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OUR NEW VOLUME.

Eighteen years ago the SCIENTIFIC AMERICAN was commenced under the belief that such a publication was desirable and would be beneficial to our mechanics and artisans. Since then twenty-two volumes of it have been issued, and this number is the first of the twenty-third, or the ninth volume of the new series. It was commenced under many adverse circumstances, but it has been successful beyond anticipation, and has advanced from a weekly journal of four pages to one of sixteen. In a very enlarged sense it has been educational in its influence. The notices, descriptions and illustrations of new inventions and discoveries which have been presented through its columns have stimulated the inventive genius of our country, resulting in an increase of improvements in mechanism and manufactures without a parallel in history.

Although the past two years have been checkered with scenes of violence, excitement and change, the circulation of the SCIENTIFIC AMERICAN has continued large, and the last volume has never been surpassed for beauty and amplitude of illustrations. We commence this volume with the continued determination to keep our readers fully advised of all that is occurring in science, invention and the practical arts. Critical discussions, timely suggestions, useful receipts and notices of discoveries at home and abroad, will be furnished as usual, and every effort will be made to render our new volume superior, if possible, to any of its predecessors.

The publication of such a journal involves a great expense, and demands severe labor, extended information and careful research ; therefore, to enable us to conduct it, we require the generous support of a large number of subscribers. Hitherto this has been given with a heartiness which has rendered our labors and efforts pleasant and encouraging. We rely upon our readers for a continuance of their patronage, and an exercise of their influence among friends to extend its circulation. No inventor, mechanic or manufacturer can keep pace with the improvements of the day unless he consults its columns. The subscription for it has been usually held by its readers to be among their most profitable and satisfactory investments.

AGRICULTURAL MACHINES.

The benefits which have been conferred upon our farmers and our whole people by improved agricultural machines cannot be computed by mere dollars and cents. In conversation, a few days since, with a most intelligent Western farmer he told us that manual labor was so scarce in the country last autumn, that but for horse-rakes, mowers and reaping machines, one half of the crops would have been left standing on the fields. This year the demand for reapers has been so great that manufacturers will not be able to fill all their orders. Farming is comparatively "child's play" to what it was twenty years ago, before mowing, reaping and other agricultural machines were employed. The severe manual toil of mowing, raking, pitching and cradling is now performed by machinery operated by horse-power, and man simply oversees the operations and conducts them with intelligence.

STEAM FOR AGRICULTURAL PURPOSES.

The application of steam to the business of farming has not been as general in this country as we could wish. Neither, from present appearances, are we very sanguine that it will become popular. We are at a loss to account for this very general indifference of our farmers on what would seem a matter of vital importance. In some of the rocky and sterile regions of the Northern States there are doubtless good reasons against the adoption of steam plows and cultivators of all kinds, yet in the Western States, and on the fertile prairies, and rich alluvial bottoms of the Mississippi valley, where the undulations of the surface are slight, it is a matter of astonishment that the advantages of steam are so persistently lost sight of.

In England this subject has received more consideration, for, as a foreign journal justly remarks, "steam cultivation means good wages and cheap, because abundant, food. It is a question of putting more into the earth and taking more out of it. It is a question of greatly increasing the corn-producing power of the land ; of more live stock and cheaper meat. Yet it is calculated that, up to the present time, the steam power applied to agriculture does not exceed 50,000 horse-power." That is in the United Kingdom, as we understand it, and in relation to the last assertion we venture to remark that not the fiftieth part of that power is in use in this country for the purpose alluded to. We cannot point to a single part of the Northern States where land is cultivated or worked by steam. What is the reason therefor? Are steam plows required? Agriculturists have only to mention such a want to have it supplied by the ready wits and talent of our inventors. We fear that our farmers are not sufficiently enterprising and alive to the advantages likely to accrue from a substitution of the all-powerful steam for the laborious and tedious process of breaking land by the old methods ; and it is a matter for no little regret that there should be 50,000 horse-power at work on farms in Great Britain, while we have not a tithe of that amount. It is estimated that one horse will devour daily the food of seven men ; we have, therefore, only to calculate the number of horses employed in farm work to ascertain the amount of grain that might be turned into the markets of the world instead of into horse-flesh. All the steam plows that could stand between here and the Rocky Mountains would not consume the sustenance of a babe, and the land now devoted to oats might be given to wheat, to the general and indeed certain advancement of the interests of the community.

