Copper.

This very important metal was used by the ancients almost to the exclusion of others, except precious metals, but it has within the last century or two been to a great extent superseded by iron, the cheapening of which has proceeded at a far more rapid rate. Ingot copper is now worth by wholesale 28 1-2 cents and pig copper 27 1-2 cents per pound, while pig iron is produced, even in this country, at 1 1-2 cents, and in Great Britain at 1 cent or less per pound. Iron is liberally distributed by nature, beds or layers of this invaluable metal being found in almost or quite every country in the world, and a sensible quantity being found even in the veins of of every warm-blooded animal, but copper is more sparingly exhibited.

Under a crushing strain cast iron is superior to wrought iron, and both are stronger than copper. Under a tensile strain, copper is intermediate between the two. A bar of wrought iron, one inch square, breaks under tensile strains of 25 to 50 tuns, a similar bar of copper under about 16 tuns, and of cast iron under from 5 to 10 tuns. Copper as ordinarily prepared is both fusible and malleable. When copper is very extensively mixed with zinc or tin, forming brass or bronze, these alloys possess the same properties in this respect. The brass tubes, now in such common use for marine boilers are made by first casting a short, thick, flattish bar, with a small rough hole through its axis, and then drawing it by suitable machinery, and shaping both its exterior and interior surfaces by dies and mandrels until a long, smooth, sound and uniform tube is produced, a mode of manufacture at present impossible with iron. In fact, to the existence of these seamless tubes is probably due in part the introduction of brass tubes into steam engineering, after they had been once pretty generally abandoned for lap-welded iron ones

Copper conducts heat and electricity with about two and a half times the facility of iron, and resists corrosion from atmospheric influences, or the action of sea water, almost infinitely better. To these latter properties are mainly due the value attached to this metal in practice. As the arts now stand, only about one-thirtieth as much copper as iron is mined. The quantity of copper produced in the world is estimated at about 35,000 tuns per annum, of which the United States furnishes 6000 tuns, mostly from native copper, and England 16,000 tuns. Large quantities of this metal in a state of superior purity are exported from Russia. Although our country produces one-sixth the copper of the world, it consumes still more, and invariably stands in the market as a buyer.

This metal is generally found associated either with sulphur or oxygen. Oxyds are rarely worked. Sulphurets are found in Connecticut, New York, Virginia, Maryland, and many other States, as black or gray ore, which, when pure, is 78 per cent copper, but copper pyrites or yellow copper ore is the most common sulphuret. It contains much iron and is often mixed with iron pyrites, either of which from their color often attract the attention of the ignorant, from a hope that they may prove to be gold. The bulk of the copper produced is from this ore, which is very plenty, but of poor quality. It does not often yield more than 12 per cent of copper, and frequently the body of a vein does not contain more than 2 per cent metal, so that the ore has to be assorted, and much rejected after it is mined. This ore occurs in Massachusetts, Vermont, New Hampshire, Maine, New York, New Jersey, Pennsylvania, Virginia, and the gold region generally, also, in Wisconsin, Missouri, Iowa; and, in fact, is diffused like iron, only to a less extent, almost over the whole globe.

Native or pure copper is also pretty widely distributed, but nowhere so plentifully as in the United States. It is found in the Lake Superior region in immense masses, the size and treatment of which must be reserved for a future article. The great source of our foreign supply is Chili. It is imported in the form of sulphuret, which is smelted in and near the principal Atlantic cities. There are one or more large establishments at this point, two in Baltimore, and one in Boston, the latter alone, we are informed, producing about two million dollars' worth per annum. The whole importation of copper and brass, aside from the ore referred to, is now less than one million dollars' worth per annum. Imported metal is principally sheathing-copper and yellow metal. The duty on copper, in pigs, has been five per cent, but this has been abolished by the new tariff.

Applying the Waste Heat of Blast Furnaces to Generate Steam.

