the machinery is arranged to drive the chain in either direction.

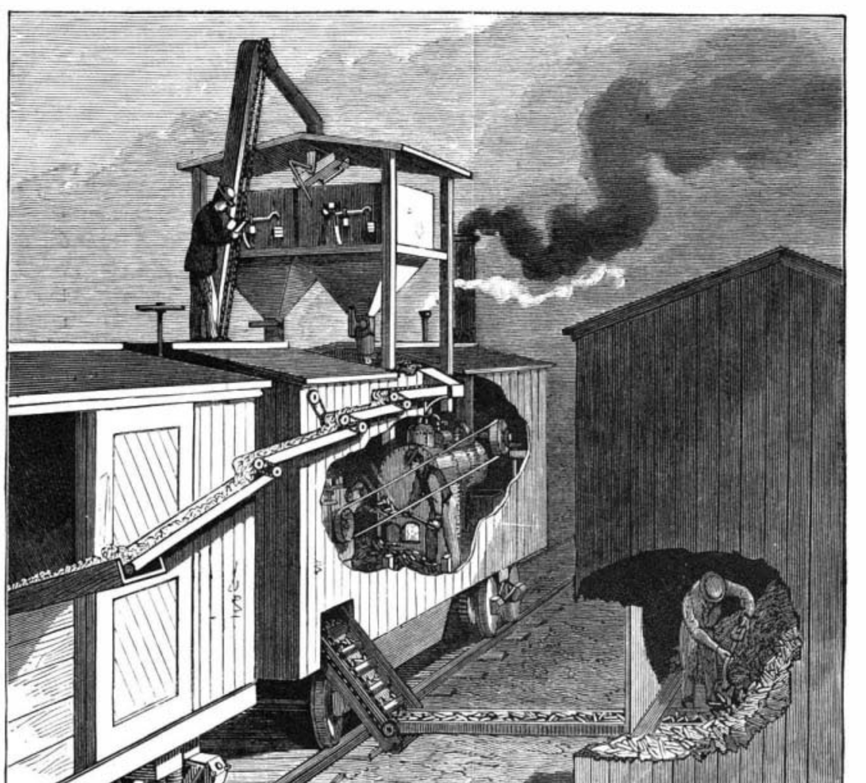
As regards other details, the chains of the trimmers and reloaders are driven by sprocket wheels. This would not answer for the elevators of the type now in use, as they have to be raised and lowered. A short endless chain, driven from a sprocket wheel, lies within the main bucket chain. Teeth are attached to its links which, catching the links of the bucket chain, drive it at whatever level the frame may be set. Tension screws are applied to the bearings to keep the chains stretched. Between each pair of links where they would otherwise come in contact with each other is a bearing block of malleable iron that prevents wear and supplies a more fixed journaling for the end of the link.

The capacity of the yard is placed at 120,000 tons. There are six trimmers. The largest pair, 74 feet high and 260 feet spread, can form a pile of 30,000 tons capacity. There are three reloaders, one for each pair of trimmers. Five elevators are at present in use. In general the conveying machinery can dispose of two or three tons a minute. One important feature is that the coal is never dropped more than a foot, so that the formation of slack is avoided. Two engines, aggregating about 200 horse power, drive the trimmers and reloaders, of course not all at once.

The large capacity of the yard provides an element of security against strikes or other interruptions in the coal supply. It represents the distributing point for anthracite coal by water in all directions, while coal may be sent by barges across the Hudson River to be transferred to other railroads. Improved coal-handling machinery makes such transfer economical.

AN IMPROVED ELEVATOR CAR.

