

THE  
**Scientific American.**

MUNN & COMPANY, Editors & Proprietors.

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

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

Messrs Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions for advertisements for the SCIENTIFIC AMERICAN. Orders sent them will be promptly attended to.

**Contents:**

(Illustrations are indicated by an asterisk.)

*Jackson's Homfly Mill.....	31A	Third Clock with Invisible Works.....	36
Another Monstrous Cast-iron Anvil.....	31	Belts to Drive Flour Mills.....	36
Notes on New Discoveries and New Applications of Science On Scientific Experiments in Balloons.....	31	The Lead Ball on a Steam Jet.....	37
Interesting Details of Animal Traps.....	32	Lany Pulleys vs. Small Pulleys for Belts.....	37
Benzol in Canadian Petroleum.....	32	Peculiar Action of Belts Running on Each Other.....	37
*Dummer's Funnel and Measure Combined.....	33	Recent American Patents.....	37
Agricultural Machinery.....	33	*Bickel's Power-multiplying Machine.....	38
On the Effects of Heat in the Preservation and Improvement of Wines.....	33	Cost of Stopping Railway Trains.....	38
To Keep Eggs.....	34	Bundoline.....	38
Erosion of Lead.....	34	Boot and Shoe Machinery.....	38
*Foster's Double-cylinder Re-volving Engine.....	34	Industrial Exhibition in Germany.....	38
Cutting Hair Steel.....	35	Eight Hour System—The Way to Get It.....	39
The Way to Buy Sponges.....	35	Leather Belts.....	39
Manufacture of Mainsprings in Watches—A New Idea.....	35	Keeping Cistern Water Sweet.....	39
Jacketing Steam Engines.....	35	Good Workmanship.....	39
Heat and Force.....	35	Patent Claims.....	40, 41, 42, 43
An Engineer Puzzled.....	36	Notes and Queries.....	44
		Smith's Shingle Machine.....	46
		Improved Stone-gathering Machine.....	46

VOL. XIII. NO. 3...[NEW SERIES.]... Twentieth Year.

NEW YORK, SATURDAY, JULY 15, 1865.

**EIGHT HOUR SYSTEM--THE WAY TO GET IT.**

At a meeting of the Polytechnic Association last winter, Professor Joy, who had just returned from Europe, described the manner in which the Italian peasants eat their hasty pudding. They gather around a flat stone, the pudding is poured out upon it, and they take up this food with their hands and eat it without either butter, molasses, or other sauce, all their meals being of the same pudding. The houses and clothing of these peasants are as cheap in proportion as their food. In Vol. I., New Series, we published a German scissors manufacturer's account of the manner in which his workmen live, and it will be remembered that these skilled mechanics are obliged to find their food, clothing, house rent and all other means of living on about 98 cents per day. The clothing of the Hindoo peasants is a strip of cotton cloth about the loins, and their food is plain boiled or parceled rice. The Digger Indians of California subsist upon acorns and grasshoppers, dress with a bunch of grass about the hips, and live in caves dug in the ground.

At one time our ancestors lived as meanly as any of these. Why do they live so much better now? Simply because they have the art, the skill, the intelligence to produce the means of living in greater abundance. The German mechanic, the Italian peasant, and the Hindoo would like varied and well-cooked food, and all the conveniences of life, as well as any Englishman or American, but they do not know how to manage to get them. The Hindoo weaves his clothing by suspending his harnesses to the limb of a tree, and slowly passing his shuttle through the warp by hand; while the Englishman's clothing is woven by the power of water or steam, one girl tending four looms that run at the rate of one hundred picks per minute. Would there be any use in the Hindoo striking for a dollar a day? He can only make 2½ cents; and the reason is that this is the amount which his ill-directed labor produces.

The German scissors-maker spends half of his time in carrying iron and steel on his head over long miles of road between his village and the manufactory. On the other hand, the cutlery manufactories of England and America are arranged to economize to the utmost every step of the workman, and every stroke of his labor, and they are provided with all known engines, machines and appliances for aiding the labor and increasing the product. The consequence is that a day's labor of the English or American artisan produces twice as much cutlery as that of the German; and it will produce from 100 to 1,000 fold more value than that of the Hindoo or the Digger Indian.

In a system of hiring, wages constitute the share of the product which goes to the workman. In order that these may be large, the first step is to have the aggregate product large, in order that there may be a good deal to divide. This is effected by having the labor well organized, wisely directed, and aided to the greatest extent possible by tools, machinery and conveniences.

The next step is to secure as large a share of the product as possible for the workman. The proportion of the product which goes to the workmen depends mainly upon their economy. If a man has not money enough in his pocket to buy the next meal, he is completely subject to any man who will give him enough. One with ten dollars in his pocket is immeasurably more independent than one with only ten cents. Says Carlyle, "Any man who has sixpence is king over all other men—to the length of sixpence." If a mechanic has money enough to buy a lathe, or a set of tools, and to pay the rent of a room for a month, he may fix his own wages in his own independent way. Intelligence and the provident spirit which it engenders will not only raise the product of wealth in any community to the highest point, but it will draw the largest share of this product to the laborer.

