keeping in view the object of insect life, he found a clew to one reason for the existence of the clothes-moth. The caterpillar of the clothes-moth, fed on wool, which is hair; and hair, by the ordinary agencies of nature, is imperishable. In the Egyptian Room of the British Museum might be seen a wig—a lady's wig--which is as brilliant and as fresh as when it came from the hands of its maker 3,000 years ago. Wool is hair, and hair is wool. The clothes-moth never touches cloth garments while they are in use, and never while the wool was on the back of the sheep that furnished the cloth, Every sheep sheds its wool once a year, scratching it against trees. If the wool were not removed from the trees it would kill the trees, for they would not be able to breathe. The clothes-moth and its insect allies set to work when the wool was done with, and enabled the trees to shoot and grow. It was a curious but a positive fact that if it were not for the clothes-moth and its allies there would not be a tree on the earth, and no human creature could exist on it. So the insect was intended to render the world better for beings higher than itself. His most excellent and respected friend, the cockroach, was not appreciated. People did not like it. He did not know why, for it could not sting or bite. Some people objected to it on the ground that it had a disagreeable smell. The insect was not aware of that fact. Then, probably, human beings had a disagreeable smell to animals. A deer could smell a person a mile off, and as the deer got away as quickly as it could, it evidently thought the person had a disagreeable smell. It was all a matter of taste. As to the cockroach it was often called a black beetle. It was not a beetle, and it was not black. Its color was a ruddy, chestnut brown, which was now becoming quite a fashionable color. They would notice there were two very distinct shapes of the cockroach. There were the male and the female, and there was no possibility of doubting which was which, for they followed the universal law that the male was twice as handsome as the female. It was a fiction of poetry to state the reverse. Cockroaches were always found where there was wasted food. They were never found where food was not wasted, and belonged more to civilized than to savage life. They were never found in the wigwam of the savage. He went on to observe that the cockroach was capable of being tamed. Its use was that of a scavenger. There was one particular use in which it was directly beneficial. Cockroaches were considered noxious insects, but there were others quite as noxious. They were quite as flat, but happily not so large. A person historically inclined might speak of them as "Norfolk Howards," while a musician might designate them as "B flats." The cockroach consumed these insects. The lecturer went on to treat of the earwig, the lace-wing fly, and the gnat, all of which he described and illustrated by sketches. Speaking of the gnat, he said it consumed in its life, in an aquatic state, certain animal and vegetable matter which, if not so consumed, would, with the warmth of the sun, produce gases productive of ague and asthma. The grand object of insect life was to eat, and render the earth fit for higher creatures to inhabit.

A Kentucky Robin Roost.

According to the *Times*, of Glasgow, Kentucky, there has been near that place the past month a robins' roost that equals the pigeon roost of olden times.

"A cedar thicket of about sixty acres furnishes the birds a lodging place About sundown every evening constant streams from every direction pour into the grove, and almost obscure the heavens in their flight. Night finds almost every bush in the thicket bending with its red-breasted load. For the past few weeks lovers of sport for miles around have visited the place, and every night the thicket is illuminated with the torches of men with clubs and sacks gathering the feathery harvest. Mr. Smith has killed over 2,000, and hundreds are carried away every night, but they don't seem to decrease; there are millions of them. Large quantities of them have been sold in town. They are very fat, and make, when well cooked, a dish good enough for anybody."

Seeing that the robin is one of our most efficient destroyers of insect pests – a young robin requiring daily a bulk of such food equal to its own weight – it is probable that every bird killed at the "roost" will cost the country a dollar, perhaps ten times as much. In any case one of these birds "in the bush" is worth a score or more "in the hand" or in the frying pan.

The Gold Gravels of California.

Mr. W. S. Keyes, mining engineer, reviews at great length, in the San Francisco *Bulletin*, the advance sheets of an important work on the "Auriferous Gravels of the Sierra Nevada" by Professor Whitney, formerly State Geologist of California:

