Scientific American.

MUNN & COMPANY, Editors and Proprietors

PUBLISHED WEEKLY

At No. 37 Park-row (Park Building), New York.

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

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

Single copies of the paperare on sale at the office of publication, and at all the periodical stores in the United States and Canada.

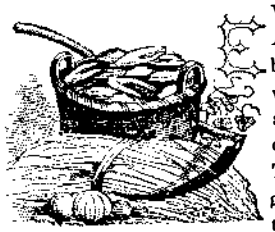
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

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

VOL. III., No. 19....[NEW SERIES.]....*Sixteenth Year.*

NEW YORK, SATURDAY, NOVEMBER 3, 1860.

AGRICULTURAL IMPROVEMENTS.



EVERY department of American industry has been greatly improved within a very few years, and this is especially the case with agriculture. This affords cause for gratitude, because all those who are engaged in the professions, commerce and the common arts are dependent upon the surplus products of agriculture for sustenance. The present year has been unexampled in productiveness; the fields have yielded abundant harvests, and the orchards have been bowed down with heavy loads of golden fruit. "These blessings," as one said to us recently, "have put our farmers in good heart," and we judge from the cheerful tone of several discussions which have lately been held at agricultural society gatherings, that prosperity is acting as a wise stimulant to further enterprising action. With the great amount of intelligence which is now widely disseminated on agricultural subjects, old defects and new wants are becoming more generally known. This may surprise many persons who have imagined that the field for agricultural inventions was almost fenced in. Owing to the great number of patents which have been issued of late years for farmers' implements and machinery, many inventors have considered that the range for their efforts in this department was very circumscribed. We assure them such is not the fact, and the past affords us good grounds for this opinion. Fourteen years ago, the yearly issue of agricultural patents was 78; in 1859, it was 664, which is an increase of eight and a half times in these few years. When there were only 78 patents granted in one year, many persons thought that the end of improvements had arrived—that the plow had surely attained to perfection. In his report for 1846, Examiner Dr. Page indulges in a sort of lamentation over the paucity of agricultural inventions for that year, and he concludes with the mournful apothegm, "farming is up-hill work." Perfection cannot be attained without severe toil, and "there is no royal road to knowledge." Farming may be "up-hill work," but the toil of ascending the mountain peak is all forgetten when the summit is gained and the world seems spread out before our vision. Similar results have animated those who have devoted themselves to agricultural improvements. No field for the inventor's exploration has brought so many rich rewards for new discoveries; and yet we think it is just about as inviting as it was fourteen years ago. Although the McCormicks, Mannys, Peelers, Pitts and others have become rich as Crœsus by their patent harvesters, plows and grain separators, they have not exhausted the subject, and it is to this particular point we wish to direct attention.

On page 266 of the present volume of the SCIENTIFIC AMERICAN, we quoted the opinions of a writer in the New York *World*, respecting the defects of common plows and the benefits which would result from an entire revolution in the mode of preparing the soil for planting. A machine which would dig up and thoroughly pulverize the soil was recommended as a superior substitute for the common plows, which merely turn it over in furrows. This subject was also brought up at the meeting of the Farmers' Club, held in this city on the 22d ult., at which the secretary stated that, as there was to be another World's Fair in London in 1862, he "hoped some ingenious American citizen would invent a practical tilling machine which would rapidly pulverize the soil and put it in good condition for planting, and present it at the international exhibition." "There is now," he said, "no machine in existence capable of performing this labor, but I trust one will be brought out at the exhibition which will reflect credit upon American genius and industry." Here is a new want which inventors are called upon to supply by those specially devoted to agriculture. And if this is the case with such a venerable operation as that of plowing, it is reasonable to infer that many other operations in farming, as commonly practised, may also be greatly improved by a new class of machines, which will produce a revolution in the modes of executing them.

LIGHTING MANUFACTORIES BY WATER POWER.

The experiments with Way's electric light have demonstrated that a brilliant and constant light may be maintained without any other expenditure than that of mechanical power; but if the power is obtained by a steam engine, the cost of the fuel makes the light expensive. As our cotton and woolen manufactories that are driven by water power, almost all have a surplus of power in the winter months, the only season during which they are lighted, would not the owners find this the best and cheapest plan for lighting their establishments?

