### DECISIONS RELATING TO PATENTS.

**United States Circuit Court.—Eastern District of Pennsylvania.**

NELLIS *vs.* THE PENNOCK MANUFACTURING COMPANY.—PATENT HAY ELEVATORS.

McKennan, Cir. J.:

On the 18th day of December, 1866, letters patent, No. 2,429, for improvement in hay elevators, were reissued to Edward L. Walker. On the 29th of May, 1866, reissue letters patent, No. 2,260, for improvement in horse hay forks, were granted to Seymour Rogers, and on the 20th of March, 1866, letters patent, No. 53,345, for improvement in horse hay forks, were granted to Seymour Rogers. The title to these several patents is alleged to be vested in the complainant, and they constitute the subjects of the present controversy.

Several patents may be included in the same suit when their subjects are correlative and the inventions claimed are embodied in the same infringing machine. Demurrer for this cause overruled.

An assignee of the exclusive right to manufacture and sell a patented invention throughout the United States is the proper party to maintain a suit for the violation of this right. The right to manufacture and sell carries with it the right to use the devices sold, and nothing short of an express qualification will change this result.

If the agreements between the parties have defined their contracts, it is out of place for an entire stranger to them to seek to circumscribe their scope by a technical limitation of the spirit and sense which the parties have impressed upon them.

A grant of "the exclusive right under said recited letters patent to manufacture and sell a certain hay elevator" *Held* not to be an assignment of an exclusive interest in the entire monopoly for the whole or any portion of the United States. It is a license only to manufacture and sell exclusively a specified form of hay elevator, and the representatives of such an interest are not indispensable parties to a suit upon the patent.

### Scientific Results of the Jeannette Expedition.

The last number of *Der Naturforscher* contains a first attempt to lay down the scientific results of this expedition, in a paper by Herr H. Wichmann, based on the reports of Messrs. Melville and Danenhower, and of the naturalist of the expedition, Mr. Newcomb. It is known that after having passed, on August 31, the wintering station of the Vega, the Jeannette sailed north, toward Wrangell Land. But on September 5, when twenty miles northeast of Herald Island, she was frozen in, and during twenty-one months remained so, "the play of winds and currents." However drifted in different directions, she still advanced during all this time toward the northwest. The first wintering was north of Wrangell Land, which last proved to be a large island, and not a part of an Arctic continent, as had been presumed. The precious observations on auroræ and magnetism which were made during the winter (about 2,000 measurements) are unhappily lost, as well as extensive collections of birds and of deep-sea fauna. The depth of the ocean in these regions was everywhere very small—thirty fathoms on an average, with a maximum of sixty and a minimum of seventeen fathoms. The bottom was usually a blue ooze, with a few shells and sometimes stones, which seemed to be of meteoric origin.

The ship still drifted toward the northwest, and on May 17, a small island, called Jeannette Island, was sighted in 76° 47′ 28″ N. lat, and 159° 20′ 45″ E. long. It was a rocky hill, covered with snow, situated on the eastern flank of a high mountain. Two days later another island was discovered toward the west, and an expedition under Mr. Melville reached it, with many difficulties, and landed on it on June 3, 1881. It was called Henrietta Island, and is situated under 77° 8′ N. lat., and 157° 43′ E. long.; it is rocky, and 2,500 to 3,000 feet high; the rocks are covered with nests of birds, but the vegetation is very poor, consisting of lichens and mosses, and of one species of phanerogam; all the island was covered with a sheet of ice and snow 50 to 100 feet thick, and a mighty glacier reached the sea on the north coast.

As is known, on June 13, under 77° 30′ N. lat., and 155° E. long., the Jeannette was lost, the depth of the sea being there 38 fathoms. The crew, divided in three parties, went south, but ten days later they perceived that, owing to the drift of the ice, they had still advanced 27 miles northwest, being under 77° 42′ N. lat. That was the highest latitude reached by the expedition.

On July 9 they perceived land, and after a hard journey reached it at a promontory they called Cape Emma (76° 38′ N. lat., 148° 20′ E. long.). This island, which received the name of Bennett, is a high mass of basalt, covered with glaciers; the island was crossed by a party, after two days' travel, and the north coast proved to be more hospitable than the south; it has several valleys covered with grass, where reindeer bones and driftwood were found; lignite was discovered on the south coast, and it is said that it would be quite useful for steamers. Dr. Ambler here collected fossils, as well as many amethysts and opals, but they were lost. The gulls were so numerous and so tame that hundreds of them were killed with sticks; the tides were regular, but very small, the level changing only two and three feet. The sea was free of ice in the west and south, and even in the northwest a "water-sky" was seen, so that M. Danenhower supposes that Bennett Island would be a good starting place for future Arctic expeditions. It was only on August 30 that the expedition discovered the first traces of men on the Faddeyeff Islands; and its further advance toward the delta of the Lena is well known.

