

MISCELLANEOUS INVENTIONS.

An improvement in the class of cheese cutters having a rotary table or platform and vertically-operating slicer or knife, has been patented by Mr. Walter R. Green, of Salt Lake, Utah Ter. The improvement consists in the construction and arrangement of parts whereby the rotating table or platform on which the cheese is placed is supported at the edge, instead of centrally, by means of a pivot, and thus rendered more firm and steady both when at rest and in motion.

Mr. Jacob G. Fletcher, of Washington, D. C., has patented for artists' use an improved canvas stretcher which shall have all the qualities experience has decided to be necessary or most desirable, and it consists in constructing the bars or pieces composing the stretcher proper with plain miter joints, which are opened by means of wedges, and in providing said bars with holes and grooves for the purpose of receiving the fastening device, which is constructed of metal and approximately U-shaped, and when applied to the stretcher frame is sunk or embedded in the wood flush with the surface thereof.

An improved handle for candlesticks, which may either be used for lifting the candlestick or for hanging the same up against the wall, has been patented by Mr. William Selkirk, of Galveston, Texas. It consists in forming the ordinary circular finger loop in one piece with an upward extension provided with a slot, which may be placed upon a nail on the wall.

Mr. Michael Posz, of Shelbyville, Ind., has patented a bill and letter file case provided with mechanism connecting with a treadle for operating the springs that press the papers being filed.

An improved commode, which is simple and convenient, has been patented by Mr. John Finsterer, of Philadelphia, Pa. It consists in the arrangement of arms attached to the lid of the commode in such a manner that when the lid is opened these arms rise with it and are secured automatically, so that the person that sits on the commode may rest comfortably and not be in danger of breaking the lid.

An improved grate for fireplaces has been patented by Mr. Joseph Bunford Samuel, of Philadelphia, Pa. The object of this invention is to furnish grates for fireplaces so constructed that the top bar of the grate may be adjusted to serve as andirons when a wood fire is to be used.

Messrs. James Skidmore, Joseph M. Liston, and Orestes Skidmore, of Charleston, Ill., have patented an improvement in hame tugs for connecting the hames with the traces in the ordinary form of harness. It consists in the peculiar construction and arrangement of the metal clip or plate in connection with the leather tug.

Mr. James C. Stanley, of New Hartford, Conn., has patented certain improvements in the thread boards and thread guides of spinning and twisting machines, whereby the thread guide can be adjusted so that the threads, when delivered from the rolls, will run through the guide centrally with the spindle tip, and thereby escape the usual stretching and breaking.

An improvement in spring vehicles, patented by Mr. William B. Thomas, of Elmira, N. Y., is designed to keep the back springs of a spring wagon under a slight strain when there is no load in the rear part of the wagon, to prevent the rattling and undue wear of the spring joints, and to cause the wagon to ride easier.

An improved ticket holder has been patented by Mr. Samuel Herzberg, of Pontiac, Ill. It is designed for holding the tickets on which are marked the sizes and other particulars of goods, such as pantaloons and other clothing.

Mr. Emile F. Espérandieu, of Nashville, Tenn., has invented a velocipede of the tricycle class which is adapted for carrying packages, merchandise, or any articles of light weight, and which may be propelled by working swinging treadles having springs that aid in moving them backward.

Mr. Lewis B. Morgan, of West Liberty, West Va., has patented an improvement in plow and cultivator handles, which consists in a construction and arrangement of parts, which cannot be clearly described without an engraving.

An improved implement or machine for running slight furrows in plowed land as marks for planting corn or other seed, or for crossing out land for planting an orchard, etc., has been patented by Mr. Washington Barron, of Summit Bridge, Del.

Mr. Archibald H. Kerr, of Midway, Texas, has patented a composition for whitewashing houses, walls, fences, out-buildings, etc., designed for great smoothness, brilliancy, and durability; and it consists in a compound of lime, whiting, plaster of Paris, glue, carbonate of soda, bichloride of soda or borax, and sulphate of soda, in certain specific proportions.

Messrs. Ebenezer Fisher and John Watson, of Kincardine, Ontario, Canada, has patented an improved die for forging metallic horse collar frames. This die has been developed after a long series of experiments. With it the desired perfection of operation and result may be obtained with certainty and precision, and a collar frame produced having the desired form, proportions, and lines of curvature required for greatest strength and lightness combined.

Mr. John B. Fogt, of Anna, O., has patented an improvement in that class of riding rakes in which the wire teeth are attached to the axle and the driver's seat attached to the hinged thills or shafts, so that upon releasing a locking lever the rake will be dumped automatically by the weight of the driver.

