Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

Curious and Incongruous Attachment.

Messrs. Editors:—I am reminded by your article of last week, entitled "Curious Associations among Animals," of an incident in my boyhood's experience more remarkable and more inexplicable than anything I have ever heard or read, which, if you think it worth the while, you may give to your readers.

My boy brothers and myself were one day roaming over the fields with a little dog—our inseparable companion in such rambles—and amusing ourselves by turning over logs, flat stones, etc., to give the dog a chance at the field-mice or meadow moles, as we called them, so frequently to be found in moist meadows and pastures.

Boys and dog were having rare sport "bagging" lots of game, when on turning over a log, we found one of those round, soft, skillfully constructed nests, with which every country boy is familiar, and, upon tearing it open, discovered five little bare, helpless mice, not yet able to crawl. We concluded to take nest and mice to the house, the nest as a curiosity, and the mice as a feast for our favorite cat. Upon placing the little creatures on the floor before her, expecting to see them consecutively gobbled with all that gusto which cats from time immemorial have manifested for that species of delicacy—imagine our astonishment at the result. Instead of devouring them, pussy, with that peculiar caressing purring usually heard only from the feline mother when calling their young, commenced licking and petting the little things, lay down on her side, and pushed them up to her body with her paws exactly after the manner of cats with their very young kittens. The whole family were called to witness the strange performance.

We had read in our juvenile treatises on natural history of the curious freaks of cats which had lost their kittens, and should not have been so much surprised if our cat had been subjected to any such bereavement, but our cat *had never had any kittens*, and became a mother for the first time ten days or a fortnight after the occurrence in question. After watching them for a time, we were told to take them away, and carried them to the barn a short distance from the house, the cat following, and calling as to kittens. The infantile mice being deposited in the barn, the cat continued to caress, and as far as she could to care for them. After a little time we left them, and returned to the house to dinner. Pussy availed herself of the opportunities thus offered to bring *every one* of her newly adopted proteges into the house again and to place them on a bed to which she had access, where they were found about an hour afterward.

The performance was becoming something of a nuisance, to get rid of which, as well as to save the little creatures from a lingering death, we destroyed them. I do not recollect that the cat manifested any particular regret, or that her subsequent conduct was at all peculiar, and as I have said, a few days after she had a family of her own.

Let those who attribute all the acts of animals to "unerring instinct," account for these facts. I give them as they occurred, and give you my word that they are exactly as stated.

Albany, N. Y. C. A.

The Currant Worm.

Messrs. Editors:—On page 297, of the Scientific American, copied from an exchange, is a description of the currant worm and its habits, which contains three errors: "The miller that deposits the eggs" is not a miller at all, but a small yellow fly with brown wings, about as large as the common house fly, but slimmer and more active. The flies deposit their eggs the last of April or first part of May, the worms appearing usually by the middle of May. This year they were first seen May 7th. When the worms attain to their full size they go under ground and turn to flies again and lay their eggs sometime in June. Last year a *third* brood of worms appeared about the 1st of September, which continued upon the bushes till every leaf was destroyed. The last brood of worms after reaching maturity, go under ground where they remain till the following April.

The "miller" of which your correspondent speaks is the parent of the loop or measuring worm, its body being about an inch in length, yellow, and covered with black dots. This worm also preys upon the currant leaf, but is *comparatively* harmless.

My method of fighting these plagues is as follows: I hold a tin pan underneath the bushes, and gently rap the branches with a paddle, the worms fall into the pan and are then easily destroyed. This I do once a week, or oftener if they be numerous. In this way I save my bushes, keep the worms in check, and have all the currants I want. J. H. P.

Wear of Driving Wheels on Locomotives.

Messrs. Editors:—A correspondent asks "Why the forward wheels of locomotives wear more than the hind ones?" In answer I would say that it is lateral slip, produced mostly in passing curves. The forward wheels only, partake of lateral slip, and having this extra motion must, as a natural consequence have more wear.

St. Louis, Mo. Geo. Shone.

The Australian preserved meat imported into England has it is asserted, hitherto proved an unsuccessful experiment, as people will not touch the strange food, preferring to go without meat altogether rather than to taste an untried dish. The importation of live cattle from Brazil has, therefore, been attempted, and the River Platte Company has recently sent 500 oxen, which arrived in good order at Falmouth.

[For the Scientific American.]

On Ruthenium.

By Professor Charles A. Joy.

Gottfried William Osann, born at Weimar, in 1797, Professor of Chemistry at the University of Dorpat from 1823 to 1828, and afterwards, until the time of his death a few years since, Professor at Wurtzburg, while examining some platinum ores from Siberia, found in them what he considered traces of three new metals. One of them because it was discovered in platinum from Urai, he named from the first letters of those words—pluranium; the second, from its gray color, was called after the Greek, polinium; and the third, as it was the first metal discovered in ores from Russia, was called after the ancient name of that empire, *Ruthenia*, ruthenium.

Professor Osann never succeeded in fairly isolating and describing these metals, and all these names would have been dropped and forgotten if it had not been for the labors, in 1845, of a native Russian chemist, Professor Claus, who was more successful in his efforts, and really found a new metal in the platinum ores, differing from anything described by Osann, but which, out of compliment to that *savant*, and in honor of his country, he called ruthenium.

