Scientific American

THE ADVOCATE OF INDUSTRY, AND JOURNAL OF SCIENTIFIC, MECHANICAL AND OTHER IMPROVEMENTS.

VOL. XIII. NEW YORK, JANUARY 2, 1858. NO. 17.

THE
SCIENTIFIC AMERICAN,
PUBLISHED WEEKLY
At No. 128 Fulton street, (Sun Buildings,) New York,
BY MUNN & CO.

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

Responsible Agents may also be found in all the principal cities and towns in the United States.

Sampson Low, Son & Co., the American Booksellers, 47 Ludgate Hill, London, Eng., are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

Single copies of the paper are on sale at the office of publication and at all the periodical stores in this city, Brooklyn and Jersey City.

TERMS—Two Dollars per annum.—One Dollar in advance, and the remainder in six months.

☞ See Prospectus on last page. No Traveling Agents employed.

Improvements in Cannon.

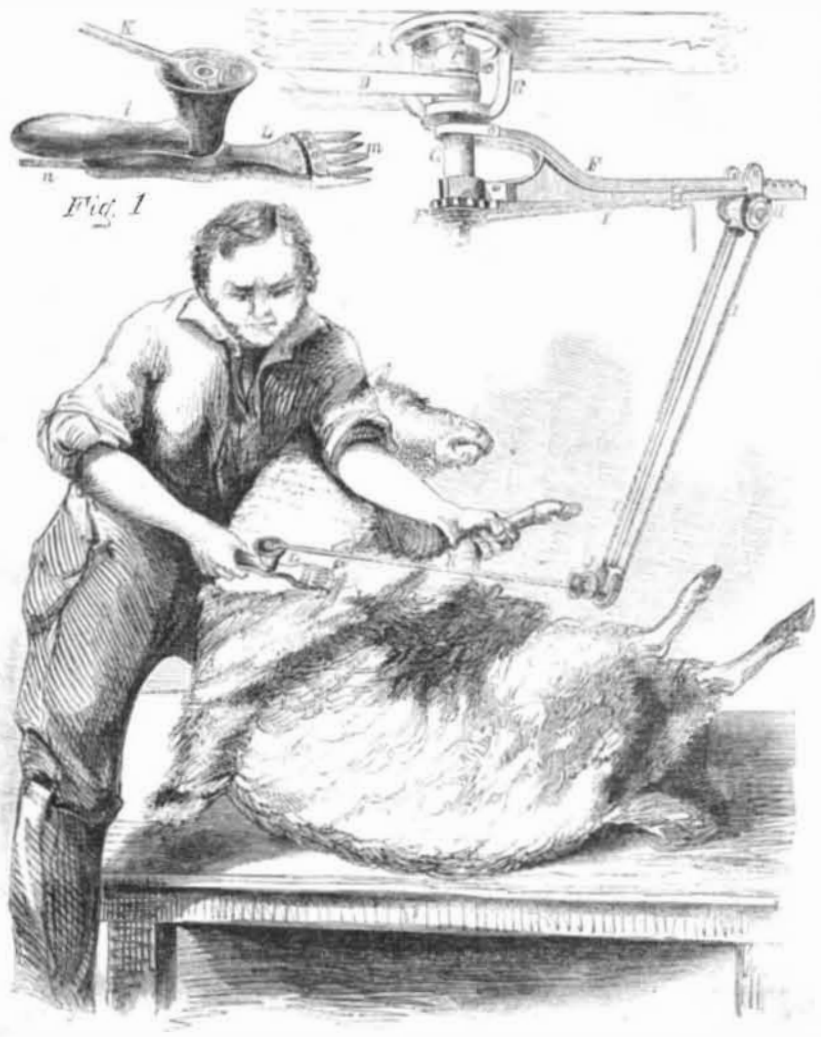
On this subject Captain Blakely, R. A., in an article published in the London *Artisan*, states that "a 32-pounder is the limit of cast iron guns of the present shape, any larger than that being unsafe with a full charge." In reference to cannons of large caliber, the shot can be carried to a greater distance, and do more execution than small balls, because the weight of the ball is greater in proportion than the surface of resistance to the air. Thus a 16-inch shot presents sixteen times the surface of resistance of a 4-inch shot, but it weighs sixty-four times as much. Large guns, however, require to be made stronger than small ones, large shot taking a longer period of time to acquire its velocity, therefore the pressure of the powder on the gun remains longer. The *time* that great pressure is exerted on any material is an important element, to which too little attention has been paid in submitting bodies or instruments to severe tests of strength. A body may bear a certain pressure for one second, which if continued for one minute would destroy it. This is doubtless the case with cast iron, of which material cannon are made.

Captain Blakely recommends that cannon of large caliber (say 10-inch) be formed of the same shape they are at present, but that the outside, at the breech, be strengthened with two layers of thin wrought iron cylinders put on at a bright red heat and hammered. One gun of this description made by him stood 447 rounds with double charge, and 158 rounds loaded to the muzzle. R. Armstrong, of Newcastle, England, has made a cannon of a solid steel center, with bar iron coiled round it and welded, which has stood thousands of rounds. Captain Blakely believes that, for very large cannon, a good plan of construction would be with a cast iron cylinder center, and either rod iron wound round it at a great heat and welded layer over layer, each in cooling taking a permanent strain, or else substitute strong iron wire wound round it at a high heat, each layer having a greater initial strain than the one under it. In this manner all the fiber is laid in one direction, and the outside takes its share of the strain. The subject of heavy ordnance is now exciting much attention among engineers of gunnery and others. The foregoing views, in our opinion, deserve general attention from all interested.

