

locomotive in underground tunnels is always productive of many nuisances.

There is but one really practicable plan by which the annoyances recited by the *Post* can be avoided, and a rapid, safe, and agreeable mode of conveyance secured; and that is by the pneumatic system. A working section of this form of railway has now existed here for the past two and a half years, having been built at private expense, for the express purpose of showing to our citizens how excellent and practical the plan is, and how well adapted for the special purposes of rapid city transit.

The section referred to consists of a nine foot railway tunnel extending under Broadway from Warren to Murray street. A strong current of pure air, produced by a gigantic blower, moves through the tunnel, which is thus always kept thoroughly ventilated. A handsome passenger car, carrying twenty persons, traverses the track, being moved back and forth by the air current, which acts upon the ends of the car like the wind upon a sail. Many thousands of people have enjoyed the ride on this pneumatic railway, and have expressed their unbounded satisfaction at the complete, effective, and splendid manner of its operation. The noise, cinders, gas, dust, jerks, and other disagreeable accompaniments of the locomotive are done away with, while a speed equal to the ordinary steam train is easily maintained.

The practical success of the pneumatic method for passenger cars was long ago settled. It cannot compete, in the open country, with the locomotive, in point of economy; but for underground rapid transit, in large cities like New York, where the travel is immense and cars are to be dispatched every minute or two, the pneumatic system promises to be the most comfortable, and the expense of its running is estimated to be about the same as the locomotive plan.

One of the most singular circumstances connected with the introduction of this pneumatic system has been the action of the present Governor of the State, Hoffman. The amended charter of the Beach Pneumatic Transit Company, which gives authority to carry freight only, was signed by him. The great success of the method and the urgent demands of the citizens of New York for the application of the system to passenger transit induced the Company to ask an extension of their privileges to passenger service.

The plans of operation, construction, and route—the latter being from the Battery under the whole length of Broadway—have been widely discussed by the press and approved by the public. For two successive years, both branches of the State Legislature have, by very large majorities, passed the necessary measures authorizing the Company to proceed with its works and construct a passenger road; but each year the Governor has withheld his signature and vetoed the enactment, one of his chief assigned reasons being that a city engineer, an appointee of the notorious Sweeny, had advised him that the construction of the works under Broadway would be impracticable. This was in the face of the direct testimony of all the leading architects and several of the most experienced civil engineers that the construction was entirely practicable.

The Governor has, however, signed several other bills for steam roads in New York, one of which, the Vanderbilt, soon, it is said, to be commenced, is to run under Fourth avenue; another, the Swan Three-tier, that is, a combined underground, surface, and elevated steam railway, is to be located west of Broadway; another, the Gilbert, an elevated steam railway, also to be located west of Broadway. In addition to these, passed last year, the Governor had previously approved the Central Underground charter for a steam road, now nearly defunct by its own conditions; also the Sweeny Viaduct charter, for an elevated steam road.

The construction of every one of these roads involves more engineering difficulties than that of the Beach Pneumatic Transit road. The latter has the most central, the straightest and best route; this is admitted by all the engineers.

It will thus be seen that the city of New York is blessed with a superabundance of steam railway charters; but the only corporation that has so far actually done anything underground, to meet the wants of the public, is the Pneumatic Transit Company. It is a shame that the consummation of this important enterprise should be so delayed. The Legislature meets again in January, when a new Governor will be inaugurated. The Company will renew their application for the privilege of carrying passengers, and, as soon as it is granted, proceed with the extension of their works.

HANGING WALL PAPER.

Many persons living in remote places defer re-papering their apartments on account of the difficulty of procuring skilled labor in this branch of industry; but it is really such a simple task that there is no reason why any one of ordinary capacity should not do it with as little trouble as white-washing. The directions here given are the result of practical experience and, if observed, will enable any one to hang paper as well as an expert.

Supposing you have decided to paper your apartment anew: the first thing to be done is to remove the old paper, if there is but one thickness on the wall, it is not necessary, as this will not do any harm. It is only where layer after layer is put on that the apartment becomes offensive from the condensation of vapors, accumulating with years until at last they become dangerous sources of disease. This is a well established fact, as recent investigation by a Board of Health in London disclosed that the several layers or thicknesses of wall paper, in houses in a crowded part of the city, were absolutely damp with noisome deposits accruing from defective ventilation.

To remove the old paper, take a common whitewash brush and a pail of water. Wash the wall all over and you can

easily tear the paper off in long sheets, and so render the surface clean again. Care must be taken not to remove or break the surface of the under layer, or ground; for if this is done, there will be a ridge or seam wherever it is torn that will show badly if your new paper has a light ground; if it is dark and the pattern is in arabesque, it matters little, as it will not show.