According to Claus, the original ruthenium was composed of zirconia, with oxide of iron, silicic and titanic acids, and was consequently nothing new. As for polinium and pluranium, it is not probable that we shall ever hear of them again.

Professor Claus found ruthenium in the residues after treating ores of platinum with acids. It occurs in the fine black scales called "iridosmine," now so extensively used for pointing gold pens, and is so rare that if it were ever to be required in considerable quantity in the arts it would be difficult to supply the demand.

The platium ores of Russia, America, and Borneo, contain it, and recently an interesting mineral has been found at the latter locality, which Woehler shows to be a sulphur compound of osmium and ruthenium, and to which, out of compliment to an old friend, he has given the name of *laurite*. Previous to the discovery of this mineral it was not supposed that sulphur would ever be found associated with the metals of the platinum group.

It is not necessary to recapitulate all of the steps taken by Claus to isolate ruthenium, as that would lead us into a scientific labyrinth of no practical value, but it is quite worth while to give an account of the method pursued by Deville for obtaining it, as it has qualities that adapt it to interesting uses, and many persons may desire to make it. The material to be employed is iridosmine, which is a refuse article from the gold-pen manufactory, and also from the assay office. At one time it was to be had in considerable quantity, but of late years, partly owing to a different way of working gold ores and partly to the absence of the scales in gold and platinum from new localities, we have less of it than formerly. Since the discovery of a method for the employment of iridium in alloys with platinum, the iridosmine has become more valuable, and more efforts are made to discover and save it.

The iridosmine is fused with four or five times its weight of zinc in a carbon crucible, and the heat is then raised sufficiently to volatilize all of the zinc.

This leaves a porous, easily pulverized mass, which is again fused with 3 parts of peroxide of barium, and 1 part of saltpeter, and the resulting powder must be treated with hydrochloric acid, and afterwards with nitric and sulphuric acids, we then convert the ruthenium into oxide and fuse it by means of the oxyhydrogen blow pipe in a lime crucible.

We have omitted certain details of the operation, but have given enough to show that it is no easy matter to obtain the metal. Ruthenium is, after osmium, the most difficult to fuse of all the metals; it is only possible to melt small quantities in the hottest point of the oxyhydrogen flame at a temperature that would convert gold and platinum into vapor.

The specific gravity of the metal thus prepared is 11·4. It can be alloyed with other metals, such as zinc and tin, but does not, as an alloy, present any peculiar features or uses. There is a property of spongy ruthenium that is worthy of note, and is not generally known. It was discovered by Professor Schoenbein, and used to be exhibited by him as a capital class experiment. He found that when cholorine gas was conducted into water and spongy ruthenium added, the metal acted in a manner analogous to sunlight, and decomposed the water into free oxygen and hydrochloric acid.

The metal was not itself in the least changed, so that the same piece would decompose an indefinite amount of chlorine water. Schoenbein was of the opinion that by passing chlorine gas continuously through water in which ruthenium was placed, a stream of oxygen gas would continue to come off as long as any water was left to be decomposed.

This curious reaction suggests other possible uses of the metal as a substitute for platinum in the manufacture of vinegars, and also to bring about many chemical changes where simple contact is sufficient. It is a subject that needs investigation and may lead to the discovery of important uses for ruthenium.

Since 1845, Claus has continued his investigations into the properties of ruthenium, and has published several papers on the subject; also Fremy, Deville, Bunsen, and Gibbs have increased our knowledge of the element, but their papers are of a purely scientific character, unsuited to a popular journal, and we refrain from attempting an abstract of them.

Ruthenium belongs to the platinum group of metals, and is closely allied to osmium in many of its chemical relations. The metals of the platinum family never occur separately, with the exception of palladium. They all possess the curious properties of determining a large number of chemical reactions by simple contact.

The order of fusibility of the group is as follows: Palladium, platinum, rhodium, iridium, ruthenium, osmium.

The specific gravities as given by Deville are: Ruthenium, 11·4; palladium, 11·8; rhodium, 12·1; platinum, 21·15; iridium, 21·15; osmium, 21·4.

It will thus appear that osmium is at once the heaviest and the most infusible of all the metals; ruthenium stands next to it in point of fusibility, but is much lighter.

The sesqui-chloride of ruthenium has been recommended by Gibbs as a delicate reagent in testing for salts of the nitrates—with nitrates of the alkalies it forms double salts which are difficultly soluble.

Many salts of ruthenium have been made by chemists, but they possess a purely scientific interest, and we refrain from giving them here.

Manufacture of Benzine, or More Properly, Benzol.

In the year 1825 Faraday was occupied with the investigation of certain liquids which were deposited in the cases used for containing compressed oil-gas, a material which was at that time a cheap source of illumination. He was able to detect, in the complex mixture on which he had to work, a body to which, in accordance with the current nomenclature and notation of his time, he gave the name "bicarburet of hydrogen." Several years afterwards, Mitscherlich found that on distilling benzoic acid with lime, a volatile oil came over, and that this was in every respect identical with Faraday's compound. Hence the name "benzol." It was not, however, until 1845 that Hofmann proved the presence of benzol in coal tar; nor until three years later that Mansfield (unhappily a martyr to these researches) showed how it might be obtained from that source on an industrial scale. A small specimen of Faraday's original preparation is still in existence, sealed up as a recondite curiosity by its discoverer; now, benzol is manufactured by the tun. The direct proportion of power to knowledge could scarcely be illustrated by a more instructive contrast.