The illustration represents an elevator car designed to facilitate the handling, transferring, and stowage into cars of grain that has been deposited in cribs or granaries along the line of a railway, affording an elevator privilege at every station in the country upon roads employing such cars. It has been patented by Mr. James E. Snevely, of Chetopa, Kansas. The car is divided into three compartments, one of which accommodates a boiler and engine, the smoke stack being hinged to fold down upon the car roof when the car is in transit. In the second compartment is a frame, adapted to be raised by chains and windlasses, or lowered so that its top will be flush with and form a portion of the car roof, the windlasses being located in the third compartment. The framework supports hoppers connected with scale beams so arranged that the weight of the grain may be read by an attendant upon the car roof, and the hoppers have discharge orifices to a conveyer belt that leads to a chute extending outward through the side of the car, where it is connected with such number of conveyers as may be necessary to reach the car that it is desired to load. A bucketed elevator is provided to transfer to the car the grain or corn to be handled, the elevator delivering directly to the receiving trough of a combined sheller and separator, and in connection with this elevator is a conveyer driven by a chain connection and arranged to be passed beneath the flooring of a crib or granary. This elevator is designed to have a capacity of three thousand bushels per day, while requiring the labor of only four men to operate it.



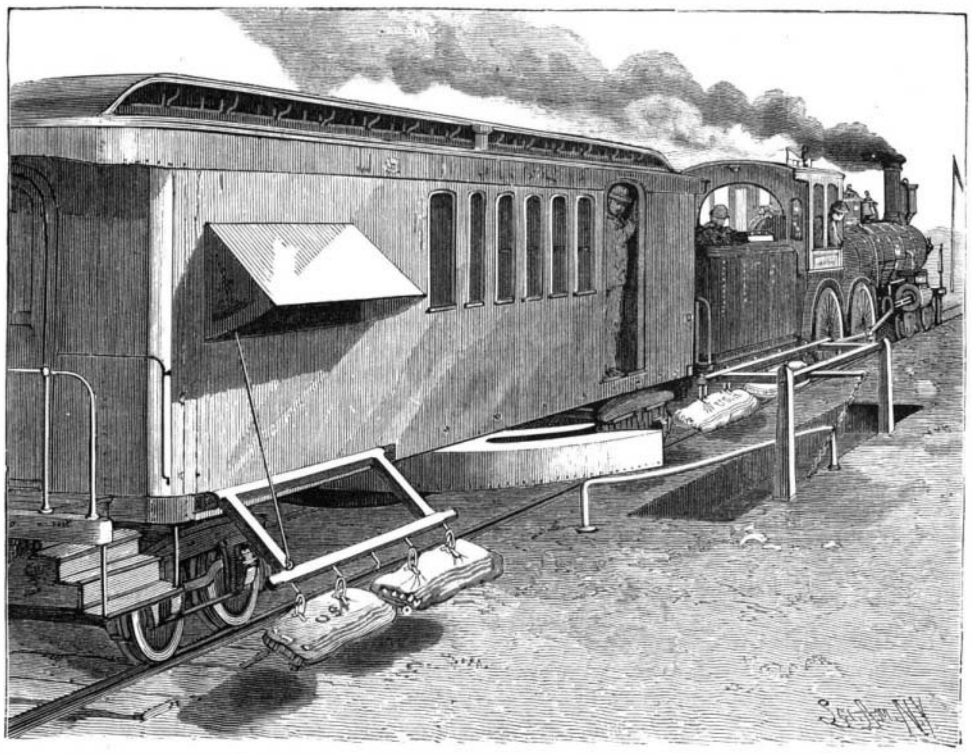
SNEVELY'S ELEVATOR CAR.

Presence of Mind in a Parrot.

A dispatch to the New York *World* from St. Louis says: Several days ago a thief entered the house of Dr. D. Morrow, at No. 308 Jefferson Avenue, and, choosing between a sideboard full of silverware and a red-tailed gray parrot in a gilded cage, took the latter. The error of his preference was soon made manifest to him when the burglar reached the street, for the parrot set up vociferous cries of "Stop thief!" and whistled up all the dogs in the neighborhood. The thief stood this as long as there seemed the faintest show of escaping in spite of it, but at last, as men, boys, and dogs closed around him, he threw down the cage and nimbly sped away, but was soon arrested.

AN IMPROVED MAIL CAR.

