

a fruit cellar under our stable, and it has proved so satisfactory that we venture to give a brief description of it. The division walls are constructed of brick, and the apartments are two in number, an outer and an inner room. The outer room is but partly underground, and is ten by twelve feet in area and eight feet high. The inner room is wholly underground, and frost-proof; it has four brick walls and a cemented floor. In this room the fruit is stored early in December, when the weather becomes cold. The outer room holds the fruit during the autumn months after it is gathered, and it is cool, well lighted, and dry. The windows are left open and a free circulation of air allowed so long as no danger from frost exists. When the fruit is taken to the inner room, the door is closed and no light admitted. Ventilation is secured in moderate weather by opening the inner door and throwing down a window in the outer room. In this cellar we kept apples of last season's growth until the present winter in perfect condition. Some of these apples, exhibited at the autumn agricultural fairs, were pronounced as fresh as those of the past season's growth.

Apples stored in this cellar which would bring only one dollar a barrel at the time of gathering we sold last spring and summer at three dollars, without picking over. The profits of a good fruit cellar are greater than anything connected with farm arrangements.—*Boston Journal of Chemistry.*

A CELEBRATED SHORT-HORNED COW.

We copy from the London *Graphic* a fine portrait of a celebrated shorthorn cow, Tenth Duchess of Geneva, whose personal and family history is somewhat remarkable. Tradition ascribes the origin of the family to a breed of cattle possessed for centuries by the family of the Duke of Northumberland, but the actual records commence in the last century, when an ancestress of this cow passed into the possession of Mr. C. Colling, of Ketton, Durham, who was one of the founders of the shorthorn as a distinct and highly improved breed. In 1804 Mr. T. Bates, of Kirklevington, Yorkshire, purchased one of the Duchess cows, and recognizing in her excellence and that of her male offspring the superiority of the family over the shorthorns he had previously owned, he determined to secure more of the sort; and at Mr. Colling's great sale, in 1810, when forty-seven animals of both sexes and all ages, from eleven years downward, made the then unprecedented average of \$732.84, he gave \$929.64 for the two year old heifer Young Duchess, afterward called First Duchess, a daughter of Comet (sold on the same occasion for \$5,080), and granddaughter of the cow he had first purchased. From that heifer, in the female line direct, sprang those Duchesses which have at different periods won the chief honors of the Royal Agricultural Society of England, and for many years past have commanded the highest prices at public and private sales. Mr. Bates, while practicing to a considerable extent the system of in-and-in-breeding, crossed his Duchesses at different times with other approved shorthorn families, notably with those of Mr. Colling's Red Rose and Princess, thus combining what he considered three of the oldest and best shorthorn families in the kingdom. In 1853, at the Tortworth sale (after the death of Earl Ducie), Sixty-sixth Duchess was bought by Messrs. Becar and Morris, of New York, for \$3,557.40.

Her descendants, having changed owners in America, were finally dispersed by auction in 1873, when Tenth Duchess of Geneva was bought by Mr. Berwick for the Earl of Bective at \$35,000. She had bred in America the bulls Third Duke of Oneida, Sixth Duke of Oneida, and the heifer Eighth Duchess of Oneida, bought also for Lord Bective, at the same sale, for \$15,000. In this country she has produced the bull Duke of Underley and the heifers Duchess of Underley and Duchess of Lancaster, all of which, with Eighth Duchess of Oneida, are now in the herd at Underley Hall, Westmoreland. The Tenth Duchess of Geneva died in January last, and in the same month the Earl of Bective had the misfortune to lose his old bull Second Duke of Tregunter.

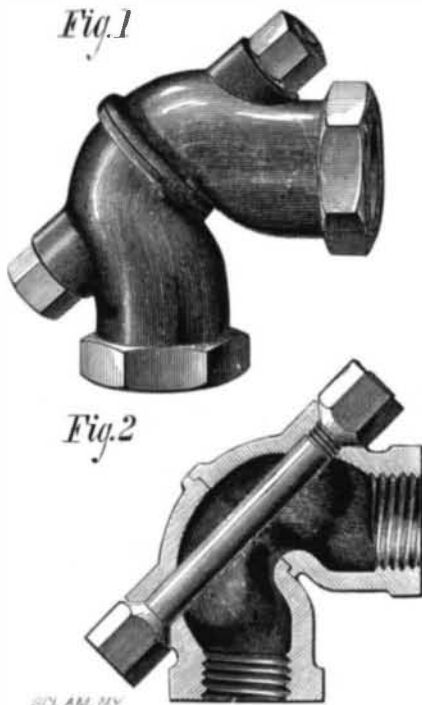
Two Flowers from One Stalk.

