SCIENTIFIC AMERICAN.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN. S. H. WALES. A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

☞ Messrs. Trubner & Co., 60 Paternoster Row London, are also Agents or the SCIENTIFIC AMERICAN.

VOL. XVI., No. 21....[NEW SERIES.] ....*Twenty-first Year.*

NEW YORK, SATURDAY, MAY 25, 1867.

Contents:

(Illustrated articles are marked with an asterisk,)

CAUTION.

It has become necessary for us to state very distinctly that the Scientific American Patent Agency Offices are at No 37 PARK ROW, and not at No 39.

THE ASCENT OF MOUNTAINS.

Mountains, next the almost illimitable ocean, are the grandest objects on our planet—grand in their immensity and in the opposition they offer to all the efforts of man to overcome their obstacles to his progress. They constitute, more than the sea, the natural divisions between peoples and nations. Their barriers are so effective that on one side may be found one people with one language, one set of customs, one government, in short, one nationality, while on the other side is a different people, different language, customs, and government. Besides this they are the look-outs of the earth. From the top of a mountain peak the eye can take in hundreds of miles of territory on either side, comprising cities, harbors, villages, farms, the wilderness and the "wide, wide world."

But to get to this elevated stand-point, that is the rub. Mount Washington, a favorite summer resort for our tired citizens, rears its head only 6,226 feet above the sea level, yet its ascent is so fatiguing, and sometimes dangerous, that a carriage way has been built, and now a railway is in progress to enable those who most need the exhilarating atmosphere of our mountain tops, the weak, the feeble, and the work-exhausted, to rise from the sweltering valleys to the pure air of the mountain. We gave illustrations and a description of a plan for this purpose in our issue of March 5, 1864, Vol. X., No. 10. Following this example, it is stated that it is in contemplation to build a similar railway on the sides of some of the Alps, which rise from 9,600 to 15,700 feet. The completion of this enterprise, if ever undertaken, would diminish the "pride of strength" and the charm of success in overcoming obstacles, which add so much in the opinion of some to the *eclat* of a European tour; but it would be a great advantage to hundreds who now, from want of constitutional stamina and bodily strength, must content themselves with viewing the tops of the mountains from the humility of the valley, seeing but never possessing.

But cannot some cheaper method and safer plan be devised than an inclined railway, the cars on which are elevated by means of a stationary engine? On inclines not too rapid the ordinary locomotive could be used by the aid of the third or cramping rail, but on steep inclines as from the brink of one precipice to another no such means could be available to overcome the natural obstacles. As it is now, the attempts of engineers are not directed so much to finding a passage over the tops of mountains, or even hill, but to secure a way from side to side either by passing around the base or tunneling through the mountain. Both the elevated railway system and the tunnel are costly—costly in construction and in operation, and dangerous in use.

In our issue of March 30th we gave illustrations of a plan for overcoming these difficulties proposed by Dr. J. A. A. Fontaine of New York city. By reference to that copy of our paper his idea may be understood, but we will give a few of the principal details to enable our readers to form a more intelligent opinion of its merits. In the application of his idea to the ascent and descent of declivities the apparatus used is simple and comparatively inexpensive. It is merely a gas holder intended to neutralize the weight or gravity of the load, guided by wire ropes stretched from point to point, with which deeply grooved wheels engage. Attached to this gas holder or balloon, is a compartment for the reception of passengers or freight, which constitute the loads and is carried up the incline by the ascensive force of the confined gas, the wire ropes being the guide to the direction of the ascent. Arrived at the top of the incline, or the summit of the mountain, and the apparatus being ready to descend, a portion of the gas contained in the elevating reservoir is pumped back to the foot of the declivity into a proper receptacle, reducing the ascensive power and thus increasing the positive gravity, which power, when sufficient to overcome the negative gravity, will bring the æro self-mover back to its place of starting.

This device has not, as yet, been tested on a large scale, but there seems to be no obstacles to its operation for practical purposes which may not be overcome by the resources of mechanical skill and scientific knowledge. The inventor intends to make a practical application of its merits and demonstrate its value on the hights of Hoboken or at Hudson in a few weeks. The device is worthy investigation by our scientific men and capitalists.

THE MISSISSIPPI LEVEES.

