rules positively reliable.

We do not know why the chimneys of farm houses, on the Western prairies of Illinois, render the houses smoky, but we suppose it must be owing to the cold and high winds which sometimes prevail in those regions, cooling the smoke rapidly while it is in the chimney. The chimneys in the West, we infer, are no better built than those in the East. In general their walls are too thin; their interior rather rough; they are not sufficiently protected from absorbing moisture, and they radiate their heat too rapidly. Brick —the common material employed in their construction—is a tolerably good non-conductor. but very porous. The sides of a chimney should be made as thick as possible, plastered smooth inside, and coated outside, to prevent the absorption of moisture. By thus constructing chimneys of the common hight and diameter, and using inverted conical cowls, or caps, on them, or any of the most common caps, we are of opinion that most of the smoky houses, not only on our Western prairies, but other regions, may be effectually cured.

A wash, containing one pound of the sulphate of iron to a bushel of lime, is very excellent for the outside of chimneys.

### Steam Fire Engines.

This city has recently contracted with Messrs. Lee & Larned for two steam fire engines of large size, to be not only fire engines but also locomotives, capable of moving themselves by steam through the streets. This is taking hold too rank. The locomotive feature might be of some little service, especially in taking the machine home from a fire, when steam might be kept up without inconvenience, but it necessarily involves some additional machinery and will, we predict, lead to far more derangement and trouble than its assistance will be worth. It can at best be but an auxiliary power; men or horses must still be depended on to surmount any inclines or obstructions, and in the present snowy and icy condition of the streets, the assistance to be derived from connecting the rotary pump to the axles would be absolutely imperceptible. In the main point—that of running to the fire—the steam could not, probably, be raised in season to be of any practicable value. We object to making either children's toys or locomotive experiments of these powerful and expensive machines. Give us the simplest engines, the most active boiler, and the surest pump in the world, and make the whole as light as possible. If the steam fire engines of Cincinnati and Boston can be beaten in any of these points—as we believe they can in both the last named—let us do it as soon as practicable at a fair price, and let the machines be kept always in order for throwing water. Every additional device will involve more cost, more weight, and more chances for derangement and fracture of the whole.

### The Preparation of Drying Oil.

If oils did not possess the property of combining with oxygen, and thereby losing their soft or greasy quality (in other words, become *drying*) they could not be employed in painting. One reason why linseed oil holds such a prominent place as a menstruum for paints, is the superior quality which it possesses of absorbing oxygen from the atmosphere.

Some oils are of such a fixed character that they cannot be employed in paints because of their limited affinity for oxygen. The very best oils, however, are slow dryers, hence they are treated chemically, to give them drying qualities. There are chemical compounds called "dryers," which painters mix with oil, to feed it with oxygen, or to separate its glycerine. Turpentine is nothing more than a drier; but the oxyds of lead and zinc, in the form of sulphates, boiled with oil, are the most common driers.

The nature of the action of *dryers* upon oil is of much interest to painters, especially as so little attention has been given to the subject by chemists.

A recent number of the London *Chemical Gazette* contains a brief account of experiments by the eminent German chemist, Professor Wagner, in this field of practical chemistry, a succinct but clear account of which will interest a large circle of readers.

He repeatedly prepared protoborate of manganese for driers, and effected its precipitation whilst hot, and thus obtained it of a coffee-brown color, and consequently containing much oxyd, and always of remarkable efficacy. He, however, endeavored to obtain it perfectly free from oxyd, and for this purpose effected the precipitation with borax cold, and obtained a snow-white powder, but this furnished no varnish. He therefore returned to the previous mode of preparation with the assistance of heat, and found that it was obtained of the darkest brown, and also of the strongest action, when both the solutions of sulphate of manganese and borax were diluted as much as possible and mixed boiling.—The siccative action upon the oil must, therefore, be ascribed to the oxyd, and not to the protoxyd.

