thing like elongated crochet needles, in and out of which the strand of wool is passed by machinery which knits it into stitches as it goes along.

The leading knitting factory is that of William K. Greene's Sons. They employ 200 hundred hands, on thirteen sets of machines. Their average daily production is about 200 dozen of shirts and drawers, of different sizes. The business of Schuyler, Blood, & Co., is nearly one half that amount. Among the older firms, there are A. W. Kline & Co., McDonald, Kline, & Co., John M. Clark, McFarlan & Marcellus, and the American Hosiery Mills, where they make a coarse grade of knitted stockings and socks. The two new mills in the village are owned by De Forrest & Wanner and Phillips, Dent & Lowden.

HOW CARPETS ARE MADE.

Mr. Stephen Sanford's carpet manufactory is supposed to be the most extensive one in the United States under one sole proprietorship and management. The average production of the factory is one thousand yards of carpet a day.

None but the very commonest wool is suitable for carpet manufacture. The finer wools have not sufficient toughness and fiber to enable them to resist the rough wear which a carpet always gets.

The wool is first of all thoroughly washed, and is then thrown, completely saturated and dripping, into the hydraulic extractor, a large receptacle, something like a huge cauldron, which revolves very rapidly. A few seconds after the extractor is started, the wool and the cauldron alike are lost to sight from the rapidity of revolution. I asked the operative who had charge of it how many revolutions the extractor made in a minute. He replied, "Three thousand, Sir." Such a momentum appears almost incredible. The extractor is about four feet across; therefore, a given spot on it would travel a distance of twelve feet 3,000 times in one minute, or at the rate of 410 miles an hour. In a few minutes, what was dripping wool is taken out so nearly dry that there is only a slight feeling of dampness to the touch. The wool is then taken upstairs to the drying room, where it is laid out in layers on extensive sheets of wire netting. A powerful blast of hot air is forced into the room, and an undercurrent downward through the wool. By this means, the wool is quickly dried and is ready for combing, drawing and carding. The spinning of the wool seemed to me an endless business. At first, the strands are as thick as your finger; but they are spun again and again, each time into a smaller strand, till they have been reduced to the required fineness. The wool is then wound from the bobbins into skeins, and is sent away to the color house to be dyed. The brighter colors of the dyed skeins have a very gaudy appearance. But this gaudiness is lost in the careful harmonizing of colors in the process of weaving. It has often been a mystery to me how they weave such beautiful and many colored patterns in carpets; but putting the machinery on one side, it is a very simple operation to watch. The pattern is punched on a series of plates of thick card board, certain holes corresponding to certain colors, and the pieces of cardboard being fastened together like the photographic plates in a revolving stereoscope. The cardboard pattern presses against the pins which govern the many cords forming the web and the woof; and, of course, where there are holes the pins pass through the card board, and so allow certain of the cords to take a different position as the shuttle flies backward and forward. The weaver stands before his loom with as many shuttles on either side of him as he has colors to weave. The shuttles are placed one below the other; and by raising or depressing them with a lever, the right shuttle is brought into play. When the weaving of the carpet is completed, it is carefully gone over by experienced hands, and all lost and faulty stitches are put in with a common carpet needle. But the carpet is covered all over with short woolen bristles. To remove these, it is passed through the dresser, a machine very similar in its operation to the mowing machine; for as the carpet passes through the dresser, the bristles are all removed by a series of knives, arranged like those of a mower.

ON COTTON SEEDS.

BY HORATIO N. FRASER.

Since small hullers have been introduced on many of the plantations, the planters are enabled to hull their own seeds. These are thrown into the top of the hullers, and first come in contact with knives, which cut the hull; then they are passed through sieves, by which process the kernel and hulls are separated. The kernel is divided into two portions; the first is that part which has been broken or cut by the knives; this is ground to make the meal used for feeding, and constitutes one third of the whole weight of the kernel. The remaining two thirds come out whole, and are sold for other purposes. This meal has been found to be as rich, in flesh and fat producers as linseed meal, for stock, and supersedes the use of it in the cotton growing States. The hulls are piled in heaps until they arrive at the right state of decomposition to be used as a fertilizer, for which they are well adapted, being rich in the phosphates and lime, characteristic of substances used for this purpose. The seeds contain a fixed oil to the amount of about thirty-seven per cent of the weight of the kernel, most of which is obtained by expression.