Mrs. Lucy A. Millington, of South Haven, Mich., writing to the *Gardener's Monthly*, says:—"Perhaps some of

the many lady readers of your *Monthly* would like to know how to get two flowers instead of one from every flowering sheath of their Calla lilies. As soon as the joint flower is cut, or begins to wither, pull the stalk down through the open sheath clear to the bottom. At the bottom will be found standing, close to the stalk, another bud, inclosed in a delicate covering. Cut the old stalk away as close as possible without injuring the bud, and if it has not been kept back too long it will grow up very quick. I have never failed to get both buds to flower. I never tie up the leaves close, but leave them free."

CHAPELL'S PIPE COUPLING.

"In the annexed engraving is illustrated a new and improved pipe coupling which is claimed by its inventor to ob-



viate the difficulty in starting union joints which have become rusted fast, in hunting out the left hand thread where right-and-left elbows are used, also in bending pipes for steam and gas fitting to the exact angle required. It consists of two parts, both of the same pattern and threaded with right hand threads, but faced on a diagonal line to fit each other, and secured together by a bolt passing through both parts, having a conical head and a conical nut covering the point of the bolt, both fitting into conical seats in each part. The two parts are curved in such a way that when one part is turned around the bolt one half a revolution it will assume

positions equivalent to those of a union joint. In the position shown it is equivalent to an elbow and union joint, and it may also be secured in any intermediate position. If this fitting was in general use, the inventor claims, there would be no need of left hand threads, taps, and dies, thereby avoiding a large outlay of capital.

Patented April 17, 1877. For further information address the inventor, E. S. Chapell, Pembroke, Maine.

New Agricultural Inventions.

A Collar Pad has been invented by Martin F. Sauer of Somonauk, Ill. Two elliptical pads fit on the upper part of the horse's neck, while a strap rises slightly above the neck, leaving the upper portion unpressed and out of contact. The neck is thus prevented from being made sore by the collar.

In a Windmill invented by William A. Guzman of Washington, Iowa, the face side of the wheel is nearest the vertical axis of the mill, the wind striking it on that side when in operation. It is provided with a rigid vane shaft placed parallel with and in front of the wheel. It combines many other useful improvements and will at once commend itself to the favorable attention of millers.

A Churn invented by Eliza Brough of Greenville, Mich., is kept erect by spring rods and elastic springs and is oscillated on gudgeons at the sides. A tube runs down through the center through which water can be poured to temper the milk. The machine can also be used as a clothes washer. The butter comes quickly.

In a Churn patented by George H. Bradshaw of Fayetteville, Tenn., the dasher is formed of a hollow truncated cone, provided with flanges and connected with the shaft by rods. A band fitted into the interior of the cup is provided with flanges. Great agitation is secured with little heat.

Between the lugs of a Thill Coupling invented by Carlton E. Pickering of Hornellsville, N. Y., is pivoted a block, the upper part rounded off and notched forward. A double hook thill iron fits over this and is secured by a spring catch. At the bases of the lugs is placed rubber packing. It is noiseless in use and easily detached and attached.

Senator T. F. Randolph, of Morristown, N. J., has patented a Ditching Machine, which is an improvement upon his previous invention, which has obtained a considerable reputation. The previous machine could cut a ditch when running in one direction only. The present or improved machine is so constructed as to work equally well in either direction, so that the cutting wheel and lifting spade do not require to be raised out of the ditch and the entire machine turned about and reset for the return cut, at end of the ditch. The saving of time effected by this improvement is above 50 per cent, so that the cost and labor of cutting a ditch is reduced more than half.

John P. Moore, of DeMossville, Ky., has patented a Millstone Balancing Device, which provides an improved means of balancing millstones to make them run true and grind

uniformly, and which permits an easy and accurate adjustment, and dispenses with weights. The improvements consist, first, in using in the place of the block a headed bolt whose head carries the weight of the millstone by resting against the under surface of the opening in the balancer and is itself supported upon the spindle; and employing in connection with the threaded end of said bolt a nut and washer which not only holds the bolt firmly in the balance rynd, but also rests against the flattened heads of the horizontal adjusting screws and acts as a nut lock to the same. The invention also consists in forming such nut directly upon the bottom part of the distributing cup.

A Grain Toller, patented by Adolphus H. Vitt, of Union, Mo., consists of a stationary conductor tube, that conveys the grain from the hopper or elevator to a revolving and vertically movable spring disk. The disk is lowered by the pressure of the grain, and the grain allowed to escape over the edge of the disk into an encircling casing with two exit spouts. Vertical partitions of the encircling casing, of which one is stationary, the other adjustable, conduct a certain proportion of grain to the toll spout, while the remaining grain is conducted to the grindstones of the mill.

