

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

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

O. D. MUNN, S. H. WALE, A. E. BEACH.

"The American News Company," Agents, 121 Nassau street, New York... "The New York News Company," 8 Spruce street.

VOL. XVIII., No. 16. [NEW SERIES.] Twenty-third Year.

NEW YORK, SATURDAY, APRIL 18, 1868.

Contents:

(Illustrated articles are marked with an asterisk.) *Improved Machine for Stretching and Winding Woolen Cloth... *Improved Hat Band Buckle for Holding Railroad Tickets... To Toughen and Refine Gold... Composition Oil... *Thomas' Patent Belt Coupling... Editorial Correspondence... Animal Electricity... Packfong and White Metal... New Mode of Preserving Eggs... Steam Boilers—Their Construction and Use... Imitating Cluster Jewelry... Mechanical Decor Bird... Curious Things About Frost... *Improvement in Holdback Hooks... Tar Pavement Cement... Improved Process of Purifying Iron and Steel... Easy and Cheap Modes of Enriching the Soil... Effect of Bright Red on Animals... Bridge Piers and Floating Ice... *How a Snow Flake is Built... Improvement in Hand Printing Presses... Improvement in the Manufacture of Molded Articles... Curious Habits of the Chlamydeer... Dissolving Aniline Colors... Editorial Summary...

THE VALUE OF SKILLED LABOR.

It is unpleasant to read in our daily journals of the destitution among our laboring classes because of the lack of work. Yet it is the fact that thousands are actually suffering for want of employment, and still it is no less the fact that skilled labor is in as great demand now as ever. The thorough master of his business, unless that business is entirely prostrated, will never find himself, for any long time, unemployed, if he desires employment. If a workman at any business—mechanical or intellectual—is not a competent worker the place he desires will be sure to be filled by his superior, the master of his business. Men, like the particles of fluids, must find their level, and neither can rise above it without outside aid. The man in any business whose sole use and value is to fill a hole accidentally left open, does not amount to much. He only is valuable whose services are eagerly sought, and, being secured, are retained. When the employer seeks the worker it may be considered that the latter is worth the seeking; but there are thousands who might be sought, but who never would take the trouble to make themselves worth the seeking. These "slumps" of mechanics, making pretense to a name to which they have no right, are stumbling blocks in the way of really worthy men. We speak not of the apprentice and learner who have never had a sufficient opportunity to acquire a full knowledge of their business, but of those who, being either unfitted by taste or talent for their chosen business, look upon it solely as a means of earning their bread and butter and never imagined such a thing as enthusiasm or interest in their work. Such men, even in the best of times, are suffered and borne with, rather than valued in the shop. They may do the work set before them, but never care enough about its character when finished or their own reputation as workmen to take care and pains, use thought and brains, as well as muscle, in its prosecution. Being only automatons—breathing machines—their places are filled by work-men as soon as business becomes slack.

Yet it is not difficult for the worker to arrive at the head of his profession, whatever it may be, if first he has any aptitude and taste for it. All that is needed is application and an interest in his work. It may take years to accomplish the result, but the time will have been profitably spent. Once a workman, in the highest sense of the term, his future is secure. His efforts will be appreciated and his proper position assured on a very brief trial, even by a stranger.

These remarks apply equally well to those who live by their brain rather than their muscle; many a so-called editor is such simply by the circumstance that no proper man has found and occupied the position assumed by him who cannot properly fill it. And possibly there is no more bare-faced assumption of responsibilities and duties for which the pretender is totally unfitted than that of some would-be literary people; yet the mechanical branches of industry are thronged with such apologies for workmen; men who have no love for their work, no respect for themselves, and no regard for the interests of their employers. Such men should turn their attention to work requiring scarcely more brains than that of the ox.

The skilled workman is to be envied. He knows his own value, and feels thereby a pride in his business and a respect for himself. He is, in a measure, independent, for his services are needed and will always receive their full market value. It is better to be a thorough workman in the lowest branch of mechanical business than a mere hanger on in a popular

or genteel occupation. Will our young men and mechanics consider this matter?

SHAFTING AND BELTS—ABSORPTION AND TRANSMISSION OF POWER.