It may be urged against the adoption of steam power that it is costly, and beyond the reach of men of ordinary fortune. We think this objection can be fully met and overcome by the organization of local interests, so that a machine would be the joint stock property of farmers in the vicinity. The same plan is now pursued very generally in the case of mowers, reapers, and other costly tools, and the principle could well be adopted in this case. A company has been formed for this purpose in Great Britain, and it now lets out steam cultivators to farmers at a nominal sum, allowing the user to pay a certain amount annually until he has purchased it. In this way the farmer becomes the owner of a valuable apparatus which he may be said to have bought out of itself, or rather with the profits he gained in its use.

We cannot say how such a plan would work in this country, but it would be for the interest of those manufacturing such machinery to try and introduce the system. Induce farmers to use portable engines for hauling gang-plows, or for elevating hay with the power-forks now so generally in use. The engines could stand in one corner of a field and by means of a long rope and pulleys add materially to the effectiveness of the apparatus. So also with stump-pulling ; a small portable steam engine would be just as manageable and for more effective than all the tugging and straining at levers, winches, or whatever the mechanical power through which force is transmitted to the obstinate roots or to the unwieldy hay. Steam cultivation offers a profitable field for research to inventors and manufacturers. Sooner or later all the work of the world must be done by steam, as much of it already is ; and it is no argument to say that the means to apply it are not at hand. Agriculturists have only to make their wants known, and, our word for it, there will be enough steam plows produced to till the whole surface of the globe every hour in the day.

AMERICAN SILK MANUFACTURES.

Next to food, the clothing of a people is the most important physical consideration, especially in changeable climates subject to severe cold. Hitherto fabrics composed of cotton, wool, silk and flax—pure and mixed—have formed the staple of our clothing, and for these the annual expense incurred has been prodigious. Woolen and cotton cloths have been manufactured upon an extensive scale at home for many years, but thus far the silk and linnen cloth used have been imported from abroad. The value of imported silk goods has ranged from twenty to twenty-five millions of dollars annually for several years past ; that of flax from five to seven millions. The present civil war, though an undesirable evil, appears to evolve some good results in the establishment of new manufactures among us. The high tariff and advanced rate of exchange have been operating to produce such results. Some qualities of silk cloth are now being manufactured, for the first time, competing successfully with similar styles imported from France. We lately examined several pieces of silk manufactured by Cheney & Brothers, at Hartford, Conn., and used by Walker & Penman, Leonard street, this city, for making trimmings of ladies dresses, and we consider these new products valuable acquisitions to our textile manufactures. They are woven in power looms, and the day is not far distant, we think, when we shall be manufacturing various qualities of silks equal in every respect to those produced in the looms of Lyons. We thus judge because in the same factory at Hartford, pongee handkerchiefs and sewing silk have been manufactured for several years, and the latter surpasses in quality the best that is made in Europe. It is preferred for use on sewing machines on account of its strength, uniformity of twist, and beauty of finish. Printed as well as plain dyed silk pieces are made at the above establishment, and the demand for these fabrics is fully greater than can be conveniently supplied at present. Great convenience has been experienced by several of our merchants in obtaining desirable colors of this class of goods to meet immediate demands, instead of having to forward orders to France. We conclude that silk cloth has now become one of our home staple manufactures.