Benzol constitutes sometimes as much as one tenth of the weight of crude tar. In order to prepare it, the light oil is used as a starting point. This material is placed in large stills, and submitted to what is termed "fractional distillation," that is, to a distillation in which the contents of the retort are separated into certain portions, which are distilled over and received separately. The apparatus employed is very simple in principle, and, however varied in form, is generally merely the embodiment of a method first delineated by Mansfield. The retort invariably contains a mixture of hydrocarbons, having a gradually increasing boiling point, and a gradually increasing chemical complexity. On applying heat so as to cause ebullition, the first "distillate," or substance that arrives at the receiver, will be that which possesses the lowest boiling point; the next will have the next higher boiling point, and so on. This law, however, is not more than approximately true, it being always found in practice that a complete separation of the constituents in the retort cannot be effected, each body of lower boiling point dragging with it, so to speak, some of each body of higher boiling point. The impurities which would thus be introduced into the distillate necessarily exist in the vapor; but it is found that, by passing the vapor through an upright tube surrounded by baths of various suitable temperatures, they can be cooled out, and compelled to run back into the retort, without rising high enough to pass over into the receiver.

The benzol of commerce, however, is never pure, its boiling point being frequently 100° in fact, a steam bath is employed in its preparation. Absolutely pure benzol can be obtained by re-distilling commercial benzole at about 80°, and submitting the distillate to the prolonged action of a freezing mixture. It then crystallizes in beautiful white plates, having a high luster, which melt at about 3°, and from which the impurities can be removed by draining and pressure in a cold apartment. When these crystals are re-melted, they constitute a colorless, highly refractive liquid, of somewhat agreeable odor, boiling at 82°, and considerably lighter than water. The crude or pure product may be used as a solvent of grease stains, of caoutchouc, gutta-percha, and resins, as an ingredient in varnishes, as a chemical discriminant in analysis, as a means of rendering tracing paper temporarily transparent, etc.; but its most important application is to the manufacture of nitro-benzol.

What the Telescope is Doing.

One of the largest telescopes in the world, it is well known is owned by the Chicago University. The destined work of this wonderful instrument is to make, in connection with nine chief observatories of Europe and America, an entirely new catalogue of 250,000 stars, determining the right ascension and declination of each particular star; so that by observing its position, astronomers may, in far-off ages, be able to announce authoritatively on its motion, and to declare in what direction it has proceeded through the illimitable voids. At this moment it is slowly and surely performing its sublime work, and furnishing those far-off astronomers the data upon which to base their calculations respecting that mighty problem, the direct motion of the sun through space.

When this is solved, data will also be abundant for locating the position of the great central sun, around which millions upon millions of other suns popularly denominated stars, do, in all probability, revolve. The labor being divided among the ten principal observatories in the world, will make the share of it falling to the Chicago Observatory, 25,000 stars—upon each one of which the most careful observations will be made and recorded. It will require about ten years to accomplish this stupendous work, and when it is done we may expect some most important astronomical discoveries.

The Draft of Mowing Machines.

Mr. H. H. Ingalsbe communicates his views upon this subject to the *Country Gentleman*, which we think of sufficient interest to quote at length.

"The power required to drive a mowing machine at work may be resolved into direct draft and side draft. A good mowing machine should be so balanced between the driving wheels and the cutter bar, by placing the line of draft nearer, or further from, the heel of the bar, that ordinarily, there will be little or no side draft. If so placed, the end of the tongue will sometimes, when at work, be drawn toward the standing grass, and sometimes thrown away from it by the side draft. Practically, the side draft is of small account in a good machine.

"The direct draft depends upon three causes, and may be resolved into three parts:

"1. The draft of the machine itself, on its own wheels on the ground.

"2. The power required to give motion to the gearing and the knife.

"3. The resistance offered by the grass or other substance cut.

"These three several parts, added together, make up the sum total of the resistance, are called the draft of the machine, and for convenience are spoken of as pounds power, which for comparison are sufficiently accurate.

"Each of these separate causes varies much in different machines at the same time, and in the same machine at different times. The power required to draw the machine on its own wheels depends upon the size of the wheels, the perfection of the axles and the smoothness of the ground, and, other things being equal, upon the weight of the machine, and in a machine weighing 600 lbs. should not, on a smooth, firm turf and a level field, be more than 75 to 100 pounds. Adding to the weight of the machine would add to the draft just in proportion, whether that added weight be in the machine or in a driver on it. Suppose the machine to weigh 600 pounds and the draft to be 80 pounds; put a driver of 150 pounds on the seat, and you have increased the draft 25 per cent or to 100 pounds, while the power required to drive the knife and to cut the grass, remains unchanged, and you have only increased the draft 20 pounds.

