# Scientific American.

**MUNN & COMPANY, Editors and Proprietors.**

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

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☞ "The American News Company," Agents, 121 Nassau street, New York
☞ "The New York News Company," 8 Spruce street
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VOL. XVIII., No. 21....[NEW SERIES]..*Twenty-third Year.*

NEW YORK, SATURDAY, MAY 23, 1868.


**Contents:**

(Illustrated articles are marked with an asterisk.)



## TRANSMISSION OF POWER BY HYDROSTATIC PRESSURE.

Much interest has of late been manifested in England, in the subject of transmission of power by hydrostatic pressure. It is proposed to substitute this method for the old system of shafting, pulleys, belts, and gearing. It is claimed that it is more economical, costing less in the first instance, and losing less power from friction. All expense attendant upon the the proper aligning of the main shaft, and lubrication of the bearings, as well as the cost of hangers, etc. is obviated. Any direction may be given to the primal force by a curve in the pipes through which the water column passes. Reciprocal motion is obtained by the aid of a cylinder and plunger, which is precisely the same as that used for the well known hydrostatic press, if we except some slight modifications which do not affect the principle to any great extent. It is also claimed that motion can be transmitted at great distances without increasing the cost, except by the expense of lengthening the pipes, the multiplier of course to be stationed as near as possible to the point where the power is to be applied to work. The reciprocal motion of the piston is converted into a rotary motion, by the old method of crank and fly-wheel.

We know of no attempt to practically apply this principle in this country. The Hydraulic Cow-Milker, described in No. 18 of the present volume, indeed uses it so far as the transmission of a reciprocal motion is concerned, but no attempt has been made to convert it into a rotary motion. Many attempts, and some successful ones, have also been made to construct engines to be driven by hydrostatic pressure, but nothing like transmitting motion derived from other sources, by means of water columns, for the purpose of impelling shafting at a distance, has come under our observation.

For ourselves, we have but little faith in the ultimate adoption of this method. For long distances, the power required to impart a reciprocating motion to the column must be very great, and we think that the loss from friction would probably be more than is anticipated. The inelasticity of water, its great weight, and the difficulty of adjusting the first motor to changes, in amount of power required, which take place at distant points, on account of the momentum of the column, seem to us to be great obstacles. The subject is, however, one of great interest, and we shall watch its development in the hope that our fears in regard to its success may prove unfounded.

## DOCKS AND WET BASINS FOR EAST RIVER, NEW YORK.

Whoever has visited and spent any time in the great commercial cities of London and Liverpool must have had his attention arrested and his wonder excited by the extent, solidity, and magnificence of the docks. They constitute one of the greatest attractions of either city. The contrast between these commercial facilities and those which serve the purposes of New York is painful to every thinking American. With a harbor unsurpassed in beauty and in value for commercial purposes by any other on the globe, our dock accommodations are of the most meager and rattletrap description.

We have been shown drawings made by Mr. G. W. Dow of New York city, proposing the construction of causeways extending from the Brooklyn to the New York shores, the spaces between the causeways forming immense water basins and the causeways themselves sustaining a double row of warehouses divided by a spacious roadway. The causeways are to be in sections allowing passageway for vessels, the connections between the sections to be made by drawbridges. Each section is to have flanking wharves on each side for the accommodation of vessels and their cargoes.

These are, in brief, the salient points of Mr. Dow's plan, and it looks beautifully on paper. It is, however, open to very serious objections, or, at least to very adverse criticism. Its provision of docking facilities is unquestionable, but whether it will, with its necessary draw bridges, accommodate the pedestrian and vehicular travel between the two cities may be somewhat problematical. The obstruction to the tide and currents and delay to vessels passing in or out are also considerations affecting the value of the project. However, we believe this plan worthy the attention of our engineers and business men and it should be thoroughly investigated and discussed. Certainly there is room for improvement to our harbor facilities, and other means than ferry-boats are required to connect New York and Brooklyn.