An improved adjustable seat for mowers, reapers, wheeled

horse hay rakes, and various other agricultural machines, for farm wagons and other vehicles, or for use in any other situation in which it may be applicable, has been patented by Messrs. Samuel Hedges, of Wheeling, and Lewis B. Morgan, of West Liberty, West Virginia. It is capable of oscillation or adjustment laterally on a fixed point of support, so that it may be kept in horizontal position despite the lateral inclination of the body of the machine or vehicle while passing along a hill side or other inclined surface.

Mr. Talbot C. Key, of White Sulphur Springs, Ga., has patented a portable hay and cotton press, an improvement in the class of portable presses which are mounted on wheels and thus adapted to be conveniently transported from one locality to another without requiring a separate vehicle therefor. The invention consists in hinging the press box to the beams of the truck, so that it can be laid down on its side, for the purpose of transportation, etc., and in the means for securing the press box in the vertical position when required for work.

Mr. David C. Williams, of Florence, Ala., has invented a fruit picker, which consists in a ring fixed on the end of the staff, and having wire fingers projecting from its top portion for the purpose of detaching fruit; also, a basket or fruit receptacle pivoted to and within said ring, so that when the picker is put in use the inclination of the staff or pole will cause the basket to tilt and one edge thereof to approach the wire fingers, which are holding and pulling the fruit, and hence when the latter falls it is sure to pass into the basket or receptacle.

What they Knew Four Thousand Years Ago.

The *Popular Science Monthly* for June publishes abstracts from the address of Chief Justice Daly before the Geographical Society, in which he says:

From one of these books, compiled after the manner of our modern encyclopædias, and the compilation of which is shown to have been made more than 2,000 years B. C., it has been ascertained, what has long been supposed, that Chaldea was the parent land of astronomy; for it is found, from this compilation and from other bricks, that the Babylonians catalogued the stars, and distinguished and named the constellations; that they arranged the twelve constellations that form our present zodiac to show the course of the sun's path in the heavens; divided time into weeks, months, and years; that they divided the week, as we now have it, into seven days, six being days of labor and the seventh a day of rest, to which they gave a name from which we have derived our word "sabbath," and which day, as a day of rest from all labor of every kind, they observed as rigorously as the Jew or the Puritan. The motion of the heavenly bodies and the phenomena of the weather were noted down, and a connection, as I have before stated, detected, as M. de Perville claims to have discovered, between the weather and the changes of the moon. They invented the sun dial to mark the movements of the heavenly bodies, the water clock to measure time, and they speak in this work of the spots on the sun, a fact they could only have known by the aid of telescopes, which it is supposed they possessed, from observations that they have noted down of the rising of Venus and the fact that Layard found a crystal lens in the ruins of Nineveh. These "bricks" contain an account of the Deluge, substantially the same as the narrative in the Bible, except that the names are different. They disclose that houses and land were then sold, leased, and mortgaged, that money was loaned at interest, and that the market gardeners, to use an American phrase, "worked on shares," that the farmer, when plowing with his oxen, beguiled his labor with short and homely songs, two of which have been found, and connect this very remote civilization with the usages of to-day.

More about the Iowa Meteor.

At the time of the fall of the Estherville Meteor, May 10, 1879, some boys, who were herding cattle near a lake five or six miles from where the larger fragments fell, reported that just after the passage of the great body over their heads they saw and heard a shower as of hailstones falling on the water near by. In April last, people began to pick up near the borders of that lake small pieces of meteor from the size of a pea to the weight of a pound. These soon found ready buyers at 25 cents per ounce by local traders. People left their farms—men, women, and children—and went out to the meteor ground, now freshly burned over, the belt being a strip of country commencing at or near Four Mile Lake, in the western part of Emmett County, and running southwesterly about eight miles, the width being from one-half to one mile. Upon this belt many thousands of small pieces were found. They are most generally metallic, very little stony matter about them, though some of the larger ones are of the same general appearance, and contain chrysolite in about the same relative proportion as in the larger masses. They are also, as a rule, very black, well crusted, and apparently perfect and independent bolides, not fractured particles from a large piece. The metal, cold, under a hammer flattens readily, is remarkably tenacious, and readily polishes, giving a peculiar steel-white or silver gray.