A Ventilator patented by R. S. Grigsby, of Fayetteville,



THE SHORT-HORNED COW TENTH DUCHESS OF GENEVA.

Tenn., consists of a right-angled tube having slotted sides, and provided with sliding doors for closing its outer ends. The device may be applied to a fruit house, and is effective in ventilating the interior of fruit piled up around it.

In an Airtight Paint-Mixing Can invented by Isaac Banister, of Newark, N. J., a shaft running through the center is fitted with a crank on the outside. Radial knives and a spiral knife are arranged on three sides of the shaft, leaving the fourth side free. By turning the crank the radial knives cut the sediment to pieces, and the spiral knife scrapes the sides. When not in use, the paint is situated in the free side of the can, leaving the knives clean outside.

Messrs. John M. Ludlow and Sanford C. Pruitt, of Hall, Ind., have devised a new Circular Toothed Pulverizer and Cultivator, which destroys weeds, cuts cornstalks and rubbish in pieces, ridges the soil, and may also be used for marking the ground.

A new Platform Wagon patented by Mr. E. H. Booth, of West Colesville, N. Y., is so constructed that the draft may be applied directly to the axle, while the rolling of the latter is prevented. A reach may be used, and the horses may be hitched much nearer to the load than is usually the case.

Mr. Alvin T. Dora, of Chariton, Iowa, has devised an improved Hay Rake and Loader, which may be attached to the rear end of a hay rack, or to the rear axle of a wagon, and which is so constructed as to collect the hay and deposit it upon the hay rack without allowing it to be scattered by the wind. The hay is collected by a rake and carried up by and between bands and an endless apron.

BOLAND'S IMPROVED KNEADING MACHINE.

The annexed engravings represent an improved kneading machine largely used by bakers throughout France and Belgium. It is adapted for any employment where soft masses are required to be thoroughly mixed. The new feature is the mixer or kneader, which is formed of three arms or blades, the central one of which is S shaped, straight in the middle, and in line with the axis of the shafts, while the ends are curved spirally to the extremities of radial arms that extend one from each shaft but in relatively opposite directions. The other two blades extend from the extremities of the arms to the inner but opposite ends of the shafts. Their middle curved parts run along the inner surface of the receptacle, while the outer ends are curved spirally but in opposite directions to their respective terminal points. Suitable braces are provided, and the kneader may be operated by either hand or power, as indicated in our engravings.

It is claimed that this machine thoroughly mixes the dough, without cutting it, saves labor, and produces better bread. It is used in all the Government bakeries in France, in the Paris hospitals, and in Philadelphia, New Orleans, and other localities in this country.

Patented through the Scientific American Patent Agency November 27, 1877, by Mr. O. Boland, of Paris, France. For further information address E. L. Touret, agent for the United States, 226 West 22d street, New York city.

Mineral Negatives.

BY PROFESSOR J. S. ST. JOHN.

On account of the expense of grinding thin sections of fossils and the difficulty of duplicating many varieties, I was led to try photography as a means to copy these sections on glass for use in projection, and with your permission I will present my results for consideration.

I found that in photographing with a camera by transmitted light the sections were too opaque to produce an image on the ground glass of sufficient intensity to tell when the fine lines were in focus, and that with such fossils as sponges and corals much of the detail was lost. In attempts at projection by using the section in the lantern I met with the same difficulty. By using a microscopic objective, not enough of the fossil could be brought in the field.

For some time I have been preparing transparencies for class work by using dry plates and printing from negatives by contact, and have obtained good results; consequently I resolved to try photographing sections with dry plates, using the section as a negative.

The trial was made, and to me the result is very satisfactory. We shall soon see some of these photographs projected on the screen.

I will now give a description of how the dry plates may be prepared and of the process of photographing the sections.