Having cleaned or removed the old paper, take a roll of the new that you desire to apply and hold it up to the wall; arrange it so that the pattern will show evenly at top and bottom, if possible, and then cut off one length. Have ready a table or a board long enough to take the whole piece; then use the first strip cut as a guide, and match all the rest to it. You may cut all the paper up for the straight part of the wall, leaving the intervals over the door and windows to be done at leisure, or with the waste pieces that always accumulate. In cutting the length, be careful to cut the bottoms and tops perfectly square across, and not zigzag, or at hap hazard, for it looks badly to see the pattern mismatched, or a ragged end where it meets the wash board. There are two white edges or selvages on wall paper, one of which must be cut off. Be sure and cut off the right one, or the one that you intend to paper from, and cut all the others at one time. In applying the paper, you will doubtless find that between the doors and windows the pattern will not come out right, leaving a hand's breadth or so to fill up between the frame and the last piece applied. This is of no consequence, as it can be easily filled up by a piece specially cut for it. Be careful and see that you do not reverse the paper or get it upside down in hanging. You can easily tell the right side up if the pattern is in vines, leaves, or geometrical shapes, by noticing which side the shading of the figures is on.

Having cut all the paper ready to apply, roll it up and lay each piece on one side, or lay them all in a pile. Have ready a smooth boiled paste of wheat flour (sound flour, not sour), a whitewash brush, and a board, or table, long enough to take the whole sheet in one length. Make the paste quite thin, not thicker than molasses and as smooth as a custard. Have a chair, step ladder, or table ready, on which you can stand and reach to the top of the wall. Then take your first piece of paper, lay it on the table and apply the paste; not too thickly, being particular to touch the edges and top and bottom well. Then take the sheet by the top, raise it off of the table and support it with one arm (on the right or dry side, of course), and put it up to the wall. Keep it entirely clear of the wall until you fasten the head of the sheet, but previous to this, run your eye down the side and see if it hangs square with the door frame. If it does, have a clean towel or cloth ready, and move it *horizontally* in wavy strokes over the sheet until the bottom is reached, but do not in any case rub up and down or draw the paper in folds; if you do, there will be ridges and wrinkles in it, which destroy the appearance and can never be got out. Hang the sheet properly at first and then follow it down from the top, rubbing across it; and there will not be a wrinkle in it. Apply the second sheet in the same way, and be careful that you match the figures properly. Success depends on this, for nothing looks worse than to see the continuity broken off or a white seam showing between the pattern, up and down the wall where the sheets do not meet. When the corner is reached, if the sheet does not come evenly to the opposite wall, it is better to cut it lengthwise and paste it on; then take the fellow to the piece and apply it also, matching the figures of course. If you endeavor to make the sheet reach round, you will make a bad job of it. Always clean well the table where you paste, so that no paste will get on the pattern; if it does, the colors will run or smudge, and soil the sheet. Gilt papers with delicate lavender grounds require great care in this respect, as the least spot shows badly. This is all there is to be observed in hanging paper, and there is nothing that any one cannot do with a little practice.

Some care or discretion must be taken in selecting papers for the purposes or places they are intended to be put in. Rectangular or geometrical patterns do not look well in a bed room or a sitting room, as they impart a severe and formal appearance that is especially wearisome after a few weeks. Neither is a paper with dark stripes at frequent intervals desirable; the stripes give the effect of battens nailed over boards or rough carpenter's work, and divide a room off with hard lines that tire the eye whenever it rests upon them. All paper ought to impart a clean, cheerful aspect to a room, adding to the homelike appearance and bearing evidence of the taste of the occupants. Never put bordering on the bottom of the wall, as it takes from the height and makes a boundary for the eye to rest upon where none is desirable. Dark grounds in papers render rooms not fully lighted darker still, and give a somber effect which is very depressing; while open chambers with white hangings have a cold and chilly aspect which it is equally desirable to avoid. No rules can be given for selecting papers; what seems desirable in one case or to one person is objectionable to others, and every one will of course suit themselves in this respect.

EDWIN MARCUS CHAFFEE.

Edwin Marcus Chaffee, a well known and prominent manufacturer of india rubber goods, died recently at Bristol, R. I., in the 65th year of his age. Mr. Chaffee was contemporary with Goodyear, Hayward and Day, and like them was also an inventor, having devised, in 1836, the devices known in the rubber business as the "Machine Patent." He began his career in 1830 and was one of the organizers of the Roxbury Rubber Company; during the past five years, he has been connected as director and secretary with the Providence and National Rubber Company.