By further experiments he found that the boracic acid is quite superfluous, and that free oxyd of manganese or its hydrate is as efficacious as the borate. The oil need only be heated for a very short time—about a quarter of an hour—with about one-eighth per cent. o the hydrated oxyd of manganese. The heat applied need not approach the boiling point by a long way; but no general temperature can be given, as new oil has a much higher boiling-point than old. The siccative quality, however, increases with the heat. But as the oil becomes darker and thicker in proportion to the heat to which it is exposed, it is the best plan in general to remove it from the fire as soon as it clears and begins to fume very slightly. Streaks of it now become firm in twenty-four hours. To obtain the drying oil of a very pale color, it must be heated still less. The drying is thus retarded several hours, but the color has scarcely become perceptibly brownish, whilst in the former case it always acquires a chestnut brown color.

He obtained a wine-yellow oil, quite unaltered, without heat, by mixing 1 per cent. of hydrated lime with a linseed oil four years old, which dried by itself in three days. After being frequently stirred for two days, a streak of it was perfectly firm in twenty-four hours. Oil of the same year, however, did not become siccative even by boiling with lime.

The oil dissolves very little of the small quantity of oxyd of manganese, and the salt when removed may be repeatedly used in the preparation of drying oil. When a drier oil is mixed with an equal weight of crude oil, it requires nearly twice as long to dry; but the time necessary for the solidification of the coating gradually diminishes with the age of the oil.

### Safety of Life in Steamboats.

We are indebted to Benjamin Crawford M. E. of Pittsburgh, Pa., Inspector of Steamboats in the Seventh District, for a copy—just published—of the proceedings of the fifth annual meeting of the Board of Supervising Inspectors, held at Boston in October last. It contains matter of interest, not only to the engineering community, but the whole travelling public. A very striking feature in this report is the large number of boilers (134) found defective during the year. Twenty of these were condemned from further use; the others ordered to be repaired and strengthened. This large number of steamboat boilers proved defective, by the hydraulic test, and by which undoubtedly several explosions were prevented, leads us to demand the enactment of laws in every State for testing the strength of all steam boilers for locomotive and land and boat engines, before they are allowed to be employed for constant use.

On another page there is a communication on steam boilers from Mellen Battel, one of our oldest and most experienced steam engineers and inventors, in which he points out how boilers should be stayed and constructed and his opinions deserve general attention. He also gives his views regarding the cause of priming or foaming in boilers, and how it can be prevented. His theory is certainly original, and if correct, a remedy for this dangerous action in steam boilers can be easily provided. From the Inspectors' report, we learn, that of the two explosions which took place on steamboats, during the year, resulting in loss of life, one was caused by the boilers *priming*. This was the *Metropolis*, a steamboat on its first trip on the Ohio river, and the first explosion which has taken place on that river since the new steamboat law was rendered in 1852. In this case the engineers were deceived by the foaming of the water, a very unusual thing in high pressure boilers and on our Western waters; but a full investigation by the Inspectors at Cincinnati evolved the fact conclusively that the boilers were red hot in some parts from want of water, and that the metal was torn apart with a very moderate pressure of steam. By this accident eleven lives were lost. This feature in steam engineering demands further investigation, and for this purpose we direct the special attention of our engineers to it.

The most serious accidents during the year were caused by the burning of vessels—most of which occurred on the lakes—and no less than 177 lives were lost by them. The Inspectors have done much to render steamers more secure against accidental fires, but a great deal more is yet required, and not until all their entire boiler rooms are enclosed in plate iron will safety from fires be insured. The Inspectors recommend that all steamers be provided with pipes leading from the boilers to all parts of steamers, for the purpose of using the steam to extinguish fires should they occur. This is an excellent plan, and one which we have on several occasions recommended for the purpose.

A communication from Jas. H. McCord, Inspector of Boilers in the St. Louis District, related his experience with fusible plugs in boilers. Those made of alloy, he stated, were a source of trouble and annoyance to all those who were compelled to use them, and they were also unreliable, and he requested that their use be suspended. A few weeks since we directed attention to the character of these plugs in boilers, and the views of Inspector McCord accord with those we then expressed.

There are three points of peculiar interest to which we request Government Inspectors and all engineers to direct their attention during the present year, namely: priming in boilers, safety plugs, and the rendering of steamboats fire-proof. Much scientific and practical information on these three points have yet to be elicited.

