

The 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.

TERMS—Three Dollars per annum—One Dollar in advance, for twelve months.
Single copies of the paper are on sale at the office of publication, and at all periodical stores in the United States and Canada.
Shannon Low, Son & Co., the American Bookellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.
See Prospectus on last page. No traveling agents employed.

VOL. VIII, NO. 21... [NEW SERIES]... Nineteenth Year.

NEW YORK, SATURDAY, MAY 23, 1863.

THEORY AND PRACTICE.

The intimate relations which exist between theory and practice are now acknowledged by all sensible men, whether professional or mechanical. Certain rude and unlettered persons, too lazy to study, incapable of mental acquisition, and envious of all others who distinguish themselves, sneer at theoretical rules and adhere blindly to the "rule of thumb" as practiced in the ancient days, when the relations between the arts and the kindred pursuits of the study were unappreciated and unapplied.

Happily, sneering and derision have no particular effect upon science itself; and those shrewd individuals who avail themselves of professional knowledge, both practical and theoretical, are far ahead of those who prefer the old way and walk blindly therein. There is, unquestionably, a great deal to be said about injudicious persons, who, pretending to a knowledge of theory, and professing to apply scientific principles to daily manufactures and inventions, fail miserably in their undertaking and draw down the scoff and jest of the illiterate, who despise learning in any shape. Their failure is no proof that science is useless, but that the way in which it was applied made it inefficient; and we assert, unqualifiedly, that theory and practice, science and actual experience, are imperatively necessary to produce finished engineers, philosophers—practical men in the fullest sense of the word. These remarks are naturally suggested by recent proceedings in the Franklin Institute, wherein it was proposed to establish, under Government auspices, a "National Academy of Sciences," which should embrace the practical details of the machine-shop within its walls, and, in fact, be a combination of all the desirable features embraced in modern mechanics.

It was not directly stated, we think (for the paragraph referring to the subject has been mislaid), that the students so educated should be held amenable to the orders of the Government in time of war. Such would naturally be the inference, even if the fact was not explicitly set forth, or within the purview of the contemplated academy. The establishment at West Point has bred a great many able engineers and—if the profession will pardon the connection—innumerable traitors also, and the mischief that these wretches have wrought the Government is and will be apparent for many a long year to come. That an academy of the natural sciences would be a very great desideratum and an important advantage to the resources of the country no one can doubt, but we do not desire to see it under Government protection. Politics in the abstract blight every educational influence they come in contact with, solely because they use the ambitions and bad passions of men to advance personal interests. Science is simple and unassuming in manner, and cannot stand before bluster and pretence. Had not the Government furnished the means for its own destruction, had not the academy at West Point and the naval school at Annapolis brought forth so many rascals recreant to their trust, we should not now have reached this climax in our history.

It is urged, as a cogent argument for the establishment of such an academy as the one proposed, that engineers in good practice commit egregious errors; and though the position is not taken, it must be in-

ferred that, under Government auspices, hereafter all blunders would cease. We do not regard this as sustained by fact; it appears to us fallacious reasoning. The proportion of mistakes in actual practice is very small, and an error of judgment cannot justly be called a blunder. A general may fight a battle to the best of his judgment, and yet lose it, and so any professional person in the mechanic arts man through a complication of causes which the public are not always permitted to know, commit apparent inaccuracies which result unhappily to him. Must we infer that, under Government patronage, the character and quality of human nature would improve, and that the old copy, "to err is human," would be dismissed from the catalogue of mortal frailties?

As remarked previously in this article, such an institution as the one proposed would doubtless subserve good ends, and result beneficially to the country at large, but not under this Administration or any other. Individual enterprise and private benevolence must supply the means necessary for so important an institution, and no one can certainly win the gratitude of posterity in a more substantial way than by endowing such an academy with funds to enter upon its career.

THE BROADWAY RAILROAD.

