

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

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

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

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

VOL. XVII., No. 4. . . . [NEW SERIES.] Twenty-first Year.

NEW YORK, SATURDAY, JULY 27, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

*Hoisting Wheels for Warehouses	49	What Constitutes a Patentable	55
*Improved Reamer	49	Combination	55
Artificial Stone for Buildings	49	Inventions Patented in England by	55
Flint Glass Manufacture	50	Americans	55
A Mechanical Question	50	*The Public Ledger Building	56
Cleaning Marble	51	Engravings for Sale	56
The Time Extended for Obtaining	51	Squeaking Boots	56
Patents in New Brunswick	51	The Trades Union Atrocities in	57
Delay at the Patent Office	51	Sheffield	57
Ventilation	51	The Earth Becoming Too Small for	57
London	51	the Human Family	57
*Automatic Device for Holding	52	To the President	57
Horses	52	Air Guns Not Noiseless	57
The Siemens Furnace	52	The Natural Colors of Fibrous Ma-	57
*Mee's Hose Coupling	53	terial	57
Mechanical Uses of Castor Oil	53	Tinning Rivets and Tacks	57
Geography of Plants	53	Uses of Nal-ances	58
Washington for Streets	53	*"Haloxylin"—New Blasting Pow-	58
*"Da Cunha's" Lock Catch	53	der	58
*Porter Spare That Trunk"	54	English Artisans at the French Ex-	58
New Base for Artificial Teeth	54	hibition	58
Agricultural	54	Native India Muslins	58
Business and Manufacturing Items	54	Product of a Fleece of Wool	58
Editorial Summary	54	Rose Crop	58
Scientific American and Foreign	54	A Strange Telegraphic Freak	58
Patents	55	Patent Claims	59, 60, 61, 62
Answers to Correspondents	55	*Improvement of Cutting Nippers	64
Extension Notices	55	Curiosities of Iron	64

NOTICE TO SUBSCRIBERS.

Those subscribers who wish to preserve the volume of the SCIENTIFIC AMERICAN just closed, can be supplied gratuitously with an illustrated title page and index, to bind with the sheets, on application at this office either in person or by mail, or through any dealers who supply the paper.

BINDING.—Subscribers wishing their volumes of the SCIENTIFIC AMERICAN bound can have them neatly done at this office. Price \$1.50.

THE TRADES UNION ATROCITIES IN SHEFFIELD.

The cause of labor combinations in the form of trades unions must receive a severe shock from the revelations lately made in England before a Parliamentary commission. Although the crimes were committed by individual members without the sanction of the associations—at least this may be charitably supposed—yet it will be difficult to disabuse the public mind of a prejudice against the combinations which make these crimes possible.

For years a system of tyranny has been steadily pursued by some of the workingmen's organizations toward those who refused to associate themselves with the unions. If workmen, their tools were stolen, their tenements burned or blown up with gunpowder, all sorts of tricks were played with their work, and they themselves were brutally beaten and even murdered by hired assassins. If employers, their machinery was destroyed by midnight burglars, their shops, and factories burned or blown up, their workmen intimidated, and their persons brutally maltreated. At last, the local authorities being powerless to put a stop to these outrages, either from sympathy with the perpetrators or from the terrorism which seemed to have taken the place of law, a commission was appointed by Parliament to investigate the matter, and by promising immunity from punishment to the perpetrators on confession, it has succeeded in drawing forth the details of crimes as revolting and tyranny as absolute as that of Al Hassan, the "Old Man of the Mountain." Except for these confessions of the villains, themselves, it would be impossible to believe these tales of horror.

In this case the directing and presiding Thug was one Broadhead, secretary of the Saw Grinders Union, and Treasurer of a national association of trades whose members number over 60,000. The confession of this Broadhead and two of his tools show that he paid them out of the funds of the societies whose affairs he managed, ten pounds for blowing up a house or shop and fifteen pounds for maiming or murdering an obnoxious person. After the deed was perpetrated he would offer rewards for the detection of the criminals, and denounce the atrocity in public meeting. One man named Linley was murdered by Broadhead's assassins for the sum of seven pounds ten shillings each, two being employed. Broadhead states that he committed the crimes with "great regret!" One of his victims was pounded until almost dead, another crippled for life, another killed outright. Seven houses and factories he caused to be blown up, among which was the dwelling of a butcher whose offense was that he harbored a relative who was obnoxious to Broadhead.