### A Turpentine Explosion.

For want of scientific knowledge a dreadful accident occurred near the village of Steuben, Pa., on the 21st ult. The Rev. E. H. Havens, a Wesleyan Methodist minister, was engaged in the preparation of a balsam, of which the principal ingredient was spirits of turpentine. He had about two gallons of this fluid and a quantity of rosin boiling together in an open vessel upon the stove. By some means fire was communicated to the inflammable mixture, and while he was endeavoring to convey it out of doors, an explosion took place, scattering the burning fluid over the persons of himself, his wife and three children who were in the room, and setting fire to the building. The father, mother and a daughter died soon after the explosion.

Turpentine is not explosive, but it is a very volatile hydro-carbon, and easily converted into gas by heat. If its gas be saturated with eight times its volume of the atmosphere, and a spark or light applied to it, the whole will explode instantaneously. This was the manner by which the serious accident described was caused. The turpentine was evaporated from the vessel on the fire; it became saturated with oxygen, and thus the contents of the room became combustible, and was ignited at once by the flame of the blazing rosin. If the preparation had been made in a close vessel on the fire, to prevent the turpentine evaporating into gas, this accident would not have taken place. All hydro-carbon volatile fluids, such as turpentine, alcohol, benzole, camphene, &c., should always be kept in close vessels. For the sake of preventing other accidents of a kindred character, we hope these facts will be made to reach every household in our land.

### Pictures on the Retina of Deceased Persons.

It has been asserted that as images are impressed on the retina of the eye, the last scene or image pictured on the retina of a person suddenly deprived of life would remain upon it, and could be viewed, if the schlerotic coat (white of the eye) were removed. It was proposed by one of the Coroner's Jurors, in the case of the late Dr. Burdell, assassinated in this city, that an examination be made of his eye to find out some clue to the assassin, by the image impressed on the retina. No such examination was made. Prof. Doremus stated to the Court that no good authority had ever endorsed the opinion respecting impressed pictures on the retina of deceased persons: he believed such opinions to be erroneous.

### Models! Models! Models!

We have several models in our possession which have come from sources entirely unknown to us, as there are no names attached, to them. This is very annoying to us, and must prove so to the inventor. In sending models, inventors should always prepay the charges, and forward us the express receipt without delay. This saves double payment in many cases.

### Bituminous Shales for Making Gas.

The Toronto (C. W.) *Globe* states that Prof. Hind recently delivered a lecture in that city, before the Mechanics' Institute, on the above subject. He stated that a light illuminating gas was produced from a species of bituminous shale—a rock extending from Whitby and Oshawa on Lake Ontario, to Collingwood on the Georgian Bay, Lake Huron.

There is still a dearth of fuel in Cincinnati; crowds of people press forward to the coal yards, taking their turns in purchasing.

### Carbon.

This is one of the fifty-three simple substances known at present as constituting the materials of our globe. It has long been known under a number of different forms, such as coal, diamond, and plumbago. It exists both in the and inorganic organic kingdoms of nature, but it especially belongs to the latter, for the great coal deposits, which constitute its great store-houses, are undoubtedly of vegetable origin. It has been ranked by some writers as the base of organic nature.

The purest form of carbon, as ordinarily procured, is charcoal, which is developed by exposing animal or vegetable substances to heat, and excluding the air. The means commonly had recourse to for the preparation of charcoal are illustrative of a leading chemical quality of this body—its complete fixity even at the highest temperature, provided the accession of air is prevented.

When prepared from wood of diff.rent species, the resulting charcoal differs as to its density, its power of electrical conduction and certain other characters; and on examining other forms of black carbon, such as anthracite coal, coke, and plumbago, other points of difference are recognized. Common bituminous coal is not carbon, but an association of many complex unions of carbon and hydrogen, from which heat expels the volatile parts leaving coke behind, which is a mixture of carbon with small quantities of metallic oxyds.