"The power required to drive the knife and gearing, depends upon the perfection of the gearing, and the weight and velocity of the knife. It should, while differing in different machines, remain nearly the same in the same machine at different times, and would do so if they were built upon correct mechanical principles, and kept in proper order. A machine that in proper order may not require more than 10 or 20 pounds of power, may require ten or twenty times that amount from deficiency of oil, collection of dirt in the gearing, gum on the knife, or loosening of the connections of the pitman by wearing or otherwise.

"The resistance of the grass to be cut will vary with every change of condition, kind, and thickness of grass, and every variation in the condition of the knife and rapidity of stroke. The greater the velocity of a cutting edge, after the velocity is once obtained, the less power is required to do a given amount of work. In the great trial of the New York State Agricultural Society, the first and second causes were measured together under the name of 'trial out of grass,' and the third by itself, called 'absolute draft,' got by deducting the sum of the first and second from the total amount of power required. In one or two cases machines were used which had an absolute heavier draft out of the grass than when in the grass and at work, a fact which was wondered at by the committee, and unaccounted for by them, but which we will consider by and by.

"The direct draft of a good machine, working under the most favorable circumstances, as shown by the trial of the State Agricultural Society, is less than 300 lbs., but those favorable conditions are not always to be obtained, so that the draft must, many times, be much heavier. The machine having the lightest draft at a trial may not be the best machine for practical use; it may not have sufficient power to work under less favorable circumstances. The power of a machine to cut, other things being equal, depends upon the hold the wheels have upon the ground. When the second and third causes, combined, are sufficient to overcome the hold the wheels have, they slide, the knife stops, the machine is clogged. The heavier the machine, the less likely this is to occur; putting a heavy driver on the seat will sometimes carry a machine through, when with a lighter one it would clog.

"As to the trial of the machine which drew lighter when at work than when running free, at which the judges expressed surprise, while it probably cannot now be told with certainty what the reason was, still it would not be difficult to give a reason which is good in some cases, and may have been so in this one. When the knife reaches the end of the stroke, its momentum is considerable, and it requires nearly as much power to stop it as it did to start it to make the stroke—it would require quite as much if it were not for the loss of some power by the friction of the knife in the guards; now, if the joints of the pitman and connections are all perfect, this stopping occurs when the crank passes the center of the shaft driving it, and the remainder of the momentum of the knife is expended upon the crank in the direction of its length and at right angles to the driving power, so that none of that is used up in stopping the knife. But if these joints of the pitman are, from any cause, loose, so that there is a little play, and the crank can pass the center before the knife reaches the end of the stroke, this momentum will be expended in opposition to the driving power, and will of course increase the power necessary to work the machine by so much as is necessary to overcome the momentum of the knife; again, the crank beginning to act upon the knife after it has passed the center to make the return stroke, the knife must start with a greater velocity, causing another loss. Now put the same machine into the grass, and the grass operates to stop the knife as soon as the crank allows it to stop, thus saving the momentum that was expended upon the crank in opposition to the driving power, and also shortening the stroke and saving power in that way.

"To illustrate: if from the imperfection of all the joints, by wear or otherwise, there is a play of half an inch (and as there are never less than four of them, a play of one eighth of an inch to each one will amount to half an inch in the aggregate), the knife running out of the grass will be thrown to the extreme length each way, and will add one inch to the length of the stroke, increasing the power necessarily required to make it. If it requires a certain number of pounds power to make a stroke of three inches in length, it will require 33 1-3 per cent more power to make a stroke of four inches in length in the same time. Whenever these amounts of power lost in this way equal the power required to cut the grass, then the machine will draw just as heavily out of the grass as in it. From these premises, many deductions might be drawn as to the care of and practical use of mowing machines."

Roast Beef by Wholesale---A New Industry.

A Houston, Texas, paper describes an establishment for packing and shipping roast beef, situated near that city, the details of which novel branch of business are interesting. It says:

"The location of the packery is a very desirable one. The bayou is straight for a considerable distance above and below, and at the wharf the bayou is wide enough for two boats of largest size to pass without difficulty. Water is deep to each bank. The wharf, a very substantial one, is just at high water mark. Two large cypress trees were growing in the bank at the exact spot where they were wanted. They were cut down, and the stumps are the foundation upon which the wharf is built.

"A large amount of excavation was required for a location for the buildings, so as to have space all around them, and ventilation underneath; no part of any of the buildings coming against a bank of earth, which would cause the timber to decay, and be objectionable otherwise. At the same time, the slaughter house is so arranged that cattle come into it almost on a level with the ground, and on to a floor level with the second floor of the packery or main building. All the framing and flooring of the building is of the best Florida pine. The dirt, mostly sand, that was moved, filled up the low ground between the buildings and wharf, and quite a distance on either side of that, so that there is a gradual slope from the main buildings to the wharf.