The illustration represents a novel construction designed to facilitate the delivery of mail bags from a moving train, and also the taking up of mail bags by such a train, which forms the subject of several patents issued to Mr. William H. Elliot, of No. 499 Eighth Street, Brooklyn, N. Y., to whom those desiring further particulars should apply. The receiver consists of a cylindrical chamber located below the car floor between the front and rear trucks, and arranged upon a vertical axis, the chamber having at one side an entrance spout, which, by turning the chamber on its axis, will be swung out at the side of the car. This spout may be joined to the circular chamber by a hinge, if preferred, when it would be swung out independently of the inner chamber. In the top of the spout is a slot, adapted to engage and release the hooks by which the filled mail bags are held upon a properly arranged delivery bar, the bags being then carried into and around the circular chamber until their momentum is lost by friction. The station delivery bar, as shown, is hinged to standards at a short distance from the side of the track, and a chain or cord extends outward from the bar to a fixed support, whereby the bar may be readily held at the desired height. The station receiver is shown in the form of a rectangular box sunk at the side of the track, and extending partly over it is a curved rail adapted to engage the hooks of the mail bags held upon a delivery bar swung out from the side of the car. This car delivery bar is adapted to be swung out and in by means of a cord passing to a drum inside, simple connections with such drum also affording ready means for turning outward the spout of the circular chamber, this drum, with the crank or lever by which it is operated, being the only portion of the mail receiving and delivering apparatus which takes up any space within the car proper. The curved bar located at or near the platform of the station releases the bags from the hooks on the car delivery bar, and they fall automatically into the box sunk under the track, where they are in no danger of being carried by momentum under and being crushed beneath the wheels of the cars, as sometimes happens when they are thrown loosely on the platform of the station. The bags may be delivered by the car and collected simultaneously, as the operations of delivery and collection do not in any way interfere with each other.



ELLIOT'S MAIL CAR AND DEVICES FOR RECEIVING AND DELIVERING MAIL BAGS.

African Indigo.

The production of indigo in West Africa, says the *Deutsche Wollen Gewerbe*, is almost entirely in the charge of women, and its extent depends upon the manufacture of cotton goods by the natives. How important this industry is can be judged from the fact that millions of meters of cotton fabrics are annually manufactured, upon the primitive hand looms of the country, for the domestic consumption and for export. Especially extensive is the export of these goods to Brazil, where they have become very fashionable and are particularly used for decorative purposes. The most popular color for these fabrics is the blue derived from indigo. A commission which, in 1886, was sent by the government from Lagos to Yoruba, to report on the culture of indigo, stated that in the city of Ibadan, with a population of about 150,000, nearly everybody is clothed in blue stuffs. Upon the banks of the Gambia River this industry is carried on very extensively. The indigo is there known under various names, as "Carro" in Mandingo, "N'Gangha" in Volof, "Elu" in Yoruba, "Suini" or "Luni" in Houssa, while the plant is called "Baba." In the valley of the Niger River the pure precipitate is produced, in which form alone the indigo has a market value. In Gambia and Yoruba it is found in the form of balls of rotten leaves, mostly mixed with cowdung, and without commercial value outside the country. The process of extracting the indigo is as follows: In an earthen vessel of about 60 quarts capacity the leaves are steeped and thereby an extract produced, which is fermented; then the liquid is poured off and exposed to the action of the air. When the precipitation takes place and all the dyestuff has settled to the bottom of the vessel, the supernatant liquor is poured off, the pulverulent precipitate mixed with a little gum and formed into small balls, etc. The materials to be dyed are steeped in the extract before exposing it to the air, and dried in the open air, which operation is repeated until the desired shade is obtained. For the production of stripes or of patterns in different shades of color, the material is sewed together where a lighter shade is desired, whereby the intensity of the blue is diminished.

Paper Matrices.

Paper matrices for making stereotype plates from type forms, used in newspaper offices, are prepared as follows: Make a jelly paste of flour, starch and whiting. Dampen a sheet of soft blotting paper, cover its surface with the paste, lay thereon a sheet of fine tissue paper, cover the surface with paste, and so on until four to six sheets of the tissue paper have been laid on.

The combined sheet thus made is then placed, tissue face down, upon the form of types, which are previously dusted with whiting, and with a brush driven down upon the types and thereon allowed to dry. The operation of drying is facilitated by having the types warmed by placing them upon a steam-heated table. A blanket is placed over the paper during the drying operation.

