Scientific American.

MUNN & COMPANY, Editors and Proprietors.

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

O. D. MUNN. 8. H. WALES. A. E. BEACH.

"The American News Company," Agents, 121 Nassau street, New York Bests. Sampson Low, Son & Co., Booksellers, 47 Ladgate Hill London. England, are the Agents to receive European subscriptions or advertisements for the SCHENTIFIC AMERICAN. Orders sent to them will be promptly attend-ed to. eu to. FF Messes, Trubner & Co., 60 Paternoster Row London, are also Agents for the SCIENTIFIC AMERICAN.

VOL. XVII., No. 8.... [NEW SERIES.] Twenty-first Year. NEW YORK, SATURDAY, AUGUST 24, 1867.

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THE IMPORTANCE OF LEARNING A TRADE.

We do not intend, under this heading, to speak of the importance of becorging an apprentice to any mechanical business, but of the importance of learning-acquiring-a trade, of becoming a workman at the business chosen. It is not enough that a young man goes into a shop and works for a longer or shorter period as a neophyte, but that he becomes master of the rudiments of his business. The country is filled with unfinished mechanics, every trade is overburdened with the miserable hangers-on who, professing a knowledge of a business, bring it into disrepute by their incompetency. There is no bond in this country by which a master can control the time of an apprentice for a period sufficient to remunerate the employer for the losses sustained in the early stages of the apprenticeship, or to give the apprentice a proper knowledge of his business. The apprentice is free to leave his master and employment, whenever, in his opinion, he has collected scraps enough of superficial knowledge to set up as an independent worker. He becomes dissatisfied with the character of his work or the amount of compensation, and, finding other work and larger pay, he quits his master's employment just when his services have begun to be valuable, thus committing a fraud upon his employer and doing a great injury to himself.

In no case is the term required to learn a trade too long. According to the value and difficulties of the business, it varies from three to seven years, and the most faithful and observant apprentice, after having filled his full term of apprenticeship, finds he has much to learn before he can honestly claim to be entirely and thoroughly competent. For at least a few months the apprentice is a constant source of anxiety and expense. From want of experience, or from heedlessness, or dislike to the particular job given him, he breaks tools and ruins work enough in a week to cover all the profits of his work for months. The employer bears with this, patiently or impatiently as the case may be, in the hope that during the last part of the novitiate's apprenticeship he may reap some return from the profits of his work. Under such circumstances it must be very vexatious to have an apprentice leave just when he is becoming, in some measure, useful. Yet it is a often to be devoid of conscience and wanting in the principles of common honesty.

Nor is such conduct of any real, permanent advantage to

ous pecuniary loss to his employer, simply because it is difficult to fill his place.

These considerations have nothing new in them, but be cause they are so trite and hackneyed they are not enough considered by apprentices. We earnestly invite their attenprospective advantage to deal honestly in this as well as other respects.

MEASURING MECHANICAL POWER----THE UNRELIABIL- | nication than a single suspension bridge. ITY OF BELTS.

Probably no one thing is provocative of more dispute between landlords who let power and tenants who use it, than the amount thus let and used. The landlord, assuming to one tenant, concludes that another employs a larger proportion than he pays for. The tenant points to the width of his belt and bases the amount of power furnished him on that.

Now, scarcely anything can be more deceptive and unreliable. A belt running horizontally and another vertically, alent mediums for the transmission of power. The distance between the driving and driven pulleys is another disturbing element in the problem; the condition of the belt itself, the surface of the pulleys, whether the belt is a "quarter turn," a cross belt, or an open belt, are all difficulties in the way of a correct estimate of the amount of power transmitted by them. Neither do we know of any dynamometer to be applied to the shaft which is entirely reliable.

for in the prime mover; and in the measuring of the amount of power from it diverted to any portion of the work performed by the engine, may be seen one of the advantages of the steam engine indicator. This implement has not, as yet, attained the notoriety to which it is entitled. There may be doubts whether it can determine the absolute power of one engine when not compared with another, as some mechanics claim; but there is no reason for supposing it is not valuable as determining the relative powers of different engines and the power of the same engine under different circumstances. This being the case, it is a comparatively easy matter to ascertain what amount of the whole power of the engine is diverted to one point or another. All the work, except the driving portions-the necessary shafting-being thrown off, let "friction diagrams" be taken. These give the amount of power exerted to drive the intermediates. Then let Mr. Smith put on his average amount of work and have another set of diagrams taken. This properly noted, let Smith throw off his work and Jones put on his, and proceed as before. A comparison of the different diagrams will infallibly point out the exact, and the relative amount of power used by each tenant.