We have received a letter from Mr. Mellen Battell, of Albany, N. Y., in which he informs us that he saw steam generated in a boiler by the waste heat from a cupola furnace, in 1826. This date is certainly prior to that of Professor Nott's patent for a like application in 1828. The place where Mr. Battel witnessed this application was in the engineering establishment of James P. Allaire, in this city. In it there was a steam engine of 20-inch stroke and 10-inch bore, running at the rate of thirty revolutions per minute; it had one boiler 20 feet long, and 30 inches diameter, using pine wood for fuel, and which worked a blowing cylinder three feet in diameter. There was a cupola furnace in the works, 30 inches in diameter and 8 feet high, over the top of which was placed another boiler two feet in diameter, and 18 feet long, built in temporary brick work. When the cupola furnace was in full blast, its heat passed under this second boiler, and generated steam sufficient to operate the engine and drive the blower. The first boiler, however, had to be used to get up the blast in the furnace, before the waste heat of the furnace was sufficient for generating the steam in the second boiler. The early application of the waste heat of the furnace to get up steam, Mr. Battel says was not of much advantage, as the molders got through with considerable casting before the waste heat became available for steam. How long this arrangement was used he does not know; he is only aware of the fact, that the waste heat was used for generating the steam for driving the engine while the furnace was in blast. The arrangement was no doubt very incomplete and of little advantage practically.

The use of the waste gases of furnaces for generating steam cannot be economically applied, except in regular iron smelting establishments, where the blasts are kept in operation continually. Old James P. Allaire, however, deserves credit for his early endeavors to save the waste heat, and apply it to a useful purpose. The statement by Mr. Battel, that *pine wood* was then used for fuel, puts us in remembrance of the great change which has taken place in the use of coal for steam engines in the past twenty years. In 1836 nearly all, if not all, the steamboats running on the Hudson river used firewood for fuel —not one employs it now. Locomotive engineers appear to be now in the same transition state, respecting the change from wood to coal fuel, that our steamboat engineers were from 1836 to 1840.

Hoop Skirts and Umbrellas.

"Whalebone has nearly doubled in price within the past four years, in consequence of the enormous consumption of the article in skirt-hoops. In places where the price was forty or fifty, it is now eighty or ninety cents per pound. The *Commercial List* of to-day reports a sale of eighty thousand pounds at ninety-five. An umbrella dealer informs us that at retail he has been obliged to pay a dollar and a half a pound for the manufactured article, and the five dollar umbrellas of two months ago are now sold for six. Nor is this all. The braces have become greatly attenuated, being hardly more than half the size they were in the old-fashioned umbrellas, so that the prospect is, we shall be compelled to rely wholly on steel braces, which have experienced no such appreciation."

The above we copy from an exchange paper. The most common article now employed for skirt-hoops is narrow ribbon, made of brass wire rolled flat between the rollers. It has considerable elasticity, as the rolling process imparts *spring* to brass. It is not alone the increased demand for hoops that has raised the price of whalebone, but the decrease in the supply. Steel has been used for umbrella braces, and it possesses the qualities of strength and elasticity requisite for this purpose in an eminent degree; but it has one defect which renders it unfit for such applications, that is, its great liability to rust. The coating of it with varnish does not remedy this defect, because it is soon worn off with the use to which an umbrella is subjected. Neither iron nor steel should be employed in such articles as umbrellas, exposed as they are to the action of water. Brass braces, as substitutes for whalebone, are superior to steel for umbrellas, but a composition of india rubber or gutta percha can be made to answer the purpose better than any of the cheap metals.

English Railroad Accomodations.

Zerah Colburn, known as an exceedingly vigorous thinker and clear writer on American railroading, has recently visited England to inspect the British railway system. He writes home to the *R. R. Advocate* that "there are no brakes on any cars of a passenger train, except on a 'luggage-van' as it is called. And the brakes, such as are used, are pushed against the wheels instead of being made to gripe them, and the brake apparatus here is bulky, even clumsy, compared with ours.

"As a general thing there is no bell-cord along the train—and there is no other mode of communication between the engineer and conductor. I cannot find out there is any difficulty in using the bell-cord, except that among so many roads, all the companies will not unite in so simple a provision, and hence when their cars are mixed, many are unprovided. You will think this a paltry excuse for the want of a communication so important as that from the train to the engine. For here it is no joke to ride in small close compartments with the car doors *locked* (for safety!) and no conductor in sight, from one end of a trip to the other. The want of some communication appears to be felt in the minds of some few inventive men, for in every odd number of any English scientific journal, you will see some wonderful scheme for supplying the means. One which I remember was, to fix a large bell over the engineer's head, and to let the conductor shoot at this bell with an arrow, so as to attract attention on the engine! I believe I have heard an electric telegraph proposed for the same purpose. And another plan was to fix large convex mirrors in front of the engineers in which he should see if anything (!) was the matter with the train behind him. Without prejudice, you will say that such contrivances are as futile as the present absence of communication is barbarous.

