

AGRICULTURAL INVENTIONS.

A simple, easily constructed machine for removing the hulls from cotton seeds and separating the hulls and kernels, has been patented by Mr. Seaborn Kitchens, Sr., of Gibson, Ga. When the seeds are hulled they are in good condition to express the oil therefrom, and they leave an oil cake free from waste, which is used for feeding animals.

Mr. Axel F. Bergqvist, of Fairfield, Iowa, has patented an improvement in sulky plows, which consists in the peculiar construction and arrangement of parts for raising and lowering the bail to which the plow is attached, and simultaneously adjusting the wheel which runs upon the land side.

An improved separator for removing cockle from grain has been patented by Mr. Eli Chapman Gage, of Whitehall, Wis. It is so constructed as to take out the cockle rapidly and thoroughly, and it is simple and convenient.

Glacier Pavements.

Speaking of the evidences of glacial action in the Sierra, Mr. John Muir, the California geologist, says that to the non-scientific observer the most striking and attractive are the polished glacier pavements, because they are so beautiful, and their beauty is of so rare a kind, so unlike any portion of the loose, earthy lowlands where people make homes and earn their bread. They are simply flat or gently undulating areas of solid granite, which present the unchanged surface upon which the ancient glaciers flowed, and are found in the most perfect condition in the sub-alpine region, at an elevation of from 8,000 to 9,000 feet. Some are miles in extent, only slightly interrupted by spots that have given way to the weather, while the best preserved portions are bright and stainless as the sky, reflecting the sunbeams like glass, and shining as if polished afresh every day, notwithstanding they have been exposed to corroding rains, dew, frost, and snow for thousands of years.

The attention of the game seeking and gold-seeking mountaineer is seldom commanded by other glacial phenomena, as moraines, however regular and artificial in form, or cañons, however deep, are strangely modeled rocks, however high and sheer; but when he comes to these bare pavements he stoops and rubs his hand admiringly on their shining surface, and tries hard to account for their mysterious smoothness and brilliancy. He may have seen the winter avalanches of snow descending in awful majesty through the woods, sweeping away the trees that stood in their way like slender weeds, but concludes that this cannot be the work of avalanches, because the scratches and fine polished striæ show that the agent, whatever it was, moved along and up over the rocks as well as downward. Neither can he see how water may possibly have been the agent, for he finds the same strange polish upon lofty, isolated tables beyond the reach of any conceivable flood. Only the winds seem capable of moving across the face of the country in the directions indicated by the scratches and grooves. Even dogs and horses, when first led up the mountains, study geology to this extent, that they gaze wonderingly at the strange brightness of the ground, and smell it, and place their feet cautiously upon it, as if afraid of falling or sinking.

The California Wine Crops.

The San Francisco *Alta* says that the California wine crop of 1880 was between ten and twelve million gallons. After mentioning the tendency of dealers to overstate the quantity of wine made, the *Alta* adds: "San Francisco has never received more than 3,500,000 gallons in a year, nor has the State ever exported more than 2,200,000 gallons in a year. The receipts at San Francisco were 1,700,000 gallons in 1876, 2,400,000 in 1877, 3,000,000 in 1878, 3,400,000 in 1879, and the same in 1880. The receipts of brandy were 60,000 gallons in 1876, 130,000 in 1877, 110,000 in 1878, and 100,000 in 1879. Our wine exports by sea were 510,000 gallons in 1876, 890,000 in 1877, 1,230,000 in 1878, 1,400,000 in 1879, and the same amount in 1880. The export by rail is about 800,000 gallons annually. The figures for 1881 will probably show a decided increase over 1880. The State has never approached the limit of its capacity in wine making, the greater part of the grapes having been used every year for the table, while many have been allowed to spoil on the vines, and the hogs have been turned into some vineyards, as the most profitable use that could be made of them. There have been years when grapes sold at Los Angeles and Sonoma for half a cent a pound at wholesale, and such low prices still prevail in large vineyards in the Sierra Nevada, remote from the market."

Traction Engines for Military Use.