Mr. Charles P. Birge, of Keokuk, who furnishes these facts in a letter to the *New York Times*, estimates the weight of matter thus recovered at 75 lb., and thinks it highly probable that much of the iron had penetrated the ground and water, and is thereby wholly lost. So the inference is fair that the total weight of the fall is greatly in

excess of the 800 lb thus far recovered, the larger masses weighing 437, 170, and 92½ lb., and minor fragments about 50 lb.

A Ship Railway Wanted in Oregon.

The *Alta California* suggests that there is no better place on the continent for testing a ship railway than at the Cascades in Oregon, to transport laden steamboats past the lower rapids of the Columbia River. The rapids there are only six miles long; the grade of the road need not exceed 15 feet to the mile anywhere; the boats to be carried are not near so heavy as those that demand transportation at Panama, and a large traffic demands greatly increased facilities for passing the rapids.

Many thousand tons of wheat were detained in Eastern Washington through the winter because transportation was impossible. The president of the Astoria Chamber of Commerce, Mr. Bowlby, in a report made in January last said:

"Last season it cost \$10.50 per ton to carry wheat from Walla Walla to Portland, and \$11.50 to Astoria. Thirty miles of that distance is by rail, and cost \$4.50 per ton, while the remainder, 235 miles to Portland, by boat, over two portages, cost only \$6, and the 323 miles to Astoria, over the same portages, cost but \$7 per ton.

"The Columbia River is the natural highway and outlet for the country drained by it, and unless navigated and improved that section of country will soon be choked by its own great growth. The portage road at the Cascades was run night and day from August till the upper rivers were closed with ice, and with great difficulty was it possible to keep the freight from being blocked. This portage, a distance of seven miles, with rolling stock, is maintained, and freight is taken from the boat on to the cars, and from the cars to the boat, provided the boats and cars await each other; otherwise, the grain is moved from the boat to the warehouse, and fourthly, to the boat below.

"We estimate the freight passing over the road at 1,000 tons per day for the past six months, which, counting 300 days in the year, would be 225,000 tons last year, which, at 50 cents per ton, cost the farmers of the upper country the sum of \$112,500 for a portage ride of seven miles."

The federal government has announced the intention of constructing canals around the obstacles to commerce, and has begun work in a slow way at the Cascades. The *Alta* insists that it is the duty of Congress either to push the canals at both rapids, or to make a contract with Eads to authorize him to finish a ship railway this summer at the Cascades, with the intention of supplying the upper rapids at the Dalles in the same manner in 1881, if the experiment at the Cascades should be successful.

The ship railway has immense possibilities. It should be tried without delay; the idea is American in its origin, and its value should be tested here; and the best place and the best man for it are the Cascades and Eads.

Luminous Paint in Railway Cars.

The experiment of coating the interior of a railway carriage with Belmain's luminous paint has been tried in England with considerable success. The English *Railway News* says that a first-class carriage was chosen for the experiments, and in the daylight its appearance is very little, if any at all, different to ordinary paint, but during the time the carriage is exposed to the light the paint is rapidly absorbing the daylight, only to give forth the same the moment the carriage is traveling in the dark. At first the light emitted is only slight, not that the paint is any different in its illuminating powers, but the pupils of the eyes of the traveler have not yet been accustomed to the light, for, as the journey proceeds, the carriage appears to be completely lighted up, so much so that the passengers are enabled easily to recognize the features of their fellow travelers, while the time by a watch is clearly discernible.

It is thought that for trains running long journeys, with tunnels occasionally intervening, the paint will be very valuable, inasmuch as the oil and gas can be entirely abandoned, and the great waste at present experienced avoided. How the paint illumination would work on dark, cloudy days does not appear.

Butter, Eggs, and Cheese.

At the recent annual session of the National Butter, Egg, and Cheese Association at Indianapolis, Mayor Lord, of Elgin, Ill., read a paper on the milk industry. The magnitude of the industry was shown by reference to the fact that there are 13,000,000 milch cows in the country, requiring the annual product of 52,000,000 acres of land to feed them, and giving employment to 650,000 men. Estimating the cows at \$30 each, the horses at \$80, and land at \$30 per acre, together with \$200,000,000 for agricultural and dairy implements, and the total amount invested in the industry is \$2,219,280,000. This is considerably more than the amount invested in banking and the commercial and manufacturing interests of the country, which is \$1,800,964,586.

Effects of Heat on Granites.

Mr. Hiram A. Cutting, State Geologist, of Vermont, has been testing the capacity of different sorts of granite to withstand heat. He tested twenty two specimens of the best known quarries, and found that while all were unaffected by 500° Fah., damage usually began at 600°. was serious and frequent at 800°, and at 1,000° all the specimens were ruined, the stone from Mount Desert standing the test perhaps better than any other. He gives it as his opinion that the effect of water on heated granite is rather apparent than real.