"The first building from the wharf is a framed shed, very substantial, 30 feet square, upon brick pillars. Ten feet from that is the main building, two stories, 30 by 50 feet, and ten feet from that is the slaughter house, 30 by 25 feet, 14 feet to the plates; it is on a level with the second floor of the main building, with a ten-feet passage between the two, connecting the floor of the slaughter house with the second floor of the packery. Between these two buildings is the rendering tank under the passage. In the floor of the passage is a door, through which all the offal, to be rendered, is put into the tank. There is, also, a cistern between these buildings, holding 3,000 gallons of water, above the floor of slaughter house, and above the second floor of the packery. From the slaughter house is a sewer, running past the main building to the bayou. This conveys the blood from the slaughter house, and the water used in slaughtering and cleansing it to the bayou under ground. The water from the rendering tank and from the boiler, and the escape steam, is also conveyed into the same sewer. There is a cistern under the shed, also, holding 3,000 gallons, designed to catch the water from the roofs of buildings for drinking purposes. There are pipes from this and the other cistern to the same sewer, to carry off the surplus water, or to prevent the cisterns overflowing.

"At the side of the two-story building is the oven and boiler house, 14 by 26 feet, built of brick, with an iron roof. The oven part of it is two stories high. There is not a piece of wood about this building, where the fires are, not even a lintel, the openings being arched with brick. As the openings are of different widths and hight, the building presents quite a unique appearance. A large amount of air is required to roast meat by this process, and quite a large opening, the whole width of the building, is left under the roof of the oven part of it, with brick pillars to support the roof.

"Next the oven, and on the same side of the packery, is a room 14 by 24 feet. In this room there will be a steam chest, of galvanized iron, with two railways, where the cans of meat, after being sealed up, will be heated with the escape steam from the engine. The air will be let out of the cans while hot, and then they are ready for boxing. All these buildings have been put up in three weeks and a half, and all have gutters conveying the water from the roofs to the cisterns. It is intended that there shall be as little manual labor in the handling of meat in this establishment as possible. The work is nearly all done by machinery.

"The beeves go into the slaughter house nearly on a level with the ground. After they are killed, they are suspended for dressing with a windlass, and, when dressed, are let down on a car platform, which runs into the packery on the second floor, through the passage before spoken of. The platform of the car is level with the cutting benches, and the carcass is slid from the one to the other, and the meat cut from the bone while still retaining the animal heat. From the cutting bench to the receiver on the same level, where the air is pumped from it to a very high vacuum through a condenser, reducing the temperature to about 38 degrees, and the weight of the meat about five per cent by the loss of ammonia and other gases pumped out of it by the air pump. From the receiver it goes to the top of the oven three feet above the same floor; as it is roasted it is let down by machinery to the bottom of the oven, a couple of feet above the first floor, where it goes through the cutter to the press, and the filled cans from the press to the railway in the steam chest, and thence to the shed, where it remains for the steamer at the wharf, a few yards only from the shed. The cans are made in the same room where the meat is run through the cutter and packed.

"As the meat goes through the air-pump process while warm, but one animal is killed at a time. The slaughter house is washed after each animal is dressed. The offal is immediately removed. The blood and washings are carried to the bayou underground, and there will be nothing more offensive about the establishment than in any clean and well-kept kitchen.

"The oven will hold eight or ten steers at a time, and will roast twenty a day. The buildings are calculated for one hundred beeves a day, and space has been left for four more ovens like the one now constructed. It is intended to increase the business as fast as a market can be created for the meat. On the premises purchased there are sites, just as convenient as this one, for nine more establishments of the same size, and the business will be increased as fast as a market can be found for the roast beef, up to one thousand beeves a day, or any number that can be sold, up to that amount.

"The twenty-two acres of ground will be enriched by the offal of the animals slaughtered, and an arrangement has been made with a very intelligent and enterprising German, who understands the business, to plant an extensive vineyard on the ground, with a view to the manufacture of wine.

"There is a small stream of never-failing water running through the place from a spring on the adjoining property. The water being very soft and free from mud, is superior to the bayou water for a steam boiler, the water of the bayou being generally muddy and sometimes brackish. A dam has been built across the stream, making a small pond, from which water is taken for the packery, and in which it is proposed to test the cultivation of fish in Texas. The grove of three or four acres, near the packery, heavily timbered, is to be thinned out till there is sunshine enough for grass to grow, the fuel furnished by it more than paying all the expenses of making it quite ornamental."

Will Pills Explode?

It is really terrible to find out every day some new danger to which we are exposed. If there is one thing which people have hitherto confided in, it is a pill box; it is allowed to lie about anywhere, it is shut up in a drawer or a cupboard, or is carried in the pocket. A general panic will therefore be caused in many a household by the account given in the *Pharmaceutical Journal* of what recently befell a lady for whom a doctor had prescribed twenty-four pills, each containing two grains of the oxide of silver, a twenty-fourth of a grain of muriate of morphia, and a sufficiency of extract of gentian, the pills being coated with silver in the usual manner. The pills, it is stated, were delivered to the patient in an ordinary pill box; but the lady, being in her nursery, and having no pocket in her dress, placed the box in her bosom, probably next the skin. Little did this unfortunate lady know the deadly peril which awaited her. In three quarters of an hour a severe explosion occurred; her underclothes were reduced to a tinder, she was seriously burned, and, but that she had the presence of mind to extinguish the flame with her hands, she would have been destroyed. Oxide of silver, being reduced by contact with vegetable extracts, is, it seems, in the habit of exploding. It is really as well people should be made aware of the danger they run, in order that they may have magazines for pill boxes attached to their dwellings. We should also be glad to know if pills of this nature are liable to explode after being swallowed. No information is given on this point, which is of some little importance; but the *Lancet*, for our consolation, under the head of "Things not Generally Known," says that a similar occurrence has been known in compounding the extract of colocynth with the oxide of silver, and that with creosote of oil of cloves this salt is reduced to the metallic state with the production of heat, amounting often to an explosion. In fact, there are some pills which are nothing more or less than infernal machines, and people with volcanic temperaments and undermined constitutions, for whom they are prescribed, should be careful to take them in secluded spots, where no one but themselves can be injured in the event of the explosion.