The effect of these revelations will probably be to destroy sympathy for the workingmen who combine in unions, and either to suppress the associations by law or by the indignation of the people. It is difficult to believe that the associations for which Broadhead acted were entirely unaware of the uses to which their money was applied, for the crime of tool stealing appears to have been very generally prevalent, and the falsification of Broadhead's accounts seem not to have instigated any investigation. He states explicitly that the sec-

retaries of two associations gave him money for the perpetration of his crimes. How far, however, his statement about others is worthy belief is a matter on which the reader must form his own opinion.

It would be hardly fair to denounce all labor combinations because some of their members behave like fiends. There is little doubt that these crimes were the offspring of ignorance and low moral sense, rather than of association. Intellectual, and especially moral education of the members is the only safeguard of the public and preventive of organized and systematized crime.

THE EARTH BECOMING TOO SMALL FOR THE HUMAN FAMILY.

It was formerly a common practice to estimate geographical distances by the time required to travel over them. The expression, "day's journey" occurs many times in the bible and in other books translated out of the ancient tongues. This measure of distance was a very convenient one and was sufficiently exact for ordinary purposes, for it was based on many centuries of the experience of mankind in traveling. The time consumed is generally the most important incident of a journey. This word journey, by the way, originally meant only the distance traveled in a day, and it held this meaning, until modern improvements in locomotion made it indefinite. A day's journey was equivalent to a distance of twenty to thirty miles.

The facilities for travel determine the extension of commerce and civilization. Where modes of travel are easy and rapid, more people can live, and can live in greater comfort. By reason of the improvements in locomotion made during the present century, it might be shown that the earth to day is capable of supporting twice as many people as formerly.

Instead of going only 20 or 30 miles in a day over a hard and dangerous road, we glide over 300 miles by sea, and 600 by land. We travel about twenty times faster than our grandfathers; our day's journey has increased in length twenty times, and at the same time it is cheaper and safer. Because travel is more rapid, cheap, and safe, every one now is on the move. Distances are practically so lessened that it is to be feared that the earth will turn out to be a narrow stamping ground for the human family. All the nations have become neighbors. We hold world's fairs and conventions; we hope shortly to have a universal system of coinage and weights and measures, and perhaps a universal language. There is to be a metropolis of the world where all tribes of men shall be represented: will it be Paris or shall we build it in America? The tendency is to bring all to a level, but it is a level whose plane is far above any former and local civilization. There is to be a universal community of interests and thus a practical community in property.

TO THE PRESIDENT.

We respectfully call the attention of the President to the deplorable condition of the business of the Patent Office, asking that he will inquire into the mismanagement of the present Commissioner, and do something to relieve the genius of the country from the oppressive delays occasioned by official stupidity. We understand that there are between three and four thousand models of new applications now waiting examination at the Patent Office. The examinations in many of the most important classes of inventions are half a year, more or less, in arrears, and the interests of thousands of dependent inventors are allowed to suffer, without any steps being taken for their relief. The Patent Office was established expressly for the encouragement of inventors, but it is at present so mismanaged as greatly to discourage them.

Nothing can be more dreary or disheartening to the inventor than the delays of the Patent Office in deciding upon the novelty of the application. In many cases the entire private business of the inventor and his associates, are suspended until the decision is rendered. In other cases the delays of which we complain, occasion the ruin of the brightest prospects of the applicant.

If the President asks for an explanation from the Commissioner, the latter will make his usual stereotyped excuses and assurances,—want of room,—want of aid from the Secretary of Interior—most positive, most prolific promises of immediate, instantaneous reform. But we warn the President that unless he issues a peremptory order to have the work brought up, nothing will be done. The Commissioner seems to be incapable of doing anything of his own volition, except to make and break promises. He evidently needs a galvanic shock from his superior officer, and we hope the President will lose no time in administering the proper kind of electricity.

AIR GUNS NOT NOISELESS.

We find the following in *Harpers' Weekly* for July 13th: Air guns have been known for more than a hundred years, yet they are rather appendages to the lecture room of the professor than for practical purposes. By the compressed air in a metallic ball, permitted to escape by the opening of a valve, ten, twenty, and possibly fifty balls may be discharged in a single minute with the deadly force of powder. The larger the volume of compressed air the greater the momentum of the bullet. A question has come up why such arms would not be of the highest importance in the time of war. Cannon might batter a fortress into powder, and ten regiments attack a fortified city with showers of balls without alarming the sentinels, because there is no report.