An important experiment was carried out in Berlin the other day with a traction engine designed expressly for military purposes, in the presence of Field-Marshal von Moltke, General von Kamecke, the German Minister of War, General von Bülow, the Inspector-General of Artillery of the German Army, and a large number of other officers and officials of high rank. Five 15 cwt. guns, mounted on traveling carriages, with timbers complete, were attached to the engine; the whole forming a train a hundred paces long, weighing altogether 650 cwt. The gun carriages were attached to one another and to the engine by an ingenious coupling arrangement, designed to secure that the wheels of all the carriages should follow exactly in the track of the wheels of the locomotive. The invention appears to have succeeded perfectly, since the long train of carriages was taken without hitch or difficulty round very sharp corners;

the traction engine and leading carriages at one point in the journey turning down a side street out of a main street before the rear carriages had entered the latter from another side street. The journey lasted for two hours and a half, the train moving with equal ease along paved streets and macadamized roads. The engine worked at a comparatively slow rate indeed; but it is said that it could have been driven at much greater speed, while it is also capable of dragging a load of 3,000 cwt.—*Continent and Swiss Times.*

The Sizes of Books.

Originally the terms *quarto*, *octavo*, and so on, denoting the number of foldings of the printed sheet, also designated the size of the book. But owing to the varying sizes of paper now used in bookmaking the size of a book can no longer be inferred from the number of foldings. Librarians are, therefore, adopting systems of arbitrary measurement for book sizes, retaining, however, the familiar denominations. The associated librarians of Great Britain recently fixed upon the following scale of measurements, the inferior limit of each size being the superior limit of the size below it:

Large folio.....la.	f°.....	over 18 inches.
Folio.....	f°.....	below 18 "
Small folio.....sm.	f°.....	" 13 "
Large octavo.....la.	8°.....	" 11 "
Octavo.....	8°.....	" 9 "
Small octavo.....sm.	8°.....	" 8 "
Duodecimo.....	12°.....	" 8 "
Decimo-octavo.....	18°.....	is 6 "
Mínimo.....	m°.....	below 6 "
Large quarto.....la.	4°.....	" 15 "
Quarto.....	4°.....	" 11 "
Small quarto.....sm.	4°.....	" 8 "

To designate unusual sizes the additional terms *square* (sq.), *narrow* (na.), and *oblong* (ob.) are to be used. It would be a great convenience to book buyers if reviewers and advertisers of books could agree upon some such system.

Somatic Physics.

A suggestive paper on the applicability of the doctrine of the conservation of energy to biological studies was read at the recent Convention of Electricians at Chicago. The author, Dr. Clevenger, claimed that if any advances are to be made in these studies greater attention must be paid by physiologists to sound, heat, light, and electricity.

Tentatively the force which traverses nerve tissue may be regarded as electrical. There is no such thing as nerve force in the general acceptation. The author regards the nerves as paths of least resistance for the conveyance of force or forces existing in the universe and concerned in the life of every atom of the individual. The physical properties of foods and medicines have hardly been looked at, and the conquests of science remain to be made in the investigation of the laws of light, heat, and electricity in the production of plant and animal life. Latent and specific heats, the fluorescence of quinine and æsculin, force occlusion, and the ability of certain inorganic and organic bodies to yield up their heat, light, or electricity under appropriate conditions bear important relationship to therapeutics and physiology, and promise to make medicine a science of the most exact nature. In support the following phenomena may be cited: Light contracts the pupil of the eye as surely as electro-magnetism attracts the relay armature. Sound produces tympanic vibrations and excites muscular contractions. Heat produces general molecular changes of position throughout the body. Electricity is demonstrably held upon the large-sized nerve tissue of gymnotus and malapterurus, and nervous exhaustion follows every discharge. Electricity also produces muscular contraction. Gravitation does not lose its control of an atom for having entered into animal or plant composition. Coffee and sugar are related electrically, as zinc and platinum. Galvanometric deflections may be produced by a voltaic current generated by bitters and sweets, pungents and salts, bitters and acids. It is a rich field for investigation, bearing directly upon the problems the therapist seeks to understand.

Peruvian Torpedo Tricks.

