Correspondence.

The La Plata Mining and Smelting Company.

To the Editor of the Scientific Americ n:

One of the most complete ore sampling and smelting companies in the carbonate region is the La Plata Mining and Smelting Company. Like most of the enterprises of this new and wonderful region, it developed into its present large proportions, from a small and unimportant beginning. About the middle of June, 1879, the present corporation was established with a capital stock of $2,000,000, in 200,000 shares, per value $10 each, although prior to the above date the firm of Berdell, Witherel & Co. had carried on the business of smelting ores with marked success. In order, however, to meet the increasing demands of a company where new discoveries of large mineral deposits followed so rapidly after one another, the La Plata company was organized, and with a cash capital of $100,000 business commenced on a scale before unthought of. The working capacity of the mills was largely increased by a judicious expenditure of nearly $50,000, and under the able management of C. B. Rustin, Nathaniel Witherel, and Theodore Berdell, seven dividends, amounting to $115,000, have been paid to stockholders.

The process of sampling and smelting ores in vogue at this establishment is thoroughly approved and entirely satisfactory in its workings and results. The different ores coming from the various mines are first deposited in bins holding about 30 tons respectively. Each mine has its especial bin, and the ores are kept entirely distinct and separate. For sampling purposes about one-tenth of a particular ore is taken, and is cut down to a sackful containing from 60 to 100 lb. This is run through a Blake crusher, which breaks up the larger pieces, and renders the whole sufficiently fine for the furnaces. One tenth of the residuum is then subjected to the Cornish rollers, which crushes it very much finer. The Aldin crusher then pulverizes it, and it is afterwards manipulated on the bucking board until it is of the consistency of a fine powder, capable of going through an "80 sieve." One-fourth of this powder is sent to the assay room, where the "assay ton" is taken, reckoned in milligrammes, and a valuation made of the entire amount of ore; one-fourth of the powder is given to the miner; the other two-fourths are bottled, labeled, and sealed for reference. Should the assay of the miner and the smelter disagree, the valuation is either determined by the other sample, or, to use a Yankee expression, they "split the difference." For purposes of smelting, the ores are taken from their bins and deposited in large "mixture piles" containing 300 tons each. These mixtures of ores are taken to the scales and weighed. It is determined in the laboratory what quantity of lime and iron shall be added for a flux to the various grades of ore. Having determined the requisite amount of fluxes necessary for a single blast, the compound mass is taken to the furnace room, where four large blast furnaces, with an aggregate daily capacity of 110 tons, are kept in constant blast. At the end of 24 hours the ore is run off in the shape of bullion pigs weighing 95 lb. The slag is run out from a different aperture, and is thrown on the "dump" as useless material. These pigs of bullion are carefully assayed to determine their exact value, and are then shipped to the Newark, N. J., refining works, where the silver is separated from the lead and the lead then refined. The product of the La Plata Mining and Smelting Company, from its organization, June 14, 1879, up to March 1, 1880, has been 1,155,661 oz. silver, and 7,083,769 lb. of lead, for which 36,917,396 lb. of ore were required. The aggregate yearly production of silver alone will considerably exceed a million and a half of dollars. The most imposing object that strikes upon the vision of the stranger coming into Leadville for the first time is the works of the La Plata Company. They cover 25 acres of ground, with a frontage of 550 feet. About the buildings of the works themselves, which are large and substantial, there clusters a small village of dwelling houses for the accommodation of the 100 employes of the company. The company owns and operates mines located in California Gulch, which yield an immense quantity of low grade mineral, so necessary for successful smelting. This together with its extensive patronage by such mines as the Chrysolite, Iron, Little Chief, and Climax mines, keeps the furnaces in constant operation.

To indicate the high position this company occupies in the business community it will be sufficient to name the officers of the corporation, as follows: C. B. Rustin, president; N. Witherel and Harry Allen, vice presidents; Theodore Berdell, treasurer and agent in Colorado; and Fredrick Sheppard, secretary. Mr. C. B. Rustin, aided by his energetic and experienced superintendent, Mr. M. E. Smith, directs and oversees with vigilance and ability every department of the complicated business. W.

Leadville, March 25, 1880.

The Voice of the White Perch.

A correspondent writing from Parkersburg, West Virginia, says, with reference to the note on voice in fishes, in the SCIENTIFIC AMERICAN, February 14, 1880, that the white perch of the Ohio river will often follow a boat for a considerable distance, all the time making a peculiar humming noise like that of a telegraph wire in the wind. He has heard the fish make the same sound when imprisoned in a fish box to keep it alive.

