

	Cubic feet Timber.	Pounds Iron.	Cubic yards Stone.	Cost.
Temporary Dam....	134,500	92,000	11,400	\$79,000
Permanent Dam....	265,000	438,600	24,000	151,000
Slides, Booms, Piers.	295,400	156,400	32,800	102,000
	695,900	687,000	68,200	\$332,000

DOES GOOD WORK PAY?

Properly considered, this question admits of but one answer, and yet there are advocates of "cheap" work and excusers of slighted jobs among our manufacturers; men who claim that close competition and close bargaining are circumstances which permit, if they do not exact, passable rather than excellent work. A business run among the shops and factories in the same line of production, in the same or adjacent localities, where each shop has equal or similar facilities, shows that no two of them will furnish the same estimates of the same job. Indeed, in some instances, the difference in the terms is quite surprising when it is considered that the materials and the methods and facilities of working them are the same. Under these circumstances the only possible means of lowering price is by slighting work, sure to be detected sooner or later, to the injury of the maker's reputation and the ultimate loss of the cream of his business. This is particularly true of the manufacture of tools and machinery; in either case poor workmanship is certain to reveal itself. And when a tool gives out in the using, or a machine breaks down, the user and owner does not console himself with the consideration that he "got it cheap," but he execrates the maker as heartily as though he had paid the highest market price; and he goes no more to the low-priced manufacturer, neither does he recommend his productions.

The manufacturer who "puts the work" into his tools and machinery is building up for himself a cumulative extending reputation for excellence of product that is far more valuable than a reputation for low prices only. In fact, the price of a piece of work is not absolutely high nor low; it bears a relation to its cost of production. A high priced article may be cheaper than a low priced one, and should be if the proper relation between price and value is preserved. In fact, high prices do not repel so many would-be customers as first-class workmanship attracts.

The truth of this could be attested by the success of a firm whose productions have a reputation extending far beyond the limits of this country. Their specialty is the manufacture of machine tools, and within less than twenty-five years has grown from a shop of four employes to an establishment of more than seven hundred hands. At the beginning the tools made by this company bore a high price, and as compared with most others in the same line of manufacture the prices have always been high. Yet the fact of the building up of a large business from insignificant beginnings proves that the high prices have not offset the benefits arising from good work. And that has been the main object for which this company have striven from the first. No job ever went out from this establishment "scrimped" in workmanship because of an error in contracting too low. "Better lose dollars than reputation," has been the principle of the company. They have always used the best materials, employed the best skill, exacted the finest work, and aimed at producing superior tools. For years their name has been synonymous with the highest possible excellence in their line, and their tools are regarded as standards of comparison. Substantial prosperity has kept pace with constant improvements, and it is much more the result of producing first-class work than of shrewd business management or fortunate contracts.

This single case, taken as an example for illustration, is not an isolated and peculiar one. There are producers by manufacture in this country and others whose name is a guarantee of excellence, a protection to purchasers and users, and an evidence of the prosperity almost certain to follow earnest, honest endeavor to do good work.

Arizona Coal.

The Deer Creek coal fields, near the San Carlos Reservation, Arizona, promise great results. They were discovered in 1881, and active developments began last March. The coal is found in fifty veins of greater or less size, which have been open, and extends for a full mile in width. Seven shafts have been sunk in different places on the property, the deepest being some 200 feet. In this deepest shaft, as in all the others, the coal has been followed all the way down, and at the depth of 150 feet a cross cut has been made through 30 feet of sandstone, striking another vein of coal 15 feet wide. Above this shaft, on the next vein, a 100 foot tunnel has been run, showing a face of 8 feet of coal about 45 feet from the surface. A cross cut from this tunnel shows a vein of 7 feet of coal at the same depth. West of this tunnel, and about 100 yards distant, there is a shaft of 40 feet down on an incline, so that any one can walk in at any time and see one of the finest bodies of coal on the property. In addition to these developments there are several other shafts where the veins have been cut, showing coal from 6 to 25 feet in width.—Arizona Star.

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THE GREAT BRIDGE ALMOST COMPLETED.