The gravels of California are of economic importance, because of the gold which they contain, and because they are so situated that they can be washed with profit. They present phenomena almost identical with those of Australia, and have the advantage of the latter in being better supplied with water and dumping ground. Professor Whitney reviews cursorily the few localities of gold-bearing gravel of the coast ranges in the northwestern part of the State, and then proceeds to consider the gravel region proper. This extends from Mariposa to Plumas, and is very nearly coterminus with the limits of the gold-bearing slates. The hydraulic interest increases in importance as we go north from Tuolumne to Amador county, and reaches its culmination in El Dorado, Placer, Nevada, and Sierra counties. He shows that all the placers must have sprung from the degradation of pre-existing quartz veins, which were probably richer than those we now see. He devotes considerable space to a description of the various mechanical appliances used for saving the gold, and credits Ed. E. Matteson, of Stirling, Connecticut, with the invention of the hydraulic method. The physical conditions necessary for an economical washing of the gravels are particularly favorable along the western flank of the Sierra. Water with a sufficient head is plentiful, and there is a gradual and easy slope from the mountains for a distance of about 70 miles, with a grade of about 100 feet to the mile. This sloping plateau is cut by deep gorges or cañons through which flow the present rivers, and into them the vast accumulation of tailings is dumped. The great depth of erosion may be inferred from a single example, viz.: at Spanish Peak, where the Pliocene gravel beds occur 3,800 above American Valley. The gravels vary in thickness up to two or three hundred feet. Usually, but not always, the lowest portions are the richest. They are found in channels of varying width up to 4,000 feet. Upon the gravels in many localities we find a capping of basalt or volcanic ash. The thickness of this cap, other conditions being equal, determines the method of working, whether by "piping off" or by "drifting."

The fossils of the gravels are divided into three classes: Microscopic organisms, plants, and animal remains. Professor Whitney devotes considerable space to the specimens of human handiwork, mortars, pestles, etc., found in several localities, and relates in detail all the facts attainable touching the fossil human skull found in a deep shaft in the Calaveras gravel measures. He gives two lithographic views of the skull. The finding of this fossil—for fossil it undoubtedly is, because the phosphate of lime has been changed to carbonate—has aroused much controversy, but in view of the proofs adduced we are constrained to accept its genuineness. And in so doing we acknowledge the existence of mankind contemporarily with the depositions of the gravels. Professor Whitney is of the opinion that there was no river or system of rivers running parallel with the present crest of the range. He believes that the whole mass of the chain was originally much higher than it now is. He attributes the formation of the gravel beds to running streams which, during the tertiary age, carried far more water than the present rivers. He denies the possibility of their marine origin, or that they were due to glacial action.

Contemporaneously with and subsequently to their deposition great outpourings of lava and volcanic ashes took place, whereby large areas of the gold regions were covered up. Through these formations the present rivers have cut their way and have formed the deep gorges which we now see.

Discussing the complicated questions touching the economical working of the gravels Prof. Whitney gives an example where a yield of 2·6 cents per cubic yard barely covered expenses. He concludes, however, that under favorable circumstances, a yield of 4·75 cents per cubic yard may be considered the mean minimum necessary for profit. He shows that about 20 cubic feet of water is, on the average, required to move one cubic foot of gravel. He closes with the opinion that hydraulic mining will continue for very many years, unless the injury from the *débris* shall be too great to be endured. "And," he says, impressively, "there is no part of the world where scientific oversight and judicious legislative interference is more desirable for the future welfare of the community than in the Sierra Nevada of California."

The Mineral Belts of the Great West.

The *Tribune*, of Denver, Colorado, is anxious that a National Mining Exposition shall be organized at that place. In an article setting forth the advantages of such an exhibition, it says: "There have already been ascertained to be four well defined longitudinal belts of silver mines between the eastern base of the Rocky Mountains and the shores of the Pacific. First, the Colorado and New Mexico belt; second, the Utah and New Mexico belt; third, the Nevada and Arizona belt; and fourth, the California and Old Mexico belt. According to Professor Rossiter W. Raymond, this latter belt extends along the east base of the Sierra. There are many transverse sections all through the mountain regions, but these great belts of mineral are sufficiently well defined. The attention of the floating capital of the country is attracted to the districts traversed by these mineral deposits.

"Railroad lines are penetrating into and through the mountains. Colorado is already handsomely provided for, and the great Southwest will be gridironed at no distant day by lines already projected. With these transportation facilities Denver will become, if she is not already, the center of the great mining industry, and an exhibition of the ores of the royal metals alone. and appliances for mining them, would be warranted. But aside from these, there are coal fields in Gunnison county, New Mexico, and the Southwest, whose importance will not be long in attracting attention, and such minerals as antimony, gypsum, quicksilver, zinc, graphite, and even cinnabar, exist in our mountains. The mining of all these mineral substances is important, and their display would have a growing interest in this community. Even such coarse material as slate, limestone, and building stone of all kinds would command no small attention among practical men, while the various crystals and fossils and rare petrifactions would prove an attractive artistic feature to a general mineralogical exhibit."

