Correspondence.

Pumping up Water Forty Feet.

To the Editor of the Scientific American:

Referring to query No. 76, January 31, the following experiment may interest some of your readers. While exhibiting a rotary pump at a county fair, we raised water by suction forty feet high quite successfully, using the following arrangement at the foot of the suction pipe: We placed an ordinary globe valve to close the pipe tight, and a ¼ in. air cock tapped into the pipe just above the valve; before starting the pump we primed it, so that the piping was completely filled with water. As soon as the pump started, the vacuum gauge marked 27 in.; we then opened both the air cock and the globe valve very slowly, until the gauge went down to 24 in., when the pump began and continued to discharge a stream of air and water. We then by the use of a 3-way cock turned this stream into a large air chamber provided with an air cock at the top and a fire hose at the bottom. This separated the water and air, and delivered a steady stream under a pressure of about 30 lb. per sq. in. We could not get any higher pressure, as we were obliged to keep the air cock on the air chamber open in order to take care of the air taken in at the suction pipe.

The theory we worked upon was that a column of air and water can be raised as much higher than a column of water as the first is lighter than the last, limited, however, by the fact that only a small quantity of air can be mixed with the water before it will begin to separate in the suction pipe,

Respectfully, A. H. L.

Watertown, N. Y., 30th Jan., 1885.

[The above is correct, but requires a quick movement of the pump to make it successful. When the pump is stopped, the water cannot be started again without the repetition of the priming and special manipulation. It might be a serviceable device for special cases.—ED.]

A New Use for Safe Deposit Vaults.

One of our well known New York seed firms has now on deposit in the Mercantile Safe Deposit Company's vaults four hundred pounds of Henderson's snowball cauliflower seed, which at the selling price of one hundred dollars per pound shows the value of this seed to be forty thousand dollars. Not only is this plan of depositing in vaults found to be cheaper than insurance, but what is of more importance is that if the seed should be destroyed by fire this quantity necessary for their trade could not be replaced at any price in time for the spring sales. When it is considered that four hundred pounds of cauliflower seed will under favorable conditions produce nearly thirteen million plants, which when headed for market and sold at even 8 cents per head will produce the sum of three-quarters of a million dollars, the value this vegetable has attained in this country, where twenty-five years ago it was almost unknown, becomes readily apparent.—*The American Garden.*

To verify the above statement, which seemed to us rather extraordinary, we wrote to Mr. Henderson, the well known seedsman of this city, to inquire if the account was correct. He replies as follows:

To the Editor of the Scientific American:

In reply to your inquiry respecting the employment of safe deposit vaults for storing seeds, I would say that by accident we got possession of a small quantity of the cauliflower seed that had been grown in an out of the way place in Europe some ten years ago; and in a test in our trial grounds with our other kinds of cauliflower we found this so much superior in every respect that we determined to have it grown in quantity, and did so, and have so far been able to keep the secret of its source from the rest of the trade—a very important matter in our business. What we state about it is strictly fact; that we have over 400 pounds of it in the company's vaults, the retail price of which is $100 per pound. This is the first season that we have placed it in the vaults, as in making our list of goods for insurance we found that it would be more profitable to us to pay for the space in the vaults than to pay insurance on it in our regular warehouses. Besides, it would have been difficult to make any insurance company believe that we had so much value in so little bulk. Moreover, we find that the uniform temperature of the deposit vaults is the best in which seeds can be kept, and it is probable that we will further use them for many of our valuable seeds.

PETER HENDERSON.

February 24, 1885.

Loss of Wealth by Fire.

In this country the losses by the burning of buildings and their contained property are about one hundred millions of dollars per annum, and the losses of lumber by the burning of forests are estimated at three hundred millions yearly; in all, four hundred millions of dollars. Could these enormous losses be stopped, the country would soon grow very rich.

Sidney Gilchrist Thomas.