An hour glass, containing a supply of mercury, would be placed in the middle of each room, just under the ceiling, and insulated wires, passing perfectly air-tight through the glass, would lead to a magneto-electric machine in any convenient part of the establishment. The wires would connect with the mercury in each end of the glass, and when the magneto-electric machine was turned by the water wheel, the current of electricity passing along the wires, would run through the slender stream of mercury flowing down from the upper chamber of the hour glass to the lower, the light being given out by the electric current as it darted from drop to drop of the mercurial stream. When the mercury had nearly all run down from the upper bulb of the glass to the lower, it would be necessary to turn the glass over, for which purpose it might be connected to simple clockwork, and the wires would be brought out of it through the axle on which it was hung. A separate machine would probably be required for each light, and the power demanded would be considerable, but the room would be filled with such a flood of light as was never yet seen in a manufacturing establishment, and all the current expense would be the very trifling outlay required to keep the apparatus in repair.

We expect to see before long the Lowell and Manchester manufactories illuminated at night as brilliantly as by day by the use of electricity in some manner, and most probably by the magneto-electrical machine and mercury light of Professor Way.

MOROCCO LEATHER DRESSING.

Although enameled oilcloth, having its surface finished to imitate morocco leather, has come into very extensive use during the past five years, still it does not seem to have injured the manufacture of the genuine article. Morocco dressing establishments are still increasing in number and extent. Real morocco leather is made of tanned goatskin; but the term is now, in a general manner, also applied to tanned sheepskin, which is colored and dressed with a polished and corded surface in imitation of morocco. Having been informed that the manufacture of sheepskin into colored leather was carried on extensively, and in a superior manner, in Albany, N. Y., by the firm of A. Williamson & Sons—old and experienced leather dressers—we recently embraced an opportunity of visiting their establishment, while briefly sojourning in the capital of the empire State. It is situated near the upper extremity of a street called Broadway, and although this street is very unlike its great namesake in New York, it can boast of a good morocco factory, in which some new and improved processes are carried on. Colored sheepskin is principally used for shoe bindings, and, in this establishment, the majority of the pelts are obtained green from sheep and lambs slaughtered in the vicinity. About 100,000 skins are dressed annually in it, and from these about half a million pounds of wool are obtained and sold.

The first process through which they are made to pass is that of soaking and softening by water, to fit them for receiving the unhairing preparation. Formerly hydrate of lime was sprinkled in the inside of each pelt; it was then folded over with the wool side out and laid down on the floor, sometimes called "the pit." In this manner a whole pile or heap was made, and a heating action was engendered by which the roots of the wool were loosened, so that the fleece could be easily pulled or scraped off on a table afterwards. This method of loosening the roots of the wool was tedious, occupying several days to complete, and the skins required constant watching, as they were liable to overheat and injury both to the wool and the gelatinous tissue. This was especially the case in warm weather; but a remedy for this trouble and these ills was lately introduced by the senior member of the firm, and is one of the most important improvements made, for many years, in this art. This is effected by a calcium orpiment compound, which they import and have also introduced among other manufacturers. It is made up into a thick creamy consistency, then applied to the inside of the skins which are folded over, wool side out, and laid in a heap, as before described. In twenty-four hours afterwards the skins can be deprived of their wool, and if they have to lie longer, no injury will result. In all cases the depilatory action is certain without injury to wool or skin tissue.

The next operation is that of washing the skins prior to unwooling them. This latter manipulation is executed by placing them upon an inclined bench, and rubbing off the wool with a blunt tool. The flesh side of the skins is also scraped to remove slime and loose flesh, after which they are ready for the liming operation. They are now placed in vats containing milk of lime (slacked lime mixed with water), in which they are treated for about two weeks. The office of the lime appears to be that of a corrosive agent for the removal of grease in the skins, as it would prevent the action of the tannic acid afterwards. The lime does not act upon the gelatinous tissue, which alone forms the leather when combined with a tanning agent. A new discovery to shorten and cheapen this part of the process would be invaluable.