The scientific results of the Jeannette expedition cannot be yet completely appreciated, observes Herr Wichmann, but the notebooks and surveys of its members having been preserved, as well as a good part of the collections, it is to be expected that they will contribute to a great extent to increase our knowledge of this part of the Arctic Ocean. The discovery of three new islands confirms the statements of Sannirikoff, who stated he saw land from the Faddeyeff Islands, and renders probable the existence of a whole archipelago in that part of the ocean. The exploration of the fauna and flora of the New Siberian Islands, which never was done before during the summer, promises interesting results. The problematical *polynias*, which stopped the advance of the sledge parties of Hedenström, Wrangell, and Anjou, are not due to some warm currents, such having not been noticed during the temperature observations of the Jeannette; they are simple openings in the ice, such as are observed elsewhere. Finally, the search expedition must give most important corrections to the maps of the Siberian coast between the Olenek and the Yana river, which has not been visited for sixty years; the observations of the American expedition will correct many of the observations of Lieutenant Anjou. We may add to these expectations of Herr Wichmann that, as the Arctic law that "each polar expedition safely reaches the points which were sighted by the preceding one," will probably be true also for the North Siberian Seas, we must soon expect new and important discoveries in that direction, now that the way was opened to explorers of those parts of the Arctic seas.—*Nature.*

### Cost of Carrying Coal on English Railways.

It is stated in the *Engineer* that a coal train of 300 tons, to run 100 miles, may be estimated for cost of running by the following method: The train would consist of thirty trucks, a brake van, and the engine and tender. The value of the rolling stock is thus made up: Engine and tender, £2,300; thirty trucks, at £70, £2,100; brake van, £120; total, £4,520. Interest and wear and tear are taken at 20 per cent—say, in round numbers, £900 a year. The average year's running would be 15,000 miles. It might be much more, and probably would seldom be less; but this is taken as a fair mean, though somewhat underestimated, so as to be on the safe side. The cost for interest on capital and wear and tear for running such a train 100 miles will be £6. The engine would burn about 50 pounds of coal per mile, representing a cost of something like 16s. per 100 miles for fuel. Wages of stoker, driver, and guard for the trip would come to about as much. The total cost of haulage of the 300 tons of coal per 100 miles is thus shown—with an addition of 8s. for grease, oil, water, and sundries—to amount to the round figure of £8, or 6·4d. per ton per 100 miles. To this must be added the charges relating to permanent way, working expenses at stations, rent, rates, and taxes, and other miscellaneous charges. The *Engineer* does not believe that these expenses will amount to three times the haulage; but even if they do, it is evident that the railway companies ought to be able to carry coal profitably for about 2s. per ton per 100 miles. It is equally certain that the railway charges for coal carriage are much more than this average, since the Great Western Railway rate from Wales to Paddington is 8s. 5d. per ton in fully loaded trucks; and the rate from the Barnsley district to London, by the Midland and Great Northern Railways, is 8s. 3d. per ton.

### Completion of the Pacific Coast Cable.

The Panama *Star and Herald* says: On Friday, August 4, the steamships Silvertown and Retriever started from Pedro Gonzales Island, in the Bay of Panama, the former ship paying out cable to complete the section between that island and San Juan del Sur, Nicaragua. Mr. Parsoné, General Agent of the West Coast of America Telegraph Company, having volunteered to take charge of the temporary hut on Pedro Gonzales Island for the electrical tests, etc., necessary during cable laying, his services were accepted by Mr. R. K. Gray, and, with Messrs. Bailey, Norton, and Phillips, he remained at that island roughing it until Sunday last, when, learning by cable that the work at sea had been completed, they returned in the Pacific Steam Navigation Company's tender Taboguilla, which went to the island to bring them to Panama.

The steamship Silvertown returned, as already announced, on the 17th inst., with Mr. R. K. Gray on board, after having successfully completed the section to San Juan del Sur. The final splice of this section was slipped on the 10th, thus completing the telegraphic system of the Central and South American Telegraph Company.