In an account of the defenses of the city of Lima, a native of that city lately gave to the *World* the following account of the use of torpedoes by the Peruvians. He said:

"You recollect the destruction of their transport *Loa* by a torpedo concealed in a fruit boat which was turned adrift in such a way as to fall into their hands. The unloading of the fruit from what appeared to be an ordinary market boat set some clockwork in motion, and when the 300 pounds of dynamite exploded the *Loa* was destroyed and sunk in less than ten minutes. The corvette *Covadonga* was destroyed in pretty much the same way. This vessel was bombarding Chauca, a small port about forty miles from Lima, when a small boat, 'got up' to look as if it was the gig of the captain of the port, came out to her. The corvette suspecting something wrong fired on the small boat, and its crew at once jumped overboard and swam ashore. The Chilians sent a launch after the boat. They were very cautious about it, for their Admiral has issued orders to them to keep clear of all boats adrift. Well, they passed a rope under it to see that it was really clear of any wires, had it examined by a calker to be sure that there was no false bottom, and even then were not satisfied, but had an engineer from the corvette go out and look the boat over. These doings were very closely watched from the shore, I can tell you. Finally they seemed to determine that the small boat was all right, and the launch took her in tow to the side of the corvette. They attempted to hoist her

up, but as soon as the weight of the boat came on the rings at each end of her a steel rod accurately gauged to break with a certain weight snapped, and 300 pounds of dynamite stowed in the air chambers along each side of the boat exploded and in ten minutes the *Covadonga* was sunk. The men on shore hurried out in boats, and the launches of the corvette, which were out doing patrol duty, also helped to pick up the men in the water. Out of 160 men on board about forty were saved.

"The last attempt to use the torpedo was not successful. It took place about twenty days before I left Lima. The iron-clad *Blanco Eucaleda* is detailed to keep the blockade at Callao, and has an anchorage ground off the corner of the Island of San Lorenzo, which forms one side of the harbor. It was her custom to put out to sea every night to be safe from any night attacks in small boats. Every morning about 8 o'clock she returned to her buoy to anchor for the day. We arranged a sunken torpedo of two boats fastened together and sunk just under that spot. The explosive was 8,000 pounds of black powder. Clockwork was set to explode the mass at 9:30 in the morning, and at that time there was a great crowd on the shore watching the vessel, expecting to see her 'go up,' for she had come in and anchored in her old spot. But it seems that the tide, which sets very strong at that point, had carried the torpedo about half a mile away, and all we had was a very fine waterspout. Now the *Blanco Eucaleda* goes out to sea as usual every night, but leaves several launches to patrol the anchorage ground."

Post-mortem Examination of a Crazy Elephant.

African Jim, an elephant belonging to the St. Louis Zoological Gardens, died recently after an illness of two months. On the evening of his death he exhibited an uncontrollable desire to smash things, and endeavored to tear down the building containing the carnivora. A *post-mortem* examination was made by Dr. Charles A. Todd, who found the body somewhat emaciated.

The abdominal organs were healthy, with the exception of the liver, which was congested and showed abundant signs of old disease—inflammation. There had been an old pleurisy, or inflammation of the membrane covering the inside of the chest and surface of the lungs, which caused both lungs to be closely bound to the chest at every point, so that they were no longer freely movable, as should be the case. The lungs were also partly congested. The brain was the site of the most important pathological changes. The membranes covering it were greatly congested, and the one that lies direct in contact with the nervous substance (*pia mater*) was markedly thickened (showing old inflammatory disease), the blood vessels passing into it being also thickened and offering considerable resistance in the examination. Other parts of the brain were congested. The congested condition of the brain and its membranes explained the frenzy of the animal on the day of his death; this, however, was but a sudden aggravation of the long standing disease indicated by the thickened membrane and vessels, chronic meningitis, which would have insured a premature death, even if life had not been so suddenly taken off by the last attack. In human beings chronic meningitis is a disease difficult to diagnose until symptoms of paralysis, weakness of mind, marked headache, forgetfulness, appear to suggest what the ailment may be. Dr. F. R. Eversole, who assisted Dr. Todd, stated that in his experience at the City Insane Asylum he had not seen more decided evidence of brain disease of a chronic nature in the *post-mortems* there held upon the bodies of chronic cases. The elephant during life did exhibit symptoms that might have been supposed to proceed from slight headache, but his chief symptoms were failure in appetite for grain, with consequent emaciation. It should be remembered that the stomach contained an abundance of well masticated fodder, and there was no indication of disease of the intestinal tract or disturbance of its functions. The matter is one of great interest to keepers of wild animals, as this elephant evidently had been liable for some time to outbreaks of violence.

A Defense of American Pork.