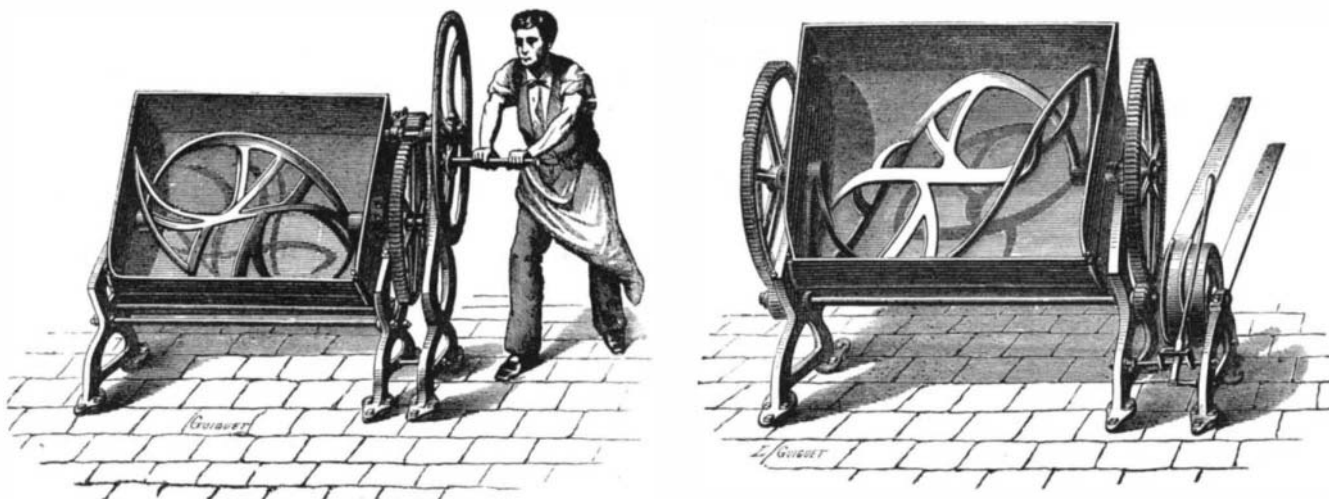
TO PREPARE THE PLATES.

In selecting the glass, only those pieces should be used that are free from blisters and other defects. It may be cut in pieces $3\frac{1}{2} \times 4\frac{1}{4}$ inches, which is a convenient size for the

lantern. After washing the glass it is albumenized. The albumen may be prepared by taking the white of one egg, 300 c. c. of water and 12 drops of carbolic acid. Shake thoroughly and filter through a sponge.

For the silver bath, use 30 grammes of nitrate of silver for every 300 c. c. of pure water. The bath should be acid, and in the best condition. If the dry plates are to be used for negatives, use any good collodion, as Anthony's. If for positives, it should be made thin by adding equal quantities of ether and alcohol. Kelsey's Banner collodion works well by using three quarters of the iodizer that comes with each bottle. Flow the plate with the collodion and place it in the silver bath, as in the wet process. When it comes from the bath it is held under the tap and washed thoroughly on both sides until all signs of greasiness disappear, when the plate is flowed not less than three times with a preservative, allowing it to flow from the plate into the sink each time. I have tried many of the preservatives that are used with dry plates, and have found none so simple as what is called the coffee preservative, which may be prepared as follows: H_2O , 300 cub. cen.; Java coffee, 30 grammes; rock candy (white), 18 grammes. Boil the whole 15 minutes and filter.

After the plate has been flowed with the preservative, it is placed in a rack to drain. When the desired number have been prepared, they are placed in a dark box to dry. I have found that when the plates are allowed to dry slowly, in this way, they are much better than when dried quickly. Plates made in the afternoon are ready for use the next morning. If a large number of plates are to be dried, it would be well to place them in different boxes, so that if the door of one was left open through carelessness only the plates in that box would be spoiled. I have kept plates a year before using. If tannin instead of coffee is used, they will keep for years. I made some of Newton's emulsion and tried it with the coffee preservative with good results. If a person could buy this emulsion prepared it would save



BOLAND'S IMPROVED KNEADING MACHINE.

one half of the work in preparing the dry plates, and would secure more uniform results; for, by using it, the silver bath is dispensed with, as the silver is placed in the collodion. But perhaps for beginners the emulsion process would be too difficult. We will now consider how these dry plates are used in photographing the rock section.

The section, with the dry plate in contact, is placed in a photographic printing frame and exposed to diffused light from four to forty seconds, according to its intensity, the kind of dry plates used, and the character of the section. A coffee plate is more sensitive than a beer plate, and the Newton emulsion more sensitive than either. The exposure may be made at night, to gas or lamp light. Many of my best prints have been made in this way. There are important advantages gained by working by artificial light; for e. g.—the intensity of the light is nearly constant, while the intensity of sunlight varies every hour of the day, making it more difficult to determine the proper length of time necessary for exposure. If we find that 40 seconds is the time required for an exposure by lamp light, we know that all prints from that negative, or others of like intensity, will require the same time.