Every engine should be indicated. What is the use of talking about the "nominal" horse-power of an engine? One man building an engine with cylinders 7 by 10 inches and another one 8 by 10 inches, and another 8 by 8 inches, all claim for their respective engines the same horse-power. One may be right, but if so, the others must be wrong. Only the indicator can give the test. It is fortunate that it has come into use. It will decide and has decided disputes which might puzzle a "Philadelphia lawyer." It is the great friend of the engine builder, the engine runner, the hirer of power, and the furnisher of power; a benefit to the buyer and seller of engines, the manufacturer, and user. Its use is daily becoming more and more known and its benefits more and more appreciated.

THE EAST RIVER BRIDGE.

Operations upon the projected bridge which is to connect this city and Brooklyn, have actually begun. For several days past workmen have been engaged on the Brooklyn side of the river, in making borings to determine the character of the substratum where it is purposed to build the piers. The plans which have nearly been perfected, contemplate the erection of a structure of such proportions that a brief state ment in regard to some of its important features, must be of more than merely local interest.

The narrowest part of the East river is between Fulton Once in four years the Royal Agricultural Society offers ferry slip, Brooklyn, and near Pier 29 on this side, and here will be located the towers. The initial point of the bridge in prizes for the best portable and fixed steam engines (of dicommon occurrence in this country. Apprentices seem too Brooklyn city will be, without doubt, at or near the intermensions prescribed within certain limits) entered for trial at secting of Sands and Fulton streets. For the other terminus the Worcester show in 1863, and that for this year has just three localities have been proposed, but the New York City been concluded at Bury St. Edmund's. The various portable Hall park will, in all probability, be the one selected, the toengine factories in the kingdom, perhaps forty or fifty in numtal length of the bridge then being 5,862 feet. The bridge ber, are now able, if fully employed, to complete upwards of fifteen hundred engines yearly; a fact sufficient to show both proper will be eighty feet wide, increasing for five hundred feet on either end, to a width of one hundred feet. There the extent of the trade and the competition which attends it. will be four roadways, two each for going and returning The Royal Agricultural Society's prizes are, therefore, keenpassengers, and two for cars or carriages. Above these roadly contested for, and, although the engines entered for trial ways is to be an elevated promenade, sixteen feet in width : are generally of a more expensive, and, possibly, less durable the center of the bridge will be 130 feet above high water class than those ordinarily sold by the same makers-being mark. The towers for suspending the cables, each 150 feet in fact, what are known as "racers," only seldom bought for high, are to be located inside of the pier lines established by actual work on the farm-it is indisputable that these compespised by every honorable workman. "Unstable as water, the law, and at a distance apart from center to center of 1,600 titive trials have done, and are doing, much to raise agriculfeet. The grade of the bridge approaches will be $3\frac{1}{2}$ feet in tural engineering to the highest standards of efficiency and 100, and the company propose to utilize all the ground over economy. There are many of our readers who can even now men is a laudable one when properly directed, but it can only | which it thus passes, by making stores and warehouses berecall the time when, under the practice of the Liverpool and Manchester engineers-in the days of John Gray and John neath. Flights of stairs leading to the corners of cross streets, will do away with the necessity of obliging passen-Dewrance, who were always encouraged by that paragon of railway secretaries. Mr. Henry Booth-locomotive engineering gers to travel to the main entrances. The lowest estimate of the cost of this bridge is \$6,000,000, was refined and perfected almost beyond all previous expectation, the consumption of coke being diminished from 40 lb. and the company who are to build it must have a capital of not less than \$8,000,000. Many details of construction or 501b. to 181b, per train-mile. There are many who can recall the time when the Cornish engineers, by emulation and job. When business is slack the incompetents are first dis- can not now be given, but will appear as the work charged, while the valuable workman is kept, often at a seri, progresses. The first year's work will be simply lay the greater care which it inspired, were raising the duty of

ing the foundations, and four or five more must pass before the undertaking will be completed.