On the 1st of February, at Paris, after prolonged illness, Sidney Gilchrist Thomas died, aged 34. This announcement will send a pang of sorrow through the iron and steel world. It is no exaggeration, remarks *Engineering*, to say that the most promising light of the steel world has now gone fromamongus. To know him was to admire him. The rapidity with which the invention, so associated with the name of Sidney Thomas, has been brought to its present importance is very remarkable, but that he considered his labors, in his peculiar sphere, unfinished is to be taken for granted, and up to within a few days of his death he was pursuing his work with all the strength of mind and body which, after a prolonged illness, he could command. So inseparable was labor to him that, being too ill to dictate, he wrote himself, and his correspondence, occasioned by the numerous patents he had taken out, the success which he lived to see realized in so many of them, and the experiments based on his ideas which he organized, occasioned a mass of correspondence at once very voluminous and very difficult. The outline of the history of the basic process is soon told.

Starting the idea with his cousin, Mr. Gilchrist, the experiments at Blaenavon were rapidly brought to a success. The first paper by Messrs. Thomas and Gilchrist was offered for reading at the Paris meeting of the Iron and Steel Institute, 1878. It was placed near the top of the list, but at the last moment was removed, and before the news of the change could reach us a part of it appeared in *Engineering*. This attracted so much attention that the paper was read at the next meeting. Trials were made at Dowlais, at Eston, at Thy-le-Chateau, and at Hoerde; success was then insured, and the rapid adoption of the process throughout the Continent followed.

In April, 1882, a second joint paper was read at the Society of Arts, and obtained the society's medal. In the autumn of the same year, at Vienna, Mr. Thomas was presented with a most chastely designed casket, made entirely of basic steel. This graceful acknowledgment of his work was presented by Herr Baumler, on behalf of the Prager Eisenindustrie Gesellschaft. His labors meanwhile were largely directed to the erection of the Northeastern Steel Works, Middlesbrough; these were started in June, 1883, andsincethen they have led the van of the basic process in England. In September of the same year, Mr. Thomas was presented by the Council of the Iron and Steel Institute with the Bessemer gold medal; and the letter he wrote to the president on that occasion, almost attributing the success of his inventions to others, is eminently characteristic of him. With excellent taste, under the circumstances of his absence, the presentation was personally made by Sir Henry Bessemer.

Since that time all endeavors to ward off the lung disease which had struck him down had failed, and sea journeys to milder climates, and residence in Algiers, were in vain. He returned to Paris in the summer of last year, where he obtained the highest medical advice; but death overtook him. During the last fortnight he was gradually sinking. His request to his relatives was that they should not be asked to take another winter journey on his account, and to lay him where he died.

Some Facts about Dynamite

Nothing is more common than to hear people express surprise, in view of the recent dastardly outrages in England, that the manufacture and sale of dynamite by irresponsible parties is not strictly prohibited by law. This, however, has been done, and so far as the law can be executed, there is no danger. The trouble lies in the ease with which the explosive can be made.

The base of all the higher explosives is nitro-glycerine, which is formed by the action of concentrated nitric acid, in the presence of strong sulphuric acid, upon glycerine at a low temperature; great care has to be taken in regulating the temperature during the operation, but upon a small scale the nitro-glycerine may be readily prepared by dropping the glycerine into the mixed acids, the mixture being kept artificially cooled. Of course glycerine, as also nitric and sulphuric acids, are so widely used medicinally and for industrial purposes as to make their purchase an easy matter, where nitro-glycerine itself would not be sold. But with the nitro-glycerine which can be produced therewith, can easily be made dynamite of any degree of strength, by just mixing with infusorial earth, sawdust, charcoal, or even with sugar, or any one of many similar substances—these latter just serving to soak up and hold the nitro-glycerine. The strongest dynamite is that in which infusorial earth is used, that will soak up three parts by weight of nitro-glycerine to one of its own.

For commercial purposes dynamite is packed in cartridges of various sizes, from one to two inches in diameter, and about eight inches long. It is commonly supposed that dynamite is easily exploded by concussion, but under ordinary conditions this is not the case. Neither is it exploded by fire. It is easily ignited, and in burning gives a most intense heat; but it cannot, usually, be made to explode in this way when unconfined. The ordinary way in which it is exploded is by means of fire and concussion at the same instant. For this purpose a strong copper percussion cap containing fulminate of mercury is used. Without the cap the cartridge is not considered dangerous by those accustomed to handling it, and the cap is not inserted until just before the cartridge is to be used.