Alloy of Chromium.

In the *Comptes Rendus*, it is stated that M. Fremy has lately obtained an alloy of chromium and iron, by reducing chromate of iron with charcoal under a high heat in a crucible. The alloy, it is stated, resembles brass in appearance, and is very hard.

JENKINS' SHEEP SHEARER.



One of the oldest materials used in the manufacture of fabric is the wool and hair of animals; and although at first the wool would be taken from the dead animal, it was not long before the living one was robbed of its natural clothing to protect our more tender bodies from the atmosphere's changes. The scissors or shears used for this purpose were very primitive indeed, being only two blades and a spring back; and with this simple implement sheep have been sheared for thousands of years past; it is but lately that a new implement has been introduced which can be worked by power, thus leaving the operator all his strength to manage the sheep and guide the shears.

Our engraving (Fig. 2) represents a sheep being sheared by one of these machines, which is snspended from a beam, A, and consists of a frame, B, carrying a fast and loose pulley, C, turned by the belt, D, to which motion may be given by any convenient means. From the frame, B, a short shaft, G, descends, carrying the arm, F, which can be moved around upon it, and is free to be accommodated to the wants of the operator. From the end of F is suspended by a rack the pulleys and shaft, H, to which is attached the shaft, K, by an universal joint at J, carrying at its extremity the knife and handle, L. Motion is communicated from D by a spindle passing through G, having a pulley, E, at its extremity, which imparts motion to the cord, I, and thus by turning the shaft, K, through the pulley and universal joint, J, gives motion to the knives, *m*, in L, by the universal joint, *k*, as seen in Fig. 1, which is an enlarged view of the cutter, knife, or shears, L. *l* is the handle, and *m* the knives, which move against each other by means of the apparatus above described, and *n* is a stop for regulating the motion of the cutters. In the process of shearing, the sheep is usually laid upon a table, with its head under the operator's left arm, while with the right he governs and guides the shears. By the construction of this machine it will be seen that the shears can be guided to any inequalities of the sheep's body; and there is little doubt that it is a good and convenient labor-saving machine.

This is the invention of J. V. Jenkins, of Detroit, Mich., and was patented by him the 8th of September, 1857. All further information can be obtained by addressing as above.

Divisibility.

This is a property possessed by all bodies, and means their capability to be separated into parts.

It was formerly a question among philosophers whether matter was capable of being divided *ad infinitum*, or whether there was a limit beyond which matter could not be divided. The question is incapable of direct solution, and fortunately science does not require that it should be known; but the extent to which subdivision has been carried in the arts is prodigious. In the gilding of buttons, five grains of gold, which is applied as an amalgam with mercury, is allowed to a gross; so that the coating left must not be more than the 110,000th part of an inch in thickness. If a piece of ivory or white satin be immersed in a solution of nitro-muriate of gold, and exposed to a current of hydrogen gas, it will be covered with a surface of gold not exceeding the ten-millionth of an inch in thickness.

A single grain of blue vitriol will give an azure tint to five gallons of water. In this case the copper must be attenuated ten million times, and yet there is sufficient in each drop of water to give it color. Odors are capable of still further diffusion: a single grain of musk has been known to scent a room for twenty years.

Animal matter likewise exhibits many instances of wonderful subdivision. The milt of a codfish, when it begins to putrify, has been estimated to contain a billion of perfect insects, so that thousands of these little lives could be lifted on the point of a needle. One of the infusorial animalculæ found in duckweed is ten million times smaller than a hemp seed; and another, discovered in ditch water, appears in the field of a microscope a mere atom endowed with sentient life, and millions of them play, like sunbeams, in a single drop of liquid.

Soluble Glass Soap.

At a recent meeting in Berlin of the Association for Promoting Industrial Arts in Prussia, H. Wichgraf reported the results of a trial that had been made with the silicate of soda (soluble glass) as a substitute for soap in washing clothes at the prison of Spandau. At this place 5,936 articles of clothing are washed every week. The cost of soaking these with soap amounted to about $5 94, but with the silicate only $1 76. The linen is first steeped for twenty-four hours in a mixture of one pound of the silicate of soda to ten gallons of water, then it is washed with common soap suds rinsed in clean water and dried. The steeping of linen clothes in an alkaline or soap solution prior to washing in the usual manner, affords time for the grease and dirt in them to unite with the alkali or soap, they therefore require but little rubbing and labor afterwards. Clothes treated in this manner involve less labor in washing than by the old method, without steeping. A great number of persons in our country pursue this system; still it is not a universal practice.

Platinum.

This metal, which is rather heavier than gold, is of a greyish white color, and is capable of receiving a very fine polish. The tenacity of pure platinum is almost that of iron, and for all practicable purposes it may be regarded as infusible; like iron, it yields to the hammer, and can be welded at a white heat. None of the simple acids will attack it, and therefore it is used to make vessels for their manufacture, its only drawback being the great expense. It is dissolved by a mixture of nitric and muriatic acids. When in an extremely divided state, platinum has a peculiar property of absorbing great quantities of gas, and also of igniting and becoming red hot in a stream of hydrogen. Platinum was not known in Europe until the middle of the last century, although it was known long before on this continent, where it had received the Spanish name of *platina*, or *little silver*. It is found in Peru and Russia, which last country affords about one thousand pounds annually, and about six hundred pounds are given to the world every year by Borneo.

Ground Nuts.

These nuts are produced underground by various plants, chiefly shrubs and umbelliferous plants, while in China they come from the common vetch.