Mr. Chaffee did not meet with the pecuniary success to

which his inventions and industry entitled him, but, far from being discouraged at misfortune, he persevered in experimenting upon and perfecting new machinery up to within two weeks of his demise. He was one of the sufferers of the poisoning affair at the National Hotel in Washington some years ago, a circumstance which rendered him an invalid and eventually proved the direct cause of his death.

PROFESSOR JOHN W. FRAZER.

We much regret to announce the death, suddenly, on the 12th of October, of Professor John W. Frazer, one of the editors of the *Franklin Journal*, and Professor, for more than thirty years past, of Natural History and Chemistry in the University of Philadelphia, Pa. He was 63 years of age. Professor Frazer was a man of extensive learning, and varied attainments.

WILLIAM PRESCOTT SMITH.

Mr. William Prescott Smith, Master of Transportation on the Baltimore and Ohio railroad, died on the 13th of October last. Mr. Smith was closely identified with the railway interests of the country, and more especially with those of the road of which he was the actual manager at the time of his death.

SCIENTIFIC AND PRACTICAL INFORMATION.

BALL LIGHTNING.

An esteemed correspondent, J. R. A., of R. I., was surprised at the letter of J. H. P., published on page 148 of our current volume, and states that in 1850 in the Shetucket valley, Conn., he had a view of a stroke of this kind of lightning at about eight rods distance. It struck a tree, rent it from top to bottom, passed off to a cart tongue laying near, into and through a pile of railroad ties, and into the railroad track about two rods distance. It was seen by six other persons, and the size, as it appeared to all, seemed to be as large as a bushel basket. They were in a building on a rise of ground facing the tree, and had a most perfect view of it. Undoubtedly there are a good many in the United States who have seen such strokes, if they would take the trouble to answer.

THE SUN AND THE ORIGIN OF STORMS.

Mr. John Hepburn says: "I have seen that all gusts coming up in the morning come from the eastward, all about noon from the southward, and all after sunset from the westward; thus clearly proving, to my mind, that the rays of the sun drive the storm, as it were, away from him after their electricity has fired and lit it up. Let the interested please observe, and they will find it so, I believe, in all cases."

NEW GALVANIC PILE.

A new galvanic pile, invented by M. Morin, is intended to avoid the inconvenience caused by the deposit of copper upon the surface of the zinc, or upon the porous cup. The pile consists of a cylinder of copper surrounded by a concentric cylinder of zinc, between which two cylinders is a third cylinder of filtering paper. There is difference enough in the size of these cylinders to leave concentric annular spaces between the paper and the copper and the paper and the zinc. The former space is filled with sand, and the latter with a stratum of flowers of sulphur. The whole is immersed in sulphate of copper.

Such a pile, it is said, has operated during five months with so little variation that the inventor believes it would work equally well for an additional five. During these five months, the current has been continuous without the need of once touching the battery.

A SIMPLE HYGROMETER.

A new hygrometer has been invented by M. G. Smiths, of Paris, France, in which a salt of cobalt is the essential ingredient. A solution is made of the salt of cobalt, common salt, and gum arabic; into this, strips of paper are dipped and allowed to dry. They will take on a blue color in a dry atmosphere, and become rose colored if the atmosphere be humid.

FORMATION OF CERTAIN METALLIC SULPHIDES.

Privoznick finds that copper, in contact with sulphuretted sulphide of ammonium is transformed into a blue bisulphide and a protosulphide. This is a means for obtaining the sulphides of ammonium, potassium and sodium in a colorless state. Silver becomes covered with a gray crystalline crust of sulphide of silver. Tin and nickel dissolve in appreciable quantities in the polysulphides of ammonium. Iron is covered with a black deposit. The solutions of hyposulphite of soda transform also, slowly, copper and silver into sulphides, with the formation of sulphite of soda.

CONCENTRATING SULPHURIC ACID TO 66° BAUMÉ.

M. de Heuipume proposes to use a lead-lined vacuum pan for this purpose. The lead is not sensibly attacked by the acid unless the temperature is 200° or over, while in air the sulphuric acid will not boil except at 325°; in the partial vacuum of the pan, 3 to 4 centimeters of mercury, it will readily boil at 190°. The lead, however, softens at this temperature, and is subjected to a considerable pressure from without; and to avoid this difficulty, it is proposed to place in the pan sandstone balls, etc., which are not attacked by the acid.

CRYSTALLINE PHOSPHIDE OF IRON.

J. Sidot reports the following result: Phosphorus vapor was passed over metallic iron in the ordinary method of making phosphide of iron. The product was then calcined in an ordinary crucible with the intention of volatilizing the excess of phosphorus. On breaking the fused mass when cool, the