

TALK WITH THE BOYS.

NO. 5.—CARBONIC ACID ALL ALONE—THE SCIENCE OF BURNING LIME—THE METAL IN THE GREEK SLAVE.

"Do you want my mouse, father?"

"Yes, you may bring him up and have him ready here. But first we will have Charles' marble dust and acid; and, John, ask your mother to send up three or four white preserve jars."

"Are you going to get carbonic acid out of sulphuric acid, sir?"

"No; I am going to get it out of marble dust. There is water in marble as there is in almost everything else; but apart from the water (and impurities), every 50 lbs. of marble consists of 22 lbs. of carbonic acid and 28 lbs. of lime. It is the carbonate of lime. If it was a combination of carbon alone with lime it would be the carburet of lime, but combinations with carbonic acid are called carbonates. The lime is composed of oxygen and a white silvery metal called calcium. Calcium, like all the metals, is a simple substance, and you may make a ball, Charles, to represent its atom."

"How heavy must it be, sir?"

"An atom of calcium is a little more than 20 times heavier than an atom of hydrogen, but we will omit the fractions and call it 20 times. It is of the same size. An atom of lime is composed of one atom of calcium, combined with one atom of oxygen; and as the atom of oxygen weighs 8 times more than an atom of hydrogen, the weight of an atom of lime is 28. An atom of carbonate of lime is composed of one atom of carbonic acid which weighs 22 and one atom of lime weighing 28, making the weight of an atom of carbonate of lime 50; so that, in 50 lbs. of pure carbonate of lime, 28 lbs. are lime and 22 lbs. are carbonic acid."

"Shall I mark the calcium ball C?"

"No. You have already marked the carbon ball C; you may mark this Ca, and CaO will stand for oxyd of calcium or lime. Have you mixed some water with the sulphuric acid, as I told you?"

"Yes, sir, and it made the bottle very warm."

"Now, pour some of the sulphuric acid upon the marble in the jar."

"How it foams! Look, John."

"Roll up a piece of paper, John; light it at one end and hold the lighted end in the jar."

"What makes it go out so quickly, sir?"

"The carbonic acid, which has been separated from the marble by the sulphuric acid, has filled the jar, pushing out all the air, and nothing will burn in carbonic acid. Throw another handful of the dust into the jar, pour in a little more acid, and then put in the cork that has the india-rubber tube through it, and bend the other end of the tube over into another jar. Now, as the carbonic acid continues to separate from the lime it will flow through the tube and fill the second jar."

"What makes carbonic acid separate from the lime?"

"Lime has a stronger affinity for sulphuric acid than it has for carbonic. Sulphuric acid is a perfect old Turk; it wants to wed itself to everything that it meets. When it comes in contact with lime, it serves it in the same way that the Roman soldiers of whom you were reading did the inhabitants of Messina."

"How was that, Charles?"

"They drove off the men, and took possession of their houses and wives."

"Carbon and oxygen are so perfectly united with each other, that they do not care much for other things. Carbonic acid may remain in quiet combination with lime for thousands of years; but if anything that the lime likes better touches it, or if the lime gets into a hot place, the carbonic acid leaves. When you pour the sulphuric acid upon the marble, the lime of the marble enters into combination with the sulphuric acid, and the carbonic acid passes off in the form of gas. The combination of the sulphuric acid and lime forms the sulphate of lime, the same as gypsum or plaster-of-paris."

"Is that jar filled now with something that we cannot see, that 10 minutes ago made a part of solid marble?"

"Even so."

"That is very curious. And the solid part of the marble is a metal?"

"The metal is no more solid than the carbon and oxygen, when all three are combined in the marble. Pure carbon, when it is crystallized, is the very hardest substance known. It is then called diamond."

"What sort of a metal is calcium?"

"It is a white metal; it looks somewhat like silver. Its affinity for oxygen is so great that, in the open air, it combines with it very rapidly; in other words, burns right back into lime. This property of oxydizing so readily, entirely destroys the value of pure calcium, though, when combined with oxygen, forming lime, it is of great value for many purposes."

"I never knew before that there was a metal in marble. Has all marble got this metal in it, father?"

"Yes. All marble is the carbonate of lime. Powers' statue of the Greek slave, if it was heated red hot so as to drive off the carbonic acid, would yield about half its weight of first quality lime, suitable for mortar or for white washing. Marble is, in fact, the ore of the metal calcium. Nearly all the rocks, as well as clay and earth, are metallic ores. Try your lighted paper in the mouth of the second jar, John, and see if that is full yet of the carbonic acid."

"Yes, sir, it puts the paper right out."

"Bring your trap then and drop the mouse into it. Is he alive?"

"Yes, sir; he has eaten up all the pumpkin seeds that I gave him. Shall I open the trap and drop him into the jar?"

"Yes; let him go in. How he clings to the wires."

"Why, father! What is the matter with him? He is dead!"

"Yes. I knew he would not live long in that jar. No breathing creature can live in pure carbonic acid. Take up the jar, Charles, very steadily, and pour the gas on the flame of this candle; steadily now, just as if you were pouring water."

"Why! Was that the carbonic acid that put the candle out?"

"Certainly. You did not blow it out did you?"

"No; but it is so strange that I can pour a gas which I cannot see."

