

The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park Row (Park Building), New York.

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TERMS—Three Dollars per annum—One Dollar in advance, for our months. Single copies of the paper are on sale at the office of publication, and at all periodical stores in the United States and Canada. Sampson Low, Son & Co., the American Bookellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN. See Prospectus on last page. No traveling agents employed.

VOL. IX, NO. 19... [NEW SERIES.]... Nineteenth Year

NEW YORK, SATURDAY, NOVEMBER 7, 1863.

ENERGY AND APTITUDE OF AMERICAN MECHANICS.

In the course of some apposite remarks upon schools for the dissemination of correct mechanical knowledge, and the inculcation of the truths of science among the practical workers in machinery in general, the London *Engineer*, England, pays a deserved compliment to American mechanics and says that "many articles of machinery could now be imported here, were there a market for them, and sold under London prices. We know of many instances in which this could be done, and yet iron, and workmen's wages are one-half dearer on the other side of the Atlantic than here. The workmen are better educated, more ingenious, and somehow, although they do not work physically harder, turn out more work than our own mechanics. The cheapness of their work can only be accounted for on the principle of microscopic profits. Many of the marine engine factories, most of the locomotive works, and nearly every railway carriage factory in the States has been, at some time or other, bankrupt; a commentary upon the spread of engineering information."

The statements are all correct in the above-quoted paragraph, but the conclusions and inferences of the *Engineer* are erroneous. Tools are made cheaper here and equal in quality to those abroad, because we have special machines for special work, and for the reason that the same tool is adapted to do many different kinds of work. In the locomotive shops of the East, this principle is of necessity carried to an extreme point. Some of the shops have failed, it is true, because of the competition of the roads to which they furnished engines, on which they relied for payment and were disappointed. Workmen cannot be paid with bonds and coupons, and when a new engine is delivered once a week or month, as the case may be, we fancy it would endanger the stability of any shop to be paid in bonds, worth, perhaps, 50 cents in the dollar. Greater quantities of work are produced by the exercise of that keen ingenuity for which "Yankees" are famous, as in fitting up brass boxes in the lathe instead of filling, as is usually done, and otherwise adapting means to ends. In many shops East one man will run two lathes, or two planers; and objectionable as this is in general, it is perhaps not so much so where the workman contracts to do it and receives wages accordingly. So also with apprentices; they are so only nominally, for in a short time they acquire as much dexterity as a journeyman; and, stimulated by an ambition to be considered "smart fellows," do as much work as one paid at twice the wages they receive. Thus a journeyman may receive \$2 per day, while an apprentice obtains in his last year of servitude \$1, and is equal to a full hand. This being the average rate of pay down to \$1 50 *per capita*, and even still lower; for all journeymen do not receive \$2 per day by any means. The present time is an exception to this rule, as the demand for good workmen is greater than the supply. For patient and steady persistence on one kind of work, and for thorough and faithful execution, there is no artisan better than an English one; but the American workman "gets sick," as he phrases it, of sameness and monotony, and demands change; he is restless and uneasy under restraint and delay, and the work in our machine shops never

goes on so well as when every man is put on separate and continually varied jobs, as far as possible, and feels that his handwork will be contrasted with that of his fellows. This characteristic is only true of intelligent and conscientious men: for there are skulkers and drones to be found in all shops and in all countries. The system of discipline by which American machine shops in general are carried on is an extremely good one, for it conduces directly to the interest of all parties—the young apprentice and the employer. Time is money; and if by personal attention and a free access to all details of the trade, and an opportunity to acquire a thorough insight into the management of tools, our apprentices learn more quickly, it must be laid to the plan and not wholly to individual or national superiority. It seems not a little singular that a manufacturer should debar a youth from the privilege of learning as much and as fast as he desires. Such a course is directly opposed to reason and common sense.

THE CROPS OF THE YEAR.