The renting of power for driving machinery is in many parts of the country as common as the renting of habitations and places of business, but while the value of the yearly amount to be paid for the latter can be easily ascertained and fixed, from the known cost of the premises, this or other sufficient data are wanting in regard to the amount of power used. Where that power is ample and cheap, as in a constant and sufficient water privilege, the amount of rent paid may be of little consequence; but where all the power must be generated from fuel and transmitted by the steam engine, it becomes a matter of great consequence to the proprietor. Only the crudest means are at present available to ascertain the amount of power transmitted by pulleys and belts. So many conditions are to be considered that the construction of a set of rules for calculating the amount of power in all cases, is simply impossible. Not only the width of the belt, the diameter of the pulleys, and the relative position of the shafts, but the condition of the belts and the velocity of the shafts, must be taken into consideration, together with the peculiar circumstances which every separate case presents.

It is well known that the closest mathematical calculations, based on the style of engine, diameter of cylinder, length of stroke, velocity of piston, pressure of steam, and other points of a steam engine fail to give accurately the amount of power the machine may develop. The actual trial by means of the indicator in the hands of a skillful manipulator is the only reliable test. From one of the best—if not the best—masters of the indicator in this country, we learn that engines calculated by their builders to give a certain amount of power often so signally fail of achieving the result desired that in one recent instance an engine calculated for sixty-horse power had run for months yielding less than twenty-six-horse power! The indicator showed the fact, and the experience of the operator detected the fault and pointed out the remedy.

Now if in a machine constructed with such care and skill as the steam engine such a wide difference should be found between the calculated and indicated horse power, what difference should we not expect, when the test is applied to a case presenting so many points of possible variations between the intended and real amount of power as that of belt transmission? And it is the fact that in very many cases the proprietor of steam power, knowing the actual power of his engine, finds that letting for hire what he deems is one-half of that power, his tenants are absorbing nearly the whole available power. The rough method of calculating the amount of power delivered or transmitted, by the width of driven belt—a plan which was common enough a few years ago, and may be so now—is as ridiculous and as far from the truth as the formula of the astronomical instructor who taught his pupils in estimating the distance of the fixed stars from our planet to "guess at the distance and multiply by four;" or as accurate as the man who took the measure of a door opening in a house he was building by measuring it with his outstretched hands, and rushed to the door maker with his hands held in position. Scarcely less nonsensical and foolish is the plan of charging for power to drive a wood turning establishment, with its lathes revolving at the rate of thousands of revolutions per minute, at the same price per machine as the machine shop with its equal number of lathes and planers revolving at a very low rate of speed. Yet we have seen, very lately too, a case of this character, where the owner of an establishment actually rented power for a wood worker—sawyer and turner—at a lower price per machine than he charged a machinist, and then wondered how the power of his engine could be so absorbed. "Wood, he said was easily worked; it must require more power to drive a lathe turning iron than one turning wood." In this statement he plainly showed his want of knowledge of the simplest principles of mechanics. Velocity is a great absorbent of power, and where a shaft is run at a rapid rate the very friction of the shaft is a serious drawback to the amount of power it will transmit compared with the amount received. To get the best results from belts they should not be driven more than thirty feet per second or eighteen hundred feet per minute; yet they are often driven at a much higher rate. There is a limit to the effective cohesion of belts to pulley faces, a fact, we are sorry to notice, some of our best mechanics are slow to acknowledge, or, at least, to put in practice.

A belt running horizontally—not crossed—will without excessive tension, deliver more power than one of the same width and weight running vertically. This every mechanic knows. It will also run easier. So with belts in other positions and under varying circumstances. It is evident, therefore, that calculations of the power transmitted by belts, based exclusively on their width, will not be reliable under all circumstances.

From a letter before us we learn that by the trial of a dynamometer, already patented and now in process of repeated and extended trial, the results of its trial have surprised letters of power and disgusted the hirers and users. In a trial where it was tested by the most elaborate and exact experiments, in one case it was found that it showed a difference of one hundred and twenty-five per cent between the amount of power used and that actually paid for, in favor of the proprietor. "Few," he says, after many trials, "imagine the amount of power absorbed by rapidly-driven shafts." We hope his endeavors to construct a dynamometer, which may be applied under all circumstances, and give reliable results, may be successful. It is much needed.

USELESS SPECULATIONS.