STUCCO.—This substance, now much in use for walls, pillars, etc., is at present prepared by mixing plaster of Paris with a solution of gelatin or glue, instead of with water. This, while stiffening more slowly, becomes much harder than with water alone. For white stucco, the proper quality of gelatin must be employed; for colored, less care need be exercised. When the mass has been suitably applied, and sufficiently hardened, the surface is to be moistened and rubbed down with pumice stone until smooth. It is finally to be coated by means of a brush with a concentrated solution of gelatin, and, when perfectly dried, it may be polished with tripoli on a buffer, with the addition of a little olive oil. It is often desirable, in using plaster of Paris in the ordinary way, to prevent its hardening too rapidly. This may be easily done by adding a saturated solution of borax to the water in suitable proportion. One volume of the solution to twelve of water will prevent hardening for fifteen minutes; while with equal parts this will not take place for ten or twelve hours.

Machine for Punching and Inserting Eyelets in Leather.

We illustrate herewith a very ingenious and important improvement in machines for punching leather and inserting eyelets therein, which surpasses in cheapness and efficiency anything of the kind with which we are acquainted, while it has all the elements of durability, freedom from complications, and ease of operation, which characterize a practical and useful invention.

It may be operated successfully by young girls, and punches a hole and inserts an eyelet at each stroke of a foot lever, with perfect uniformity, both in the width of space from the edge of the piece and in the distances between the eyelets.

The machine is one of those ingenious affairs which are only produced occasionally, and is worthy the attention of all who delight in curious mechanical contrivances, as well as those for whose use it is specially designed.

The eyelets are placed in a magazine, A, which moves with every motion of the foot lever. This magazine is divided into two compartments by a perforated partition, the perforations being of such shape that the eyelets pass from the first chamber to the second, with the turned or flanged end downward. The hight of this second chamber is such that the eyelets cannot turn over while passing through it, and it tapers so that the eyelets are forced finally to move in single file down a curved way, C, which reverses their position as they pass over the curve at the end next the magazine. The way, C, down which the eyelets slide, consists of two rails sufficiently separated to allow the body of the eyelets to pass between them, while the rim or flange slides along their upper surfaces. At I, two springs act as fingers to hold the eyelets from dropping till they are wanted.

A spring latch, B, serves to secure the cover to the magazine, A, so that the eyelets cannot be accidentally thrown out.

Having thus traced the course of the eyelets to the point of insertion, we will next describe the movement of the machine.

A rod, M, connects the principal actuating lever, F, of the machine with a foot lever or treadle. The lever, F, is weighted, as shown, so that when it is not moved by the foot lever through the rod, M, it falls into the position shown in the engraving.

By the action of the foot lever the back end of the lever, F, is raised, and being pivoted at S a right-angled lateral projection, H, forces down the sliding punch stock, which carries a punch corresponding to the female die, J, and an eyelet-riveting punch corresponding to the die, K.

A link, E, connects the principal lever, F, with the frame which carries the magazine, A, and the sliding way, C. This frame is pivoted at D, so that every movement of F raises it, and by means of a slot and a pawl arrangement, not distinctly shown in the engraving, allows it to fall with a sudden jar, by which the eyelets in the magazine are shaken up and a sufficient number passed through into the second chamber and down the way, C, to keep the punch supplied.