At the factory on Long Island, which the writer visited, the seeds are bought with the hulls on, although the whole kernel is generally brought directly from the planter. These are first thrown into a gin, which separates some more of the lint. This is packed in bundles and sold for ordinary cotton batting. From this, they are conveyed to the hullers and undergo the decorticating process. The kernel is then carried by an elevator to a box which feeds two large iron rollers,

converting it into meal; the meal is put into a large vessel, heated by steam to render the oil more fluid, and then is put between iron plates which are forced together by hydraulic pressure, which presses out nearly all the oil and some mucilage. About eight per cent of oil is left, which cannot be removed except by solvents. This oil, as then obtained, is of a handsome dark wine color and sweet taste. This then undergoes the purifying and bleaching process, which is kept a secret by the manufacturers.

The purified oil is either a golden yellow or white color. An oil is also produced, by chilling the purified oil and expressing, to obtain a variety almost free from stearine, called by the manufacturers "winter oil," from the fact that cold will not thicken it.

This oil is used extensively in the arts, chiefly to adulterate and substitute higher priced oils. Cheap paints are ground in it, and it is used to a certain extent to adulterate linseed oil. But being a non-drying oil, only a small percentage could be used.

It is also used for adulterating sperm oil for burning, and for mixing with lard oil. The most practical way to detect these is to heat the suspected oil with distilled water; separate the water and add a solution of subacetate of lead. If it contained cotton seed oil, a white precipitate will be formed on account of the presence of mucilage, which is always found in this oil. If the sperm or lard oil is pure, it would be indicated by the absence of any milkiness.

It is also used to adulterate olive oil, and chemistry has found no practical mode by which they can be definitely distinguished apart.

A soap has been made of the residue left after refining. It is of a more or less dark brown color and disagreeable smell. It is used in the laundry, and sells at from three to seven cents a pound, according to quality. It was also attempted to make a soap from the white oil. This, when first manufactured, is of a handsome white color, but after standing some length of time it becomes dark and finally almost black. It is not made now.

It is used to the amount of ten per cent in making fancy soaps, to give them a good lather, for which the oil is said to be the best known; but even in this small amount, the odor of the rancid oil can be detected.

The hulls are used for fuel in the factory, and the greater part of the cake meal was sent to Europe, the farmers of this country, at that time, not being generally acquainted with its properties. It sold for about thirty dollars a ton.

A few years ago, the oil was noticed in the journals in connection with preparations of pharmacy, to be substituted for oils in liniments and ointments, for which it is adapted by its properties as an emollient; but nothing definite was arrived at. Being cheaper than even the commonest grades of olive oil, and resembling it so much in its behavior, it is peculiarly fitted for the preparations of the pharmacopoeia in which the olive oil is used. Mixed with aqua ammoniac in the official quantities for "Liniment. Ammoniac," it makes a product which has all the essential properties that are indicated by the olive oil, and has the advantage of not forming so thick a mixture, thereby making it more convenient. In the "Liniment. Camphorae," it seems to serve exactly the same purpose as the official oil.

Lead plaster made with the cotton seed oil has been substituted with advantage for the official, and has been used to mix with it to the amount of fifty per cent by some manufacturers of the plaster. This, made with the cotton seed oil alone, forms a handsome, light colored plaster, apparently equal in all respects to the English, with the exception that it does not become hard enough to keep its shape, in the usual form of selling it. But when mixed with olive oil in equal proportions, this difficulty is entirely overcome.

The cost of the plaster made with the cotton seed oil, using the best English litharge, is twenty cents per pound. This difference in the cost, combined with the practicability of using it, will recommend it to the more careful examination of druggists who deal extensively in this preparation.—*American Journal of Pharmacy.*

Origin of Microscopic Living Forms.

In a recent lecture before the Scientific School of Yale College, Professor W. H. Brewer said: "The most reliable observers are overwhelmingly of the belief that all life is from antecedent life, or, in the words of the old Latin aphorism, *omne vivum ex vivo*. And each good investigation reduces the number of supposed cases of spontaneous generation.

