Scientific American.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW, NEW YORK

O. D. MUNN. A. E. BEACH.

TERMS.

One copy, one year - - - - - - - - $3 00
One copy, six months - - - - - - - - 1 50
CLUB RATES { Ten copies, one year, each $2 50 — 25 00
Over ten copies, same rate, each — 2 50
TO BE HAD AT ALL THE NEWS DEPOTS.

VOL. XXVII., No. 7. [NEW SERIES.] *Twenty-seventh Year.*

NEW YORK, SATURDAY, AUGUST 17, 1872.

Contents:

(Illustrated articles are marked with an asterisk.)

THE APPRECIATION OF KNOWLEDGE.

It is an old observation that man generally appreciates only that knowledge which he possesses himself, even if this possession is quite limited; and that those branches of knowledge to which he is a total stranger are considered by him as not worthy of the expenditure of his own or any body else's time. We must, of course, make exceptions to some ornamental accomplishments; a man who never danced may come into a ball room, and then appreciate the value of dancing, and wish he could dance; or a young lady without any education whatever may ardently wish she could play the piano and talk French; but such a kind of appreciation proceeds not always from any love to the knowledge itself, but often from the reasonable and natural desire to make one's self agreeable and entertaining, or, what is worse, often simply from vanity and the selfish desire to shine and eclipse others.

It is this total ignorance of everything relating to the science of the present day, of those educated in our old fashioned exclusively literary colleges, which is the chief cause of the opposition to the introduction of scientific courses in our higher educational institutions. The knowledge of the classical languages and their literature, even when it is only limted, of course increases its appreciation more and more; and if the student, by an incomplete *curriculum*, is kept exclusively in this path, he must of course become one-sided; the result is seen in the opposition of the present day, found among many professors and students, to the innovation of devoting to the scientific course as much time as to the classics. It is perhaps little known that, 300 years ago, there existed as much opposition against a reform then introduced into the classical education as there is now manifested against the modern reform. The reform then introduced was the study of the Greek language and literature. The whole scientific world was then under the tuition of the scholastic lecturers in Latin, who, under pretence of teaching the philosophy of Aristotle, taught nothing but the rubbish under which the philosophy of Pythagoras and Plato were buried. When, after the overthrow of Constantinople in 1453, by the Moslems, the learned Christian Greeks had been driven to the cities of the west, and diffused the well merited admiration for that language and literature, the scholastics and Roman Catholic theologians, comfortably seated in their universities and pulpits, opposed vehemently the attention which was then commenced to be paid to Greek. Their opposition was bitter and most violent; the Christian faith, they said, was in danger. The Greek classics would undermine Christian Roman theology. The established and well tried mode of educational training were to be superseded by worthless empirical schemes. The humanities would supersede divinity, and society would be endangered by such a change, etc.

The changes, at last established in the system of study, came then as now, not from inside appreciation, but from outside pressure. Hamilton says: "The awakened enthusiasm for classic studies did not originate in the universities; it was only after a strenuous opposition from these bodies that ancient Greek literature achieved at last its recognition as an element of academical instruction." The new philosophy, so called, was considered a fifth wheel to a wagon, abominated as a novelty that threw the ancient Latin learning into discredit, diverted the studious from the universities, emptied the schools of the *magistri* and the *bursæ* of the colleges over which they presided, and rendered contemptible the once honored distinction of a degree. Greek in particular and polite letters in general were branded as heretical, and while the academical youth hailed the first lecturers on ancient Greek literature in the universities as messengers from heaven, the academical veterans prosecuted these intruders as preachers of perversion, and winnowers of "the devil's chaff," etc.

It is curious to observe the similarity of the objections made against the educational reform of that time, and those made in our time against the introduction of scientific training. It is also now asserted by the ultra orthodox veterans that religion is in danger, that science will beget infidelity, etc.