Several years ago, the cultivation of the mulberry tree, for the purpose of raising silk, was entered upon by thousands of our people under a feverish excitement which raged for one or two seasons. It was one of those speculative manias which occasionally inflict communities with day-dreams of prospective wealth, ending with gloomy disappointment. This was not because silk cannot be raised in almost every section of our country, but because it could not be raised as a raw material to be sent to France, and compete successfully with the cheap raw silk of China and Southern Europe. But as we have now the prospect of a home market for raw silk, this beautiful product may yet be cultivated in our country with fairer hopes of profitable success. The subject is at least worthy of renewed consideration and further experiment.

PECULIARITIES OF PETROLEUM BENZINE.

When petroleum is distilled at a low temperature a light limpid liquid is obtained which has received the name of benzine. It is different in its chemical properties from the benzole of distilled coal-tar naphtha, and is about as volatile as an ether—its density being 0.715. It boils at a temperature between 140° and 150° Fah., and it has now become a valuable article in the arts, being used extensively as a substitute for turpentine in mixing paints, and it is also employed for the removal of grease, &c., from light kid gloves, silks and woolen fabrics. It dissoves india-rubber, asphaltum, some resins, tallow, fatty oils, paraffine, stearic acid and wax, but it is not a powerful solvent of amber, copal or shellac. Iodine dissolves in it, producing a red color ; bromine is dissolved in it with a slight explosion, and

a gas is disengaged which burns with a beautiful green color. Nitric oxide gas passed into the benzine gives it a fine green color; when ligh ted the flame of the gas has a broad green coat and a purple center. Hydrogen gas passed over the surface of benzine burns with a flame emitting considerable light. The petrol-benzine cannot be mixed with water nor with wood naphtha, but readily and to any extent with absolute alcohol, oil of turpentine and bisulphide of carbon. In common ether it produces a turbidity, caused probably by a per-centage of water. Sulphur and phosphorus dissolve only in small quantities in it.

FLAX DRESSING.

The attention of a large portion of the agricultural and manufacturing community is at this time turned towards the production and treatment of flax; the former endeavoring to produce it in sufficient quantities to answer the demand, and the latter, in connection with the inventor, seeking to put it in the market at such prices that it can at once be obtained by all classes. Very little difficulty has been experienced in growing flax, but insurmountable obstacles have attended the dressing of the straw as economically as is demanded. Many flax-breaking machines have been invented, but few of them, however, have been found desirable in all respects. We are gratified to observe that one—the Mallory & Sanford machine—performs its work with a thoroughness that augurs well for its popularity and adaptability to the end desired.

Most persons are aware that flax is nothing but a series of fibers concealed in a wooden case or stem, and that, in order to liberate the flax, the shoove or wooden part must be removed, and this without injuring the quality or character of the staple. Although an apparent simple and easy duty, to the superficial observer, it is in reality a very serious task and has had an amount of ingenuity expended upon it that seems surprising, unless the character of the work be considered. The machine that we have alluded to performed its work very handsomely, and makes not a particle of tow. We were informed, and can readily believe, that the proprietors cannot keep pace with the demand for their machine.

We allude to this machine in the belief that it is destined to work a revolution in the art of dressing flax; and that in view of the manifold interests springing from the successful treatment of flax fiber, it behooves all interested in its manufacture to adopt every means which promise a successful prosecution of their labors. For printers and publishers generally the benefits likely to ensue from a supply of flax stock to the paper-maker, in lieu of cotton, are not to be over-estimated, both as regards the better quality of the paper and the reduced cost at which it is believed it can be afforded. Also, for belting, warp for carpets, felting, calicoes, &c., the adoption of flax for cotton, which is now rendered feasible, promises to inaugurate a new era which will be hailed by all who desire to be independent of a stringency of cotton occasioned by any cause whatever. The whole Western country teems with flax straw which has hitherto been burned or thrown into rivers, after being deprived of its seed, for want of flax machinery to reduce it to a condition fit to be worked, the seed alone paying for the cost of raising. This machine (an engraving of which and testimonials from those who have used it are presented on another page of the present number) is not exclusively a power machine, but is made of a suitable size to work by hand, so that any farmer owning but an acre or two of land can dress his little crop with the utmost celerity. Hand machines are provided, which accomplish in a proportionate degree all that the more ponderous power machines can. The actual value of such a machine to the growing demands of society, for linen clothing, housekeeping and the arts in general, is very great, and we expect to see linen in our markets rivaling in quality that of Ireland and at much lower prices.