The facts of the case may be stated as follows: 1. The old view of organic and inorganic compounds in chemistry has been broken down. 2. All allow that beings do arise where the germs cannot be distinguished by the best microscopes yet made. 3. That some of these lower forms are so variable that what were once supposed to be several species are now known to be often only phases of the same thing. 4. Although it is highly improbable that all forms of living beings are derived from one original, yet many of the so called present species appear to have been produced from earlier similar species. The whole question must be regarded as yet among those that are unsolved, and should be approached in a candid and scientific spirit. I believe, said the lecturer, that it will ultimately be shown that all life is derived from antecedent life, and that the beginning rests with the Creator.

Some microscopists use instruments which magnify 5,000 or even 10,000 diameters. But notwithstanding the power of the instruments used, it should not astonish us if we cannot even then see the original germs. For let us make a simple calculation. Some of the great trees of California are over 300 feet high and 30 feet in diameter. Such a tree

is estimated to contain 250,000 feet of lumber exclusive of the branches, or 36,000,000 of cubic inches. The cubical contents of a seed of one of these trees may be put at from $\frac{1}{1000}$ to $\frac{1}{2000}$ of a cubic inch, and its length at from $\frac{3}{10}$ to $\frac{2}{10}$ of an inch. In one of these trees, then, we have a living being from 10,000 to 15,000 times as large as the largest dimension of the seed—not the germ however—and from 50,000 to 75,000 million times its cubical contents. And if we may suppose that the relation between these microscopic living forms and their germs is at all analogous, it is not unreasonable to consider that they exist, though we may not be able to see them.

But have these questions no practical bearing? Are they merely curious and interesting speculations? It is indeed a subject of immense practical importance. Diseases of both man and animals are caused by microscopic organisms. As samples of these may be mentioned, the itch, a disease known as favus, and all the phases of ring-worm. So also certain diseases of vegetables, such as rust, mildew, and blight of crops, the grape disease, and the potato rot. In all these cases, the animals are known to reproduce from others. There are also numerous other contagious and epidemic diseases, which seem to be of like character, although their causes are not so well known. Such as smallpox, kine pox, and sheep pox. Extensive experiments, made on these diseases, go to show that the infecting material is minute particles, and the problem becomes to destroy them. It is also but a step from these contagious diseases to epidemic and malarious ones, such as cholera and the plague, although the cause is here more obscure. That treatment of these diseases, however, has been most successful which regards them as caused by living organisms. Some malarious diseases are checked by cold, as the yellow fever by a frost. The silk worm disease may also be placed in this category. The subject may be summed up as follows: 1. We know that some diseases are caused by minute organisms. 2. That others apparently are so. 3. That of those that are certainly so caused, the organisms are not spontaneously evolved. Beyond this, we are still in the dark, but every year brings a solution to some new case, and they all point the same way, namely, that these great scourges are caused by minute organisms not spontaneously generated. If so, the remedy is simply to keep the seeds or spores away from the body, but if they are spontaneously generated, there is no hope of extirpating them, and unless a specific is found the race must continually suffer.

Bone Felon Arrested by Congelation.

Dr. James B. Walker, of St. Louis, Mo., says, in the *Medical Archives*: Not long since I was consulted by a young lady who was suffering from an incipient felon. The distinguishing characteristics of the painful affection were already manifest—pain, throbbing, some tumefaction, and the nervous excitement, indicated plainly what was in advance, unless the inflammation was arrested; and the command was: Arrest it at all hazards.

The starting point had been two days previous to her application for treatment. I could think of nothing offering such a prospect of success as cold, as low as the freezing point. Adding equal parts of snow and salt in a tumbler, I placed the finger, it being the middle one, in the freezing mixture. For a few seconds, there was an increase of the sensibility of the part, and it was with difficulty I could persuade her to hold her finger in the mixture. By degrees the pain subsided, and, at the end of two minutes, perfect insensibility had followed. I removed the finger, and after a few minutes the sensibility returned, and with it came the pain, throbbing, etc. The application was renewed, and the pain again ceased and insensibility ensued. This was repeated as often as the pain returned, and in about two hours, alternating the application and removal, there was no return of the painful sensations, and the difficulty entirely ceased and there was no felon. The induration remained several days, and the skin gradually exfoliated.

Manufacture of Horseshoes by Machinery.

