Source of Animal Heat.

MESSRS. MUNN & Co.—I notice in your paper of Jan. 20th, an article headed "Heat and the Human Body," which contains a number of misstatements I propose to correct by your permission. You say "the human body is by some *inscrutable* arrangement supplied with an internal fountain of heat by which its temperature is maintained over the air which usually surrounds it. The fountain of heat owes its origin to the same *unknown* principle as *organization* itself."

Justus Liebeg has scrutinized the human body so closely as to discover the fountain head of heat, as the following extract from his work on Animal Chemistry will show. At page 20, he says: "These experiments and the conclusions deduced from them, in short, are incapable of furnishing the smallest support to the opinion that there exists in the animal body any other unknown source of heat, besides the mutual chemical action between the elements of the food and the oxygen of the air. The existence of the latter cannot be doubted or denied, and, and it is amply sufficient to explain the phenomena."

You say: "The fact of its existence and that it i capable of supplying a certain quantity of the calorific principle, *are all that we can know*."

You surely forgot the progressive age we live in when you wrote that paragraph, it is impossible to tell what we *can know*, it is as much as editors and authors can do to record the discoveries and inventions that are showered on the wondering inhabitants of this globe, and this is only a commencement. A few years ago, before Liebig published his researches on animal heat, food, the blood, and vegetable life, it was a reasonable conclusion that we should know but little more about life and the body; but now with the aid of chemistry it is probable that even greater discoveries will be made than have yet astonished the world.

You state in your article on the 20th, that "the air taken into the lungs undergoes a change, *with the nature of which we are not acquainted*." The air is deprived of its oxygen when taken into the lungs, as Liebeg shows at page 14. He says: "According to the experiments of Lavoisier, an adult takes into his system, from the atmosphere, in one year 746 lbs., according to Menzies 837 lbs of oxygen; yet we find his weight, at the beginning and end of the year, either quite the same, or differing, one way or the other, by at most a few pounds.

"What, it may be asked, has become of the enormous weight of oxygen thus introduced, in the course of a year into the human system?

"This question may be answered satisfactorily; no part of this oxygen remains in the system; but it is given out again in the form of a compound of oxygen or hydrogen.

"The carbon and hydrogen of certain parts of the body have entered into combination with the oxygen introduced through the lungs and through the skin, and have been given out in the form of carbonic acid gas and the vapor of water.

"At every moment, with every expiration, certain quantities of its elements separate from the animal organism, after having entered into combination, within the body, with the oxygen of the atmosphere.

"If we assume, with Lavoisier and Seguin, in order to obtain a foundation for our calculation, that an adult man receives into his system daily 32½ oz. (46,037 cubic inches=15,661 grains, French weight) of oxygen, and that the weight of the whole mass of his blood, of which 80 per cent is water, is 24 lbs.; it then appears from the known composition of blood, that, in order to convert the whole of its carbon and hydrogen into carbonic acid and water, 64,103 grains of oxygen are required.—This quantity will be taken into the system of an adult in four days five hours.

"The mutual action between the elements of the food and the oxygen conveyed by the circulation of blood to every part of the body is *the source of animal heat*."

Lastly, you say, "this we know that when it is expired *its nature is changed* and it has acquired the *qualities of carbonic acid gas*." Now what is expired from the lungs is not the air that is inspired, but a *mixture* of carbonic acid nitrogen and vapor of water; in proof of this assertion I quote Liebig page 39, where he says: "The carbonic acid of effervescing wines and of soda water, when taken into the stomach, or of water saturated with this gas, administered in the form of enema, is given out again through the skin and lungs; and this is equally true of nitrogen which is introduced into the stomach with the food and in the Saliva"

The oxygen of the air is extracted, and consumed while the nitrogen is thrown out of the body, because, it is not wanted there

Yours Respectfully, W. L. LAY.
Philadelphia Feb. 2, 1849.

[We know a *few* things, but there are some things we don't know, and friend Lay has not made us a whit the wiser. We read Liebeg long ago, and however sufficient his exploration of *animal heat* may be to others, it is not sufficient for us. The elements of heat, (but what is heat?) may be contained in food and air, but are these substances heat itself? The heat of our bodies is maintained by the low combustion of our food, &c., and this was known before Liebeg wrote on the subject, but neither bread, beef, water, nor the oxygen of the atmosphere is combustion, in fact, there is no chemical action more difficult to explain than simple combustion—and Liebig's *mutual*, will not do it. Oxygen and nitrogen are the elementary gases of our atmosphere, but they are not *the atmosphere*. The elements of our food may lie in our larders in contact with the atmosphere till doomsday without producing the combustion which developes the heat that keeps up the steam to propel our man machines. Further discoveries may yet disclose to us that bodies which unite with oxygen and the *quantity* of heat evolved by the chemical combination, may be connected with the equivalent number and the electrical condition of substances by a definite law, but the investigation of this subject may well be left for a more subtle philosopher than Liebeg—viz Faraday—and until this takes place friend Lay will be pleased to give his last paragraph a more logical examination, as it is the climax of his explanation, confounding his argument and leaving the question of *animal heat*, as developed, sustained and at last extinguished in our frames, still unexplained.—ED.