Wheat for a Barrel of Flour.—The question is often asked, how much wheat does it take to make a barrel of flour? At the annual fair of the Dubuque County Agricultural Society, in 1860, James Pratt & Co., of the Rockdale Mills, entered one barrel of winter and one of spring wheat, accompanied with the statement that sixteen bushels of winter wheat yielded three barrels and 103 pounds of flour—at the rate of four bushels and fifteen of wheat to the barrel. Of spring wheat, fifty bushels yielded eleven barrels of flour, being four bushels and thirty-two pounds per barrel. The wheat used was of a fair quality, and no more.

THE MECHANIC ARTS AND THE FINE ARTS.

Shortly after the death of President Taylor we spent an evening with the celebrated painter, Vanderlyn, and the Commissioner of Patents at the house of a mutual friend in Washington. A portrait of the deceased President, by Vanderlyn, had just been disposed of, by raffle. After expatiating awhile on "art and high art" and giving incidents connected with the production of Vanderlyn's famous pictures of Marius, Ariadne, the landing of Columbus, &c., the conversation slid into an amusing debate on the relative importance of the mechanic arts and fine arts, and the social standard of their professors. Vanderlyn was insulted at the comparison and poured forth scathing remarks on the ignorance and presumption that would raise the anvil and forge to a level with the easel and palette. The Commissioner laughingly replied that his position justified, if it did not require, him to uphold the dignity of mechanical professions. "Mechanicians and artists" he observed, "are both children of inspiration, differing only in the medium of their manifestations—one portrays his thoughts on canvas, the other casts them in workshops, and places the things themselves, instead of their pictures, before you. There is some difference between a steamship and the finest painting of one. Had the Greeks (whom you, Mr. Vanderlyn, worship) honored the mechanic arts more, and those which ministered to the vanity of their leaders less, they had left a brighter history. Some of their great thinkers were sensible of the error and have left a memorable proof of their conviction."

"What in the devil's name is that?" exclaimed Vanderlyn.

"Why, this—instead of awarding the goddess of beauty to the patron of the fine arts, they gave her to a blacksmith; and, as if to mark the moral with the keenest emphasis, that blacksmith was a homely, awkward and limping one! Such a decision may excite disgust in painters and sculptors, proud of their profession; but there is no getting rid of the fact that, on the sole ground of mechanical talent, an artisan—deformed, halting on a broken leg, his face and breast blackened with smoke and his hands hardening into horn—is represented as bearing off the great prize of beauty in the face of the handsome and all-accomplished Apollo himself!"

There was no reviving Vanderlyn's good humor after this; nor would he offer any other reading of the riddle.

VALUABLE RECEIPTS.