A WEAK galvanic current, which will sometimes cure a toothache, may be generated by placing a silver coin on one side of the gum and a piece of zinc on the other. Rinsing the mouth with acidulated water will increase the effect.

Telephone Engineering.

In a recent paper on this subject read before the New York Electrical Society by Mr. John J. Carty, he says:

Telephony is not wholly confined to the study of electricity; a broad and comprehensive knowledge of the subject requires also some familiarity with the physiology of the human voice and ear and an intimate acquaintance with the science of acoustics. A telephonist should be a good deal of a physicist.

The phonograph is destined to form an important part of the telephone system of the future. At some time no doubt a phonograph may be inserted in a telephone line to act as a sort of "talk meter," recording all conversation which goes over it. I once thought of a curious use to which the phonograph might be put, that is, in transmitting speech through one of the existing ocean cables. I have no doubt that a cable could be designed which would enable us to talk direct to Europe. In such a cable the idea would be to have the capacity and resistance as low as possible. Perhaps if there were a cable ten feet thick, we might talk through it. With the present cables signals are transmitted so slowly that before one telephone vibration reaches its destination, another is piled in on top of it, and confusion is the result. Now, my idea was to first speak into a phonograph and then turn the cylinder at a speed no faster than the cable can take care of the impulses, and to have at the other end a phonograph, also revolving slowly (but not necessarily synchronously), upon which a record would be made. This second cylinder could then be revolved at the proper speed, and if all went well, the transmission of speech through an existing open cable would have been accomplished. It has been estimated from a microscopic examination of the word "Hello" on a phonograph cylinder that it contains sixteen thousand indentations. If this is true, it would be quicker to send the phonograph cylinder by mail than to rely upon the cable.

The radiophone of Prof. Bell involves the most delicate and complicated theories of interaction within human knowledge. By means of this wonderful instrument, as you all know, it is possible to telephone between distant points without the aid of a wire. The ether is used to convey the impulses. This instrument has not yet found its way into practical use, but must some day form an important part in telephone systems.

Telephone engineering is a science of the future. It is interesting on account of its possibilities rather than because of what has been accomplished. At the same time, the work which is daily being carried on by the system of the Long Distance Company shows that the plant of that company is unique among the engineering feats of the world.

Before the introduction of the telegraphs and railroads into this country it was doubtful if our union of States would be rendered sufficiently homogeneous to hold together; but steam and the telegraph have, up to the present time, enabled us to expand far beyond the conceptions of our forefathers and still remain the prosperous and united country that formed their ideal. Still, as our civilization becomes more complex, there is a demand for a more complete intimacy between the various portions of our body-politic, and the long-distance telephone comes in to meet this want and supplement the railroad, telegraph, and mail.

There is a possibility in connection with long-distance telephone service which has never before been pointed out, and that is its effect upon the language of our nation. As is well known, where people in different sections of a country rarely come in speaking contact with each other, there is a gradual change in the language which ultimately results in the formation of a dialect; and while the telephone can never compensate for those differences in speech which are due to climatic influences, it will be an important factor in preserving the uniformity of our language.

The telephone has never been used in a great war, but it is capable of martial application, perhaps not as important, but not less unique, than characterizes its use in time of peace. A short time ago, General Manager Hall, of the Buffalo Telephone Company, assembled in less than half an hour the entire Board of Trade of that city to attend a meeting on an important subject connected with their commercial interests, and which meeting could only have been called by the aid of the telephone. This should suggest to our military authorities its utility in the mobilization of the various State militia organizations. With a telephone in every block in every city in the land, it would be possible to assemble all of the State militia of this country in a few hours. In Germany, the telephone, like the telegraph and railroad, is controlled by the government, and telephone officials are assigned to a regular place in the field, to be taken on the commencement of hostilities.