Glucose—Grape Sugar—Corn Sirup.

The wonderful impetus that has recently been given to the manufacture of glucose and grape sugar from corn, has awakened an interest in the early history of the industry and its introduction into this country. Mr. Lyman Bradley, one of the original inventors of the process of producing those articles from corn, writes to a Buffalo paper in reference to it as follows.

"Grape sugar was long before made from potatoes in Europe, and came here at a cost of from 8 to 12 cents a pound, in gold, when gold was at a premium of 40 per cent. But sugar from corn was not then known. In the year 1863, F W. Gessling and Lyman Bradley, in the city of Buffalo, improvised a small factory for experimenting, to see if grape sugar, glucose, and sirup could be made from corn. Although sneered at and ridiculed by their friends as insane, they, by their persistence, succeeded, and in 1864 they obtained a patent, which may be seen on the records at Washington. In July, 1864, a committee of sugar manufacturers and chemists from New York visited Buffalo as experts, to report as to the value of the invention. They remained several days, testing the process. They returned, and others from New York took their places for the same purpose. The patentees employed a well known citizen of Buffalo to negotiate a sale of the patent, and on the 10th of November, 1864, a sale was made for $600,000, a stock company formed with a capital of $1,000,000, and stock issued, some of which may be seen in Buffalo bearing that date."

From the supposed folly of Gessling & Bradley has grown up a business in which nearly $30,000,000 are invested. Grape sugar has been made from potatoes and imported here to be used in making wine, costing near 12 cents per pound, it being better than cane sugar for that purpose, it having no taste but sweet if properly made. No grape sugar, no glucose, no sirup, was ever made on this continent or elsewhere from corn until after the invention so made by Gessling & Bradley, and if any credit is due to any one for inventing a process which is proving to be so valuable, the meed of praise belongs to them. For now, instead of importing an inferior article of grape sugar, made from potatoes, at a cost of 8 to 12 cents a pound, large quantities of grape sugar made from corn are exported at 3 cents a pound.—*The Western Manufacturer.*

The Compression of Gaseous Mixtures.

In a recent paper on this subject to the Paris Academy of Science, M. Cailletet begins with the remark, that when a mixture of air and carbonic acid was inclosed in the apparatus which had served him for liquefaction of gases, he found, as Andrews and several other savants had already observed, that the liquefaction of carbonic acid was retarded, often very greatly. It is even possible to compress at zero, beyond 400 atmospheres, a mixture of 1 volume of air and 1 volume of carbonic acid, without getting a change of aspect in the tube.

On compressing in the apparatus, he proceeds, 5 volumes carbonic acid and 1 volume air, the carbonic acid is easily liquefied. If the pressure be then carried to 150 or 200 atmospheres, the meniscus of liquefied acid, which, up to that point, was concave and perfectly distinct, becomes plane, loses its distinctness, then is progressively effaced; at length the liquid entirely disappears. The tube then seems filled with a homogeneous matter, which thenceforward resists all pressure as a liquid would.

If, now, the pressure be slowly diminished, one perceives that at a pressure constant for determinate temperatures the liquid suddenly reappears; a thick mist is produced, developing and vanishing in an instant, and marking the level of the liquid which reappears. The following numbers indicate the progress of the phenomenon.

Operating with a mixture formed approximately of 5 volumes carbonic acid and 1 volume air, the liquid carbonic acid reappears at:

Atmospheres.		Degrees.
132	at the temperature of	+ 5·5
124	"	10
120	"	13
113	"	18
110	"	19

The carbonic acid compressed above 350 atm. no longer liquefies at 21

This phenomenon of disappearance of the liquid cannot be explained by the heat disengaged by compression; for, in this experiment the tube is immersed in water, which keeps the temperature constant, and the compression is effected slowly enough for the cooling to be always complete.

The whole phenomenon, indeed, is as if, at a certain degree of compression, the carbonic acid is diffused in the gas above, producing a homogeneous matter, without sensible change of volume; and nothing seems to hinder us from supposing that the gas and the liquid are dissolved in one another. I have tried to verify this hypothesis by coloring the liquefied carbonic acid. Of all the substances tried, iodine alone was capable of dissolving in the acid; but, unfortunately, in this experiment the mercury is rapidly attacked, and the phenomenon is immediately masked by the iodide of mercury, which is deposited on the wall of the tube.