The first momentous question for a nation to consider is securing an abundance of food. Nations and tribes once numerous and powerful have perished from the face of the earth by famines. From the first appearance of the potato rot in Ireland, nearly twenty years ago, the population of that island has diminished from above eight to a little over five millions. Thousands perished from famine, because of the failure of a root which formed a chief portion of their food. This took place in our own day, and is a sequel to many cases of a similar nature which occurred in other portions of the globe. All the arts connected with civilization are dependent, not only upon an abundant supply of food, but a surplus supply from those who pursue the art of husbandry. If every man was compelled to till the soil to obtain a scanty supply of food for himself and family, civilization, as we understand the subject, would be unknown. There would be no books, no institutions of learning, and none of the fine arts practiced; in fact, no cities, and no community in the whole earth of a higher type than the Bedouins of the desert. The very rapid advancement in population, in wealth and power of the United States, has been due in a great measure to the fertility of the soil and the favorable nature of our climate. Since the great West was opened up to culture by an energetic people, the vast surplus crops of the soil have tended to multiply manufactures, and advance education and all the arts with a rapidity unparalleled in history. The nature and quantity of the crops raised annually should, therefore, form the most prominent consideration for the people. For several years these have been wonderfully abundant, and large surplus supplies have been furnished for the populations of Europe, especially those of Great Britain, when the crops there had in a great measure failed for about three years in succession. As these surplus supplies of food chiefly furnish the sinews for war, as well as the arts of peace, considerable anxiety was felt respecting their condition and quantity the present year. This anxiety was experienced because a severe frost had visited extensive sections of Ohio, Michigan, Illinois, Indiana and Wisconsin, during the month of September last, and it was reported that corn, potatoes and buckwheat had suffered to an alarming extent. Statistics collected and furnished by the Agricultural Department at Washington afford information on this subject of an instructive and deeply interesting nature. The total wheat product of the loyal States for 1863 is estimated at 191,068,239 bushels; oats, 174,858,167; corn, 449,163,894; buckwheat, 17,193,238; potatoes, 97,870,035. In 1862, the product was as follows:—Wheat, 189,993,500 bushels; rye, 21,254; barley, 17,981,464; oats, 172,520,997; corn, 586,704,474; buckwheat, 18,722,995; potatoes, 113,533,118 bushels. There has, therefore, been an increase of the wheat crop amounting to 1,074,739 bushels; of oats, amounting to 2,327,170 bushels, but a very large decrease in all the other crops, especially corn and potatoes—in the former amounting to no less than 137,540,580 bushels. About 40,000,000 of wheat and 11,680,000 bushels of corn were exported of the crop of 1862; but the crops in Europe this year have been very abundant, and the foreign demand for our surplus will thereby be diminished

in proportion. The domestic consumption of corn is set down at 575,024,132 bushels annually, and at this rate there will be a deficiency this year of 125,869,000 bushels, and the hay crop is deficient about 1,624,000 tons. This quantity of corn allowed for home consumption is large and in a certain sense hypothetical. Many millions of bushels of the crop of 1862 are still in storehouses, and millions have been wasted annually in the fields. Economy, with respect to corn or wheat, is an obsolete word in the great West, as is well known to all who have visited there. The total supply of grain and potatoes this year, with all the deficiency, amounts nearly to a thousand millions of bushels, or about forty-five bushels to each person, and is sufficiently abundant for domestic consumption, with an overplus to satisfy a considerable foreign demand.

ARMSTRONG GUNS RIDICULED.

We recently gave (page 233, current volume, SCIENTIFIC AMERICAN) an account of the vast sums—amounting to more than ten millions of dollars—which the British Government had expended on Armstrong guns, and that they had at last been condemned. On this subject the *Examiner* (London) indulges in the following amusing piece of criticism:—

"It is a perfect anomaly to send our armor-clad fleet to sail round our islands and visit our ports without an effective gun on board any one of them which could make a hole in the side of its neighbor. We are thereby reminded of the brave knights of old, who were so encased in steel as to fight half a day without hurting anybody, unless some of them fell down, and, not being able to flounder on their legs, were smothered in their armor." And one of its correspondents grows that "two years have given the Americans forty or more 200-pounders, which have beaten down a strong fortress at a distance of two miles. Sir William Armstrong's 210-pounder, at that distance, could hardly knock an old duck off its nest; and no gun that was ever cast or forged, with a charge of twelve pounds of powder, could do that which Parrott's guns have done."

The London *Telegraph* indulges in the following bitter sarcasm on the same subject:—"Instead of calling all scientific England to put their heads together and watch events with the Ordnance Office, Sir William Armstrong was shoved up the ladder alone; his own committee approved his own guns; his own factory at Elswick turned them out, on his own evidence, without sufficient proof and trial; and 'the first hundred of the 110 pounders were served out before the experiments upon them had been concluded.' In a country full of founderies and inventors, Elswick alone drew £1,067,794 between 1859 and 1863, and Woolwich, under the orders of the 'retired partner,' spent another £1,471,763."

If all these statements are reliable respecting the Armstrong guns, the Government officials—such as General Peel, Secretary of War, and others who patronized them, deserve condemnation for stupidity and cupidity. A few years ago this gun was proclaimed to be the wonder of the world, and those very papers which now pelt it with their sarcasm, were as loud in its praise as they are now voluble in its censure. And who was like its great fabricator? He was held up to be the right arm of Britain's defense, and was dubbed with knighthood for his great achievement in the production of such incomparable war dogs. And now, after expending over two million pounds sterling, and arming the navy with them, they are found to be incapable of "knocking an old duck off its nest."

THE GREAT ORGAN.

A very full and interesting account is given in the *Atlantic Monthly*, of the great organ which will soon be completed in the Boston Music Hall. It is stated that this great organ is "a choir of nearly six thousand vocal throats." Its largest wind pipes are thirty-two feet in length, and they are so wide that a man can crawl through them; while at the same time the finest tubes are as small as a baby's whistle. It contains several distinct systems of pipes, capable of being played alone or in connection with one another, by four manuals or key-boards. These systems are called the solo organ, the choir organ, the swell organ, the great organ, and the