Our young and promising contemporary, the *Chronique de l'Industrie*, prints a communication from the pen of M. A. Verhaeren on the above subject. He gives it as his opinion that the most remarkable factory of the kind is that of MM. Mansoy et Cie., who supply the horseshoes used by the Omnibus Company and the Cab Company of Paris, and who, during the siege, furnished all the shoes required for the cavalry. The machinery employed by MM. Mansoy is described as very simple—a rolling mill, a shaping machine, two steam hammers, and two punching machines, with, of course, dies for each size of shoe made; the value of all this is said not to exceed \$6,000. The hammers require 15 horse steam power, and a 6 horse engine suffices for all the rest; but, it is added, a 15 horse engine would probably answer all purposes. With the above machines, the company turns out 2,000 shoes a day with six laborers and three apprentices, and the space occupied by the factory is about four hundred square meters. The production is constant; when working only during the day, the fires are covered up at night, but when working night and day there is, of course, a considerable economy of fuel and working expenses. The engines are worked with the lost heat of the plate furnace, as in rolling mills.

THE ODORS OF PLANTS.—It may be laid down, as a general principle, that a larger proportion of white flowers are fragrant than those of any other color; yellow come next, then red, and lastly blue; after which, and in the same order, may be reckoned violet, green, orange, brown, and black.

MULLER'S IMPROVED ROPE RAILWAY.

Müller's Rope Railway.

The use of rope railways as a means for transporting heavy freights, mining products especially, has within the past five years become quite extensive. In England, Scotland, and on the continent, many miles of these railways are now in successful operation, and contracts for the erection of lines thereof, several hundred miles in extent, are now out. In Colorado, they are now in use to a considerable extent, and many new lines are being projected.

Among the especial advantages of the rope railway as a means of locomotion are its economy of first cost, the quickness with which it can be set up, and the cheapness of its operation. It consists of traveling ropes suspended on poles, the ropes taking the place both of the rails and the locomotive of the common railroad. On the rope railway, the burden to be carried is attached to the traveling rope, the movement of which is not affected by the form or grade of the surface of the ground. In this respect, it resembles a telegraph line, and works just as well whether it passes over the roughest chasms or the smoothest levels.

The improvement illustrated in our engraving is the invention of Mr. Hermann Müller, an Austrian engineer, and has lately been patented in this country. The distinctive features of the improvement consist in peculiar devices whereby the ordinary mining cars with their loads are transferred with facility from the usual ground railway tracks to and from the rope railway. This will be readily understood by a glance at our picture. It will be observed that, at each end of the rope railway, there is a drum of considerable size over which the traveling ropes pass. The ground tracks are arranged to run in connection with the upper and lower surfaces of the drums, and it is only necessary to push the cars, into contact with the ropes at either drum, in order to connect them with the ropes and effect the transport of the cars in either direction. Our sketch is not purely a fanciful one, for these railways are used in places far rougher and more inaccessible than the scene here represented.

This invention has for some time been in practical operation at Sigl's great machine establishment in Vienna (Austria) where it passes from the roof of one of the buildings over the fortification walls, ditch, and streets to a neighboring piece of ground pertaining to the concern. Its operation gives great satisfaction. The invention is particularly adapted for large manufacturing works, also for coal and mining purposes. It costs comparatively little for erection, and may be used in long or short sections. Further information concerning the expense of erection, plans, etc., will be furnished by S. S. Townsend, No. 31 Liberty street, New York, sole agent for the United States.

Noiseless Pump Valve.

Mr. H. Teague, of London, suggests the form of valve shown in our engraving, which is stated to be very effective and to operate without noise. It will be observed that an opening

equal to one third of its area is made in the ordinary clack valve, and over this opening another valve is hinged. The two valves are thus arranged in opposite directions. This is a very simple and excellent invention.

Green Corn Fodder.

A correspondent of the *Country Gentleman* says: "Having three cows, and not having the grass for them, I concluded to soil them with sowed corn entirely. I commenced about the first of June, and have fed them bountifully ever since, with the aid of 18 or 20 heads of small loose cabbage apiece. Now for the result; The cow, that would have given on grass 20 quarts per day, now gives only 12 quarts; No. 2, instead of 14 quarts per day, now only 8; No. 3, a heifer that did give in the past winter, on dried stalks and feed, 6 quarts per day, now only 2 quarts. The three cows are perceptibly decreasing in milk every day, and I fear, by the time cool weather sets in, there will be more milk taken from the corn than from the cows. They have a shady, cool yard to run in during the day, and are stabled at night. I was always under the impression that sowed corn was a great supplier of milk. But I have come to the conclusion, so far as these cows show, that sowed corn fed alone and continually is not as valuable as we think. But grass and sowed corn fed together are all that we can ask."