The Secretary of the Treasury recently transmitted to the Senate a report on the alleged occurrence of trichinæ in American hams and other meat in Germany and elsewhere. The report was prepared under the direction of the Surgeon-General of the Marine Hospital Service, and was called out by letters received from United States consuls in foreign parts, one of which, from the Consular Agent at Mayence, states that on investigating the reports of the finding of trichinæ in American pork it was found that the infected meat was not American but German. The Senate report says that the number of diseased swine is overestimated, probably through the influence of those most interested—the German pork dealers and producers.

The One Mechanic Buried in Westminster Abbey.

Notwithstanding England's enormous indebtedness to her mechanics, but one mechanical workman has ever been honored with a burial in Westminster Abbey; and that was Graham the clock-maker. Graham made exact astronomy possible by his great improvements in time pieces. He invented the dead-beat escapement and the gridiron compensating pendulum, and he was the first to make clocks that would run for many days without winding. Graham was also a maker of great quadrants and instruments of that sort. His funeral was attended by all the members of the Royal Society.

Antiquity of Trade Marks.

The question has been asked somebody, "How old are trade marks?" who answers it by saying that they seem to be nearly as old as the industry of the race.

Ancient Babylon had property symbols, and the Chinese claim to have had trade marks 1,000 years before Christ. Guttenberg, the very inventor of printing, had a lawsuit about a trade mark, and he won it. As early as 1300 the English Parliament authorized trade marks, and the laws of America have always protected them. The theory by which a suit is brought for infringement of a trade mark is that its use deprives the originator of his property, and deceives the public as to the article. Extraordinary means have been required at all times to guard against the fraudulent use of marks of manufacturers.

In ancient times the greatest importance was placed upon the marks of individual workmen, because, as in the case of the armorers, valuable lives often depended on the quality of the workmanship. One old author complains that certain good and true soldiers were killed simply because the workmanship of their swords and arms was not good, and failed them when in battle. Very early, therefore, it was found necessary to make stringent laws against counterfeiting trade marks, and against scamped workmanship. Without protection in this one particular, trade would almost come to a standstill, because there are very few things, comparatively, that can be purchased upon their merits, judged at the moment. In general, we know the quality of goods by experience, and it is only after they have been in use that a certain judgment can be pronounced upon their quality. Having, then, once found that a certain workman's productions are good, we seek them again in the market. If we have no means of identifying his trade mark the whole work of buying becomes a haphazard affair. The best goods at once lose their value. This was early discovered, and probably the successors of Tubal Cain were the first to use distinctive marks on their manufactures.—*The Carpet Trade Review.*

Curious Uses and Works of Ants.

At the recent Southboro session of the Massachusetts State Board of Agriculture, Prof. E. S. Morse gave the following curious particulars about ants:

The ant belongs to a family of insects such as wasps, bees, hornets, but is the superior of them all, as are the elephant, the horse, and the dog, in other lines of animal life. Ants are constructed with the "back" bone in front, and the heart and other internal organs on the opposite side are put together upside down, as we might think. Their mouth is for biting and swallowing food only, not for breathing. Their bite is so determined and lasting that they are used in some countries for confining the edges of wounds and cuts. Ants' heads are presented to the cut surface, which they grasp with their nippers, when their bodies are cut off leaving a whole row of them to hold the flesh. They are cheaper than sticking plaster in some countries.

As an illustration of their ingenuity and intelligence, it was stated that they sometimes excavate tunnels under rivers of considerable depth and width, and use the tunnels for transporting supplies. They dig wells twenty feet deep and a foot in diameter for drinking water. The harvesting ants plant seeds on farms, which they cultivate with great skill and neatness, keeping every weed down and harvesting the grain, curing and storing it safely in weather-proof cavities in the soil. They also organize into divisions with commanders, each individual doing a certain kind of work. Some ants are smart enough for engineers, while others only know enough to do as they are told. They can count and make correct estimates of the magnitude of an undertaking, as proved by observers.

Eight chrysalides (often called the eggs of ants) were placed in a path where ants travel. A single individual found them and undertook to remove them to their home. Several were carried by the single ant patiently enough, but when twenty chrysalides were placed in the heap, another ant was found engaged in the work. The pile was increased at intervals till eighty ants engaged in the undertaking, showing that workers were detailed according to the demands of the cases.