After the plate is exposed, it is taken to the dark room and developed. This is accomplished by taking the plate as it comes from the printing frame and holding it under the tap for a short time, until the film is thoroughly wet, and then flowing it with the following developer: Pyrogallie acid, 2.5 grammes; citric acid, 3.5 grammes; Pure H_2O , 284 cub. cen.

For a $4\frac{1}{2} \times 3\frac{1}{4}$ inch plate pour into a small graduate or beaker about 10 c. c. of the developer and add two drops of $AgNO_3$, the same as that used in the bath.

As the developer is poured on the plate it is allowed to flow back into the beaker again, and this is repeated until the picture is distinctly seen on the surface of the glass by reflected light, when it is washed and fixed as in the wet process. Cyanide of potassium or the hyposulphite of soda may be used. The hypo. is best.

It will now be found that the picture is not so distinctly seen, and a beginner would be tempted to throw it aside as worthless; but, on application of a fresh quantity of the developer, the picture soon grows to the desired intensity,

when the plate is washed and placed in the rack to drain. If the tone of the print is too brown, which is often the case when the coffee preservative is used, a weak solution of potassic sulphide may be poured over the surface of the plate, which will not only change the tone but will clear the picture. In using this pyro. developer, it will be found to turn to a wine color after it has been flowed over the plate a few times; just as long as it remains this color it will not fog the plate, but if it begins to turn black or muddy, it should be thrown out and a fresh supply taken. The plate that is now developed may be used in the lantern, or prints from this may be made by using it as a negative and proceeding as with the rock section. To protect the photograph from injury, it should be varnished and covered with a thin piece of glass.

I think many minerals could be photographed in this way; of course only those presenting detail could be worked. Many of the agates would work well; if they were colored, the prints on the glass could be tinted to imitate them.—*Anthony's Photographic Bulletin*.

Recent American Earthquakes.

Professor C. G. Rockwood, Jr., contributes to the *American Journal of Science and Arts* a record of the earthquakes which have occurred on the American continents from May 10, 1876, to November 18, 1877. These aggregate about 65 distinct shocks, the distribution of which is approximately as follows: California, 13; Territories, 9; Canada and Eastern States, 9; Southern States, 8; Western States, 7; Middle States, 4; Central America, 3; South America, 7; West Indies, 3, and Sandwich Islands, 2.

The severest earthquakes reported are those which occurred on May 19 and November 4, 1877. The first was a series of severe shocks lasting four or five minutes and followed by a destructive tidal wave along the coast of Peru and Chili. On the Peruvian coast the wave was from 20 to 60 feet high, and caused immense destruction in the harbors.

It is supposed to have originated near Iquique, and its average rate of progress was to Callao 228 miles per hour, to San Francisco 348 miles, to Honolulu 408 miles, and to Australia 378 miles.

The earthquake which occurred on November 4 was felt throughout a large part of Canada, New York, and New England. In some places it lasted for 20 seconds; reports from others fix its duration at four or five minutes.

In the valley of the St. Lawrence river the vibration was sufficient to overturn crockery, crack ceilings, and in a few cases to throw down chimneys.

New Method for Mapping.

A new method of orography, or mountain representation, whereby the outline of a horizon is given by an automatic operation, has lately been brought to notice by M. Schrader. Considering the horizon as a cylinder, in whose axis the observer is placed, this cylinder is transformed into a circular plane. A telescope attached to a sleeve on a vertical support rising from the middle of a circular disk covered with paper is directed to follow the outlines of the hills, etc., and the movements of a lever connected with it are transmitted by means of an arc and a horizontal rack to a pencil or style, which transforms them into out and in movements on the paper. If the telescope describes a circle round the horizon the style gives a corresponding circle on the paper, and if it rises or descends the trace of the pencil is further from or nearer to the central axis. The telescope being brought to a horizontal position by means of a spirit level, a circle is described round the central axis, and this affords a means of measuring the profiles of the hills. It is easy to transform such orographic circles into a map, and M. Schrader showed the French Academy a geographical map of Mont Perdu, obtained with his instrument.

Tanning Woods.

In general it may be said that plants whose wood endures in wet soils, experiencing only a slow alteration, contain, in the wood itself, tannin, whether associated with resinous matters or otherwise. Among such woods may be noticed the Quebracho, a tree belonging to the family of the Apocineæ, specimens of which were displayed by various South American States at the Vienna Exhibition. In Paraguay the wood of the tree has long been in use for dyeing brown shades, though the employment of the wood as a tanning and dyeing agent is of more recent date. It contains a colorable compound, which, under the influence of light and air, is transformed into an orange yellow dye, and it is also possible to obtain from the same wood a very beautiful yellow coloring compound.—*M. J. Arnaudon*.