Submarine Telegraph Cables.

A cable of the very best construction, containing four conductors, was manufactured and recently laid from Lowestoft, on the coast of Suffolk, Eng., and Emden, on the Hanoverian coast, for the German Union Telegraph Company, by the Telegraph Construction and Maintenance Company, and is now in perfect working order.

The conductors are of stranded copper, of excellent conductivity, weighing 107 lbs. per nautical mile, and insulated with three coatings of Willoughby Smith's improved gutta percha to the weight of 140 lbs. per mile, so that each insulated conductor weighs in the aggregate 247 lbs. per mile. The insulation, it is hardly necessary to state, is excellent.

The several "cores" or insulated conductors were wormed and served in the ordinary manner, and then sheathed with 12 No. 3 B. B. galvanized iron wires for the main cable, and with 12 No. 000 B. B. galvanized iron wires for the shore

ends. Each type of cable was further protected with servings of tarred yarn and bituminous compound.

The length and weight of the cable necessitated its being laid in two sections, but the whole was successfully accomplished. The end landed on the coast of Suffolk, at Lowestoft, adds some additional importance to that place from a submarine telegraph aspect. This makes the fourth cable landed there. The others are the Lowestoft and Zandvoort north and south cables, and the Lowestoft and Nordeney (Reuter's), the property of the Post Office; this additional cable makes up a total of sixteen wires starting from that point for continental traffic. How strangely the traffic has grown since 1853, when one wire alone stretched across the North Sea. And now, in addition to the cables mentioned, there are other existing cables northward, which swell the number.

A cable well manufactured and laid on such good ground may be expected to last many years—take, for instance, Reuter's cable, separated by but a short distance from the German Union cable; how well that has lasted through these years! And, indeed, it would be vain to attempt to define the life of such a cable, when we have already the Dover cable still in existence and still working, of the ripe age of twenty-two years.

[For the Scientific American.]
FRICTIONAL GEARING.

BY E. S. WICKLIN.

NUMBER IV.

Since the introduction of friction as a means of transmitting motion, it has often been desirable to apply the principle to bevel gearing. Frequently, however, this has been unsuccessful. The failures have resulted either from the want of a correct knowledge of the principles of bevel gearing, or from imperfect workmanship in the application of those principles.

When correctly and substantially built and accurately put up, bevel and miter friction pulleys, within certain limits, operate just as well as in the other form. True, we cannot in these, as in the cylindrical pulleys, extend the face *ad libitum* without greatly increasing the diameter; and for this reason, when great power is to be transmitted, it is not convenient to use this form of gearing. But in all fast motions, where not more than ten horse power is to be transmitted, the bevel friction is one of the best means of connecting at an angle. It may be adapted to almost any change of speed, and set to any angle, either right, obtuse, or acute, and has the same advantages in operation as the other form of friction. And when it is required to reverse the motion at pleasure, it is most conveniently done by setting two bevel pulleys upon one shaft, facing toward each other, and placing one, upon another shaft, between them so that it may be brought into contact with either.

In building this gearing, the iron cone, or pulley, is made similar to a bevel pinion, except as to the teeth, instead of which there is a smoothly turned face. The same care should be bestowed upon the accuracy of finish and balance that is required in the other form of friction pulley; but the pulley may be made somewhat lighter in the rim, as the conical form gives additional strength. In making the wooden driver—the iron pulley being furnished—the first point is to determine the exact diameter and bevel, for upon the correctness of these, to a great extent, depends the success of the work.

To obtain these dimensions, place a square across the smaller end of the finished iron pulley, and set a bevel to it, as shown in diagram A. This will give the correct bevel for the face of the driver.

Next, upon any plane surface of sufficient size, draw the lines, A B and A C, making the length of the line, A B, just equal to the larger diameter of the iron pulley, and the angle at A a right angle. Then, with the square and bevel, or with a movable T square adjusted to the bevel, draw the lines B C and A D. The distance, A C, is the diameter required for the driver, and the other dimensions are easily obtained.