Amongst the most interesting forms of black carbon is plumbago or black-lead—formerly considered to be a carburet of iron—but the best specimens of plumbago are free from iron. Lead is never present in plumbago, hence the appellation "black lead" is a misnomer.

The employment of plumbago in the manufacture of pencils is too well known to require comment. For this purpose the best quality of plumbago was the produce of Borrowdale, in Cumberland, England, but this vein is now quite exhausted. Most of the ordinary pencils now used are manufactured from a factitious paste, made of powdered plumbago, antimony, and sulphur, fused together, cast into blocks, and these blocks sawn into bars of the required length and size. The great disadvantage of these pencils is their grittiness, and the difficulty with which their marks are effaced by india rubber. The best of pencils are made by subjecting the powder of plumbago to extreme hydrostatic pressure simultaneously with the abstraction of all remaining traces of air by means of the air-pump.

A material very much like plumbago in appearance, and which is formed, under certain circumstances, in gas retorts, is called *plumbagine.* Ivory and bone black are varieties of charcoal which result from the concentration of ivory and bones in retorts.—They are employed for a variety of purposes. Ivory black forms a constituent of the finer kinds of printing-ink—that used for copper and steel plates. Bone black is chiefly used in the decoloration of raw sugar in the operation of refining. For this purpose the bone black is prepared in the state of grain, packed into large cylinders, and the colored sugar solution allowed to percolate through.

The most extraordinary and beautiful, as well as the most valuable form of carbon, is the diamond, a gem which has been known and valued on account of its resplendent beauty, from the earliest ages.

Its composition is undoubtedly carbon, because the sole result of its combustion in oxygen is carbonic acid gas; but the origin of the diamond is a subject of much curious speculation. As its structure is crystaline, the diamond has been at some early period in a liquid or semi-liquid condition—a state which pre-supposes fusion by fire, or solution in some menstruum. Opposed to the first hypothesis is the circumstance that within the structure of many diamonds are seen remains of organic beings—appearances scarcely consistent with the assumption that the diamond was once in a state of igneous liquidity. Sir David Brewster inclines to the opinion that the diamond is a drop of fossilized gum.

The extreme beauty which this gem is capable of assuming can only be developed by a tedious process of cutting, unknown even to this day in its full perfection by Eastern nations, and of somewhat modern introduction to Europe, viz., in the year 1456 by Louis Berghen, of Bruges, who accidentally discovered, that by rubbing two diamonds together a new face was produced. The diamond is so hard that it can only be abraded by portions of its own substance; hence, diamond powder is universally employed for that purpose; such stones as, on account of their inferior color or their flaws, are valueless as gems, being broken down into powder for the purpose of cutting others. At present, and for a long time past, the head-quarters of the diamond-cutting operation are at Amsterdam, Holland, where the operation is conducted by Jews exclusively.

The weight of diamonds is estimated in carats, 150 of which are equal to one ounce troy, or 480 grains. These carats are subdivided into halves, quarters, or carat grains, eighth, sixteenth, and thirty-second parts. The rule for the estimation of the value of diamonds is peculiar, and supposing the gems under comparison to be equal in quality, may be expressed as being in the ratio of the square of their respective weights. Thus, supposing three diamonds to exist, weighing, respectively, one, two, and three carats, their respective values would be as one, four, and nine.

Farmers have not yet learned the value of charcoal as an agent in fertilization. In the form of a dust it absorbs and retains ammoniacal solutions; and on sandy and clayey soils is valuable for retaining carbonic acid, which is positively necessary to the growth of every plant. Charcoal ground into dust, and mixed with manure, or sown on sandy and clayey soils, has a most beneficial effect in promoting the growth of vegetables.

### Crystalization.

We copy the following beautiful extract from an editorial in the Philadelphia *Ledger* :—

"Crystalization is found through all nature. There is not a substance, which, when allowed the free movement of its particles, does not exhibit a tendency to crystalize. Water at a low temperature crystalizes into ice. Metals slowly cooled after melting, crystalize. The gases, evanescent as they seem, may be made so artificially cold as to crystalize. Our children eat crystalized sugar under the name of rock-candy, and we ourselves use it in the loaf, crystalized in another form.