The trustees of the great suspension bridge over the East River, between New York and Brooklyn, have announced that the structure will be thrown open to the public on the 24th day of May, 1883. This will be a notable day in the history of these two large cities. The event will be celebrated by festivities appropriate to the occasion. Probably half a million of people will join in the procession across the bridge, forming a rare and wonderful sight. The question of fares and tolls is yet to be settled. In addition to ample space for foot passengers and ordinary vehicles, there will be a double track railway, with commodious passenger cars, constantly moving back and forth, like shuttles over the bridge.

RELATIVE COSTS OF STREET LIGHTING BY ELECTRICITY AND GAS IN NEW YORK.

New contracts for lighting the streets of the great city of New York have just been awarded, to begin May 1. The price to be paid for gas lighting for the closely inhabited part of the city, in which by far the larger portion of the lamps are located, is \$17.50 per year per light. In the outskirts and sparsely inhabited regions, from \$19.50 to \$32 per gas light is to be paid.

The use of electric lights will be continued in portions of Broadway, Fifth Ave., including certain parks and squares, in all a length of about six miles, at 70 cents per night per light. Arc lights are used of the Brush Company, also of the United States Company's styles. Each electric light displaces six gas lights. The contract price for each electric light amounts to \$225 per year per light, which is rather more than double the cost of gas in the chief parts of the city. It is conceded, however, that the quantity of light furnished by an electric lamp is much greater and better than that yielded by the six displaced and dingy gas lamps. The streets that are illuminated by the electric light present an attractive and brilliant appearance. Reckoned by quantity of light supplied, the arc lamps are far cheaper than gas. Not so, however, with the incandescent system—the Edison system, for example, which is not at present used for street lighting in New York. Each small Edison light, not quite equal in force to an ordinary gas light, costs rather more than gas.

MAKING A DRILL CHUCK.

In these days, when almost every appliance used in the machine shop may be obtained ready-made, at any mechanic's supply store, it may seem unnecessary to suggest methods of fitting ordinary lathe appliances. But there still are many shops unprovided with attachments of a handy character except these which are home made, and even when the ready-made articles are obtainable there may be occasions when the workman finds it preferable to get up his own attachment.

There are plenty of handy drill chucks to be found in the market suited to almost all the exigencies of work, but if the contingency just referred to should arise, it is well to know how to produce a good drill chuck from shop materials and appliances.

The preferable method of making a drill chuck to be used in the lathe is to drill, bore, and thread a suitable block to screw on the live arbor of the lathe, in place of the face plate. A cylindrical casting, or a piece cut off the end of a bar of round iron, will furnish the stock for the chuck. Drill a hole in one end of this of sufficient length to comprehend the threaded portion of the lathe arbor and the lathe center, the hole being of sufficient diameter to receive the center. Then enlarge this hole by boring to a depth sufficient to receive the threaded portion of the lathe arbor, and chase the thread in the hole to fit the arbor.

The first stage is now completed. Screw the block on the lathe spindle, and drill, from the other end, the hole for the reception of the drill shank. Turn and finish the outside of the chuck to taste. With a chuck of this sort there is no necessity of removing the lathe center when the chuck is to be used.

Sometimes the workman wants a drill chuck that shall take the place of the center in the lathe arbor. In this case the drill chuck must have a tapering shank corresponding with that of the lathe spindle center. The turning of this shank on the proposed chuck is frequently the first part of the work attempted. This is an entire reversal of the proper method; it is impossible to get the true center of the piece proposed for the chuck by this wrong method.

To produce a chuck of this style, cut a piece off a bar of round iron of the proper diameter for the boss of the chuck, and long enough to receive the shank of the drill and to form the shank of the chuck that takes the place of the shank of the lathe center. Chuck the piece and drill the hole for the reception of the drill shank. Then lay the unfinished chuck aside, and cut another piece long enough to form a shank to fill the receptacle of the center shank in the lathe arbor, and the hole just drilled in the proposed drill chuck.

Turn this piece to fit the center hole in the lathe arbor accurately, put it in place, and then turn the projecting portion to fit the hole in the proposed chuck. Drive the chuck on, and by rotating it the true center will be found. From this center turn the shank for the hole in the lathe arbor, and perfect truth will be assured.

A CUBIC foot of water weighs 62½ pounds, and contains 1,728 cubic inches, or 7½ gallons.