"You find this carbonic acid rather a curious substance, do you not? I have explained to you how firmly the carbon and oxygen that compose it are bound together, but next week we will follow it into the growing leaf, and discover the two blades of the invisible shears, that, like the shears of fate, sever even this union asunder."

THE NOISE OF THE AURORA BOREALIS.

MESSRS. EDITORS:—Since reading in your issue of the 18th inst., the account which Mr. Thompson, of Illinois, gives of the "noise of the aurora borealis," which came under his observation in 1815, I am induced to record a fact of the same sort, as additional proof on that subject.

In December, 1848, one evening during a brilliant display of the aurora borealis, the streamers were of unusual size and brightness, and as they flashed across the sky they were attended by precisely the same sort of sound which your correspondent describes, viz: "the soft, crackling sounds produced by the shaking of a sheet of fine tissue paper." While looking at a blank space in the sky, it would be suddenly lighted up by those meteoric streamers, attended with such a rustling, hissing noise that there could be no mistake of its proceeding from them.

Sometimes, during the evening, the noise was incessant, and, though not loud, it was as if numberless sheets of fine tissue paper were shaking or being torn in the air above. This phenomenon was seen in northern Indiana, but whether heard by many, I am unable to say.

ISAIAH M. LEE.

Yellow Creek, Ind., Aug. 21, 1860.

SEEING STARS IN THE DAYTIME.—On the 13th inst., at noon, we noticed, from our office window, crowds of people collected in Beekman-street, looking at a star which was plainly visible in the sky, though the sun was shining brightly at the time. We took a look at it, and, from its position in relation to the sun, it must have been the planet Venus.

GRINDING MILL WANTED.—W. S. Lewis, of Shreveport, La., writes to us as follows:—"Permit me to inquire if a mill of any kind has been invented to successfully grind the corn in the ear (shuck and all) into cow feed; the great difficulty is in grinding the shuck so that the mill will not choke."

A COLUMN OF VARIETIES.

It is now fully established that the silver mines in California surpass in richness and extent all silver mines heretofore known in any part of the world, as much as the gold of California, at the time of its discovery, surpassed all gold mines previously known.

In England the business of operating the telegraph has been, to a very great extent, placed in the hands of young ladies, who find it very agreeable employment. The inland department of the Electric Telegraph Company in London now employs one hundred young ladies, who receive and transmit the messages from all parts of the United Kingdom.

Mr. Richardson communicates to the *London Lancet* a new mode which he has discovered for extracting teeth without pain. It consists in immersing the affected part in chloroform, which is done by filling a little cup half full of cotton wool, saturated with chloroform, and placing it over the tooth. It takes from seven to fifteen minutes to produce the effect.

The lantern of the North Foreland light-house, in England has been lighted by the electric light for the last six months. The electricity is obtained by magnetism, there being two sets of helices and three wheels of magnets, which are driven by a two-horse power engine. The light is visible from the coast of France, and has not once failed of doing its duty during the six months.

Cushman & Co., in Amherst, Mass., are manufacturing about fifteen hundred pounds of artificial leather daily, from scraps of leather and old pieces of rope. It has not been introduced out of New England, yet the demand is reported to be greater than the supply. The process of making is similar to that of manufacturing paper.

HOW TO COOK A BEEFSTEAK.—The following were the rules adopted by the celebrated "Beefsteak Club," started in England in 1734:—

"Pound well your meat until the fibers break;
Be sure that next you have, to broil the steak,
Good coal in plenty; nor a moment leave,
But turn it over this way and then that.
The lean should be quite rare—Not so the fat.
The plaster now and then the juice receive,
Put on your butter, place it on your meat,
Salt, pepper, turn it over, serve and eat."

There are sixty-four inmates of the Ohio State Prison, at Columbus, under sentence for life, one of whom has been confined twenty-four years, nine others more than ten years, etc. Of these, ten are hopelessly insane, others are on the last verge of insanity, and the tendency of nearly all is to monomania and despair—facts calculated to inspire the belief that life-sentences are by no means cheerful punishment.

The schooner Caroline E. Foote has arrived at San Francisco, from the Amoor river, with fifteen Tartar camels (two humped) to be used in transporting goods in Utah. Eight of them are males and seven females. There were thirty-two of them, but seventeen of them died last winter when they were frozen fast in the Amoor. Since getting to sea they have all done well. They are large, healthy, hardy animals, capable of carrying one thousand pounds each, and are excellently suited to the business of packing.

Dr. Winship, the strong man of Boston, who has brought himself up, by training, from a weakly condition till he is able to lift 1,100 lbs. and to shoulder a barrel of flour, says, that in the course of his training he has discovered that forty minutes exercise once in two days is better than twenty minutes every day; that lifting is the safest and surest method of producing harmonious development; and that the performance of twenty gymnastic feats once is better than the performance of the same feat twenty times; and that it is best to eat heartily of such food, animal and vegetable, as agrees with the stomach.

Before referees, a suit has been brought by F. O. J. Smith, against Professor Morse, to recover five-six tenths of the amount of money received by Professor Morse from the different governments of Europe for the invention of the telegraph. The parties have been connected together in the telegraph business for some twenty years, and some time since a settlement was had between them, when Mr. Smith received \$300,000, and here matters in dispute were left open for suit or reference, of which this is one. The hearing is not finished. The referees are Judges Sprague and Upham and George S. Hillard.