## HYDROCARBONS----THEIR INFLAMMABILITY AND EXPLOSIVENESS.

The very general and rapidly increasing use of hydrocarbons for illuminating purposes, and the frequent deplorable accidents happening, either from careless use, or ignorance of their properties, necessitate a presentation of every item of knowledge concerning them that we can gather. We have written often, and sometimes quite at length, on this subject, but there still seems to be, on the one hand, an almost criminal neglect of proper precautions in their use, and, on the other, as foolish confidence in their perfect safety under all circumstances. The first can be remedied by a knowledge of their nature and qualities, and the second by instructions as to their use. Probably the disinclination to take the trouble to test the quality of the liquid, and a desire to get the best article for the price of the poorest and most dangerous, is an indirect, if not a proximate, cause of some of the serious and even fatal accidents our journals record. On pages 180 and 217, current volume, we gave directions for ready and reliable tests of the quality of hydrocarbons; to those we refer our readers.

The use of different terms to designate similar substances are calculated to befog and confuse the public, and we are pleased to see that the Boston Institute of Technology have thought the matter of sufficient importance to appoint a committee on the subject, a portion of whose report we herewith reproduce. The committee say that, "after careful examination they find that the term naphtha is a general term, and covers both the other terms, gasoline and benzine. The word naphtha is one of great antiquity; it has long been applied to certain springs in Persia, from which is obtained a volatile, limpid, bituminous liquid, having a strong, peculiar odor, and generally a light, yellow color.

"When the art of distilling coal tar became known, the same term was applied to the more volatile products of such distillation; the heavy products being called dead oil and asphaltum. The term was next applied to the most volatile products from the distillation of coal for oil. When petroleum took the place of coal for this purpose, the term naphtha was again used to distinguish the more volatile, so called 'light' products from the heavier ones. This is still its use, and in our market all volatile products of petroleum lighter than illuminating oil (or what is known among our dealers as 'kerosene,' which has a specific gravity of 8-10, or 45 degrees by Beaume's Hydrometer), are designated by the general name of naphtha.

"Of the naphthas, those of a gravity from 45° to 80° Beaume are often, though improperly, called benzene or benzole. True benzole is a product of coal tar, and differs essentially from any liquid obtained from petroleum. The term 'gasolene' is applied to all naphthas having a specific gravity lighter than about 80 deg. Beaume, the lightest known being about 90 deg.

"This committee find, however, by reference to Prof. C. M. Warren's unpublished determinations, that none of these products are simple bodies. All of them are mixtures, in indefinite proportions, of at least twelve hydrocarbons, distinguished from each other by their boiling points, which vary from 32 to 318 deg. Fah., and are nearly as follows: 32, 47, 86, 99, 142, 156, 195, 208, 247, 261, 303, and 318 degs.

"While gasolene contains mostly those hydrocarbons whose boiling points are low, kerosene is composed chiefly of those whose boiling points are comparatively high. The isolation of any one of these products being a matter of great difficulty, few have attempted it, and your committee have had to rely on the labors of a fellow member for much valuable information on the subject. To completely separate the constituents of any sample would be the labor of many months.

"Your committee also report that there is great danger from the careless use of naphtha—1st, on account of its great inflammability; and 2d, from the liability of forming explosive mixtures of the air and vapors. The liquids are not in themselves explosive, neither are the vapors; but both are highly inflammable. If the liquids escape by any means and form pools, or saturate porous substances, the near approach of flame may cause the vapor to ignite and set fire to the whole exposed surface of the liquid.

"The vapors, it is true, are not explosive, but they become so when mixed with air in certain proportions, and this committee would particularly call the attention of the society to the fact that such mixtures are more likely to be formed in what are called empty cans, which have contained hydrocarbons, and from their supposed emptiness are imagined by ignorant people to be free from danger. A light may be applied with but little or no danger to a vessel full of gasolene or gasolene vapor, or even such a mixture of vapor and air as would produce lighting gas; but in case the vapor be mixed with a sufficient quantity of air, it would instantly explode."

