VULCANIZING INDIA RUBBER.

The vulcanizing of india rubber is the mixing of sulphur with the gum, and exposing the mixture to a temperature of 270° Fah. This process effects a material change in some of the properties of india rubber, enabling it especially to bear a much higher heat without being destroyed. It is supposed by chemists that the vulcanizing process decomposes the gum, and forms a new substance, one of the elements, the hydrogen, being driven off and its place supplied by the sulphur. Many organic substances are subject to a similar change, the removal of the hydrogen and the substitution for it of some other element or compound. In a long series of substances, hyponitric acid (N. O_4) will take the place of hydrogen. In vulcanizing, the gum and sulphur must be first very intimately mixed mechanically, and then heat effects the chemical change, driving off the hydrogen and inducing the other elements to combine with the sulphur in its place. This application of heat was Goodyear's great discovery, which gave him his fortune. Sulphur and india rubber had been mechanically mixed before he began his experiments.

Sometime ago Mr. Parkes, of Birmingham, England, discovered that if the chloride of sulphur is dissolved in a suitable liquid, and the solution is applied to india rubber at ordinary temperatures, or with very moderate heat, it will penetrate the gum and vulcanize it. It is supposed by chemists that the same change is effected in this case by the chlorine as in the other by the heat. Chlorine has a strong affinity for hydrogen, and it combines with it and passes off in the form of gas, leaving the sulphur in its place. If this theory is correct, Parkes's process produces precisely the same substance as Goodyear's and without the employment of heat. Mr. Parkes uses the sulphide of carbon as a liquid in which to dissolve his sulphur. A modification of Mr. Parkes's plan has been patented in this country, and has been for some time in operation in the neighborhood of Boston. The absence of heat in the process permits it to be employed in vulcanizing very thin sheets, and especially sheets of various colors, which cannot be done by the Goodyear process.

We learn from *Le Génie Industriel* that M. Gauthier de Claubry has recently made a communication to the French Academy of Sciences, in which he states that the hypochlorite of lime and sulphur may be used in place of the chloride of sulphur employed by Mr. Parkes. He says that if sulphur and the hypochlorite of lime are mixed, with the sulphur greatly in excess, care being taken not to pound or rub the mixture, and it is added to india-rubber paste, either at ordinary temperatures or at a mild heat, objects of any thickness may be obtained uniformly vulcanized.

We would ask M. Claubry if the water—always present in the hypochlorite of lime—will not decompose his chloride of sulphur, and thus prevent the reactions which he describes?

NEW LINE OF MAMMOTH ATLANTIC STEAMERS.

"The Transatlantic Express Steamship Company" is the name of a new association recently organized in Bristol, England, to establish a new line of steamers to run between that port and New York. The steamers to be built for this line are to be improved *Great Easterns*, and they are promised to make passages in less than seven days. Each steamer is to be 600 feet in length, 75 feet in breadth and 80 in depth from the upper deck to the keelson. Three watertight longitudinal bulkheads are to run from stem to stern; and with cross bulkheads, the ship will be divided into fifty water-tight compartments below the load line, thus converting it into a huge cellular structure of great strength. There is to be a grand saloon 500 feet in length on the spar deck, and the main and orlop decks are to be fitted up with 836 state rooms. The nominal horse power of the engines are to be equal to those of the *Great Eastern*. The total displacement of each vessel will be 8,000 tuns, and it is intended that the draft of water will only be 18 feet, to obtain small submerged cross section in order to secure great speed. It is set forth by the proposers of this line of steamers that an average speed of 17 miles per hour will be maintained between Bristol and New York, and at this rate voyages will be made in six days at most.

The people of Bristol, we trust, have awakened out of a Rip Van Winkle sleep on the subject of their Atlantic commerce. At one period Bristol was a greater seaport than Liverpool, and her citizens exhibited the most laudable enterprise and public spirit in the beginning of ocean steam navigation. The *Great Western*—the true pioneer of steam navigation between England and America—was a Bristol steamer, and so was the *Great Britain*, the first very large iron steamer. The Scotch engineers, however, have run the Bristol navigators off the ocean course, inasmuch as they have built all the Cunard steamers, and they, indeed, control the steam navigation of the Atlantic.

As Bristol is the nearest large port in the British Isles to New York, and as it is but a short distance from London compared with Liverpool, we would not be surprised if her citizens were to win back their trade from Liverpool, which port has of recent years engrossed mostly all the steam commerce of the Atlantic.

Artificial Alizarine—the Coloring Matter of Madder.

The following is the substance of a paper from the *Comptes-Rendus*, which was read by M. Dumas for its author—M. Z. Raussin—at a late meeting of the Academy of Sciences in Paris:—

Binitronaphthaline is a fruitful source of coloring products. The action of sulphides and protosalts of tin, dissolved in caustic potash, cyanide of potassium &c., yields with this substance very rich red violet, and blue derivatives. When the reducing agents are acids, as, for instance, when a mixture of zinc and weak sulphuric acid is employed, or iron filings and acetic acid, minute grains of tin and hydrochloric acid, &c., the binitronaphthaline undergoes no alteration.

By making concentrated sulphuric acid react on crystallized binitronaphthaline, no reaction is produced. When the temperature of the liquid is raised to 250° C., binitronaphthaline dissolves completely, as soon as the liquid becomes amber color. Only after long boiling will concentrated sulphuric acid begin to react on this substance. If powdered madder root is treated by concentrated sulphuric acid at 100° C., all its organic materials are carbonized. Only one among them can resist this violent treatment, and that is the coloring matter of the root itself—namely, alizarine. Now, all chemists know that the formula of the latter substance, as well as its principal properties, denotes that probably it belongs to the naphthalic series.

