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TO OUR FRIENDS.

NOW IS THE TIME TO FORM CLUBS.

With our next number another volume of this journal closes. We appeal to its friends in all sections of the country where mail facilities exist to endeavor to form clubs for the coming year. We feel justified in asserting that no other journal in this country furnishes the same amount of useful reading, and especially at the extraordinarily low price at which it is furnished. The present high price of paper has rendered it necessary that we should somewhat increase the subscription price of the SCIENTIFIC AMERICAN, but by availing themselves of our clubbing rates persons may obtain the journal on very reasonable terms even now. We are obliged to pay more than double the price we did one year ago for the same quality of white paper that the SCIENTIFIC AMERICAN is printed on, while the subscription price to clubs is only a fraction more than formerly.

The long winter evening must be relieved of its dullness, and we must keep reading and thinking, and thus be prepared to overcome temporary difficulties and open new channels of wealth and prosperity. Friends, send in your clubs; at least renew your own subscriptions promptly.

See prospectus on the last page of this number.

A FEW WORDS TO OUR SUBSCRIBERS ON THE CLOSING VOLUME.

The period has arrived when we are about to close another volume of the SCIENTIFIC AMERICAN. The subscription term of nearly five thousand readers will expire with the next number, and with more than our usual solicitude we request a renewal of their patronage. We feel encouraged in doing this as we have received the most gratifying assurances from all our correspondents, that the SCIENTIFIC AMERICAN has been conducted during the past year with even more than its former acceptability. It has furnished profitable and attractive information, we trust, to all its readers; and its illustrations and typography are unequaled by any other periodical devoted to the literature of the mechanical arts. It has been the aim of its publishers and editors to make it a creditable representative of American invention and enterprise, and it is universally admitted that it occupies this position and stands alone as the popular expositor and repertory of American art and science. It is a periodical respecting which our mechanics generally have said they "feel proud of it, and it deserves the patronage of all." As it is impossible to maintain such a large and cheap illustrated paper without a very extensive list of subscribers, we solicit all our readers to exert their influence and to labor more than usual to obtain for us new subscribers among their acquaintances.

The proprietors of the SCIENTIFIC AMERICAN will spare no effort to render the next volume acceptable to all its readers, and, if possible, superior to its predecessors. According to our established rule, the paper will be discontinued to all whose subscriptions expire, but we hope to experience the satisfaction of not being required to erase a single name from our mail books.

THE MANUFACTURE OF PRINTING PAPER.

The invention of movable types, stereotyping, the machine for casting type, and improvements in the printing press have undoubtedly tended to advance knowledge by the aids which they have furnished in providing cheap literature; and at the same time, it it is equally true that improvements in the art of paper-making have done as much in effecting the same object. But all the improvements in type-making, setting type, and printing would be of little avail in advancing knowledge, if a sufficient supply of paper at a moderate cost was not obtainable. Paper really forms the item of greatest cost in the art of bookmaking. Improvements in machinery for making paper and in the art of bleaching it, but above all a great reduction in the cost of the raw material—cotton—have reduced the cost of paper so much below what it was during the last century that books and periodicals have of late years been produced at an unexampled and gratifyingly low cost. A change, however, has suddenly come over that state of things. Printing paper which, eighteen months ago, was selling at six cents per pound has advanced in price three-fold; and as a consequence, all kinds of publications must be raised in price also. The causes of this are a depreciated currency, an increase of taxation; and, above all, a scarcity of the raw material—cotton—due to the war in our country, which has of course almost entirely suppressed the Southern cotton trade.

In the year 1857, cotton rags, of which paper is chiefly made, became scarce for a brief period; and paper advanced in price one-half of its former rate. Much excitement was occasioned thereby, and great energy was displayed in making efforts to furnish a substitute for cotton and linen rags. Newspapers and other periodicals then teemed with treatises respecting the manufacture of paper from straw, wood, flax cotton, and numerous other materials. Several good improvements were then undoubtedly made in preparing straw, grasses and wood for making paper; but when the price of cotton rags fell, all the new materials, except in a few cases, were abandoned. The present prospects, however, offer no hope of a sufficient supply of cotton rags being obtainable for several years to come; therefore some substitute is imperatively required, and, judging from the present prices of the raw material, it is reasonable to conclude that many substitutes can be furnished at less cost. Paper can be manufactured from every vegetable substance that contains fiber—the minute threads of vegetable tissue.