Correspondence.

Hearing Noises in the Sun.

To the Editor of the Scientific American:

For a couple of months past there have appeared in all the papers accounts of certain efforts on the part of Professor Bell to reproduce, by means of the photophone, the noises which accompany the solar disturbances. But I have looked in vain for any statement of the error in the assumptions on which these experiments are founded.

If we have a beam of light of varying intensity falling on the selenium cell of the photophone, the instrument will give out sound; but it by no means follows that this sound is a reproduction of any previously existing sound.

Suppose the light of a lamp to be thrown on the cell, and a screen be made to pass rapidly back and forth across the path of the rays. The alternate light and darkness thus produced would certainly give a sound in the instrument, yet the lamp may burn and the screen may move absolutely without noise.

It is only when the variations in the light are originally produced by the action of the pulses in the sound medium that the sound given out will be a reproduction of a previous one.

Furthermore, the intensity and character of the sounds in the photophone depend upon the degree and rapidity of the variations in the light.

Now, in the case of the sun we have no assurance that the requisite conditions exist to enable us either to reproduce the solar noises, on a small scale, or to originally produce anything similar to them. We certainly cannot say that the variations in its light come from the rays having been modified by sound waves in the solar atmosphere; nor is there any reason to believe that they are at all naturally proportional to any accompanying sound; and until one or the other of these conditions is shown to be a fact, it seems to me that the results of Prof. Bell's experiments will continue to be, as hitherto, "not wholly satisfactory."

W. V. BROWN.

Cambridge, Mass., February 19, 1881.

Sun Storms.

It is pitiful to witness the condition of the sun. The great fire-ball is in intense commotion. His surface is seamed and scarred in every direction, with black spots that indicate the disturbing elements at work in his chaotic mass. Occasionally, for a day or two, the blemishes disappear, and the glorious king of day shows a face like a shield of glowing gold. But the aspect quickly changes; spots come rushing in all directions and assuming all forms. They appear singly and in pairs, and again in groups and rows. Immense groups break up into small ones, and small ones unite to form great chasms, into which half a dozen worlds might be dropped and there would still be room for more. Sometimes the spots are visible to the naked eye, and at that time a good opera glass or a spy glass will make them easily perceptible. Hundreds of observers all over the world watch the sun's face every clear day, and keep a record of the number of spots, their size, and the direction in which they move, for as the sun turns on his axis they turn with him, some of them remaining for months without much change, some taking on new forms and some disappearing entirely. Very little is known of this mysterious sun or the spots that are visible more than ninety millions of miles away.

Once in about eleven years the sun takes on his present sun-spot phase, and we are approaching the maximum of disturbance. No one knows the cause. Some believe that it is planetary attraction, some that it is the fall of great masses of meteoric matter, and some that it is the result of internal commotion and the rush upward of gaseous explosions in comparison with which our fiercest volcanic eruptions are but the flicker of a flame. Besides the sun-spot agitation, the gaseous outbursts are marked and vivid. The tongues of flame or rosy protuberances are darting forth in all directions and bearing their testimony to the solar commotion. Mr. Trouvelot, of Cambridge, who makes daily observation of the sun's chromosphere, gives a graphic description of a remarkable solar protuberance that he witnessed on the 16th of November. When first seen it was large and complicated, extending upward from the sun about a hundred thousand miles. Three or four hours after it had developed into huge proportions, extending far out into space, and vanishing gradually to regions where it could not be perceived. As nearly as it could be measured, it reached a height of over a quarter of the sun's diameter, or about two hundred and thirty-five thousand miles. Such a protuberance hurled upward from the earth would almost reach the moon! Two hours after, the whole structure had collapsed, and was only about eighteen thousand miles high. Observations like this give an idea of the mighty forces at work in the solar orb, and make observers long for the time when a satisfactory solution may be found for this mysterious periodical solar disturbance, so intimately connected with the meteorological condition of the earth.—*Providence Journal.*

THE Wheeler wood filler patents, after a long controversy, have been fully sustained at final hearing, and injunction is ordered to issue. This filler is manufactured by the Bridgeport Wood Finishing Company, of Bridgeport, Conn., and is acknowledged to be the best article in the market for the purpose. Mr. D. E. Breining, 40 Bleecker street, New York city, is agent.

Tea Curing and Packing in Foochow.