There is a strange quality in the human mind, by virtue of which it ever seeks to divine the unfathomable and to unravel insoluble mysteries, neglecting often the more useful and practical inquiries of every day life in order to gratify its penchant for metaphysical subtleties. Every age has been haunted by some scientific phantom-problem, which it was beyond the power of human mind to solve, and the period of time in which we live forms no exception to this rule. While formerly the discovery of the "philosopher's stone," and other impossibilities, engaged the attention of actual and pretended philosophers, speculations concerning the origin of the world have of late years become the favorite theme of theorists. But there is one fact to which we will call attention. The labors of the alchemist laid the foundations of modern chemistry; the search for the square of the circle promoted mathematical science, and to the failure in securing perpetual motion we owe the spread of clearer notions on the subject of mechanical principles; but what, we ask, is the benefit that shall accrue to mankind from the vain attempt to lift the veil from the mysteries of the first creation? Even if any one of the thousand theories proposed would commend itself to general approval, it would only be a barren acquisition to our theoretical knowledge, from which not a single useful result could be expected, and which would prove to be valueless in the advancement of our race.

We make these remarks because an examination of the correspondence sent to this office discloses the fact that many of our readers waste their time and abilities on this unprofitable subject. We have also occasion to notice the entire disregard or ignorance of the most elementary and best established principles of science on the part of these theorists. Wild notions of heat, electricity, the properties of matter, and so forth, form the cement which holds together the hypotheses and speculations with which they construct the unsubstantial fabrics of their brains. They are not aware that our knowledge of the behavior of matter under the influence of extreme temperatures (heat or cold), is, as yet, far too imperfect to warrant attempts of generalization. The creation of matter, its formation and gradual settling into the present arrangement is a fit subject for the reveries of the poet or the unbridled speculations of the metaphysician; but practical men who are willing to improve themselves and others should leave it alone. There are too many urgent questions of real importance which claim and deserve all the attention and energy which they can bestow upon them. Those of our friends, however, for whom the temptation to "lift the veil" should prove too strong, will pardon us for suggesting that their first duty is to obtain a comprehensive knowledge of physics and chemistry. If, after obtaining this, they find that they are further from the solution of the puzzle than they thought themselves before, they will at least not have to repine for wasted time and labor, as they can render their newly acquired knowledge useful in a thousand different ways.

TECHNICAL EDUCATION.

In the matter of "technical education," which now forms a prominent topic of discussion on both sides of the Atlantic, there has been, hitherto, altogether too much talking and too little that looks toward a practical, satisfactory, and speedy solution of the question, and yet the discussions are becoming still more long-winded and unintelligible every day. If we are willing to look on and wait till the philosophers have ceased to wrangle on this subject and have come to an agreement among themselves, the day of judgment will certainly dawn on an earth unprovided with technical institutions. The necessity for something of this sort is, we think, all but universally recognized; the rest is of minor importance. If the institutions are once established the settlement of subordinate points will be best accomplished when they present themselves in practice. We therefore call upon those interested to move in this matter. A good beginning for the present would be the appointment of a teacher of natural sciences in every public school. There is plenty of time to spare for instruction of this kind there, and it would be a pleasant addition to the established scheme of studies. We have no doubt that the Board of Education and the various committees of trustees to whom the duty of watching over the interests of instruction is committed, would give their consent to this plan if they are approached in the right manner. This point gained, it would become a mere question of time to mature a more systematic and complete plan, which would fully meet our necessities. Workingmen, mechanics, artisans, laborers of every kind, recollect that your interests are chiefly at stake; for your sake the agitation was confessedly begun, and you should, therefore, lend a helping hand in the attainment of its objects. If your organizations bestir themselves vigorously there is no doubt, with a community constituted like ours, that you will soon be gratified by the fulfillment of your wishes.

REPORT ON LIFE-SAVING INVENTIONS.

The official report of Capt. W. M. Mew to the Secretary of the Treasury, detailing the results of the investigations of the government commission which met in New York city in April last, is before us. From it we learn that about three hundred and seventy inventions, designed for saving life at sea, were entered for examination, of which a number were not reported upon, they either not coming within the scope of the objects of the commission, or lacking in merit. A large number, however, were tested with great care and are recommended in the report for adoption and use. Capt. Mew says that in addition to the trials before the commission the inventions have been subjected to practical tests through