On the Metallization of Plaster Casts.

BY M. A. BRANDLEY, CIVIL ENGINEER, PARIS.

The plaster casts are first immersed in melted wax, either white or yellow, for the purpose of rendering the plaster incapable of absorbing moisture, and giving an appearance of softness. Any excess of wax may be removed, and the cast allowed to cool. Then take:—

Sulphuret of Carbon : : : : 1000 parts
Good clear Phosphorus : : : : 250 parts

A few minutes after having shaken the phosphorus in the sulphuret it is entirely dissolved. Then take:—

Silver, in fine grains : : : : 100 parts
Pure Nitric Acid : : : : : 550 parts

Dissolve the silver, evaporate the excess of acid, and dilute the solution with 100 parts of distilled water. When the nitrate of silver is dissolved, take two basins, each capable of containing two quarts; in one place the solution of phosphorus, and in the other the nitrate of silver solution. The quantities above given are the result of a great number of trials, and they are those which have been found to answer the best. The plaster casts fixed to a copper wire are dipped in the solution of phosphorus, and after having been allowed to drain, are placed flat on a plate of sheet-iron or zinc, with the engraved side uppermost.

When all the sulphuret of carbon has evaporated the casts will commence to give off phosphoric vapors; it is then ready to be dipped in the solution of nitrate of silver. The bottom as well as the side should be completely dry before this immersion. Care must be taken that every part of the cast should be covered with a solution, and to ensure this it may be touched over with a brush after it is taken out of the silver solution, otherwise a hole would appear in the point not touched with the solution. The cast is then allowed to drain, and is afterwards suspended by the wire to dry.

The presence of phosphorus produces the reduction of the silver which soon takes its natural color. The moment this has taken place, plunge it into the phosphorus solution, where it may remain for from eight to 15 days; instead of remaining white it assumes a dark color by the evaporation of the phosphoric acid, which re-acts on the silver and the oxide. In this state the casts receive an equal coating of metal, but less freely, because the oxides are not so good conductors as the metals themselves.

The process finished, carefully pour the solution of phosphorus into a stoppered bottle, which should be placed in the cellar, or in a large vessel of water. If it should happen that during the operation any of the solution has fallen on the fingers, they should be immediately dipped in nitrate of silver solution, to prevent the action of the phosphorus on the skin.

The process should be performed on a marble slab, or, what is better, on a plate of zinc, to avoid the accidents which might arise from the action of the phosphorus on wood.

If the casts requiring to be metallised are of a large surface, lay them over a sheet of cast-iron by means of a triangle of iron reaching to their full length, and pass over their surface the solution of phosphorus, and afterwards that of nitrate of silver.

When the casts have been metallised and are dry, they should be brushed over lightly with a soft hat-brush and the metal on the back parts may be scraped off.

However soiled it might have been, a cast thus prepared becomes certain in the effect produced, whether it be wished to obtain reproductions from it by the electrotype process, or to have a simple covering of metal to protect the casts. Another advantage is that the metallic deposit is more agreeable to the eye than that of the plumbago, or the metallic powders. Unfortunately it cannot be applied to casts taken in stearine, with which we must for the present continue the use of plumbago.

Winter Fishing on the Upper Lakes.

At Sundusky and all along the Bays of the Upper Lakes, both on the north and south shores, much amusement and of a profitable kind too, is found in fishing through the ice. During this present winter which has been unusually severe, the Lakes are very solid, and there is rare winter fishing. At Sundusky, Ohio, which has a fine Bay about 8 miles long and four broad, the sport has been unusually good and enjoyed by both old and young. Afar off the shore on a line were erected temporary buildings each one occupied with a single tenant seated upon a cushioned stool beside a sheet iron stove. His house is situated over a hole cut in the ice, and there he sits contentedly, with a fish gig in his right hand and a decoy fish dexterously managed by the other, waiting the visit from one of the finny tribe. Hold! Did you see the broad flat nose of that noble pike, as it protuded beyond the limits of the ice orifice? A slight movement of the left hand, and the decoy glides about like a thing of life—the pike darts suddenly upon it, the fish gig of the patient fisherman descends like lightning, and the next moment a ten pound pike lays floundering, dying, upon the floor of the cabin—The hunter detaches it from the gig, throws it outside the door to freeze, adjusts his decoy and makes raady his spear for another onset.