AMERICAN INDUSTRIES.—No. 44.

THE MANUFACTURE OF WESTON'S DIFFERENTIAL PULLEY BLOCKS, SAFETY HOISTS, ETC.

The invention of the differential pulley block by Mr. T. A. Weston, some years ago, was the accomplishment of a radical improvement in one of the oldest mechanical appliances known to man. The ordinary tackle block, in more or less perfect form, is known to have been in use among the early Egyptians, and probably dates back to the earliest days of civilization. The device, like the art of sewing prior to the invention of the sewing machine, continued without essential change until Mr. Weston at a single stroke increased its efficiency thirty or forty fold, gave it its self-sustaining capacity, and added that quality of safety which gives to the differential block its greatest value. First introduced in England, the invention spread rapidly over the entire mechanical world, and has now long been recognized as an indispensable adjunct in mechanical operations of all kinds. Its greatest charm lies in its *absolute simplicity*, for it is the reduction of a mechanical problem to its simplest possible terms. To this fact may be attributed the extraordinarily rapid adoption of the device as soon as introduced, and the universal popularity and esteem in which it is held.

In the ordinary or "direct" style of block one man can lift from one thousand to two thousand pounds. By means of the recently added "geared" style of block the lifting capacity of each man is increased to from two thousand to five thousand pounds. With both styles the load is always self-sustained, and *cannot run down*. To effect lowering it is necessary to reverse the motion of the chains, by pulling on them, when the load will descend, but only so fast and so long as the chains are moved by hand. If at any time the chains be let go, either in hoisting or lowering, the load immediately comes to rest.

In the illustrations on the first page of this paper are shown the principal details of the manufacture, as well as some of the most important uses to which these hoisting devices are put. In the differential pulley, as is well known, the wheels in each block are made with sprockets, in which the links of an endless chain must lie smoothly and fit exactly. The chain passes around but one wheel in the lower block, but in the upper block are two wheels on the same shaft, one a small fraction larger than the other. In hoisting, the chain is taken up on the larger, and paid off from the smaller of these two wheels, while in lowering the reverse occurs, the effect on the load being due to the *difference* in the diameters of the wheels. This difference, as already stated, is very slight, and the differential effect that is obtained, therefore, gives the operator an immense leverage in handling the load. In making what is styled the "direct" differential pulley blocks, the loop in the chain which hangs loose and free from the upper pulley is used to pull upon in raising or lowering the load, and this loop is lengthened or shortened as the load goes up or down; but in the "geared" pulleys, which have been since introduced, an extra wheel is added to the upper block, from which an endless hand chain depends, the length of which does not change. By this simple addition to the "direct" differential pulley its power can be increased from three to five fold without making the blocks or apparatus any more cumbersome or complicated.

The prime essential in these pulleys, and the condition without which they would be worth little more than so much old iron, is to have the shape and pitch of the sprockets in the wheels exactly right, and then to make the chains so they will fit perfectly, without danger of stretching. When, therefore, the Yale Lock Manufacturing Company, about five years ago, purchased the patents of Thomas A. Weston on differential pulleys and other hoisting apparatus, they set themselves to making such improvements in the manufacture, and to the attainment of such exactness in workmanship as would leave nothing to be desired on this score. The company already had a wide reputation for the excellence of their locks, but in the new field they then commenced to work they achieved a success in every way commensurate with that they had won in the specialty with which they have been for so many years identified.

In our illustrations, the chain making, as shown to the left at the top of the page, is conducted in a blacksmith shop where are twenty-one forges. The chains for the differential pulleys are all made by hand, and Welsh and English workmen are found most competent in this specialty. They work very rapidly, each link of the chain being made of a piece of Norway rod iron cut off at an exact length, and made as true as it could be cut out with a die. In this department also is a steam hammer, and an apparatus especially designed by the company for bending the hooks for the wrought iron tackle blocks. These hooks are flattened a little to give them greater width through the point where the greatest strain comes, and it has been a matter of no little study and experiment with the company to determine exactly what shape was best for giving the greatest strength, so that the hook would not straighten out under the load, and in all parts, as well as with its joining with the block, the strength would be proportionate.