The following quaintly-worded, yet very graphic description of the work done in a large Chinese tea packing house, is given by the Foochow *Herald,* at the close of a season's operations:

A large tea packing house presents a very different scene from that two months ago. Then, at the door one found lines of fifteen catty boxes and waiting to be soldered up. Now, none. Next, one found fat bags stacked up eight or ten feet, bursting with Pehling tea that escaped here and there through holes temporarily stopped with bamboo leaves; the bottom of the bags mostly stained from contact with wet flights of mountain stairs upon which the exhausted cooly had set them down on the passage.

Now, one finds but empty chests, hundreds in number, square, deep, and oblong, used for handling the tea in the factory. Ordinary tea chests would not stand the rough usage.

Farther on, one came to the dozen long double row of sifters facing each other, forty in a row, the mesh of some taking a pencil—that of others refusing a pencil point—sifting tea leaf rough and bold, that after a persuasive grasp or two in the hand broke, and consented, after a few shakes in the sieve, to be stripped of some of the sappy leaf edges and to appear below, the even and uniform leaf which tea the drinker insists he must have (plus the dust due to the persuading). The transformation in a rough leaf on passing the meshes of a coarse sieve, with a gentle crush from the sifter's hands, enhances a rough, bold tea much in value.

In place of the rows of men then seen, tilting and jerking their sieves in a monotony only broken by the Cantonese taskmaker's roll-call twice a day before the general meal of fish and rice, there is now to be seen only the bare floor of hardened earth, piles of empty benches stacked in a corner, and the sieves of the twelve different sizes used, each in its division in the three-story stands.

The dozen or score of fanning mills are still now. The trained hands are gone that turned the cranks with a uniform motion, sending the heavy tea, light tea, and flaky dust each down its respective spout separated, never again to meet, unless haphazard, mixed in a Whitechapel grocer's window.

The tea leaf separated in these fanning mills has been parted with at the smart loss of Tis, 8,000 on 3,500 piculs to the foreign buyer, and has been let go by the latter to the London dealer or auction room habitue. The mills now stand still. The tea growers in the hills who waited through June and July for their money have now been paid. The losses to the packers here, however, have been so smart that there is little third crop tea now being packed in Foochow, and the mills will rest until another May shall bring the physical courage bred of hot blood back to the pale and dispirited native teamen. There are stacked up in this huge go-down a few hundred packages of a native maker's brick tea wrapped in plaited bamboo strips, bound in half bamboo and triply rattanned. Aside here, the Chinese upper millstone is being turned upon the nether by a Chinese who is grinding the seeds left by the fanning mill.

In these sycee boxes sharp spades are falling upon the tea stems, chopping them fine enough to go into the stemmy dust mixture to which the seed dust gives the strength, while the chopped stems vouch for it being tea.

In the firing house, four Chinese rice kettles, two feet across the mouth, set obliquely across the edge, turn the tea back in a shower over the hand of the stirrer, a wood fire being kept up in the brickwork underneath. Fire holes, scores in number, follow in rows the walls of the firing house; in each an iron pan is placed, now filled and rounded with charcoal ready to be lit. Placed over each of these fires is a huge hour-glass-shaped-basket-hood or muffler that shuts in all heat of each fire to but one outlet—that through the tea sieve that chokes the throat of each basket.

In these baskets is dried off the tea that comes in from the hills wet or flat from constant down-pours and from the first fermentation of the leaf. These fires are out and all is still.

Here too, on the floor above, the benches are empty where girls and women came—some too often—to throw out the stems from the leaf, getting half a cent for removing those from the two catties of tea given them in wound bamboo-woven trays.

The floor is now bare where we saw the Ningteh tea brought to a uniform shade, by shaking in bags with a few spoonfuls of lampblack; then balked upon the floor, only to be strewn white as a grave in spring with the pure muhil blossoms; then blossoms, in turn, buried under another avalanche of funeral tea, and this again with blossoms, life upon death; then both were rudely mingled together and put away in boxes for a night till the fragrance should have been robbed by the dead tea, and the faded flowers be thrown aside, spent and worthless.

Our round finishes at the shed where Chinese lads, out of long sheets of lead, are glibly making lead cases by moulding them, hatter-like, upon a box, and then running the soldering iron along the edges. Here Chinamen in their natal costume, beside this huge four-hogshead vat of hot water, are washing off the dust and sweat of the day. Here are piles of wood for the hot tea coppers, crates of up-river hardwood charcoal for the firing pans and firing baskets. We must leave without the sight we then had of the mad dervish dance of two Chinese, who, given a dozen pounds of tea stems under their sandals in a tray, performed about the interior periphery a double shuffle, twist and grind of the enemy under the heel, that is cooler for the spectator, the thermometer in the nineties, than for the performers, from whose bodies the perspiration rolls into the tea stems below.