This is the way in which the tables of our inland citizens are supplied with the most dainty fish.

Railroad Steamboat.

There is at present building at Glasgow by Robert Napier, an iron steamboat 180 feet long and 35 broad, with three lines of rails on deck to take a train of cars 500 feet long on the boat at once, on the three tracks. It is to be propelled by a 240 horse power engine and is to connect the Northern Railway across the River Tay at Broughton Ferry, where it is about a mile and a half broad near the sea.—The banks on each side are high and water low between, so the cars are to be let down into the boat by an incline plane worked by stationary engines and raised on the other side in the same manner, so that it may be said that the railroad company has made a floating railway across the Tay.

A little saltpetre put into old cream takes away its bad flavor when churning.

Cocculus Indicus.

The fruit of a tree growing upon the coast of Ceylon, and imported from the East Indies in bags, and hence also called Indian berry. It is similar in appearance to the *bay berry*, but slightly smaller, and is distinguished therefrom by the semi-lunar form of the oleaginous yellow seed, which seldom entirely fills the cavity of its shell. It is sometimes employed as a dangerous and fraudulent sophistication of malt liquors, in order to increase their exhilarating influence; a most reprehensible practice, for the berries owe their active properties to a narcotic, poisonous, crystallizable principle, *pidrotoxin* or *cocculin*, which is bitter to the taste and of neutral reaction. Besides this, there is left in the alcholic extract of the fruit, from which the cocculin has been dissolved by means of acidulated water, a brown resinous acid, called the picrotoxic acid. Menispermin and Peramenispermin are also constituents of the fruit, alike in composition, but dissimilar in certain properties, the former being crystallizable and capable of forming salts, while the latter, though crystalline, is unable to saturate acids, and is moreover less fusible and more insoluble in either. The above-named together with yellow alkanine, resinous and fatty matters, wax, gum, starch, chlorophylle, lignin, mucus, malic acid, odorous and inorganic matter, represents the composition of the berry. According to Meissner, crystals of picrotoxin are readily obtained by the evaporation of a concoction of the berries.

This substance has been used in Britain for adulterating Beer. It has also been used to destroy fish in streams and rivers.

Peat for Fuel.

The editor of the Portland, Maine, Enquirer suggests "the employing of peat for fuel in air tight stoves, as there are plenty of peat bogs in Maine." Peat is good fuel. The upper part of the bog is but poor, being light and turfy, but the under black strata, when cut into square pieces about 4 inches thick, and 12 inches long, and well dried, makes both a warm and clean fuel. By pressing the moist peat, like brick, they are made nearly as solid as coal, easily dried and burn for a long time. A machine for pressing peat we see by our foreign exchanges, has been invented by Lord D'Eresby, for improving the condition of his Highland tenants, who frequently suffer for want of fuel, owing to the wet seasons so common in Scotland, which prevent their peat from ever being thoroughly dried. Peats are cut in the bogs, by first digging a trench, and then by a sharp spade of the exact width and length, the peats are cut from the face of the trench. They are then exposed to dry like brick in our brick yards. This is the only kind of fuel known and used in many parts of Ireland and some of the northern European countries.

The Ophir of Solomon.

There is a large mountain called "Ophir," says a recent traveller, contiguous to the coast of Malacca, and it abounds in gold. In sailing close along the shore at night the air was perfumed as if with spices and frankincense. The whole country teems with rich and rare products. Sofala, on the contrary, is a low swampy territory; no mountain is visible; gold is certainly obtained there, brought from the interior, but there are no spices, frankincense, or myrrh. Its latitude prohibits the growth of those articles, while Malacca is especially adapted for them. The transition of the Jews from Malacca, up the coast, to China, was an easy matter; indeed, the Chinese themselves visited the Red Sea and Persian Gulf. About the year A. D, 1150, the Rabbi Benjamin, of Tudels, visited several Eastern countries, for the express purpose of ascertaining the residence of the lost tribes. The Rabbi found some of his brethren in Sarmacand, China, and Thibet; in the first city the found 50,000 Israelites.

To those who consider California as the ancient Ophir, we would just like to ask of them where Solomon got his apes and peacocks from, that were brought in his Ophir ships.

Mr. Devereux, of North Carolina, a most accomplished gentleman and farmer is the largest corn grower in the Union, his crop being largely upward of 100,000 bushels.