What is glass but a crystal? The sizes of crystals vary infinitely. There are crystals too small to be recognized except under a microscope; and there is one at Milan weighing nearly nine hundred pounds. The White Mountains of New Hampshire are a vast aggregation of crystals. The Mammoth Cave in Kentucky is an enormous museum of crystals. As yet, however, with all our knowledge, we are comparatively ignorant of the laws of crystalization. Under them, we see atom arrange itself by atom in mystic, myriad forms; we discover also, that not only magnetism, but light and heat exercise an influence in crystalization, but there our information substantially stops. The science of crystalization is almost a sealed book. Its mightiest curiosities still lie, like the virgin islands of the Pacific before the days of Cook, awaiting the skill and perseverance of some fortunate explorer."

### Rosin Oil.

The following, from the New Orleans *Picayune*, affords evidence of the progress of the manufacture of rosin oil in New Orleans, and the use of rosin oil gas on plantations in Lousiana :—

"We some years ago announced the formation of a company in this city for the manufacture of oil from rosin, and now it affords us pleasure to be able to state that the undertaking has proved a complete success. The attempt to extract oil from such a substance was at first looked upon as simply ridiculous, for between rosin and oil there was nothing held to be in common. But there are more wonders between heaven and earth than ever was embraced in any man's philosophy; and the making of rosin oil is one of those recently developed wonders. The discovery was made and patented by Mr. Robbins some four or five years ago, and has ever since been slowly though surely working its way into popular favor. Last spring a company, under the title of the 'New Orleans Manufacturing Company,' was formed in this city, with a capital of $100,000; the patent right for this State was obtained; a site was purchased on the road side of the new canal, and now the works have been completed and are capable of turning out over 500 gallons of crude oil per day. To make paint oil, or the best description of lubricating oil, the crude article has to be twice refined, and altogether about ten per cent. of the original substance is dissipated in gases. Of the remainder, every portion is greatly superior in value, bulk for bulk, than rosin, while the greater portion of the product is worth from fifty to seventy-five cents per gallon. The oils produced by the various processes made use of are gas oil, paint oil, lubricating oil for machinery, tanners' oil, tallow oil for light-colored leather, bright varnish, naphtha, black varnish, cart grease, and pitch. The various kinds of oil are classed according to the number of distillations which they have undergone, and the residuum is pitch.

The success of the experiment thus far has been so satisfactory that the company has already determined to increase their works by the addition of two more stills. No fewer than two hundred planters have ordered sets of apparatus for the manufacture and use of rosin oil gas."

### The Mesmerism of Machinery.

A Birmingham (England,) paper describes the following remarkable case, which is stated to have taken place in one of the large iron manufactories in that place :—

"One of the most singular instances in connection with material things exists in the case of a young man, who, not very long ago visited one of our large iron manufactories. He stood opposite a large hammer, and watched with great interest it perfect, regular strokes. At first it was beating immense lumps of crimson metal into thick sheets, but the supply becoming exhausted, at length it only descended on the polished anvil. Still the young man gazed intently on its motion; then he followed its stroke with a corresponding motion of his head; then his left arm moved to the same tune; and finally, he deliberately placed his fist upon the anvil, and in an instant it was smitten to a jelly. The only explanation he could afford was, that he felt an impulse to do it, that he knew he should be disabled, that he saw all the consequences in a misty kind of manner, but that he still felt the power within above sense and reason—a morbid impulse, in fact, to which he succumbed, and by which he lost a good hand."

This story may be true; as wonderful events as this have occurred before. It certainly has a Baron Munchausen look about it, but we presume all have at times felt more or less of a similar temptation to thrust the hand into shears, gearing, or the like.

### Louisville Mechanics.

The best criterion by which to judge the intelligence of any people, is from the means they employ to acquire useful knowledge. There is no city in the Union that can claim a more intelligent class of mechanics than Louisville.

