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SIX GOOD REASONS WHY EVERY MANUFACTURER, MECHANIC, INVENTOR AND ARTIZAN SHOULD BECOME A PATRON OF THE "SCIENTIFIC AMERICAN."

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COTTON AND ITS SUPPLY.

The manufacturing and commercial communities are deeply exercised at present, respecting the supply of cotton for manufacturing purposes. Very large meetings have been held recently in England, and active measures taken to encourage the cultivation and development of cotton in several of the British colonies; and in private, as well as public, cotton has been the universal theme of discussion. What is the cause of this excitement respecting cotton? The answer is to be found in the position of the cotton-growing States of America. Fears are entertained by manufacturers of cotton goods that contingencies may arise by which the cultivation of the plant in these States may be interfered with, and the regular annual supply be greatly diminished. Such a result would not only raise the price of cotton, but, owing to the diminished amount furnished to manufacturers, many thousands of operatives in Europe and America would be deprived of employment, and a vast amount of capital invested in buildings and mechanism would be rendered unproductive. The whole cotton crop of America last year, was 4,675,770 bales; and of this, 3,697,727 bales were exported, and 978,043 used at home. England alone took 2,582,000 bales, which amounted to about four-fifths of her entire consumption. It is no wonder that this question causes considerable excitement at present, and especially in England, where four millions of persons are stated to be connected with, and dependent for support, on the cotton manufacture.

The great desire of cotton manufacturers is to increase the supply of cotton in many different parts of the world, so that they may not be so dependent upon one particular section of the globe. Several erroneous views have lately been propagated on this subject. The growers of any material are just as dependent upon consumers as the latter are upon the former. The laws of trade regulate these things, and there is no earthly mode of controlling the influence of the cotton-growing region of the Gulf of Florida but by raising as good qualities of cotton at lower prices, in other sections of the world. Now, the question arises:—"Can this be accomplished?" So far as we have knowledge of the various climates, we think it cannot, without new agencies being brought into requisition. Cotton requires a warm, moist climate; it is as sensitive to drouths as to frosts, and so far as we know, the warm breezes of the Gulf of Florida supply that moisture to the plant in America, which cannot be obtained in any other warm climate without artificial irrigation. Cotton is raised in Egypt, the land of no rain; but the plants are watered by artificial agencies, from the Nile, at a great cost for such labor. In India, Africa, and China, wet and dry seasons prevail; there are no gentle showers of frequent recurrence, as in the Southern States; therefore the drouths in those countries are unfavorable to the cultivation of cotton, as compared with America. The development of the American cotton trade affords evidence of great natural advantages. The cotton fields of America embrace an area of 500,000 square miles, and the capital invested in the cultivation of the plant amounts to $900,000,000. Seventy years ago, the exports of our cotton were only 420 bales—not one-tenth of the amount furnished by several countries to England. Now, America furnishes five-sevenths of the surplus cotton product of the entire world; it has increased while other cotton countries have decreased. There must be a reason for this, as the best American *herbaceous* cotton is not indigenous to the soil; the seed was first imported. We can only attribute these results to great care in its culture, and the natural advantages of climate which we have described. We do not say that it is impossible to cultivate cotton as cheaply and to raise as good qualities as American cotton in other countries, but we do assert that without great and new improvements in machinery for cultivating, irrigating and cleaning it, so as to lessen the cost for labor, such results cannot be achieved.

HISTORY OF THE ART OF KNITTING.

In a small treatise lately published by Mr. Aiken, the inventor and manufacturer of the family knitting machine illustrated on another page, we find some very interesting information relating to the history of the art of knitting by machinery in America.