One might, however, suppose that the disappearance of the liquid is only apparent; that the index of refraction of compressed air, increasing more quickly than that of the liquid carbonic acid, there comes a moment when the two indices becoming equal, the surface of separation of the liquid and the gas ceased to be visible. But if, then, we augment several hundred atmospheres the pressure of the system, the surface of separation of the gas and the liquid should become visible again, the index of refraction of the gas continuing to increase, by hypothesis, more rapidly than the index of the liquid. But experiment, pushed to 450 atmospheres, gave only negative results.

We may, then, suppose that at high pressures a gas and a liquid may be dissolved in one another, so as to form a homogeneous whole.

An Englishman's Views on American Manufactures.

In a lecture recently delivered in Sheffield, England, Mr. W. K. Marples, of that town, related his experience and observation in his travels through the United States.

"I found," says the lecturer, "in visiting various American factories, machinery much more generally used than it is with us—in fact, I sometimes saw machinery employed for a process which might have been done more cheaply by hand labor; but we must remember that until recently skilled workmen were not numerous in the States, and so manufacturers were driven to the use of machinery. The Americans are much more advanced in manufactures of all kinds than many of us are aware. Cabinet furniture, glass and china, cutlery tools, guns and pistols, agricultural implements, carpets, linen, in fact, soft and hard goods of every description are made, and in most instances made well, in the United States. Their resources are wonderful; nature has given them coal, iron, waterpower, etc., with the finest navigable rivers in the world, and then their chiefly English origin has given them pluck, endurance, and perseverance under difficulties, and these qualities, coupled with the immigration of many of our best artisans, have in the comparatively short space of 100 years worked marvels for them. The New England States are one vast hive of manufacturing industry, and it is here that the brains of inventors are stimulated to their utmost powers in developing labor-saving articles, and the machinery to make them.

"I think the introduction of the many American ideas and inventions into England that has been attempted during the past few years will tend to develop new ideas among our workpeople, and assist us in holding our position as the great manufacturing nation of the world. I have little fear that English hardware manufacturers will succeed in holding their own in all markets where the duties are not prohibitory, as in the United States. There is little doubt that much of the boasted superiority of American manufactures in the matter of price was a mere myth, and I am fully convinced that until a few months ago, when the hardware trade in America was so depressed, the manufacturers there exported goods to England at a positive loss. In some cases this has been admitted, and the enormous advances, amounting in some goods (notably in locks) to over 100 per cent, bear me out in this opinion. Many goods, that up to a short time ago were imported from America, are now manufactured in England, and the Americans would seem to be doing their best to destroy the trade which until recently they were apparently so anxious to build up. English manufacturers have been fully alive to the situation, and will not readily allow American manufacturers to recover the ground they are now losing."

The Railways of London.

A London paper states that the rails used by the companies within a radius of 6 miles of Charing Cross would form a single line from London to John O'Groat's house, a distance of 750 miles. This estimate does not include the rails in bays and sidings, but it includes all double, treble, or quadruple tracks. Leaving all duplicate lines aside, the incredible number of 260 miles of railway is in daily operation in the metropolitan district. From Hendon and the Alexandra Palace on the north to Penge and Streatham on the south, from Forest Gate and Woolwich on the east to Acton and Willesden in the west, thirteen different companies hold sway, not including the East London, whose line is worked by another company. There are also six short lines, varying from 4¾ miles to 1 mile in length, owned and worked by the companies jointly. The Brighton Company owns the greatest mileage in the metropolis—37 miles. It is closely run by the Great Eastern with 32. Then comes the London and Southwestern with 27; the London, Chatham and Dover and Northwestern follow with 24 each. So far as using the lines are concerned, the London and Northwestern run over more than one-fourth of the whole metropolitan system. The trains of this great company use the lines of five other companies, practically adding 44 miles to their own system. The Great Northern has running powers over the lines of six companies, embracing 36 miles. The mixed nature of the metropolitan system is apparent in the fact that over the London, Chatham and Dover Railway five companies run their trains. The Metropolitan Company's lines are open to four companies. The Southeastern alone uses no other lines, though it has running powers over the East London. If there be added to this astonishing system of locomotion the 70 miles of tramways now open, the omnibuses which ceaselessly traverse the metropolis from one end to the other, the thousands of cabs, the passenger steamers which ply on the river—the magnitude of the means daily employed by the people of London in getting from one part of the "New Babylon" to another will strike the observant mind. With all this vast traffic the injuries to life and limb, save in the cases of street accidents, are comparatively few. With trains flying above ground and underground, over complicated points and through crowded junctions, collisions seldom occur and seldom result in loss of life.