The war did more in some instances than to temporarily depress industry and destroy the works of the husbandman. The effects of the ruin wrought in some cases are of national importance. Such is the cutting of the Mississippi levees which turned many square miles of valuable and productive territory into a waste of waters. An appropriation of $4,000,000, has been made by the legislature of Louisiana to rebuild and repair the levees, a work that should have been undertaken by the general government, if for nothing else, for the sake of securing uniformity in the results, but it is a work of a national character, as the river which the levees protect is a highway for a continent and these levees extend for over 130 miles. The levees are made of soil, clay, or turf, strengthened with cypress logs and vary from five to fifteen feet in hight and from ten to thirty feet in width or thickness.

A prominent engineer, Mr. G. W. R. Bayley, proposes an improved method of constructing the embankments which seems well calculated to withstand the ravages of time and wear. He says: The disastrous results consequent upon the construction of inadequate levees, simple embankments of earth, without support or protection from the ravages of crawfish or the action of the river waves, show conclusively that a different mode of building and maintaining them must be adopted. Newly constructed levees of earth, unsupported, and unprotected, cannot be depended upon, but it is claimed that with suitable support and protection they can be guaranteed against failure. A system of piling, with heavy cypress timber, sheet piling and revetment of three inch cypress planking properly constructed in front, or on the river side of all large and important levees, will protect and preserve them from the borings of crawfish, from leaks, from the action of river waves during storms, from being cut by evil disposed persons and from all other sources of danger.

This year's experience proves that a new or green levee of earth will not stand with a rear or land slope of two to one, or two feet horizontal to one foot perpendicular. With this slope, when saturated with water, the earth sloughs off, or slides down, taking a flatter slope and thereby diminishing the width at top. The front is washed down by the action of the river waves, and a crevasse is the result.

The plan I venture to propose is, to increase or extend the rear or land slope to not less than three to one, and to substitute for the very flat, or four to one, river side slope adopted by the Levee Commissioners—a work of piling, sheet-piling and inclined revetment of cypress timber and planking. This work to be made of piles, driven fifteen feet into the ground, in two rows, ten feet from center to center in the line of the levee, and distant from each other equal to the hight of the levee. Horizontal pieces to be bolted to the front row of piles above and below ground, a trench being dug about five feet deep for the latter, and sheet-piling driven to a depth of ten feet below the surface, or five feet below the bottom of the trench, in front. The front row of piles to be cut off five feet above the ground, and the rear row at the hight of the levee, which should be not less than five feet above the highest water line. Inclined timbers to be bolted to the heads of the front and rear rows of piles. Then horizontal pieces to be bolted, about five feet from centers, to these inclined timbers, and the whole covered with three-inch planking. The lower ends of the inclined planking to be fitted to the inner side of the sheet piling.

It may be objected that it will cost too much, but security and safety should be the true measure of economy. It is thought, however, that the saving in the amount of earthwork by substituting this kind of protection for the four to one river side slope would equal very nearly if not quite the cost of it. Such a work, if made of good cypress, would not need repairs for ten years.

Millions have been expended in the construction of inadequate levees, and untold millions have been lost by their failure. Nearly all of the new levees, particularly in upper Louisiana, have been swept away. Would not reliability and safety be a sufficient equivalent for a small increase in expenditure? The river accommodates itself quickly to every increase or diminution of its high water discharge. A decrease adds to the sand bars and contracts the sectional area by diminution of current; an increase washes them away and increases the section by an increase of current. With a greater velocity of current, and a larger sectional area, a greater quantity is discharged in a given time with the same, or even less surface slope.

We must make levees in such a manner and of such hight and strength as cannot break, and thus reclaim and protect the whole valley, or we must surrender the whole to destruction. No middle course is possible; it must be, in the very nature of things, either all levees or all outlets. Although the first effect of the building of levees of sufficient hight and strength, (protected in front,) from the river's mouth to Cairo, or in such a manner that they cannot give way, would be an increased rise, yet immediately afterwards the river channel would be accommodated to the increase, the sectional area would enlarge by the washing away of the sand bars—or a portion of them—and the greater quantity would be discharged in the same time by an accelerated current and a diminished slope—the river surface would be reduced.