For sometime past a combination of as unscrupulous men as ever existed have been steadily at work in endeavoring to procure from the Legislature of this State the right to lay down a rail track through Broadway in this city. It is well understood that the most dishonorable means have been resorted to, in order to obtain this grant. The schemers have operated upon the principle that "every man has his price;" and by the vigilant exercise of all the arts known to them, they succeeded in getting the grant from the Legislature, denying to the city all consideration for a franchise worth millions of money. Responsible real-estate owners in this city, whose property was most affected by the railway, offered two millions of dollars for the grant; but, inasmuch as none of it as to go into the pockets of the scamps in the Legislature, their proposition met no favor. The Legislature adjourned after perpetrating this outrage; and all that was wanted to complete the transaction was simply the signature of His Excellency, Gov. Seymour. The case was argued before him with skill and ability; but, to his praise be it said, he could not be moved to sign the bill; his veto is an admirable document, and fully shows that he is proof against the arts and wiles of those unscrupulous speculators. It appears probable that Broadway is to have a railroad; but there is much satisfaction in the fact that the Albany jobbers are not to have a hand in the spoils. In the year 1832—at the time the Legislature granted a charter to the Harlem Railroad Company to lay its track in the Fourth Avenue, Bowery and Center street—provision was made in the charter to allow this company to lay a track in other streets of the city whenever the Common Council should think proper to allow it. The municipal authorities have recently granted this right to the Harlem Company, and the work of tearing up the pavement of Broadway has commenced; but the work is temporarily suspended by an injunction issued by Judge Barbour of the Superior Court. We think, however, that the injunction will soon be dissolved, and the track laid. The company is to pay the city ten per cent of the receipts of the road below Fourteenth street, which will amount to a large sum. The scheme before the Legislature gave to the city no advantages whatever—the cormorants wanted all for themselves; and we rejoice, in common with good citizens generally, that they have failed. We trust, now, that the city authorities will see to it that the Harlem Company be compelled to lay down and equip a road that shall present as perfect a system as possible; their present road is one of the worst in the city, not only as regards the track itself, but also in respect to the cars. The rail is of an old antiquated pattern, and is dangerous to passing vehicles, while the cars are miserably arranged for comfort and are wholly destitute of ventilating apparatus. In stormy weather, when the cars are overcrowded, the atmosphere is about as murky as it is in the hold of a ship. A railroad in Broadway ought to be an ornament to

the street; but, judging from what we have seen in Union Square, where the Harlem Company have commenced the work of tearing up the roadway preparatory to laying down a track, it promises to be an eyesore—a disgrace to the city and also (if possible) to the company. We suppose the company intends to lay down the track as rapidly as possible; and then turn on their old, yellow, faded-out cars to accommodate the traffic. These vehicles are tolerably well adapted to run down past the "Tombs" in Center street, and in front of lager-bier shops and brothels, as it does; but not one of them ought to be allowed to traverse Broadway, unless during the small hours past mid-night, when the majority of honest people are in bed. We urgently call on our city authorities to carefully watch the Harlem Railroad Company's proceedings in this matter, and to compel it to build and equip a line which shall be in every respect a model city-railway.

SEA FOGS AND SIGNALS.

Sea fogs are exceedingly dangerous to shipping, especially near coasts like those on the Northeast part of our continent. A few weeks ago the steamer *Anglo-Saxon* was wrecked near Cape Race by striking upon a rock during a fog, and this was but one of many similar accidents which have occurred in such situations and under like circumstances. A sea fog is simply a cloud resting upon the face of the waters, and usually it does not extend to a very great elevation. It consists of moisture evaporated from the water, becoming condensed near the surface of the sea by the cold air of the upper atmosphere. When standing upon a high elevation, fogs may frequently be seen extending like white sheets over low grounds, along river courses and upon the face of bays, while all above is quite clear. Fogs differ in density, and they are dangerous just in proportion to their density. When a red light cannot be recognized at a distance of over one hundred yards, seamen consider them to be very dangerous. As no art of man can prevent their occurrence, all that can be done, as a preventive of accidents on much frequented sea-coasts, is the employment of the best signals to give warning of danger to vessels. To obviate collisions between vessels sailing in a fog, sounds are employed. Steamers use steam whistles; and sailing vessels, bells. But the danger of a fog not only consists in its impenetrable nature to the rays of light, but also in its acting like a cushion to prevent the vibration of sound-waves. As fogs are very irregular, the waves of sound are frequently so deflected, that they appear to proceed from a different direction than the place from whence they are propagated. Sounds are also deceptive in fogs by sometimes seeming to come from a much greater distance than their source. And yet, although, sound-signals are very uncertain, in such circumstances they are really the only kind that can, with any degree of safety, be relied upon; the great question connected with them is to employ the best agency that will transmit them to the greatest distance and in the most direct line from their source. Now it is not volume, but intensity, of sound which is transmitted to the greatest distance, and musical sounds of high degree are the best to employ. In the harbor of Boulogne, France, a fog-bell is placed on the end of a pier and in the center of a large parabolic reflector facing the sea, and its sounds are conveyed outwards in a very direct line to a great distance. On land such signals appear to be the best, but on vessels sailing in a fog, the reflector would be a disadvantage, because the waves of sound in such cases should radiate in all directions. A steam whistle is employed at Partridge Island, near St. John's, New Brunswick; and Daboll's air whistle is used on the dangerous stations of our New England coasts. This latter is an excellent and simple fog signal, but it appears to us that it would be much improved if it were so constructed as to transmit several musical notes, like those of the calliope. By employing a parabolic reflector to concentrate musical sounds of a high degree of intensity with air or steam whistles, perhaps the most perfect fog signal yet tried would thus be secured.

PRINCESS ALEXANDRA was married in a lace dress which cost £8,000! The same night hundreds of poor girls were starving in London.