"There is no such thing as a water-closet in an English car; and the india rubber and some other dealers in the towns, drive quite a trade in a portable article designed to supply the want.

"As to speed. There are instances of trains being in motion at speeds of 60 miles per hour. But for express train travel the average time, excluding stops, is 35 miles per hour—the actual running speed sometimes reaching 40 miles—but including stops it is 30 miles an hour. We do quite as well as this. You must observe, also, that the express or quickest trains here, are the lightest loaded, as the price per mile to passengers is very high in these trains. With us, every passenger will take the quickest train he can, especially as the price is all the same. The general average speed, throughout England, is probably higher than with us—yet the difference is due more to a better state of road here, than to any other cause."

American Telegraphers.

As an evidence of the growing appreciation of American mechanical skill, the Philadelphia *Ledger* states that the governments of the three colonies in Australia have commenced the construction of nearly one thousand miles of magnetic telegraph, to be completed at the close of the present year, and have selected S. W. McGowan, formerly in charge of the office of the New York, Albany and Buffalo Telegraph, in this city, as superintendent of the construction of the lines, which are to be worked under Morse's patent. They extend from Melbourne to Sidney, 600 miles; from Melbourne to river Glenely where the line from South Australia, of 230 miles, is met, and from Launceston to Hobart's Town, Van Dieman's Land, 120 miles. Lines from Melbourne to Bendigo, 102 miles and from Melbourne to Balaraat, 108 miles, are just opened. All of the above lines are to be under the supervision of Mr. McGowan, who is commissioned by the home government as Superintendent of Telegraphs in its Australian colonies. The instruments, batteries, materials, &c., have been ordered from this city, and are to be of the most finished and perfect construction.

Hungary Water.

This perfumed liquid is said to take its name from one of the Queens of Hungary, who is reported to have derived great benefit from a bath containing it, at the age of seventy-five. It is composed thus:—Rectified alcohol, one quart; oil of English rosemary, half an ounce; oil of lemon peel, and oil of balm (*melissa*), of each a quarter of an ounce; oil of mint, seven drops; spirituous essence of rose, and spirituous essence of orange flowers, of each a quarter pint. After being well mixed it is ready for use.

It will be seen that rosemary is the leading ingredient in the above recipe. There is no doubt that clergymen and orators, while speaking for a long time, would derive great benefit from perfuming their handkerchiefs with Hungary water or eau de Cologne, as the rosemary they contain excites the mind to a vigorous action, sufficient of the stimulant being inhaled by occasionally wiping the face with a handkerchief wetted with these "waters." Some such property of rosemary was evidently known to Shakspeare, who says, "There's rosemary, that's for remembrance." Now the poet giving us the key, we can understand how it is that perfumes containing rosemary are so universally said to be "so refreshing."

SEPTIMUS PIESSE.

Enlightened Cities.

In the year 1855, the enormous quantity of three thousand millions of cubic feet of gas were consumed in the city of London. In the same year, there were 600,000,000 cubic feet consumed in New-York, which equals the consumption of London, according to the number of hours gas is required. London has such a smoky and foggy atmosphere, that gas-light is employed during a greater number of hours yearly than in New-York.

The effect of artificial light upon the health of man, is a very interesting subject for investigation by physicians, for undoubtedly its influence is very great.

L. R. BREISACH.

A Runaway River—A Deserted Town.

The *Nebraskian* of the 1st inst. describes a flagrant outrage upon "squatter sovereignty" as having been lately perpetrated by the Missouri, in the vicinity of De Soto, Washington county, in that Territory. The ice gorged in the bend of the river, a few miles above that town, and the water, with a criminal disregard of the rights of De Soto and her ferry privileges, took a short cut across the bend, forcing a channel near Calhoun, Iowa and making De Soto an inland town of Nebraska, some four or five miles from the river, to the infinite disgust of the inhabitants of that city. By this arrangement a few thousand acres of land will be added to the already extensive domains of Nebraska.

East India Cotton for America.

The Liverpool *Times* states that several hundred bales of East India cotton have been entered at that port to be shipped to New York. This appears to be like sending coals to New Castle; but this cotton is so very coarse, that we have no American cotton like it, either in poverty of quality or lowness of price; and it is no doubt exported by way of experiment, for making cheap cotton cord, or coarse bagging.

The Pennsylvania Polytechnic Institute in Philadelphia has added to its geological collection a full *suite* of specimens which illustrate the entire mineralogy of Berks and Delaware counties, Pa.

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