WOODEN PAVEMENTS.

The city government having authorized the laying of Nassau street from Pine to Spruce with the Nicolson wooden pavement, and the Mayor having withheld his approval until he can hear objections, has brought the question again before the public.

The past experience of New York with wooden pavements has been unfortunate. Many years since a block on Broadway, between Chamber and Warren streets, was thus paved, and its even surface, freedom from creation of noise, etc., gave such general satisfaction that it was copied in other streets, and one block was put down, where the Nicolson pavement now is, in Nassau street between Wall and Pine. But after a considerable period of wear, some of the blocks began to decay, and this state once arrived at, almost all the rest of the blocks rolled out at once. In heavy rains also water collected under loose blocks, which floated, thus causing unsafe footing for which, and other reasons, wooden pavements were dismissed.

Those pavements were, however, of larger blocks of wood than those now used; were of octagonal form, and placed, on end, each one touching the other, upon a foundation bed of sand. There was no provision to exclude water, which settled between the blocks, and aided their decay. The construction and practical operation of the Nicolson pavement, both of which we described lately, are entirely different in these respects. A further test made on the 4th inst. by the Croton Board showed that not only is this pavement taken up and replaced with peculiar facility, but the sand beneath remains dry and the wood unassailed by decomposition and even unworn to any perceptible extent, by nine months of the severest usage to which pavements are liable.

Still, there is no sufficient reason to conclude that the Nicolson pavement is the *ne plus ultra* of human ingenuity and nature's resources. Before any more large paving jobs of any kind are decided on, we hope to see a capable commission appointed to examine and test the different methods, including several which are yet in the background—such as Stafford's and others—as well as to stimulate further invention to do its best, if not already done, for this important object.

AMERICAN STANDARD FOR BOLTS AND NUTS.

Several years ago we strenuously urged the establishment of a standard for the number of threads on different sizes of bolts, the object being to secure uniformity throughout the country, to the advantage of all who used machinery of any kind. The subject was also treated by the Franklin Institute, and a committee was appointed by that body who recommended a form of thread, the relative proportions of heads, nuts, and shanks, and the number of threads for different diameters. We believe their decisions could not be materially improved upon, and cordially recommend their standard for general adoption.

Mr. Edward Lyman, engineer and machinist, of New Haven, Conn, whose advertisement may be found in another column, has embodied the results of the committee's labors on a lithographed sheet, which gives the dimensions and proportions of nuts and bolts from one quarter of an inch diameter to three inches, drawn to full size and the measurements properly designated. A section of the form of thread adopted, much enlarged, is also given.

COPPERED IRON HULLS.—Although the French Government is liberally sustaining Mr. Bernabé's experiments, and has ordered one of its iron-clad vessels, *Le Belliqueux*, to be coppered by the plan of M. Roux, it is unknown, at least to the public, how the disintegration of the connected metals in sea water is to be obviated. It is a law of electricity, that where two metals in conductive proximity are both brought in contact with a fluid, that which is electro-negative to the other must be dissolved, with an energy proportionate to the activity of the fluid, and the difference between their electric states. It is not seen how the new experiments are to be exempted from the failure which has attended their predecessors, unless a ship's copper can be guaranteed against all flaws, accidents, and abrasions. A communication to the *Mechanics' Magazine* suggests enveloping iron hulls with planking, on light ribs, the interspaces being filled with some kind of asphaltic concrete, and the wooden skin sheathed with copper in the usual way.

BOND'S BOILER FEEDER.—We direct attention to an advertisement on another page of this apparatus, patents for which were secured through the Scientific American Patent Agency in this country and England. It has been fairly tested and has secured the unqualified commendations of practical men who have it in constant use. It is simple, cheap, and not liable to become deranged in operation. We think it worthy the attention of our engineers and users of steam power.

SAFETY BLASTING POWDER.—Tehleisen, a chemist of Wurtemberg, has patented a blasting powder which he calls kaloxylin, and which is not exploded by a blow, a shock or friction. The carbonaceous ingredient is cellulose prepared from sawdust of hard non-resinous woods, (nine parts) with three parts of charcoal, and forty-five parts nitrate of potash.

THE first gold discovered in the United States was found in Cabarrus county, N. C., in 1799.