In the meantime, science manifests so powerfully its influence on our present social condition that opposition to its study is utterly useless. Every thoughtful man is reminded almost every minute of his life of what comforts he owes to scientific research, discovery and invention. We close with a quotation of George Gore, of Birmingham, England, from an article on "The Practical Importance of Scientific Education" He says: "Every man who eats his food with an electro-plated fork is indebted for the use of that article, not only to the labors of those inventors who developed the steam engine, by means of which the metal is rolled and stamped into forks, but also to Volta, Davy, Daniell and others who produced the voltaic battery, to Gay Lussac, who discovered cyanide of potassium, and to the various inventors and practical men who applied all those means to produce the final result." And this is only a single illustration out of scores which can be easily given.

PROTECTION FROM LIGHTNING.

The importance of metallic rods as a means of protection against lightning was well illustrated during a thunderstorm at Baltimore, on the 20th ult., when an electric discharge fell upon the rod of the Washington Monument. This structure has an altitude of 185 feet, stands upon high ground in an open square, and forms a conspicuous point for the convergence of electricity. The monument was protected by a common lightning rod, put up apparently in a bungling, imperfect manner, but it unquestionably saved the structure from serious damage. The Baltimore *Sun* says that "investigation shows that the damage to the statue and monument was very slight indeed when compared with the damage to the lightning rod, and infinitesimally so when compared with the damage that would necessarily have resulted if the rod had not been there. A careful examination developed the fact that the rod received the whole charge and passed it safely to a bad connection, five feet from the point at which a lateral explosion occurred, knocking some small fragments out of the statue; from that on, it followed the rod, exploding in its way wherever inferior connections obstructed its passage, blacking the top of the base between the shaft and the outer edge as thoroughly as though a large quantity of powder had been exploded upon its surface. From there to the earth, the lightning passed without further explosion until arriving at the terminus of the rod, at which point the flag pavement was torn up and broken into fragments. It then seized upon the iron railing surrounding the base of the monument, over which it passed, fusing it where it first came in contact with the metal. Wherever the connection was good in the lightning rod, no damage was done."

In almost every example where buildings having rods upon them are damaged, it will be found that the connections or terminals of the rods are defective. One of the chief defects of lightning rods, as they are ordinarily put up, is in the ground terminals. The lightning-rod-man covers the house with neat looking rods and points, sticks the lower end four or five feet into the ground, pronounces the job a good one, receives his money and departs. But a rod thus left is almost as unsafe as it would be if its lower end were enclosed in a glass bottle and rested on the ground.

Ordinary earth is an exceedingly poor conductor of electricity as compared with iron; hence, in order to effect the safe discharge of electricity from an iron rod into the earth, the bottom of the rod should be provided with a large conducting surface, so that the electricity may be diffused and pass into the earth at many points simultaneously. The explosion at the pavement, in the example of the Baltimore monument, shows that the rod there employed was sadly deficient in the area of its ground terminal.

The necessary area of underground conducting surface for a lightning rod may be obtained in a variety of ways: (1.) Extend the rod itself for a considerable distance underground, away from the building. (2.) Connect the lower end of the rod with an iron pipe which extends in like manner underground. (3.) Provide a trench and supply it with good charcoal well packed, and imbed the rod, for some distance from the building, in the charcoal.

As an electrical conductor, well burned charcoal ranks next to the metals. Metallic ores come next to charcoal. Water and moist earth, which are so frequently recommended as terminals for lightning rods, are among the poorest of conductors.

One of the best protected dwellings that we have heard of is that of Mr. John Knox Smith, an intelligent English merchant residing at Singapore. His country house is built on a prominence, upon a bed of iron ore, with which the house lightning rods are made to communicate. The lower ends of the rods thus have a very extensive conducting surface, and the protection afforded is considered perfect. Thunderstorms and lightning strokes are very frequent, but the house has never been injured.

A PETROLEUM FIRE.

A great conflagration of petroleum occurred at Hunter's Point, opposite New York city, during the forenoon of the 30th ult. Over thirty-five thousand barrels of crude oil and thirteen thousand barrels of refined oil were consumed, together with many valuable buildings, tanks, docks, and several vessels. Property to the value of over one million dollars was consumed. The fire spread over an area of ten acres, and lasted for twenty-four hours, emitting an immense quantity of flame and smoke, which rose in a column of great hight, visible in all directions for twenty miles or more.