The proposed bridge promises to be a magnificent structure; but the stockholders will pay dearly for the whistle. For the six millions which this one bridge is to cost, seven tion to the subject, believing it will be to their present and | or eight tunnels might be laid down across the bed of the river, one for each of the principal streets of Brooklyn. Through these tunnels steam cars might run and carriages pass, affording quicker, safer, and better facilities for commu-

THE CAREER OF A WORKING MAN.

We do not intend to select an exceptional case in noting a few facts in the life of the mechanic whose course is the subknow the actual power of his engine and the amount used by ject of this paragraph : this case is chosen because it is not exceptional; there are hundreds of a similar character, and the encouragement to young and struggling mechanics is all the more valuable.

A short time ago the workmen employed by Mr. John Snowdon, the proprietor of the Snowdon Iron Works, of Brownsthough of the same length and width, are two entirely differ- ville, Fayette county, Pa., made him a presentation as an evidence of their respect and esteem for him as a man and employer. Fifty years ago Mr. Snowdon came from Yorkshire, Eng., and settled in Brownsville. He went to work as a blacksmith for one dollar per day. After a time he started business for himself, his bed the floor, his table abox, and his seat a block. He gained slowly, until he succeeded in erecting and putting in operation a foundery, machine, and pattern shop, employing two hundred hands. He has built the But the proper means of estimating power must be looked | machinery for about three hundred steamboats, some to run on the Monongahela, on which Brownsville is situated, some for the Ohio, Missouri, Mississippi, the lakes, and gunboats for the Government to run on the Rio Grande and the sea. Iron bridges and all descriptions of engineering machinery have also formed a part of his manufactures. For more than forty years he has aided in building up his section of the country, and during a good part of the time furnished employment to a large number of workmen.

Many men have done greater things, met with more notable success and been better known in the world, but Mr. Snowdon's course is none the less instructive because unobtrusive. It is simply that which is open to hundreds of others who unite with common capabilities for business, industry, perseverance, and will.

COMPARATIVE WEIGHT OF ENGLISH AND AMERICAN SCREW ENGINES.

In the Paris Exposition there are the engines for the English sloop of war Sappho, built by Penn from designs of the Chief Constructor of the English navy. The Engineer gives their dimensions and weight, by which it appears that although calculated to work up to 2,000 indicated horse power the total weight of the engines is but 74 tuns. These engines are not exceptional; there are many similar ones in the En. glish navy.

On the other hand, the engines of the Lackawana and other screw sloops of our navy are reported by the board of examiners-composed of such men as Copeland, Bromley, Wright, Hibbard, Everett, Coryell, Merrick, Bartol, etc.-as being of only 1,000 horse-power, yet they say if proper proportions had been observed 60 tuns of weight might have been saved! Query: is there no room for improvement in our naval machinery?

TRIAL OF STEEL RAILS NOVEL RAILROAD OFFICE.

The New York and New Haven Railroad Company are testing the steel rail in a section between Port Chester and Greenwich. The President of the road, Hon. W. D. Bishop, formerly Commissioner of Patents, is an energetic, practical man, and we shall look to him for a report on the subject which will be conclusive of its practicability. Mr. Bishopis the first railroad president to adopt the plan of locating his office on wheels. His office is a neatly fitted car, and his head quarters may be truly said to be any where between New Haven and New York that his presence is required.

AGRICULTURAL ENGINEERING.

the apprentice He becomes the Bohemian of the workshop, a waif driven hither and thither, having a smattering of knowledge and yet understanding no one thing thoroughly, His services are not sought; he is only a "Jack-at-a-pinch,' to be used merely to fill a space otherwise empty. Scores of such half baked mechanics can be picked up any day; they infest shops, torment employers, and disgrace the business they falsely profess to understand. They are industrial vagrants, if such a term is permissible, to be shunned and dethey cannot excel."

The ambition of the apprentice to be ranked among journey be realized by an honest and persistent sticking to his obvious and plain duties. If he ever expects to teach he must first be taught; if he desires to direct he should submit to direction. What this country needs in the industrial arts is finished workmen. They are scarce and always in demand. A competent and intelligent workman is seldom wanting a good