The next operation consists in passing the skins through a bath of hen or pigeon manure, mixed with water, which softens them. After this they are washed and passed through a sour of dilute sulphuric acid, which neutralizes all the lime that may remain in the pores of the skin, converting it into a sulphate, which is easily removed by a good washing in moderately warm water. After this they are dipped into a solution of common salt, sewed up at the edges with the grain side out, to form bags partly filled with tanning liquor, inflated and tied. They are now placed in a tub containing an extract of Sicily sumac, in which they float and are kept in constant motion for several hours; and when they have absorbed a sufficient amount of the tannic acid in the sumac to convert the skin into leather, they are taken out, drained and rinsed; and if not to be colored, they are ripped out and dried in the atmosphere in sheds constructed for the purpose. They are stretched on boards, rubbed out to render them smooth, and tacked down so as to dry without wrinkling. These skins are generally filled three times with fresh liquor to tan them fully.

The next operation is that of coloring. If the color is to be applied topically by putting it on the surface with a sponge, the skins are first dried. If they are to be dyed in liquors, they are sewed so as to have the grain side out, then mordanted, and afterwards handled in a tub containing the coloring agents. Prussian blue colors are imparted by handling the skins first in a dilute solution of nitrate of iron for about an hour, then in a warm bath containing the cyanide of potash and a little sulphuric acid. A beautiful blue is thus dyed. A scarlet is prepared with a mordant of the muriate of tin and cream of tartar; the red color is afterwards obtained by handling them in an extract liquor of cochineal. Purple is dyed by applying a cochineal color on the top of a Prussian blue. Bronze is obtained from a strong extract of logwood and alum. After being dyed, the skins are rinsed, stretched on boards, rubbed smoothly down, tacked around their edges and dried.

Topical applications of color are given to the grain surfaces in many instances. They simply consist of a strong extract applied with a sponge or a piece of cotton

cloth; almost any color can thus be put on. A scarlet color is made by a topical application of an extract of turmeric upon a dyed cochineal red. To enable some of the coloring agents to go on evenly, milk and the white of eggs are frequently mixed with them. These applications also serve to impart a metallic luster to the surface. Prior to rolling, the dyed skins are slightly shaved on the wrong side and trimmed at the edges.

The subsequent finishing operations consist in rolling the skins on a table under a small weighted roller having a grooved face, and which is attached to a suspended arm which the operator moves back and forth until the roller has traversed the entire surface. This operation imparts a glossy cordovan surface to the leather. A second rolling, with the grooves running in an angular direction, gives the surface a diamond corded finish—the true morocco style. Formerly these skins were all finished by hand labor. The operatives stretched them on inclined boards, and rubbed over their surface with grooved balls of ebony held in the hand. Sometimes an extra finish is still imparted in this manner to skins.

In this factory we saw the first aniline (popularly called Magenta) colors on morocco that have been applied in this country. The senior partner had been on a European tour last summer, and obtained the new color from abroad. It produces the most beautiful shades of purple, lavender and lilac upon leather. No coloring agent hitherto known can equal it.

All processes for making leather from skins is not tanning, although most persons so term them. White leather is prepared with alum, and in some instances with a paste of flour. These are tawing, not tanning processes. It requires an agent, such as hemlock, oak or sumac, containing tannic acid, brought into contact with gelatinous tissue, to constitute the tanning process.

Heavy sheepskins are frequently split by machinery, and for some purposes such leather is more suitable than any other kind. In this factory, a new machine for splitting had just arrived from England, and we were surprised to learn that, although it did not split so many skins in the same space of time as the American splitting machines, it was preferred because its work was of a superior quality. The cutting knife moves with a reciprocating sawing action, and is driven with a very high velocity.

We have in this brief description of morocco dressing mentioned three new improvements not to be found in works published on the subject, viz.: the depilatory process, the cleansing operations with dilute sulphuric acid, and the new styles of colors. Morocco leather dressing proper is principally carried on in our cities on the seaboard or in their immediate vicinity, as the goat skins are all imported from India, Africa, &c., and the sumac for tanning them from the island of Sicily—that land to which the eyes of the whole civilized world have recently been directed, on account of the wonderful exploits of Garibaldi and his heroic followers, fighting for the freedom of Italy.