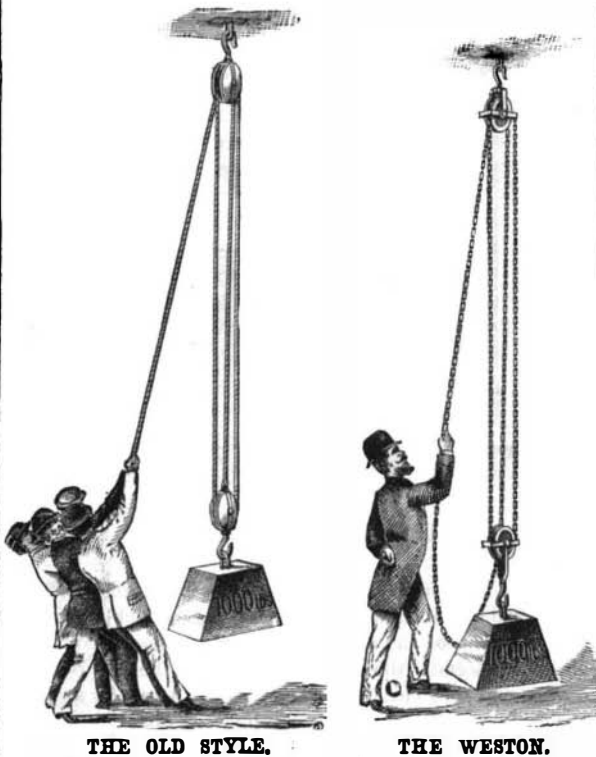
The machine shop, as shown in the other engraving at the top of the page, is fully fitted up with lathes, planing machines, etc., and all the requisite tools for finishing the various parts of the work, and in this department is also conducted the gauging of the chains and testing of the blocks, which are shown in separate views. The gauging of the chains is carried on according to a plan especially designed for this work, and every link of each length destined

for use in the differential pulleys is here gauged. The links are first purposely made a little short of the length they are finally intended to be, the chain is then laid on a gauge which represents just the circumference of the sprocket wheel, and stretched until it fits exactly therein. This is intended to take out all the "stretch" which would occur in use, and to give the links just the shape at which the chain will endure the greatest strain. The chains tested here include those for one eighth ton pulleys, made of three sixteenths inch iron, up to those for ten ton pulleys, made of seven eighths inch iron. The testing of the blocks, shown in the adjoining view, explains itself. No hoisting apparatus is ever sent from the shop until it has all been put together and tested as to its capacity to lift, without stretching, the entire load which it is built to carry.

The "Light Traveler," for warehouse use, showing how these pulleys can be arranged to run on overhead rails, affords a good illustration of the advantages which can be secured by such an arrangement in stores where goods are to be stored in quantities, and yet give such convenience of access that cases may be readily taken, for inspection or removal, from any part of a large warehouse.

In the "Hoisting Crab and Derrick Winch," shown in another view, the Weston patent brake is used, so that the load is always self-sustained, and the handles may be at any time suddenly "let go" without the weight "running down." To lower the load the handles must be turned backward, but unless this is done the suspended weight remains stationary.

In the jib and traveling cranes, shown at the bottom of the page, the further application of the principles of this patent hoisting machinery for the moving of heavier bodies is represented. All the several motions for moving the load are made by direct pull, and, while the appliances are so simple that nothing can possibly get out of order, there is absolute safety against the load running down except by the positive action of the workmen having it in charge.



In the illustrations on this page one will be at once recognized as an apt portrayal of the difference between the hoisting of heavy weights by these improved differential pulleys and the doing of the same work in the old fashioned way. In the other is shown what is called the "double lift," for hoisting or letting down expeditiously only moderately heavy loads. It is extensively used in stores and factories, and consists of a chain, with hook on each end, passing over a sheave which can be rotated by a hand rope and wheel. It is provided with Weston's patent brake, so that if the rope is let go the load will remain suspended and can never run down. As one hook ascends the other descends, and is thus ready for the next load, one man being able to lift a full load at the rate of about twelve feet per minute, and lighter loads proportionately faster, while the speed for lowering may be regulated as desired.

By the improvements which the Yale Lock Manufacturing Company have introduced in the manufacture of these various devices for hoisting and managing heavy loads they not only have greatly increased efficiency, but absolute safety, as against the cumbersome and dangerous methods heretofore used, and their differential pulley blocks, safety hoists, traveling and jib cranes, etc., are now meeting with constantly widening demand for use in machine shops, factories, forges, mills, steamships, as well as in laying street mains, pulling stumps of trees, and in fact to a diversity of uses which it would require a catalogue to enumerate.