We regret to see a periodical like *Harpers' Weekly*, usually so accurate in its statements, aiding in the perpetuation of a popular error. It is not correct to say that the action of compressed air in an air gun has the "deadly force of powder." While air cannot be compressed by any mechanical means now used more than about forty times, giving a

pressure per square inch of about six hundred pounds, the lowest estimate made of the force of exploding gunpowder is a pressure per square inch of about twenty thousand pounds. Neither is it true that the discharge of the air gun is noiseless. The shock of a suddenly liberated gas against the atmosphere is the cause of the noise of the explosion of gunpowder; it is not its combustion. So in an air gun, the liberation of the compressed air makes a report proportioned to the force of its action on the atmosphere. In the recent case of the shooting of Carr, in Brooklyn, by Skidmore, the officer who witnessed the affair testified to the sound of a dull explosion, and although the murderer was within a few feet of his victim the projectile merely entered the head, instead of passing through, as would most likely have been the case if gunpowder had been used.

It is erroneous to suppose that the air gun is noiseless. The only reason its explosion does not make so loud a report as that of gunpowder is because it has a proportionably less force.

THE NATURAL COLORS OF FIBROUS MATERIAL.

Although Nankin cotton was for many years a favorite material for thin goods, and the woven fabric was quite popular not only for its endurance but for its color, many people then and many now suppose the yellow tint of the cloth to be given by the art of the dyer. This is not so. The deep yellow, or rather the faint orange tint of the Nankin cotton is inherent in the natural product and the art of the dyer has nothing to do with it. This cotton is of the variety known to botanists as the *gossypium arboreum*, or tree cotton, and is supposed to have originated in Persia. The fiber is remarkable for its length, strength, silkiness, and yellowish tinge. It grows luxuriantly in some parts of India and China, from the latter of which our importations of Nankin cotton were originally made. The Sea Island cotton of our Atlantic coast is a variety of this cotton, and greatly excels the *gossypium herbaceum*, or upland cotton, in length and strength of fiber, and differs from it in its color. This makes the strongest thread cotton in use, and as its yellowish tinge is much fainter than that grown in the East, chemical science has discovered a way to bleach it.

The color is generally considered to be due not to the climate but to the constituents of the soil, which must contain ferruginous oxides to give it the orange shade. Its length of fiber, and strength however, is due mainly to its species, as no upland or herbaceous variety ever equals it in this respect. The last generation was very partial to the Nankin cotton. At that time buckskin breeches, having a buff color, or cloths of a similar hue, were considered "the thing," and in summer the love of the color could be gratified by the substitution of the Nankin cotton as being lighter and almost as tenacious and durable. The changes of fashion, only, can be quoted as an adequate reason why the Nankin cotton should not now as then be popular as material for gentlemen's pantaloons and vests and ladies' dresses. Certainly no such cheap and agreeable material has as yet succeeded the Chinese product.

It seems as though nature was chary of her extremes in color. She produces but little material for our manufacture which is either pure white or unmitigated black. Our cotton, however nearly it approaches white, is still impure in shade, and the wool of the blackest sheep appears a dingy dark gray. To make them either the one or the other we must have resort to the sciences as practically applied. Even the white silk dresses of brides are colored. They are not of the natural tint. If so they would show an unsatisfactory tinge neither white nor positive yellow. When the silk, imported from southern Europe, or China, or Japan is received in this country, it has a dirty half yellow half orange shade which is not at all agreeable to the eye. The blueish silvery luster which is seen in white silks and satins is produced wholly by the art of the dyer. It seems impossible to produce any vegetable material for textile manufacture which shall have a positive shade.

In animal products it is different. We can have perfectly black wool, also wool which is a perfect white. If it does not appear so when first sheared, thorough washing and cleaning by chemical means will make it rival the driven snow. No need of the art of the dyer here. Possibly, however, the time will come when by the advancement in the arts we may be able not only to give different colors to the vegetable products used in the manufacture of textile fabrics, but be able to bleach tinged material to a perfect snowy white.

TINNING RIVETS AND TACKS.

T. M. H., of Mass., desires to know how to coat tacks with tin. He says he has tried for a long time, but has not yet succeeded. The process is very simple, but some manufacturers make a great mystery of it and endeavor to keep it a secret. Rivets, tacks, and other small articles are tinned in the same manner. First, the tacks should be thoroughly cleaned. For this purpose dilute sulphuric acid is used, only strong enough to remove the grease and whatever scale there may be on the tacks. From the acid they are put into water and rinsed, then taken out and drained. While still damp, powdered salammoniac is sprinkled over them and they are ready to go into the bath. This is merely a cauldron of melted tin. Until the tacks are hot enough to "take" the tin they float on it, but soon as they sink they are ready to be removed. This is done with a perforated ladle or skimmer, and the operator throws the ladle-full of tacks violently against a screen of sheet iron to loosen the excess of tin and prevent the tacks from being soldered together. From the screen they slide down inclined troughs of sheet iron long enough to insure the cooling of the tacks before they reach the bin.