The oldest known paper was made of the papyrus, an aquatic plant growing in Egypt. The Chinese made paper from cotton before the Christian era; and the Arabians introduced the art of making paper from cotton and linen into Spain in the eleventh century. In 1719, Reaumer the French scientist, published an essay, in which he stated that paper could be made of wood and hornets' nests; and in 1734, Seba, a Belgian writer on natural history, stated that good paper could be made from the *alga marina* or sea-grass. In 1751, M. Guettard, of France, exhibited specimens of paper made of the bark, wood and leaves of trees, and also from various plants; and in 1756, during a scarcity of linen rags, paper was made of straw in Germany. In 1772, a book was issued in Germany by Jacob Christian Schaffers, of Ratisbon, which was printed upon sixty specimens of paper, made of as many different materials. There is a copy of this remarkable volume in the library of the Smithsonian Institution at Washington. Among the paper materials of which it is composed are hornets' nests, sawdust, moss, beech, aspen, mulberry, pine, hop vines, hemp, leaves of aloes, barley straw, wheat straw, broom corn, thistle stalks, and almost every material which has been proposed of late years as a substitute for cotton and linen rags in paper manufacture. We have adduced these facts to show that printing paper not only can be, but has been made of an innumerable variety of materials. The simple reason why they have not been commonly used is because paper could be made cheaper from cotton rags, owing to the low price of the latter and because they could be easily reduced to pulp. But this state of things has changed, and a favorable opportunity is now presented for the employment in paper-making of some of the materials above enumerated.

A few weeks ago, we published some account of the progress made in Austria, in the manufacture of paper from the fibers of maize-corn. We may learn something from Austria in the manufacture of both cloth and paper from maize fiber, as a substitute for cotton. We have lately examined a very beautiful pamphlet prepared by Professor J. Arenstein, and printed on paper composed of pulp made of maize, cotton and linen fiber. The quality of this paper resembled that of the fine "Indian wove" that is used for the prints of steel engravings. We are informed that a great number of works in the German language are now printed on maize paper at the Imperial Printing Office in Vienna. There are also establishments at Vienna and Schloglmule, where maize flax is spun and woven into cloth in considerable quantities. It is to this substance that we wish to direct particular attention at this time. There is no country in the world where the raw material for maize paper can be obtained in such abundance and perfection as in the United States. Its fiber—unlike that of cotton—is not free, but is cemented and imbedded in vegetable gluten and albumen, which require to be removed by chemical and mechanical processes before it is fit for making paper. What the expense of these processes may be we are unable to say; but the present high price of cotton rags warrants us in urging experiments with this material, in the confident hope that it may be economically employed in the manufacture of paper.

RELIEF FOR ENGLISH OPERATIVES.

Subscriptions to the fund for the relief of the working-classes thrown out of employment in Great Britain by the failure of the cotton supply are coming into the committee very rapidly. We are not of that class who are fond of doing a good deed and then publishing it, but we cannot help saying that the action of the Chamber of Commerce and Corn Exchange, in this city, is in striking contrast to that of many of the British merchants abroad, who seem to have let no opportunity slip to inflict injury and damage upon our commercial interests. The sum of $100,000 has already been subscribed for this noble object, and Messrs. N. L. & G. Griswold have generously tendered a new ship of large capacity, to carry abroad such provisions as may be contributed or purchased with the money collected toward relieving the suffering poor of Lancashire and other manufacturing districts in England.

Many of the railroad companies whose lines lead into New York have consented to transport over their respective roads corn, flour and other provisions, from the West to this city, free of charge; and it is expected that most of the Western roads will not be behind the Eastern lines of transportation in carrying forward this humane work.

It is hoped that half a million of dollars' worth of the products of the country may thus be poured into the lap of the suffering operatives of Great Britain. One of the publishers of the SCIENTIFIC AMERICAN is on the committee for receiving subscriptions to the "International Relief Fund;" and any contributions remitted to this office for the cause will be acknowledged, and the amount handed over to A. A. Low, Esq., the Treasurer of the fund in this city.

NATIONAL WORKSHOPS.

The Secretary of the Navy, in his recent report to Congress on the condition of affairs under his supervision, urges, among other matters, the establishment of national foundries and forges, wherein a heavier class of wrought and cast-iron work can be made than it is possible, in his opinion, to do in our private shops. We cannot see the utility of such a measure. It is true that at present the rolling mills and foundries of the country are urged to their utmost capacity in order to meet the demands made upon them for plating, &c.; but this is owing to the limited time allowed to the proprietors to fulfill their contracts, as also to the imperative needs of the country. To build and fit out a fleet of from forty to fifty