At the commencement of the present Volume of the Scientific American, the enterprising publishers offered to the persons who should send them the twelve largest Clubs of subscribers by the 1st of January, 1857, *one thousand dollars* in Cash Prizes. The last number of that paper that has reached us contains the commencement of the awards, and the mechanics of Louisville, through the agency of D. McPherson, Esq., stand at the head of the list, for the first and highest prize of $200. This is the second time this honor has been awarded to the mechanics of Louisville. First in 1855, and in 1856 they received the award for the second highest prize, and now again for the first. It affords us pleasure to make this announcement.—[Louisville Courier.

[Our cotemporary could not have paid a more just and merited compliment to the mechanics of Louisville, than it has done in the above paragraph. As we cannot have a better test of the character of a man than "the company he keeps," so the best criterion of the intelligence of any class of men, is just the means they employ to acquire useful knowledge; and, in this respect, the citizens of Louisville may well feel proud of the r mechanics—they are not merely great readers, but *good* readers, and they have earned for themselves a noble reputation for intelligence and practical skill.

### Genius under Difficulties.

The following case is one of such a rare and peculiar nature that we feel it our duty to present the correspondence, especially as the circumstances are therein explained in a very lucid and interesting manner. We copy, *verbatim et literatum* :—

Look out for Mistakes.

——, Pa. Jan 22it 1857.

Munn & Co Dear sir

your favour of the 17it inst At at one favour i Ask of you if you will Please to Come here i will inform you of My Improvemetnt And Should it be An unjust one as it is frequently the Case i am willing to go with you to Case New York and work for to pay your Expenc for Coming here And further i think i have as good an impovement and Better for the Purpose Designed for Cheapness and Durability and if you do Not want to go to the Expense of Coming here Please send the Money and and you will Not be the loss of or Regret of it

As i am No Seffisf kind of a Man the Reason i ask this Favour i have been on on a Deep Study for the Last 6 mo on different Plans Concerning the improvement to Find the Cheapest way of Putting the Machinery Where it is Designed My My Pocket Book beCame subject of the sweeny i will Come to a close By say My Pen is Bad My ink is Pal My upright and Contrite heart to you Shall Never Fail

Yours Truly

G. W. L——.

I think We Can Come to terms for i Like to Live While i am Alive and i Like to See others Live too

yours truly G.W. L. ,

you Can find Me By Enquiring of David P Browns Coal works at Mount Laffe David Lives in Market Street Most any Body Can show you Where he Lives

Want of time and funds will, unfortunately prevent us from following up this promising case.

### Growth of Coral Islands.

The reef building coraline will not operate in water of a mean winter temperature less than 68 deg., which circumstance confines it principally to the torrid zone. It is for this reason that corals do not grow on the coast of South America. On our own coast they grow to a greater distance north than elsewhere, owing to the presence of the Gulf stream. Their growth is also limited by the depth of water—ten or fifteen fathoms. Another condition is that the reef coral will not grow in fresh water, nor in turbid or muddy shores. Whenever rivers or muddy waters pour into the sea, there is a break in the coral reef. The washing of the waves is also necessary to its growth; consequently it will thrive on the windward side of an island when it will not on the leeward side. At first, when a coral island is formed, it gives growth only to the lowest order of vegetables, such as feed on air. These decay, and thus leave a little soil which by and by sustains a higher order of plants. These islands seldom rise more than ten or fifteen feet above the water, and are seldom more than half a mile broad. There is a vast area in the Pacific 6000 miles long by 3000 wide, without any coral islands.

### Rise and Fall of Water in Lake Erie.

At a recent meeting of the Cleveland (O.) Academy of Natural Sciences, Colonel Whittlesey exhibited tables and diagrams of the rise and fall of water in Lake Erie, from the year 1796 to 1852, the maximum being in 1838, the minimum in 1819 and 1820, the variation being 4·55 feet. Rain gauges were kept for various periods in different places in the lake region. He also stated that, by a long course of observation he had discovered the existence of a short pulsating wave in this chain of lakes, and entirely independent of winds or currents. Its altitude does, in no case, exceed eighteen inches—more commonly four or five. Its periods of vibration are short.

The sum of $5,060.000 has been paid by our government to the Collins' line for carrying the mail.