WEAR OF RAILWAY CAR WHEELS.—An examination made last year, on the Reading Railroad, in England, showed that, of all the wheels in use on all descriptions of cars since 1852, the average wear had been that of 58,094 miles, before the wheels were renewed. The life of the wheels under the passenger cars was ascertained to be 117,706 miles, a fact which shows not only the superiority of the wheels used under passenger cars, as compared with those under freight and coal cars, but also the advantage of good springs, those under the passenger cars being much the easiest on the road. The coal trains have been run at from 8 to 15 miles an hour; the passenger trains at from 25 to 40 miles. These results, as to wear, were carefully ascertained, and are of value to other railroad companies.

CALIFORNIA MECHANICS.—We learn from our California cotemporaries that the Fair of the Mechanics' Institute held in San Francisco in the month of September last was an entire success. The *California Farmer* says respecting it:—"We say that the mechanics of California have reason to be proud of the exhibition they have made of their skill and progress, and every observer should also be proud that our State can show such enterprising and skillful operators."

THOMAS T. STRODE.—The address of Mr. Strode is Mortonville, Pa.

DISCOVERIES AND INVENTIONS ABROAD.

Trussing Casks.—In trussing casks, coopers generally make a fire of shavings inside of them, for the purpose of slightly warming the staves and thus enabling them to be driven up more easily. A patent has been taken out in England by Thomas S. Cressy, of Burton-on-Trent, for a heating furnace for casks. This furnace is secured between jointed levers and raised up in the inside of the casks, and also lowered, with the greatest facility, to supersede the trouble of making a new fire of shavings for each cask to be trussed. This improvement deserves the attention of all coopers.

Transferring Pictures to Glass.—A patent has been granted to Willoughby Smith, of Dalston, England, for the following process relating to transferring prints. He takes the print of any picture produced on paper and treats its surface with three coats of collodion. When this is set and hard, the paper is washed off, when the ink or color will be found firmly attached to the film of collodion. To effect this operation perfectly, the print should be first stretched on a board and receive the coats of collodion, then put into water to soften it, when it may be easily rubbed off, leaving the design firmly fixed upon a transparent coat of collodion, which is then allowed to dry and afterwards receives a thin coat of transparent varnish. Collodion may be rendered tough and transparent by adding about three per cent of castor oil and the same amount of Canadian balsam to it and boling them together in a close vessel until they are thoroughly incorporated. The printed film of collodion is now ready for mounting upon glass. This is done by placing it between two plates, pressing them close together, and cementing their edges by pasting a strip of paper around them. By this process any printed pictures may be transferred, rendered transparent, and fitted for the slides of magic lanterns. These collodion transfer pictures may also be pasted on single strips of glass and covered on the back with transparent varnish, and in this manner ornamented windows may be easily made by almost any person.

Hardening Spindle Caps.—In spinning and doubling machinery, the spindle cap consists of a cylinder of cast iron, polished on the outside and placed on the spindle. Being made of cast iron the caps are easily damaged by a blow or by falling on the floor. To remedy this defect and render them more enduring, W. Smith and P. Smith, of Keighley, England, have taken out a patent for hardening them in the same manner that steel tools are treated; that is, they heat them to a red heat, then dip them in a bath of cold salt brine.

Deep Sea Telegraphs.—In a communication to the London *Mechanics' Magazine*, Thomas Allan, Esq., a distinguished electrician, states that of 12,000 miles of submarine cable which have been laid in various parts of the world, only 1,200 miles are in working order, at present. He asserts that the success of any ocean telegraph depends entirely on the nature and construction of the cable, and that those companies (such as the Atlantic, of famous memory) which have failed have themselves to blame, because they persisted in dogged adherence to the use of cables which were suited only for shallow waters. An ocean cable, he says, should have great internal strength and low specific gravity—lightness—and it should be made of such materials as will permit it to be thorougly tested before it is laid down. There were upwards of 1,500 joinings in the Atlantic cable, and it never was tested under water until the cable reached the bottom of the sea.

Cast Iron Enameled Water Pipes.—The pipes which are employed to convey water in cities are made of cast iron and are very liable to rapid corrosion, when placed in the vicinity of leaky gas pipes. To obviate this evil, cast iron pipes for conveying water are now being made with imperishable surfaces, by Messrs. Salt, of Birmingham. Cast iron pipes thus treated will be more expensive at first, but cheap in the end, as they will last for a hundred years, whereas, in many situations, common cast iron water pipes have to be renewed every seven years.