The box factory is elsewhere. We enter on our homeward way. It is another old disused tea hong occupied by foreigners in the days when money was made, tumbledown now and abandoned to Chinese. Inside, a few Chinese youth eating a dollar's worth of rice per month, are rapidly gluing and dovetailing together, by rough wholesale strokes, boxes by the score. Few nails are used, for these are hand-made and cannot be afforded. What a bungling "mending" the merchant will pay for when these frail cases reach the land of rough usage and coarse nails!

Here you see a bit of thin tea-wood, there a bit of paper gaudily daubed with cardinal colors, a stroke or two, side marries end, the gaudy paper cover hides all joints, and the catty boxes, gay with bird, butterfly, dragon, and phœnix, are *en route* to be stared at in a provincial grocer's window.

The only foreign devices we have noted in those busy establishments, where in the season 500 men and women are busy from daylight to dark, are a Fairbanks scales and a Canton-made fire engine. Two red tapers stuck in the earth at the door burn for good luck, and good luck we must wish the patient set who work here.

Nearly 2,000 piculs this season have passed the sieves, one might almost say, a leaf at a time. And so this year, of hundreds of packing houses, some in hamlets in the hills, some, as in Foochow, in cities ten to fifteen miles from the hills. Women have carried, each her picul, up and down the mountain pathways, twenty-five miles a day, not complaining of the bent backs, nor once rudely jostled or insulted by "foreign coolies" from outside districts who come starving their way toward the work offering, their only food a double handful of salt in their girdle to bite at before they drink along the road. Boatmen at river marts have fought pitched battles for the tea, upon the transport of which depended their livelihood.

Probably all the tea leaving Foochow has been lifted up and down as most as if it had been carried up one side of the great Pyramid and down the other a score of times. Plenty of men have been ready to fight for the privilege of carrying it; plenty of women, too, under their loads behind their new husbands.

IMPROVED COFFEE POT.

The annexed engraving shows an improved coffee pot, which is claimed to be a very superior article, and capable of making coffee of a uniformly good quality, where a good properly roasted and ground berry is used. The coffee, C, is placed in the wire cloth sack, S, suspended from the flange, R, at the top of the pot. A trap, T, covers the inner end of the spout and prevents the escape of vapor.

The construction and management of the pot are very simple, and it has the indorsement of a large number of persons who have used it.

Further information may be obtained by addressing the Ideal Coffee Pot Company, 622 Filbert street, Philadelphia, Pa.

The New Mill of the Willimantic Company.

The new thread mill of the Willimantic Linen Company is said to be the largest and finest structure in the world devoted to the manufacture of spool cotton, and also the most capacious cotton mill anywhere on a single floor.

The main building is 820 feet by 174, with two porches at the ends 30 x 40 feet each, and two wings 80 x 60 feet, three stories high. The first girders are supported by 707 columns, 12 inches in diameter, while 352 columns on the main floor support the roof. The walls are chiefly glass resting on brick piers. The roof is also largely of glass, the dark part being covered with felt overlaid with asphalt and gravel.

Internally the mill is divided into five sections, each complete in itself and driven by a separate Porter-Allen engine of 250 horse power, making 350 revolutions. The power is distributed by steel shafting running the entire length of the building, that of each section being coupled directly with its engine. No belting over 2½ inches wide is employed.

The boiler house is 80 feet square, and covers two batteries of eight boilers, each boiler of 80 horse power. The chimney is 16 feet at the base and 152 feet high.

The mill is lighted throughout by Brush electric lamps. The generators are in the center of the building on the basement floor. One supplies 18 lamps of 2,000 candle power, the other is a 40-light machine.

Ring-frame spinning is employed throughout, the yarn ranging from No. 50 up to No. 120. The entire process of thread-making is completed on the main floor, which is 820 feet by 175 feet.