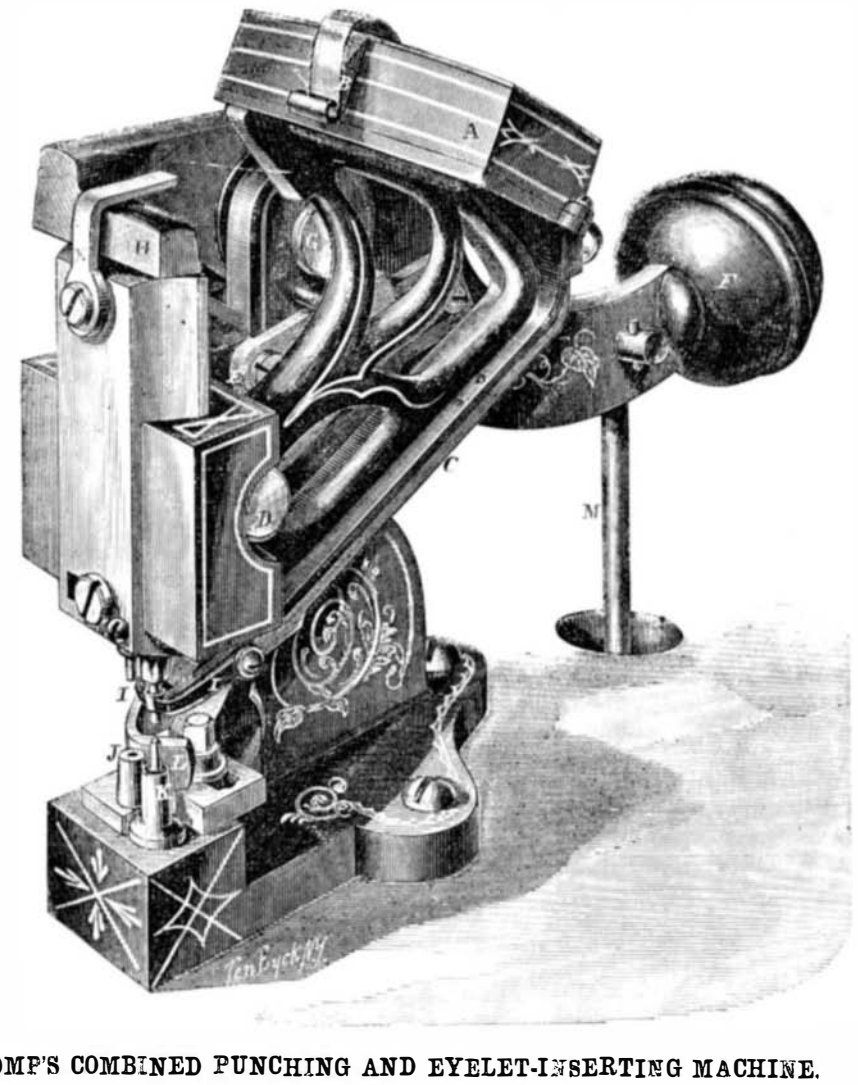
The die corresponding to the die, K, is a hollow cylinder, and has a spindle in its interior, which, when it meets the upper point of K is thrust up into the hollow, and as the die rises is thrust out again by a spring. The eyelet having arrived at the spring fingers, I, the sliding punch stock descends and thrusts the spindle just described through the eyelet. As the punch stock descends vertically, and the spring fingers are drawn back radially, they are forced to release the eyelet, which then slides down the spindle on to the die, K, where it is riveted by the force of the blow. At the same time a new hole is punched in the leather by the punch corresponding to the female die, J; a guide bar, L, serving to keep the distance from the edge uniform.

The punch stock is raised by a hook, N, which engages with the lateral projection, H, on the lever, F.

The facility and accuracy, with which this machine does its work, are surprising, and its merits will undoubtedly attract the attention of all interested in the shoe manufacture, where it will find its most useful application.

It was patented, June 30, 1868, and a patent for recent improvements is also now pending through the Scientific American Patent Agency.

For further information, address Albert Komp, 215 Center street, New York city.

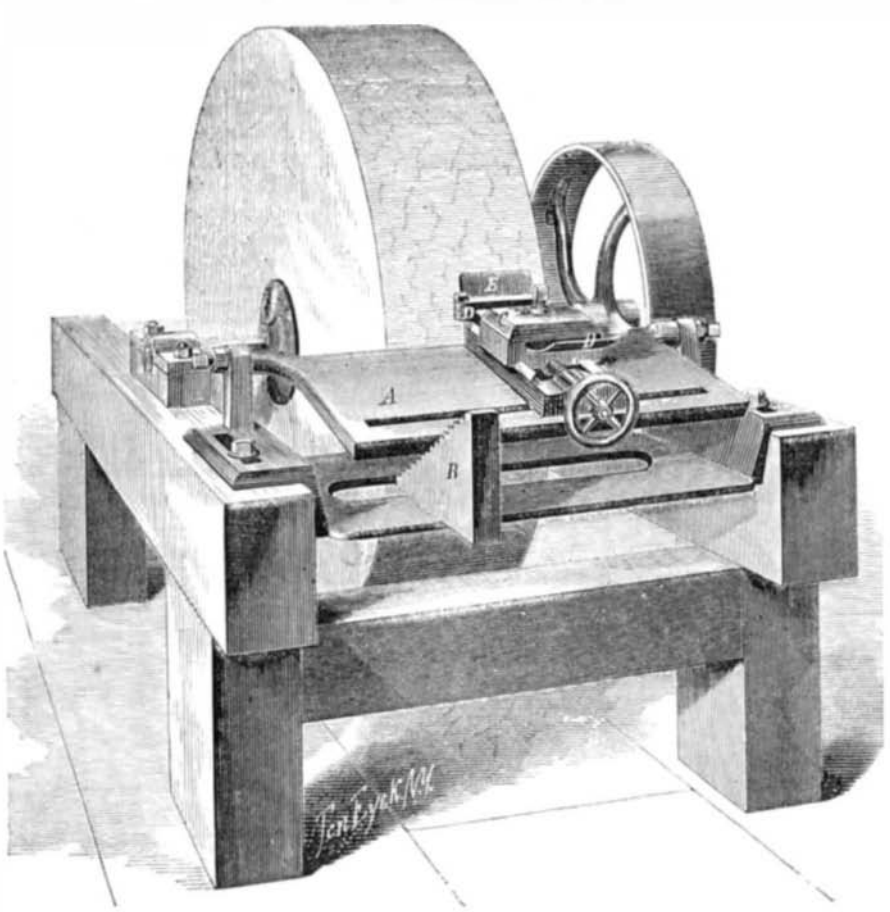


KOMP'S COMBINED PUNCHING AND EYELET-INSERTING MACHINE.