To obtain the bevels for pulleys to work on shafts placed at acute angles, draw the lines as in the annexed diagram marked B.

First, draw the line, A B, to represent the driving shaft.

Then, at a right angle, draw the line A C, making its length equal to half the diameter of the driving pulley. Next, at the angle at which the shafts are to be set, draw the line C D; and at a right angle from this line, draw the line C E, making its length equal to half the required diameter of the other pulley. From the point, E, parallel to C D, draw the line E F, which will represent the other shaft. Now, from the point of a section of this and the line A B, draw the line G C, which will give the bevels for both pulleys.

If not above two and a half feet in diameter, the driver of the bevel pulleys may be built upon a "hub flange"—a disk of iron of about two thirds the diameter of the pulley, with a hub projecting from one side. The hub should extend half an inch beyond the thickness of the wood to receive an annular disk of smaller diameter, through which the whole may be securely bolted together.

Upon the flange, around the hub, the pulley should be built. The first two or three inches, to form the back, should be of hard wood put on radially. For the balance, use soft maple. It is, in the present state of our knowledge, the only wood that can be recommended for this form of friction gear. It should be laid on this, as upon all friction drivers, with the grain running tangentially as nearly as possible. And each subsequent course should be made smaller, so as to form the bevel. The layers are put together with glue or white lead, and carefully and thoroughly nailed. The builder should be careful to make the joints perfect, and to put the wood snugly around the hub.

When the wood is built up to sufficient thickness, the other flange should be put on, and the whole bolted together and turned to the exact diameter and bevel required, and the pulley should be balanced with the utmost care.

For a larger bevel driver, it is best to use an iron center with arms, and a flanged rim something like a car wheel. The diameter of the rim or cylinder should be a few inches less than the smaller diameter of the face of the pulley, and that of the flange something less than the larger diameter. Upon this wheel, the wooden rim is built as directed upon the hub flange, except that the bolts must be put in as the work progresses, so that subsequent layers will cover the heads; and the pulley is finished without the smaller flange.

The diagram, marked C, shows a cross section of this pulley, which will be understood without further explanation.

In setting up this gearing, it is of the utmost importance that the countershafts line exactly to the centers of the main or line shafts, and at the precise angle for which the pulleys were fitted; and that they are substantially set, so as not to get out of line.

This gearing is thrown on and off, connected and separated, by moving the countershafts endwise in their bearings. This may be done by allowing the end of the shaft to extend through beyond the outer bearing far enough to receive an

extra box, one end of which is closed and Babbitted to receive the end pressure. This box is set up by a lever to which it is pivoted. And by having the end of the shaft grooved where it is embraced by this box, it will be drawn back where the lever is released. In light work, it is as well to make the outer bearing do the whole by making it both an end and side bearing, and having the box movable in a line with the shaft.

The pressure required, to hold these pulleys up to the work, is not great, and is easily applied by finishing the end of the shaft, and using a flat bearing of anti-friction metal, the full size of the shaft. Sometimes a steel point, like a lathe center, is set against the end of the shaft to receive the pressure, but this is a very bad arrangement. It makes the bearing surface too small, and is one of the worst forms of bearing to keep supplied with oil. A flat bearing of wood, especially of hard maple, is very much better than this.

When there is considerable difference in the sizes of bevel pulleys working together, the end pressure is most upon the shaft carrying the larger, but this may frequently be neutralized, upon lines having several of these drivers, by setting them with their faces reversed.

A point that should never be lost sight of, in constructing setting levers for all friction work, is to make them adjustable so that the pressure may be easily increased if required. This is sometimes done by a ratchet with several notches, into any one of which the lever may be drawn; but it is generally better to have but one catch, and to make the adjustment elsewhere. This may be done by connecting the lever, to the part to be moved, by a rod having adjusting nuts, or by making the fulcrum adjustable by bolt or set screw.

These adjustments should be made by the person having charge of the machinery, not by the operator of each machine. They should be kept tight enough to do the work required, but more than this is a waste of power, and a useless strain upon the machinery.

It may seem unnecessary to give the diagrams of lines for the dimensions of bevel gearing, as these are well understood. But it must be remembered that we have no work on millwrighting, at present, that gives information on this point of any scientific or practical value, and that our millwrights are not all familiar with the construction of this gearing. Our mills, though superior, are built without rules or uniformity of construction.