Some time ago Mr. Preece made some experiments to determine the effect of the great Deptford 10,000 volt alternating current dynamo upon neighboring telephones, and he came to the conclusion that when this dynamo was working, all of the telephones in London would be interfered with, owing to their connection with the earth. At that time I pointed out that by means of a dynamo properly connected with the earth and a set of telephones a besieged garrison might communicate with a relief party by signaling through the earth itself. Similar signals might be sent with the aid of a telephone from a ship to the shore, or from one ship to another. In this connection a remarkable statement has recently been attributed to Mr. Preece, to the effect that the operation of the Deptford dynamo created disturbance in the telephones of Paris.

Microscopical Notes.

*Preservation of Algæ.**—Having been perfectly successful in preserving the color of many of our fresh water algæ, it may be that the same method would prove successful with desmids. My plan is simply to have a wide-mouthed bottle, with glass stopper, filled with distilled water, in which I have a number of pieces of camphor. When it is desired to mount the algæ, I place a portion of the same in some of this camphorated water, to which a few drops of glycerine have been added, in a watch glass. At first it will become a yellow lemon color, but after a few hours the original green returns in its full vividness, and then I at once mount in a shallow cell, with a portion of the fluid. *Draparnaldia plumosa* thus mounted, twenty years ago, is to-day as beautifully green as at first, and the chlorophyl seems to be unchanged.

Camphor water is made by placing a lump of camphor in distilled water and leaving it there for several days, or until the fluid acquires a strong camphoric taste. It is used for mounting certain delicate vegetable structures. Creosote water, used for the same purpose, is made by dissolving creosote in a mixture of one part of alcohol and thirty parts of water.

Methyl alcohol, alcohol and glycerine, alcohol and carbolic acid, glycerine and honey, and a thousand other mixtures have been suggested from time to time as media possessing real or fancied advantages for general or special mounting purposes, but an experience of nearly twenty years with glycerine, balsam, and dammar has convinced me that these are practically all-sufficient, save in very isolated cases, as for instance where a liquid with a very high refractive index is required for some special investigation.†—*The Microscope.*

Confectioners' Secrets.

"People think that we charge a great deal for putting ice cream in moulds," said a confectioner to a *Star* writer the other day, "but that is because they don't realize what a skilled and difficult labor it is. It does seem a high price to pay $2.50 for three pints of water ice—itself worth only 75 cents—in a shape. However, you will readily see that it is not excessive when I describe the elaborateness of the process. Suppose you order your three pints of cream in the shape of a hen, which is a comparatively simple one. I say you can imagine that it is merely necessary to squeeze the material into the mould with a spoon and then empty it out of the form, all ready to go on the table. As a matter of fact, the filling of the mould requires great care and skill.

"The operator has to take the material bit by bit and force it with his fingers into every crevice of the interior of the pewter, which is usually in two or three pieces. In the case of the hen, the bird opens into two halves from bill to tail, at the back, and the workman, seated before a row of tubs containing different kinds of cream, first fills in the wings with chocolate; then he stuffs the places for the bill and crest with orange water ice, and loads the breast cavity with speckled bisque to give the proper effect. The tail is filled with pistache and the body suitably made up otherwise, the mould being finally closed and the halves fastened together again. But that is only the beginning. Next, the mould thus stuffed must be put in a freezer, with ice and salt around it for a while, and when it has got thoroughly hard, the cream hen is taken out of the mould and put in a cold air box to freeze some more. When it comes out of that it is like a rock, and the last thing is to touch up the feathers with water colors, outline the eyes, and give a smooth finish to the general effect. Then you have your hen natural as life, with a yellow beak and crest, brown wings, speckled body, and green tail. May be you seat her in a nest of spun sugar to heighten the effect. This is what you call art. The ice cream, too, tastes better when so prettily served. Of course, each kind of mould is filled on a different artistic plan. A swan, for instance, would be all of white vanilla with a yellow water ice bill."

"Where do the moulds that you use come from?" the confectioner was asked.

"From Paris," he replied. "They are very expensive. Twenty-five dollars apiece they cost, if not very elaborate. Pewter is the material always used, and I think they are made on wooden models. You can see for yourself how carefully they are made—each feather distinctly carved out so that it shows naturally in the cream bird. Beasts of different kinds and other things are equally artistic in other ways."

"You were speaking of spun sugar. How is it that you make it?"