The formula of alizarine is generally represented by $C_{20}H_6O_6$; that of binitronaphthaline by $C_{20}H_6(NO_4)_2$. An opportune reducing agent, which, by carrying off two molecules of oxygen, and making nitrogen pass to the state of ammonia, would probably convert binitronaphthaline into alizarine. Experience has confirmed this idea. By the following process, artificial alizarine may be prepared:—

Introduce a mixture of binitronaphthaline and concentrated sulphuric acid into a large porcelain capsule, heated in a sand bath. When the temperature is raised, binitronaphthaline dissolves completely in sulphuric acid. When the mixture reaches 200°C., throw in minute grains of zinc, and in a few instants sulphurous acid is disengaged. The operation takes about half an hour. Then, if a drop of the acid mixture is made to fall into cold water, it develops a beautiful red-violet color, owing to the formation of alizarine. Sometimes the reaction becomes energetic, if a large mass is operated upon, if there is too much zinc, and if the temperature is not carefully attended to. In such a case the sulphuric acid boils rapidly; abundant white vapors are disengaged with extraordinary noise and violence. It must be added that the latter inconvenience is easily avoided by adding only small quantities of granulated zinc, and by watching the temperature. When this accident does happen, the proportion of alizarine is greatly diminished, but still a considerable quantity remains in the residue.

The reaction over, dilute the liquid with eight or ten times its volume of water, and then boil it. In a few minutes, throw the liquid on a filter. Cooling causes it to deposit alizarine, in the form of a red jelly, sometimes adhering to the vessels, sometimes suspended in the liquid. In either case, this jelly appears, under the microscope, to be composed of a mass of very distinct, pointed crystals. The mother waters are colored dark red, and hold in solution large quantities of alizarine. They can be immediately used for dyeing after dilution with water and proper saturation. They contain large quantities of sulphate of ammonia. Some undissolved alizarine remains on the filter, which is easily carried off by caustic alkalies or carbonates, and precipitated anew by acids.

In the preceding reaction, zinc can be replaced by various substances; for example, tin, iron, mercury, sulphur, charcoal, &c.—in a word, by all bodies simple or compound, organic or inorganic, which react upon and reduce sulphuric acid at a high temperature.

Rival to Gutta Percha.

At a late meeting of the French Academy of Sciences M. Serres gave an account of the *balata*, a shrub which abounds in Guiana, and affords a juice which, he asserted was superior, for many purposes, to gutta percha, but especially as an insulating material for enveloping telegraphic wires. The milk or juice is drinkable, and used by the natives with coffee; it coagulates quickly when exposed to the air, and almost instantaneously when precipitated by alcohol, which also dissolves the resin of the *balata* juice. All the articles made with gutta percha can be made with the sap of the *balata*, and it has no disagreeable smell. When worked up it becomes as supple as cloth, and more flexible than gutta percha. M. Serres exhibited a number of articles manufactured of *balata* milk. Up to the present time it seems, from M. Serres's account, not to have become an article of commercial export.

Science versus Romance.

We are indebted to the editor of the *Visitor*, published at Marengo, Iowa, for the following complimentary remarks:—

Romance is fascinating, but science is ennobling Therefore, seeing that we are commanded in Holy Writ to "do good and to communicate," and furthermore we are cautioned to keep it in remembrance to "forget not," it is for the good of mankind in general that we inform our readers that the SCIENTIFIC AMERICAN is a medium through which they may obtain more really useful information than they could by imbibing all the sensation story papers ever written.

The editor of the *Daily Times*, Brooklyn, N. Y., said to his readers not long ago:—

We were conversing with a tradesman the other day, who assured us that he would not miss taking the SCIENTIFIC AMERICAN on any account, and referred particularly to one improvement which he had been able to make in his business from a hint given in its columns, which added largely to his profits.

The same sentiments as the above we have heard expressed a great many times by careful readers of the SCIENTIFIC AMERICAN.

Important to American Grain Shippers.

The following decree in reference to the importation of grain has just been published in the Paris *Moniteur*:—

From the 15th of the present month till the 30th Sept., 1862, the cargoes of grain and flour, rice, potatoes, or dry vegetables, carried on rivers and canals not conceded to public companies, will be exempted from all internal Navigation Dues levied by the State. The same exemtion will be extended to the dues levied on canals that have been so conceded, and which may be repurchased under the authority of the laws of the 28th July and 1st Aug., 1860.

Foreign vessels may, till the same date, and under the same conditions as French vessels, navigate all the rivers and canals of France exempt from these dues, wherever their cargoes may have grown, provided they consist of grain and cereals, as specified in the former article.

Whatever may be the date of the arrival of such vessels they will be exempted from dues, provded they left their place of shipment before the 30th of Sept., 1862.

THE SHORTEST PASSAGE YET.—The Prince Napoleon left Boston in his steam yacht, the *Jerome Napoleon*, Sept. 30th and arrived at Brest Oct. 7th; making the passage in 6½ days. The vessel is a screw propeller, and is one of the sharpest and handsomest craft that we have ever seen.

A SECOND crop of tobacco is growing at Enfield, Conn., a crop that has shot up from the old stalk cut more than a month ago. It is fully a foot and a half high, and will soon be cut and sent to market

STEAMBOATS have been running on the Delaware and Raritan canal, N. J., for the past seventeen years. It is no uncommon thing to see six screw propellers of large size within sight of one another on this canal.

THE Directors of the *Great Eastern* have voted $40,000 for repairs, and $115,000 as a working capital for the outfit of another voyage. These sums are to be borrowed upon a second mortgage on the vessel.