Improved Tool Holder and Machine for Turning and Scraping Grindstones.

Every mechanic is aware that the accurate grinding of a tool can be accomplished only on a stone properly faced and free from glazed streaks, and that with many kinds of tools it is important that they should be held uniformly at a given angle. This is in many cases a difficult thing to do, especially in grinding long knives for wood planers, tobacco cutting machines, and the like.

The invention we herewith illustrate, is designed to provide for both the convenient and accurate facing of the stone, and the uniform holding of tools in grinding, and is, we believe, not only a cheap but a valuable adjunct to a grindstone in most shops and manufactories.



LEONARD'S TOOL HOLDER AND GRINDSTONE DRESSING MACHINE.

The parts are so clearly delineated by the excellent engraving, that any mechanic will comprehend at once the operation of the device.

A pivoted plate, A, is adjusted to any required angle by means of a wedged-shaped step-block, B. This plate carries a tool holder, C, by which the adjustment of the scraper, D, is effected, and by which the latter is firmly held when dressing the stone.

Parallel motion is given to the tool-holder by means of a slot in the plate, A, in which a guide slides.

The tool-holder is also used for holding any other tool which it is desired to grind perfectly true, acting as a clamp firmly sustaining the tool to be ground in the required position. A fender plate, E, prevents the scattering of dust while facing the stone.

The form shown in the engraving is a cheap style for general use; it will, however, be understood that the principle may be carried to any extent, and to any degree of refinement, for any tool of whatever size or length required for various kinds of work.

This device has been made the subject of four patents, bearing date, respectively, July 14, 1868, June 29, 1869, December 7, 1869, and February 22, 1870, all taken through the Scientific American Patent Agency by Philip Leonard, Sharon, Pa., who may be addressed for rights, etc.

The Wild Beast Trade.

An English magazine says, "The trade in wild beasts is a system as regular as the trade in tea, coffee, or cotton, or any other merchandise. Some creatures, of which parrots are the most numerous, are brought over by sailors, who intend them, perhaps, as presents for their sweethearts, but they sell them for grog or tobacco as soon as they land. A dealer has agents in every country; and these agents communicate with the natives of the various countries. The system is now carried to such perfection, that if any gentlemen or lady would like an elephant for private riding, a tiger as an ornament to the garden, a crocodile or hippopotamus for the lake, or an ostrich or emeu for the lawn, the wish can be gratified by merely addressing a letter to the London dealer. He will calculate distance, the time occupied in catching and transporting the desired animal, give a close estimate of the cost, and deliver it at the door on the appointed day."

RUBBER TIP FOR FURNITURE LEGS.

In some forms of rubber tips for furniture legs, now in use, the method of attachment is such that when the rubber wears away from long usage, the attachment by which it is held fast to the leg, becomes a nuisance, marring floors, and cutting carpets. There is also danger of their coming off, especially when submitted to the test of the Yankee practice of tipping back in chairs. These things have been serious drawbacks to the use of such tips for libraries, sitting rooms for hotels, etc., when otherwise they would be found very useful, in preventing the wear of polished floors, and reducing the noise consequent upon moving chairs from place to place, sliding them about, etc.

The object of the present invention is to remove both the annoyances specified.

The screw by which the rubber tip is held to the leg is formed as shown at A, Fig. 1, with a broad head, to abut against the leg, as shown in Fig. 2; and it also has a button, B, formed upon the head, upon which the rubber tip is cast, as shown.

The portion of the head which abuts against the end of the leg, is made octagonal in form, with a circular flange, which gives it a finished appearance, the angular part enabling it to be driven into the wood by a wrench, or other suitable implement.

The whole forms a neat, cheap, and durable attachment,

Fig. 1

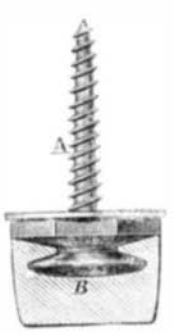
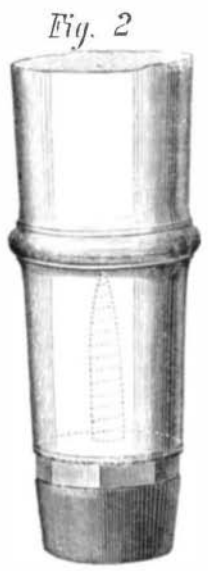


Fig. 2



and we regard it as a decided improvement upon other methods hitherto employed.

Patented, through the Scientific American Patent Agency Dec. 22, 1868, by O. B. Collins, whom address for further information, Box 249, Charleston, S. C.