The best dynamite is about twelve times as powerful as gunpowder, and is very effective for blasting purposes. It freezes at about 45°, and it is almost impossible to explode in a frozen condition. It may be used under water. The paper shell of the cartridge has a covering of paraffine, which is not easily penetrated by water; but even if the dynamite is wet its explosive properties are not destroyed, though if it remain in the water any length of time the glycerine is washed out, and the destructive value of the compound lost. There is a marked difference in the explosion of gunpowder and dynamite; the former, if placed on the floor of a building and exploded, might blow out the windows without seriously injuring the structure; but dynamite exerts a powerful force downward, and for this reason is used by the so-called "dynamiters," as they can hastily place it anywhere in a building, without confining it, as would be necessary with gunpowder.

The Texas Salt Lake, La Sal del Rey.

This remarkable salt lake, which has attained a widespread celebrity, is situated in the county of Hidalgo, Texas, about forty miles north from Edinburgh, the county seat, which fronts the old Mexican town of Reynosa, on the opposite side of the Rio Grande del Norte, and about seventy miles northwest from Brownsville. Its geographical position, as shown on the maps, is about 26° 32′ north latitude, and 98° 4′ west longitude. It lies in the broad prairie that stretches from the Rio Grande on the south to the Nueces on the north and the Gulf of Mexico on the east, but is immediately surrounded by a wide fringe of dense thickets, composed of guisache, ebony, mesquite, and other different varieties of trees indigenous to the country. It is embraced within the limits of a tract of seventy-one leagues of land, orignally known as "La Noria de San Salvador del Tule," claimed to have been granted by the government of Spain, about the year 1798, to one Juan Jose Balli.

It is in form an ellipse, about one mile in length and five miles in its circumference. Its depth nowhere exceeds three or four feet, and its bed consists of pure rock crystal salt. The water is a brine of unusual strength, which crystallizes with such rapidity that no matter how large a quantity of salt is removed from the bed of the lake one day, its place will be found filled with salt of a similar quality the next. This indicates that the supply of salt is practically inexhaustible, while in purity it ranks with the best rock salt productions of this continent or of Europe, being composed of 99·0897 parts chloride of sodium, or pure salt.

An analysis of it, made in 1860 by Dr. Riddle, then Assayer at the Mint in New Orleans, gave the following result:

Matter insoluble	0·5103
Sulph. magnesia	trace
Chloride sodium	99·0897

All salt is more or less mixed with impurities, the only known exception being the product of the Wieliczka mine, in Poland, which is one hundred parts pure chloride of sodium, or salt. The best salt is pure rock salt, in which class that of Wieliczka stands at the head; but in general commerce it is practically unknown, in consequence of its remote inland location. It has, nevertheless, for centuries been the source of a princely revenue to its proprietors, and often constituted the dower of royal brides.

In this country there are only three sources for the supply of rock salt, viz., Holston, Va., the Petite Anse, La., and La Sal del Rey, Tex.

La Sal del Rey and its surroundings have never been geologically examined or explored. The indications are that the powerful brine, which crystallizes into rock salt in its bed, is merely an exudation from an adjacent mine of rock salt, equal, perhaps, in purity to that of Wieliczka, the slight percentage of impurities it contains being probably acquired by the brine while percolating through adjoining strata.

IT was discovered upon examination not long ago, that a chimney 80 feet high at a machine shop at Holyoke, Mass., was about 42 inches out of perpendicular. The method employed in righting was quite simple. A harness was located under the cornice, and two others below the first. Two lever jackscrews were placed under the girders of one of the harness on one side, and six jackscrews similarly on the other side. The earth was then carefully loosened about the chimney on the opposite side from that of its inclination, and water poured in, after which the jackscrews were turned gradually, and the earth again loosened and dampened with the hose. After this process had been several times repeated the earth was puddled, and the whole stands now properly righted.