The works of the company are located at Stamford, Conn., and they have salesrooms of their own at 53 Chambers street, New York; 36 Pearl street, Boston, 506 Commerce street, Philadelphia; and 64 Lake street, Chicago. Their goods, as above described, are largely handled by all dealers in machinery, engineers' supplies, etc., and the company will be happy to furnish, on application, an illustrated catalogue of the goods of their manufacture.

Correspondence.

Cotton Size and Cotton Sizing.

To the Editor of the Scientific American:

With reference to the article in the SCIENTIFIC AMERICAN of February 7th last, describing the English practice of over-sizing cottons, and advising American manufacturers not to follow their example, I wish to bring to notice the fact that the people of this commercial part of the continent have begun to know that "not all that is white is cotton;" and it may be a surprise to the English manufacturers and traders to learn that the consumers now ask for American unbleached goods, in preference to the very white finished English cottons. The motive is this: practical experience has shown them that the former will become whiter after washing, and the weaving more compact, while the latter will be less white, the weaving more separated, and more than half of the weight of the goods will be lost in the first washing.

I am confident that this single yet forcible fact must be sufficient evidence in favor and encouragement of all kinds of honest manufacturing, whether in cottons or anything else.

The present fever for fraudulent adulterations, as now entered into by many of the manufacturers in England, in order to compete with cheap German and French manufactures, is simply ruinous to British commerce, and its evil effects will have to be borne directly or indirectly by the entire kingdom. To say that the cotton goods now introduced here from England are the same in quality to those of ten years ago, would be an absurdity. The English linen goods, which have stood unquestionably ahead of all others, are to-day so adulterated that some grades and trademarks, stamped "pure linen," "guaranteed all linen," etc., are, in fiber, half cotton, half linen, and in all cases heavily sized. But it is not only in all kinds of woven goods that England is suffering from great competition; in fancy goods and hardware she has a dangerous neighbor in the French Republic, which is in a good way to monopolize the trade of this country.

Adulterated manufactures will not last long anywhere to-day. People have time now to think, and a little to say in everything. Even the Indians in the vast Pampas readily know polished nickel from silver. Honesty and honest productions will, in the end, pay the best. In support of this assertion let us look at Messrs. Rogers & Son's cutlery. The steel used to-day in the different articles manufactured by this firm is as good if not better in quality than that furnished in their very first productions. For this and no other reason consumers here will pay two dollars gold for a Rogers & Son's three-blade penknife, and will not pay a half dollar for one of other makes, even should it have six blades.

Regarding art processes on the whole, one is led to believe that in England the idea still prevails that price is the primary and quality the secondary object with the consumer. In this case, I dare say, the adulterers will think it remarkably droll that the customer here should not pay better price for an article that furnishes him with more stuff.

In conclusion, let the Americans continue to manufacture honestly what they produce, disregarding other nations in the art of adulteration. The time will come when a common black cotton or linen necktie will bring a better price than a silk one, judging from the abominable black silks that are at present forced into public use.

P. DEL VALLE HALSEY.

Buenos Ayres, A. R., March 27, 1880.

Nerve Grafting.

Dr. J. Gluck, of Bucharest, lately brought before the ninth congress of the German Society of Surgery at Berlin some interesting results of experiments in nerve grafting. He cut out a portion of the sciatic nerve of a fowl, and then removed a similar portion of the same nerve from the leg of a rabbit, and placed this in the leg of the fowl, uniting the two ends by sutures. The nerve united, and the paralysis caused, of course, by the excision of the piece of nerve, was recovered from. He repeated the experiment, and exhibited the successful results, showing the fowls with full restoration of power. He was led to these experiments by the result of a case of nerve suture. Paralysis of the median had resulted from extensive destruction of the tissue of the arm by gangrene. Dr. Gluck cut down on the radial nerve and found that part of the nerve was destroyed. He united the two ends by sutures, and the man regained the power of motion, which he had entirely lost. Of course, the experiment in nerve grafting in animals, adds the *Lancet*, do not warrant the expectation that a similar result could be obtained in the case of the human subject. It is well known that the union and regeneration of nerves occur with greater facility in the case of the lower animals than in man.

Black Ants a Cure for Currant Worms.

A correspondent of the *Ohio Farmer* finds the common black ant an efficient protection against the plague of currant worms. He has several colonies of ants close to his currant bushes, and enjoys an abundance of currants, while his neighbors' bushes are overrun with worms. Formerly he took pains to destroy the ant colonies, but on witnessing their attacks upon the worms he has taken pains to protect and encourage them.