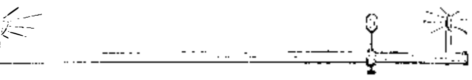
The art of knitting itself is stated to have been invented in Scotland, but the first machine for making knitted fabrics was the invention of Wm. Lee, of England, about two and a half centuries ago. This machine remained in nearly the same condition in which Lee left it for almost two centuries, and the first introduced into America was the old heavy hand frame, which required the strength of a pretty strong man to operate it with advantage. Immense sums of money had been expended in England to adapt the knitting frame for operation by steam or water power, like the carpet loom, but this achievement was left for the perseverance and skill of American inventors. This was first accomplished, as we learn by the treatise referred to, in 1831, by Timothy Bailey, of Albany, N. Y. It is stated that Egbert Egberts, of that city, Dr Williams, and Alfred Cook, in a conversation regarding the application of power to the knitting frame, suggested that Bailey, who was well known to be a man of great inventive powers, should be consulted; this being done, the latter asserted that he could "do the job." A partnership was soon formed, and Bailey set to work in earnest, but so many delays and discouragements were for some time experienced that the partnership was ultimately broken up. Bailey, however, although poor in this world's goods, was richly endowed with the qualities which characterize most inventors—genius and perseverance. His interest in the invention was stimulated, his faith in ultimate success was unshaken, and with a resolute will he stuck to his old machine, continuing his experiments by taking out a piece here and adding another device there, until he was able to make it execute thirty-two revolutions per minute, without missing a stitch—which was done by simply turning a crank. His old partner, Egberts, hearing of this, went and saw the machine, advanced Bailey five hundred dollars to render it still more perfect, and it was soon afterward placed and at work in the attic of a large building at Cohoes, on the lower Mohawk Falls, in the State of New York. This machine established knitting by power in America; it was the parent, so to speak, of all the knitting manufactories in our country.

Timothy Bailey, the inventor, now resides at Ballston Spa, N. Y.; Egbert Egberts and Joshua Bailey—who also became an early partner in the business—reside at Cohoes, where they have extensive works, and it is said that they have accumulated large fortunes in the hosiery business.

Bailey's machine was modeled upon Lee's hand frame; it was square, and made a flat web. The circular knitting loom which forms the legs of stockings without a seam, is an invention of quite recent date, but whether invented in France or Germany is at present a matter of dispute. We do not know the entire value of knit fabrics manufactured on such machines, but it must be large, as Mr. Aiken states that upon the machines manufactured by himself, no less than $2,000,000 worth of hosiery and other knit fabrics are made annually.

MEASURING LIGHT.

In our gas works a standard quality of gas is fixed upon by the directors, and then it is the duty of the engineer to so mix his coals as to produce gas of this quality. In order that the quality of the gas may be readily determined, a most ingenious little apparatus has been devised by which the quantity of light emitted from the gas-burner may be measured in comparison with the light of a candle burning a certain amount of spermaceti per hour. This apparatus is illustrated in the annexed cut. It consists of a graduated bar



with the gas jet at one end and the candle at the other, and a peculiar disk fitted to slide along the bar between the two lights. The central portion of the disk is oiled so as to be translucent, while the outer portion is opaque. Thus a portion of the light coming from the candle is transmitted through the oiled portion of the disk while the light which strikes the opaque portion is reflected. The same is the case with the light from the burner. By slipping the disk along the bar, a point is found where the light transmitted from each side is just equal to that reflected from the other, and the difference in the appearance of the two portions of the disk disappears, showing that at this point the light received from the burner is just equal to that received from the candle. As the graduated bar gives the distances of the disk from the candle and from the burner, and as light radiating from a burning body diminishes in proportion to the square of the distance, it is easy to calculate the quantity of light coming from the burner in proportion to that produced by the candle.

Nothing can exceed in delicacy and care these measurements of light as conducted in the beautiful laboratories of our large city gas works. The apparatus is placed in a perfectly dark room with black walls, the candle is nicely balanced in sensitive scales with fine sand, and after it has burned the measured length of time, it is extinguished, when the quantity of spermaceti consumed is accurately ascertained. The standard candle burns 120 grains of spermaceti per hour, and the standard gas-burner is a five feet Argand burner, with 15 holes $\frac{1}{23}$ of an inch in diameter, and a 7-inch chimney.