Dyeing Mixed Goods Black.—Cloth made of a mixture of cotton and wool or flax and wool has become very common, and in order to obtain black goods of this composition, the practice formerly pursued was to dye the cotton warp first, then the wool of the filling or weft afterwards. It is very difficult to dye fabrics composed of mixed vegetable and animal fibers. They are so different in their nature that different processes are generally required to dye them the same color. Difficulties having been experienced in dyeing mixed cloth black by the old mode of coloring the cotton first, and a superior and more convenient mode has been desired. This is secured by coloring the wool in the piece of cloth first, and the cotton afterwards. The wool is prepared by boiling it first in a mordant of the bichromate of potash, then in a bath of a decoction of logwood, in the usual way now practiced of dyeing black on wool. After the cloth is washed it is steeped for about six hours in a weak decoction of sumac—one pound of sumac being sufficient for ten pounds of cloth. The sumac liquor must be cold or it will tend to make the wool brown in color. After this the piece of cloth is run through some weak lime-water, then through a weak solution of the sulphate of iron, aired and washed. After this it is again run through a weak liquor of logwood, washed, dried and the processes are complete. The acetate of iron is superior to the sulphate of iron for treating the cloth in the second process, and is to be preferred when it can be obtained. Black on cotton soon fades, and becomes a slate color when exposed to sunlight and rain. This is one reason why some mixed woolen and cotton goods soon become faded in appearance. The sulphate of copper is sometimes used for dyeing black on wool, especially for homespun cloth. It is an objectionable substance to use for this purpose, as the light acts upon black thus dyed, and it soon fades into a dirty drab shade. The same process that is pursued to color cotton will also color flax. Fast blacks are dyed on cotton for the cloth of Scotch gingham designed for umbrella oovers, by dyeing it first a dark indigo blue, then a black on the top of this with sumac, copperas and logwood. A fast black can also be dyed upon cotton and flax with madder as a substitute for logwood, but these fast blacks are very expensive. It is not generally known that the dyeing of vegetable fibers, such as cotton and flax, involves far more intricate processes, more skill and expense than the coloring of wool and silk. Aniline colors have not yet been applied to dye cotton except for very light shades, they being too expensive for cheap fabrics.

Cleaning Kid Gloves.—When kid gloves are stained with grease and dirt they may be cleaned with a composition of benzole containing a few drops of ether. The glooves are to be laid upon a board, then rubbed with a sponge containing the fluid, after which they are dipped in the fluid, squeezed, rubbed with the sponge dry upon the board, then expanded by blowing into the opening for the hand, and when all the fingers are opened full they are hung up to dry. This cleaning operation will not restore faded colors. Common burning fluid, composed of four parts of alcohol and one part of turpentine, will answer for cleaning kid glooves nearly as well as the benzole fluid. In using such fluids care must be exercised to conduct the operation at a distance from fire, as the vapor which is generatad is very combustible, and will explode if ignited.

THE ABUSE OF FILES.

There are by far too many files wasted and misused in ordinary work, and the abuse is one that should be checked at once. To judge from the treatment some persons bestow on these costly tools, they are as common as pins and about as valuable. A new file is used for fitting a Babbitt metal box to a shaft, or a file for brass-work is used alike on iron and brass; and then another must be procured when the workman desires to finish brass again. And so the interchange goes on, until the consequence is that the workman guilty of such carelessness has no file of any kind, fit for any purpose in his drawer. Hard steel makes no difference to a file-abuser either. Apparently there are some individuals who think that because a diamond will cut another diamond, so a file must bite another file; they pursue this theory and rasp away on the scale of cast-iron, or over the black places in forgings, with an utter disregard of their employers' time and money. A fifteen-inch flat bastard file costs from a dollar to a dollar and a half, but we have seen one of these tools placed *hors du combat* in five minutes by the blundering stupidity, not to say criminality, of the person using it. If the individual had been obliged to buy it himself, it is hardly to be supposed that he would have treated it in such a manner. It contributes in no wise to the reputation of any workman to be careless of tools that he uses but is not obliged to purchase, and it would be much better for all parties if a little more consideration was given to this matter.

Vessels on the Lakes.

The immense amount of capital invested in the commerce of our great lakes, is hardly realized by the public outside of business circles immediately interested in the trade.

The following statement of sail and steam vessels now engaged in this business is compiled from the "Marine Register" for 1863, just issued by the Board of Lake Underwriters:—Steamers, 134; propellers and tugs, 253; barks and barkantines, 191; brigs and brigantines, 79; schooners, 1,030; sloops, 14; barges, 60. Total, 1,761.