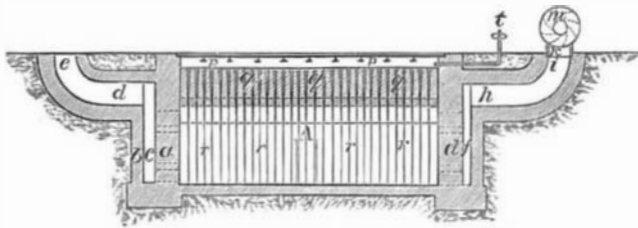
Ants' battles sometimes last many days, in one case seven weeks, the victors finally taking the stores and removing them to their own houses. Their wars are quite as justifiable as those of men, when the object—pillage—is the same. They have the power, too, of knowing members of their own communities even after six months' absence. Strangers are always driven off or killed. They are very helpful to each other, and show sympathy in case of sickness. Some families of ants build arched roads covered by an arch of clay or mortar for protection against enemies, and show great skill in the work, which is under the supervision of trained engineers, who order a rebuilding if the work is not perfect. Some kinds of ants keep cows, build cow-yards, and milk their cows regularly, and don't throw milking stools at them either to make them "give down," but pat and stroke their backs very tenderly. Of course these cows are the plant aphides so familiar to all farmers and gardeners.

A Locust-killing Beetle.

In the neighborhood of the site of ancient Troy, Sir John Lubbock finds a beetle which in both its mature and its larval condition preys upon locust eggs. The beetle is said to be very voracious. What it lives on when locust eggs are out of season does not appear. If it is not mischievous at such times, the beetle might play a good part in helping to exterminate the locusts of our Western Territories.

CELLAR FOR MANUFACTURING ICE.

From the water reservoir, *p*, which is fed by the pipe, *t*, water falls through the funnel-shaped openings, *q*, upon the threads, *r*, into the cellar, and is brought there to the freezing point soon after the exhaust fan, *m*, is set in motion. Ice can be made only when the temperature of the atmo-

**CELLAR FOR MANUFACTURING ICE.**

sphere is low. The air enters through the channel, *e*, *d*, *c*, and through the openings, *a*, into the cellar, *A*, and is drawn through similar openings, *a*, and the channel, *f*, *h*, *i*, by the exhaust fan, *m*.

HUMAN FOOTPRINTS IN KENTUCKY SANDSTONE.

Through the courtesy of Mr. M. Robinson, of Shawneetown, Ill., we are able to lay before the readers of the SCIENTIFIC AMERICAN a picture of what is probably the earliest human "footprint in the sands of time," that has come to the light of day.

The track from which the photograph was taken is one of three occurring in a block of sandstone in Union County, Kentucky, about a mile and a quarter from the Ohio River. The stone is very hard, and the stratum containing the tracks (or, rather, which originally contained the tracks, for they have lately been cut out) is said to be from fifteen to twenty feet thick and to lie at an angle of 21°. The buried portion underlies shale. The exposed portion would seem to have formed at one time the bank of the river, and the tracks were within a few feet of the edge of the rock. The age of the rock is uncertain. Mr. Robinson says it "is thought by those best posted here to have been below the coal measures."

**HUMAN FOOTPRINTS IN KENTUCKY SANDSTONE.**

The track represented in the engraving is now in the possession of Mr. Robinson. It measures ten inches in length and five inches across the spread of the toes. The foot appears to have slipped forward in making the track, thus elongating the heel mark and spreading the toes. Of the other two tracks, Mr. Robinson says that one, eleven inches long, was sent to a museum in Danville, Kentucky. It was badly defaced, but enough was left "to tell nearly all about the foot." The third track was too much defaced to be of any value, but whether in the act of cutting out, or by being weather-worn, Mr. Robinson does not say.

The tracks have been known almost from the first settlement of the county, but the former owner of the land would not let them be touched. The present owner gave Mr. Robinson permission to remove them only recently.

The geological value of these fossil footprints it is obviously impossible to estimate at this distance. It is to be hoped that the matter will be carefully investigated by some geologist so well known as to give his report assured scientific value. The lines crossing the track are cracks in the rock, which have been filled, it is inferred, by infiltration.

MISCELLANEOUS INVENTIONS.