"That is a confectioner's secret, and I oughtn't to give it away. However, I will tell you. No end of people exercise their wits to the point of despair in trying to make spun sugar. They know how to boil the sugar to just the right point, so that it will spin beautiful threads, like silk; but when they have spun a few such threads, laboriously—not enough to fill a spool, perhaps—the mixture gets hardened and 'sugary,' and wont spin any more from the forks or whatever unsuitable instruments are employed. Now, I will inform you very simply how to make as good spun sugar as a confectioner can, in any quantity you may desire. Take two parts of granulated sugar to one part of cold water and stir them together in a saucepan—the larger the quantity, the easier the operation.

Let the mixture boil hard, without stirring, until a little of it dropped into cold water becomes at once as brittle as glass. Then remove the saucepan to a table and you are ready for business. Previously you must have provided yourself with a baker's egg beater, the wire end of which you have cut off with wire nippers, so as to leave a handle with perhaps fifty long wire points projecting from the end. This is the tool with which spun sugar is made. You dip it into the saucepan and draw it out, a thread of candied sugar hanging from each point, and thereupon you wave the tool in every direction, to the right and left, over your head and all around as far as you can reach, above the greased pans with which you have completely covered as large an area on table and floor as possible.

When I make spun sugar, I place in the middle of a large room a large quantity of the boiling sugar and cover the entire floor, save the small space necessary for standing room, with huge bakers' pans. Then my assistant and myself dip our wire brushes into the hot candy and throw the spun threads all over the place, up to the ceiling and this way and that, redipping the brushes as often as is necessary, until the room looks like a silk factory. Finally, when we have spun all we want, it is gathered up and made into any shape desired. By the way, it may interest you to know that if you will dip white grapes, mandarin oranges, figs, nuts and such things into the same mixture that is prepared for spun sugar, you can make in this way as good fruit glaces as can be bought at any confectioner's. When the sugar has been boiled to a "crack," pour it into previously warmed cups, drop in your fruits, fish them out as quickly as possible with forks, place them on greased pans, and set them out in the cold for a few moments. Twenty minutes later you will have the most delicious candies procurable. Would you like to know how to make ice cream for yourself as well as any confectioner can make it?"

"Very much indeed."

"Nothing could possibly be simpler.

"In the first place use pure cream, unmixed with milk or water—so long as the cream is not unusually thick—and fresh fruits. If you want to make strawberry ice cream, take a full quart of strawberries and a quart of cream. Mash the strawberries, put some sugar on them, and let them stand an hour or two. Then mix them with the cream and sweeten to the taste. Put the mixture into a freezer, turn the crank, and when it is frozen it will be as good ice cream as any one can produce. For orange water ice take the juice of a dozen oranges and three lemons and put with it as much water as there is juice, with sugar to suit the taste: then freeze it. The reason why home-made ice cream is nearly always a failure is that housewives will put milk or even arrow root into it."

"Is not a good deal of ice cream wasted by getting stale on your hands?"

"Not so much as a half pint. It will keep indefinitely in the porcelain-lined vessels we use. Tin is not good for the purpose, because it corrodes. How do we dispose of cakes that get stale on our hands? Throw them into the garbage barrel; nobody is poor enough hereabouts to want stale cake. The dough nuts and one or two other things sometimes are given to the garbage man personally. We don't lose so much in that way as you might suppose. Our loss is chiefly on charlotte russes, cream cakes, and eclaires, all of which sour in a day. The demand for these goods is very capricious, and we can never tell how many will be called for within a given 24 hours. May be 20 or 30 charlottes, for instance, will be left on the counter of an evening to be thrown away next morning. Mixed cakes, such as pound cakes, keep much better, though all cakes are best not later than the day after they are made. Macaroons will last fresh enough for a week. Pies are never left on our hands, because the demand for them is a very steady one. We might keep cakes for a long time in cold, air-tight boxes, but it is a trade necessity to have them always exposed on the counter or in a glass case that is constantly opened.—*Washington Star.*

* W. H. Wamsley, in *Journ. of Micros. and Nat. Sci.*

† F. L. James in *Mic. Bul.*