The statement in the above that "the liquids are not, in themselves, explosive, and neither are their vapors," should not be understood as an assurance that there can be no danger in the use of these liquids. We have seen, repeatedly, a lighted match dropped into a lamp or other vessel full of naphtha, benzine, gasoline, or whatnot, sometimes not lighting the the liquid, but if so, the flame being easily extinguished by a blast of the breath. In our opinion such a test proves simply nothing. The vapor from any hydrocarbon requires the admixture of oxygen to render it explosive, and a certain quantity to make it even inflammable. If this vapor should be confined in an air-tight vessel it would neither explode nor burn. To burn, it must have oxygen; to emit light, a larger proportion of oxygen, and to explode, a still larger proportion. Many will, undoubtedly, as many have, be deceived by these so-called tests; but, after all, more danger is incurred by the inflammability of hydrocarbon and its vapors than by its explosive qualities. Care in storing, care in handling, and the use of a proper lamp for burning these liquids are what are needed to render their employment safe.

## FOREIGN MATTERS IMBEDDED IN GROWING TIMBER.

An exchange relates that on sawing a white oak log at a saw mill the saw struck a "hard substance, which, on investigation, proved to be a stone. The log was some eighteen inches in diameter at the part where the saw had penetrated, and the stone, which weighed about a pound, was found imbedded in the center of the log. The wood was found to be sound and solid, with no cavity or space in which a stone could be placed. It was found that the saw had made an incision in the stone of about half an inch before it could be stopped. The stone at present lies imbedded in the wood in the same position in which it was found, no effort having been made to remove it, and in fact the wood had grown round the stone so closely that it cannot be removed."

How that stone became imbedded in the wood we are not prepared to explain. It might have been lodged in a crotch or cleft, which afterward closed up. It being in the center of the log would seem to give some plausibility to the supposition, as it might have been placed among the clustering branches of the growing shrub and gradually closed in until it became seated in the very heart of the tree.

Appropos to this is a fact of which we are cognizant, partially. Thirty one years ago in company with a youthful companion we stuck a common pin in a young white pine at the intersection of the lower branches with the trunk. We took the bearings of the tree and marked those adjacent so it could be identified after the lapse of years. One year ago the tree was felled and our companion happened to oversee the clearing of the ground. He identified the tree, and it was brought to the mill and sawed up. Strange enough, the pin, perfect in form and very slightly corroded, was found by a carpenter in planing the stock, and there could be no mistake about its identity as the lumber sawed from the tree was watched through every stage by one of the parties to this boyish experiment.

## JUDGE FISHER ON REISSUES, SUSPENSION OF A GOOD RULE.

The Patent Office has abrogated its recent rule in respect to suspending action upon applications for reissues for thirty days. The recent decision of Judge Fisher pronouncing this rule of the Patent Office not justifiable under the statute, may be legally correct, although we differ from him on this point.

It has never been questioned but that the Commissioner has discretionary power to adopt rules and regulations for the management of the Office not expressed in the Patent Laws, and this rule, for suspending Reissues for a limited time and publishing the proposed new claims that parties interested might advance evidence to the Office showing cause why such claims should not be allowed, was one of the best and most practical that have been recently adopted. Of course the sewing-machine interest and some other large monopolies were opposed to this rule, for it prevented their slipping through broad claims unbeknown to the public; but all honest inventors approved of the plan of publishing claims for reissue before official action upon them, and we have never known of any detriment arising to any one in consequence, who was justly entitled to the claims asked for under a reissue. But Justice Fisher's decision sets aside this rule, and hereafter reissue cases will be acted upon immediately on their receipt, and no notice is to be taken by the examiner of testimony adverse to the application.

## LECTURES ON THE ANIMAL KINGDOM.

The talented naturalist Mr. Waterhouse Hawkins, of London, is now engaged in delivering, in Plymouth Church, Brooklyn, the course of popular lectures on natural history which he lately delivered with such acceptance in Cooper Institute, this city. The familiar, yet spirited style with which the speaker treats his subject, has attracted large, attentive, and, what is still more difficult of accomplishing, thoroughly interested audiences. The wonderful faculty which Mr. Hawkins possesses, of being able to draw upon the blackboard, with the greatest ease and rapidity, sketches illustrative of the subject under immediate consideration, is an invaluable gift, by the exercise of which he is enabled to control the attention of his hearers to a far greater degree than is possible with the best executed of ordinary lecture room diagrams. The most indifferent of listeners cannot fail of being entertained and instructed when ear and eye are both engaged in following the animated description, and watching the skill with which the structure of the animal is shown in detail, until finally, when the framework is sur-