If the eight hour system of labor is ever adopted, it will be commenced, as the ten hour system was, among the best class of mechanics. It will also be preceded by such an advance in wages that mechanics will be willing to abate one-fifth of the amount for the sake of two hours' leisure. The constant increase in labor-saving—or rather labor-doing—machinery, and the steady progress of education, with the temperance, frugality and thrift which are its accompaniments, are continually increasing the product of wealth and raising the wages of labor. We need only an uninterrupted operation of these forces to enable the workmen of this country at no distant day to command such an amount of leisure as to them shall seem good.

**LEATHER BELTS.**

The subject of belts and the peculiar action of them under certain circumstances and the conditions under which they work are of the greatest importance to mechanics and manufacturers. We print in this issue several communications from practical men which refer to some peculiarities not generally known or observed, and we deem it important enough to the arts to devote considerable space for a time to a full elucidation of the subject. We direct research and attention to some other features not yet remarked which may afford useful data to persons using power. We put these questions as follows:

Is a thick belt better than a thin one, or the reverse?

When belts stretch on one side, as they do from a looser texture of the leather, or from other causes, why do they run harder and run off? Why is it that some belts never will run straight on the pulley but twist like a corkscrew?

Is the hair side or the flesh side to be put next the pulley?

Is there anything better than neats foot oil for belting, to keep it in good order. Is a crowned pulley or rounded face necessary to make a belt run true? Some machines which run at high velocities have pulleys with flat faces. Why should a belt be laced straight on the inside and crossed on the outside?

**KEEPING CISTERN WATER SWEET.**

When water in cisterns becomes foul it is not from any alteration in the water itself, but from the decay or decomposition of organic matter held by the water in solution or suspension. These organic impurities are generally washed into the cistern from the roof. It has long seemed to us that the most simple and direct method of keeping cistern water sweet would be to allow the first portion of every rain fall to run to waste until the roof was thoroughly washed, and then to fill the cistern from a clean roof. A very simple apparatus might be arranged to effect this automatically. For instance one plan would be to set a hogshead near the lower end of the gutter pipe, with a short, light trough hinged to the pipe and leading into the hogshead; then have a float so adjusted that when the hogshead became filled with

water, the trough would be shifted over to lead the water into the cistern. If one hogshead of water should not prove sufficient to wash the roof clean, the trough might be adjusted to conduct only half or quarter of the water passing through it into the hogshead, allowing the rest to run one side upon the ground. We do not know that this plan has ever been tried, and therefore offer it only as a suggestion.

It is common to filter cistern water, and it may thus be rendered perfectly sweet if the filtering be done through charcoal. Solon Robinson filters the water as it is pumped from his cistern by passing it through the walls of a drain pipe. The pipe is coiled around the bottom of the cistern, with one end closed and the other communicating with the pump; this is very simple and works satisfactorily.

Another plan is to make the cistern in two compartments, the water to be received in one and drawn from the other, and the dividing wall to be formed of vertical strata, alternately of sand and charcoal, through which the water passes from one compartment to the other. We should suppose that the most effectual of all plans would be to wash the roof thoroughly and fill the cistern with pure water. If any of our readers have tried this plan, or should any of them try it, we should be pleased to learn the result whether favorable or unfavorable.

**GOOD WORKMANSHIP.**

The character of work of any class whatsoever is made by its absolute fidelity and integrity throughout. It is not necessary to go through all trades to show that this is true, or that in general the highest priced is the best; for, all things being equal, greater pains has been taken in its construction.

A simple line or two in a late dispatch from Richmond says more in a paragraph than we could in a page; this said—"The furniture in the Spottswood House is still good after four years' hard service, although no opportunity for replenishing it from Northern workshops has occurred through the war." This furniture, it seems, was unusually elegant, but it was not the mere external finish which gave it character so much as the solid and substantial fitting of the several pieces.

If these remarks apply to furniture, how much more true are they when spoken of machinery, which does the heavy work of mankind.

A want of honesty in construction is sure to be found out and redound to the disadvantage of the maker. A half-way kind of a job, and a listless way of doing it, is sure to be detected.

Not unfrequently we see instances of haste and carelessness about steam engines which looks badly, and is an absolute loss to the manufacturer. The general excellence of American machinery is due to the care exercised in its construction. Colt's pistol factory has done more toward educating mechanics to walk the straight road, to do their work well, than any other similar factory in the world. The several sewing-machine shops—Wheeler & Wilson's in particular—and especially the Waltham Watch Company concern, are all schools for mechanics—schools where they not only learn but are "paid while learning," as specious advertisers say. Most wonderful progress in the art of working metals has been made in these shops. In the Waltham concern the nicety of the workmanship there executed is incredible, and must be seen to be believed or appreciated. Some of the screws we saw cut had 240 threads to the inch, and these were cut in an engine lathe with trains of gears as 5-8th bolts are, in a common machine shop. Other shops do larger work with equal accuracy, but none so fine as this.

We might cite innumerable instances which would go to prove the truth of the assertions here put forth, but it seems palpable that a reasonable amount of time, spent in finishing and fitting the most important parts of machines or structures of any kind, is not lost, but is absolute testimony to the fidelity of the maker.

**INDESTRUCTIBLE LABELS FOR BOTTLES.**—Coat the label with white of egg, and steam it until it becomes opaque; then dry it in an oven at 212°. The albumen becomes hard and transparent, and is unaffected by oils or acids.