The architectural design and finish of the mill are elaborate. In all the windows are ample boxes for window-gardening. In the three towers are large water tanks of 30,000 gallons capacity each, to supply the closets and for other uses. The four entrance porches are neatly fitted up and supplied with wardrobes, each operative being given a numbered compartment. The spacious main entrance leads to the inspecting room, 60 x 80 feet, tastefully finished opening upon the main room. Here, says a reporter of the *Economist,* to whom we owe these particulars, "a view, grander than was ever seen in any mill, either in the Old World or in the New, is afforded. The wide sweep of perspective, broad and ample, the long rows of windows bordered with stained glass above, and fringed with the bloom of plants and flowers below, the solid floor shining as clean as if waxed for the occasion, the whirl of spinning frames, the long white rows of bobbins and spools, the numerous lines of contented but busy operatives in their clean attire, white and neat, as the color of the skein so deftly shaped into thread for spools, all tend to form a busy, changing, stirring scene not to be forgotten."

In one of the wings is the dining-room provided for the operatives. The room is light and cheerful, and fitted up with the appliances needed for serving hot lunches.

The mill is located on the north bank of the Willimantic River, and from its high elevation commands an extended view of the surrounding country. Some idea may be formed of the skill and energy displayed in its completion, when it is stated that the site it occupies was a pine forest up to the first of March, 1880. During the first week of that month the excavations for foundations were commenced, and during the second week the timber was cleared away. In the short space of ten months the most beautiful and complete thread works of the country, or of the world, were erected, and thousands of spindles set running in the manufacture of six-cord spool cotton.

Glass Eyes.

A reporter of the Chicago *Inter Ocean* has been investigating the trade in glass eyes. From the leading dealer in the West, a firm which has sold glass eyes for many years, he learned that there were as many as a thousand wearers of them in that city, and that from 600 to 800 eyes are sold there every year. The best eyes are made at Uri, in Germany, the manufacture centering at that place on account of the occurrence there of fine silicates and other minerals needed in the business. The German eyes withstand the corrosive action of tears and other secretions better than those made in France.

At Uri are made also vast quantities of eyes used by taxidermists in mounting birds, animals, and other natural history specimens, besides a superior quality of glass marbles, known to boys as agates.

The artificial eye is a delicate shell or case, very light and thin, and concave so as to fit over what is left of the eyeball. The shell is cut from a hollow ball or bubble of glass, the iris is blown in, and then the whole is delicately recoated.

The trade in Chicago has undergone a curious change. Twenty years ago there were sold very many more dark eyes than light, but from that period on the sale of dark eyes has been perceptibly dying out. Now nearly all are light eyes, say twenty light to one dark. In Boston the percentage is even larger, about thirty-five blue or light eyes to one brown; while on the other hand, in New Orleans fifty brown or dark eyes are sold to one light. Regarding the change of color in Chicago of course fashion has nothing to do with it. No one has yet decreed that party-colored optics shall be the rage. The change simply shows that the influx of population has been from the East principally and from northern Europe.

Surgical operations are performed much more skillfully than formerly. Time was when it was deemed necessary to take out the eye entirely. Then the artificial eye became a fixed, glassy, staring object. Now amputation of portions of the eye can be performed in very many instances, and the glass eye fitted on the stump, which moves quite naturally.

Sometimes those who have lost an eye will keep two or three artificial substitutes. They will use one for the daylight with a small pupil, and another for night time with a large pupil to offset the dilatation.

Flexible Shafting for Tower Clocks.

Philadelphia has recently adopted a time ball similar to that used in this city. The automatic apparatus for dropping the ball at noon was devised by the builder of the clock, Mr. G. W. Russel, the city time keeper. To a delicate hair trigger the armature of a magnet is attached, so that when the electric current is passed through the magnet the movement of the armature sets off the trigger and lets the ball drop.

The current is sent to the magnet in a very simple manner. In the clock are three wheels, one of which revolves but once in twenty-four hours, the other once in one hour, and the other once in a minute. In each of the three wheels is a notch, and, of course, these three notches can be in the same straight line but once in twenty-four hours. This occurs on the completion of the last second before noon, and then a lever attached to the escapement drops into the notches, completes the electric circuit, and sets off the hair trigger.

The time ball is placed above the clock tower of the Union Insurance Company's new building at Third and Walnut streets, and is visible from a long distance.

Owing to lack of space it was found inexpedient to put the machinery of the clock in the tower, so it was placed in a separate loft and connected with the dial by flexible shafting. This avoids obscuring the skeleton dial by the boxing that would have been necessary with the usual right angle connection. Mr. Russel claims that this is the first application of flexible shafting to tower clocks, and that the result has been satisfactory. The time is taken daily from Washington.