The Standard Oil Works, one of the largest refining and storing concerns in this vicinity, were totally destroyed. The fire broke out in a canal boat which was being loaded at the dock in front of the Standard premises, and is alleged to have been caused by the careless throwing down of a match by a workman, after lighting his pipe. The spread of the flames was so rapid, owing to the explosions of the oil barrels, that the firemen and workmen were compelled to keep at a distance, and were able to do but little in arresting the fire.

Large flocks of tame pigeons were observed to approach and whirl as though maddened around the huge column of smoke, and then dart suddenly into the midst of the flames and perish.

During the progress of the flames, some of the burning vessels were carried by the tide into the East river and floated northward. One of them, burning at a furious rate, was thus carried through the narrow channel between Blackwell's Island and Astoria, through the fearful pass of Hell Gate, beyond Ward's Island to Port Morris, a distance of five miles, where it approached the extensive docks and storehouses at that place, threatening the whole with destruction. No escape seemed possible, as no means for preventing the collision were at the command of the inhabitants. Slowly the burning monster came on, belching forth horrible flames and smoke. At the last moment, when all hope of saving the Port Morris warehouses was abandoned, a United States steamer was observed to run in under the smoke, into the very middle of the burning vessel. Running in and backing out quickly several times, the officers of the steamer finally succeeded in casting an anchor and chain upon the flaming hulk, by which it was towed out into the stream, and Port Morris was saved. The steamer proved to be the United States revenue cutter *Bronx*, and her commander and men are entitled to great credit for the skill and courage they so successfully displayed.

We are glad to be able to state that the extensive Astra oil establishment of Charles Pratt, which was illustrated so fully in our supplement a few weeks ago, escaped all injury. The Pratt works are located next south of the Standard works, and only escaped by a sudden shift of the wind after the fire broke out.

The application of water for the purpose of extinguishing petroleum fires, appears in this, as in other examples, to have been of little service. The water simply buoys the fleming oil, and enables it to run off in different directions, carrying destruction in its course. It is evident that a more effective extinguisher than water must be brought into use before we can hope to prevent these terrible conflagrations. Whoever can discover an effectual agent for this purpose or find out some simple way of rendering the oils uninflammable while in transit or storage, will confer a great benefit upon the country.

A RAILWAY ACCIDENT EXPLAINED.

By a recent accident on the New York and Oswego Midland Railway, a freight train was completely wrecked and much valuable property destroyed, but no lives were lost. The accident took place near Oneida, N. Y., while the train was running at a speed of from twenty to twenty-five miles an hour on a down grade. The train consisted of the locomotive and tender, two box cars, then two empty platform cars, followed by twelve or fourteen cars loaded with coal and other freight. The brakeman, a new hand, states that according to orders on down grades, he set the brakes on the box cars in front, and had just put his hand on the brake of the first platform car when he saw that the second platform car was off the track. In a moment more it was thrown athwart the track, a general crash ensued, and he jumped for his life.

Among the reasons assigned for the accident was the stereotyped one, "broken rail"; also slipping of a wheel on its axle; also dropping down of a brake. But Mr. Alfred Hawley, superintendent of the Oneida Community machine shop, who made a careful examination of the track and remains of the wreck on purpose to ascertain the correctness of these alleged reasons, gives a different report. He found the rails and road bed in perfect order, and no indications of a dropped brake or slipped wheel. "What then was the cause of the disaster? What caused the middle portion of a train to leave the track on a straight, level, well lined, well ballasted portion of the road? We are convinced, says a correspondent of the Oneida *Circular*," that the accident was caused by an improper application of the brakes to the forward part of the train when running at a high speed." He thinks that the checking of the front part of the train caused the heavy rear cars to crush against the light platform cars and lift them from the track; and with this opinion, probably most railway people will agree. The same correspondent takes occasion to observe that many of our railway accidents are due to the incompetency, carelessness or ignorance of railway employees; and with this view, almost everybody will coincide.

THE INTERNATIONAL PRISON CONGRESS.

An international congress is now in session in London, composed of representatives from all civilized countries, for the purpose of considering the questions of the repression and prevention of crime and the care of the criminal. The delegates number many distinguished persons, many of whom have made the subject of prison reform a life study.

© 1872 SCIENTIFIC AMERICAN, INC