Mr. Carl Posen, of Offenbach-on-the-Main, Germany, has patented an improved fastening for pocketbooks and other articles, which is so constructed that they may be easily and conveniently fastened and unfastened, and it presents a neat and finished appearance.

An improvement in eyeglasses has been patented by Mr. Robert Kabus, of New York city. The object of this invention is to simplify and cheapen the construction of eyeglasses and to render them more convenient for use.

An improved drop gate has been patented by Mr. James Beezley, of Rocky Ford, Col. The object of this invention is to furnish drop gates so constructed that they may be conveniently opened and closed by persons riding in a carriage or on horseback.

An improved device for securing wheels to axles has been patented by Mr. Thomas H. Outerbridge, of Hamilton, Bermuda, the object of the invention being to dispense with the screws and nuts generally used for that purpose, and to furnish a lock that shall secure the hub safely to the spindle and can be readily manipulated.

The sheets of gaff-topsails on vessels are led through sheaves at the outer end of the mainsail gaffs, and it frequently occurs that the sheets part or unbend from the sail and unreeve from the gaff, so that a man must be sent out on the gaff to reeve the sheet or the gaff and mainsail lowered to the deck for the same purpose. To lower the gaff, especially if the wind is fresh, involves considerable wear and tear on the sails and rigging, besides loss of time and labor, while the work of

passing out on the gaff to reeve the sheet is the most hazardous undertaking required on vessels, as there are no footropes, becketts, or other conveniences to insure safety, and loss of life by men being thrown from the gaff is of frequent occurrence. Mr. Frank B. Cort, of Holyoke, Mass., has patented means for reeving gaff-topsail sheets, rendering such work safe and rapid. The invention consists in the combination with the gaff of an endless rope fitted to run in the throat and end sheaves of the gaff, so that the top-sail sheet can be rove from the deck or from the throat of the gaff.

Mr. Green Smith, of Coal Valley, West Virginia, has patented improvements in that class of windows designed to secure the benefits of ventilation through the entire area of the window, to permit the window-panes to be washed on both sides without taking out the sash or going outside of the window, and to secure the balancing of the sashes, the independent movement of either sash, or the entire removal of the sashes, as may be desired.

Mr. Robert B. Herskell, of Wallingford, Conn., has patented an improved apparatus to facilitate the coating of spoons, forks, and similar articles with a plating or covering of metal, so that the thickness of the plating metal shall vary at different parts of the articles, as desired, the thickness being greatest upon the parts most exposed to wear.

An improved fan, patented by Mr. Max Rubin, of New York city, relates to that class of fans on which the wing or web folds between two handles and opens into circular form when in use, and has for its object to make the fans more convenient in use and less liable to get out of order than fans constructed in the usual manner.

An improvement in steel earth scrapers has been patented by Mr. William Haslup, of Sidney, O. It consists in the means for fastening the handles to the sides of the scraper, and in curved and flanged socket plates arranged on the inner walls of the scraper to receive the ends of the backboard.

Messrs. Sylvester J. Tucker and Robert F. Williams, of Richmond, Va., have patented a street car which is convertible at will, by a simple adjustment, either into a summer or winter car.

A machine for fitting and putting together the several parts of a wagon wheel has been patented by Mr. William Casady, of Milton, Iowa. The invention consists of felly-boring, spoke-tenoning, and spoke-gauging devices combined in one machine.

Mr. George E. Bales, of Walla Walla, Washington Ter., has patented an improved snap-hook and buckle for breast-ropes, hitching, and other straps or lines on which snap-hooks are commonly used. This snap-hook is more easily unfastened and less liable to become clogged with ice or mud than those now in use.

An improved bale tie has been patented by Mr. Thomas B. Taylor, of Mount Meigs, Ala. The object of this invention is to apply bale ties and bands in such manner that the bands will not turn upon the bales when being tightened, and will be securely held, retaining the compression by preventing the bale from swelling when the pressure is withdrawn.

A block of artificial stone formed of pitch, cement, sand, and embedded surface pebbles, the latter planed down, to exhibit their various colors, has been patented by Mr. George W. Mason, of Sharon, Pa.

An improvement in machines for folding the edges of collar and cuff blanks, preparatory to sewing, has been patented by Mr. Max Hermann, of Troy, N. Y. The machine folds the blanks ready for being placed together, and attached by a single line of stitching.