The Sun: Is it a Sphere of Fire?—M. Leverrier, of Paris, believes that the spots seen on the sun's disk are clouds in its atmosphere. His opinion is that the sun is not a luminous body on account of its high temperature, but that it is a huge solid or liquid body surrounded by an atmosphere. A common opinion respecting the constitution of the sun is that it has a luminous atmosphere but an opaque body, and that the spots seen on the sun are open spaces formed by unknown causes in the luminous atmosphere. This subject is still shrouded in mystery, and on this very account it excites more general interest.

Earthquakes.—Within the memory of man, earthquakes have been principally confined to a few localities, such as Aleppo, in Turkey, Portugal and Calabria, in Europe, and Chili, in South America. Most of the people in Europe and we, dwellers in North America, have congratulated ourselves that there was no danger to us of such trepidations of the earth producing like sensations in our sensitive hearts. According to Dr. Ansted, of London, however, we are admonished not to be quite so secure in our reflections of immunity from earthquakes, and the quake which vibrated through New England and Canada, last week, affords him argument for his opinions. He tells the people of London, in the *Chemical News*, that "earthquakes have frightened our forefathers, and may overwhelm us. The fatal explosion may happen this or next year; it may not happen in this century. It may originate beneath our very feet, or at the bottom of the ocean near our shores, or it may take place so far away that we hear only the faint distant echoes of the convulsive throe, but we are not the less certainly living over a mine ready to be sprung, and no one can tell when or where the fatal match will be applied."

WOODEN SCHOOL SLATES.—Since the manufacture of wooden nutmegs, in the State of Connecticut, has ceased, the people have turned their attention to the manufacture of all sorts of Yankee notions, from patent sewing birds, in the manufacture of which a fortune has been made, and wooden clocks, in which fortunes have been made and lost, down to campaign medals, of which one manufacturer turns out ten thousand per diem. About the last invention contrived by one of these ingenious people is the manufacture of school slates out of wood. Not long ago, Messrs. Dean and Munger, of New Haven, Conn., took out a patent, through this office, for the manufacture of this article, and from their manifest superiority over the old stone slate, they are going into almost universal use. They are made of three thicknesses of veneering glued together and covered on both sides with a black coating of just the proper degree of roughness to receive the impression from the pencil, and are then framed in the usual manner. Their most striking peculiarities are their extreme lightness and durability; they may be thrown down and even stamped upon without being broken. The manner of polishing these slates is illustrated on another page. The same firm also make blackboards with the same covering.

THE OIL REGION OF PENNSYLVANIA.—A correspondent of the Boston *Post*, writing from among the oil works of Pennsylvania, says:—

The hotels are crowded, people often sleeping three in a bed, and one hears nothing talked of but "petroleum," "surface indications," "boring," territory," "pumping," &c., landlords, doctors, lawyers, ministers, blacksmiths, and almost everybody has an interest in a well bored, or being bored. As to the election, it is entirely forgotten in the eagerness of securing a fortune. A politician drove up to old Father Raymond's Rural House, in Franklin (the old man has two wells pumping fifty barrels daily) and after getting his dinner, commenced pumping the old gentleman by asking, "How is politics?" "Don't know any such well around here," replied Father Raymond. "But," says the stranger, "what is the prospect for Douglas or Breckenridge?" "Oh," says Boniface, "I don't know, it all depends on whether there are any surface indications." "But," continues his guest, "will fusion go down among you old diggers?" "Fusion," exclaims the landlord, "well, I don't know, some of these chaps called geologists say that there must be fusion below, but my opinion is that the devil has something to do with it down there before we get it." "But," says the politician, "are you not in favor of squatter sovereignty in the Territories?" "No; I will shoot anybody who dares to squat on any of my territory, and I own four miles on Sandy Creek!" "Give me my horse," says the stranger—and vamoosed.

Several mines are new being worked with success in the White Mountains, N. H. About four tuns of charcoal iron are turned out daily at the Franconia iron mine. The ore is magnetic oxyd of a very superior quality.