Few persons are aware of the extent of this system, which runs from Lima to Payta, Peru; from Payta to Santa Helena, Ecuador; from Santa Helena to Buenaventura, Colombia; from Buenventura to the Island of Pedro Gonzales, and thence to Panama; from Pedro Gonzales to San Juan del Sur, Nicaragua; from San Juan del Sur to La Libertad, in Salvador; and from La Libertad to Salinas Cruz, in Mexico. From Salinas Cruz a land wire crosses the Isthmus of Tehuantepec, and a cable thence from Coatzacoalco to Vera Cruz, Mexico, places the line in connection with the United States and the Old World. The total length of electrical cable connections completed by the company amounts to 3,170 knots, a figure which proves the enormous amount of work which has been rapidly and successfully performed.

A flaw discovered in laying the Pedro Gonzales and San Juan del Sur section was easily removed within twenty-four hours of being discovered, and perfect communication through the whole line was re-established within twenty hours. The electrical tests were so accurately made that they located the flaw within one knot of its actual position. The main cable was at once grappled for and picked up in 700 fathoms of water. Reeling in was commenced, and very shortly afterward the defective piece was made good. The cable which was picked up was found within 500 yards of its location on the cable company's charts, a circumstance which proves the wonderful accuracy which must be observed by all concerned in such an extremely scientific and costly work as that which has now been so successfully and happily terminated.

The undertaking has been a great one. Now that it has been happily concluded, the few drawbacks which have been encountered having been overcome by foresight and knowledge, and the work having been performed on a coast hitherto almost, if not entirely, unknown to the promoters of cable enterprises, Mr. Robert Kaye Gray, and every one connected with his staff and the vessels, must feel satisfied with the satisfactory results which have attended their labors.

### Slaking Lime.

A correspondent of the *Topfer Ziegler Zeitung*, treating of the slaking of lime, points out that quicklime can be divided into three classes: first, that which slakes into paste with water, and which may be called "whole burnt;" then there is the "half burnt" lime, which contains hard lumps after slaking; and the "over-burnt" lime, which, as its name implies, has either been subjected to too high a temperature, or has been burnt too long. In such cases there is an approach to vitrification, which is especially marked in limestone which contains clay. When it is desired to remove the two latter classes from a sample of lime, a layer of the material is to be spread out and sprinkled with water. When crumbling begins, it is easy to pick out the over-burnt and hard particles, and to continue the slaking by the continued addition of small quantities of water. Too hasty or excessive watering is to be avoided. The most suitable water for slaking lime is the softest that can be procured; if from melted snow or rain, so much the better. Spring water is usually too hard, and contains carbonic acid or carbonate of lime. Saline constituents in water also prevent its successful use for slaking lime; but, as a general rule, it may be assumed that the fewer carbonates there are in the water the more economical it will be for this purpose. In order to perfectly slake all the particles of lime the paste should be allowed to stand at least fifteen days before use; and should, during this time, be kept covered with ashes or sand. If lime is to be used for purifying gas in conjunction with any other material, as in Walker's patent, it is obvious from these considerations that the mixture should be prepared as long as possible before it is wanted, and that the ashes should be added when the quicklime is slaked.

### The Contraction of Metals in Melting.

F. Nies and A. Winkelmann have examined the density of metals in a solid and in a liquid state, and find that, contrary to the generally accepted views on the subject, many melted metals expand when they solidify. The results of their experiments are embodied in a paper contributed to the Munich Academy of Sciences. Tin, slowly and carefully heated to its melting point, 2,265 degrees Celsius, floated on melted tin, and rose to its surface even after it had been submerged. By attaching pieces of copper to the floating tin it was found that the increase of density by melting over solid tin was 0·7 per cent., a difference which is almost as great as that between tin at the freezing and the boiling point of water. Lead and cadmium did not yield as decisive a result. Zinc, however, behaved like tin, but showed only a contraction of 0·2 per cent. In the case of bismuth the floating test is very easily carried out, as this metal shows as much as 3 per cent. Copper and iron showed a slight difference, the peculiarity in the case of iron being well known, and having been the subject of elaborate investigations by Wrightson in England.

### Stopping the Engine by Electricity.

An ingenious method of instantly stopping machinery when in motion is said to be in operation at the Dominion Bolt Works, Toronto. A wire rope, coiled around the stem of the throttle valve of the engine, carries a weight which is held in place by a rest, and the whole arrangement is so placed that the passing of an electric current along a wire releases this rest and causes the weight to fall. The tension thus thrown upon the wire rope acts upon the throttle valve, cuts off the supply of steam, and consequently stops the machinery. Buttons, with wire connections, are placed in different parts of the works, and on pressing any one of these the passage of an electric current acts as above mentioned. In any factory these electric buttons can be placed in every room, or several of them in a large room, as may be required. Should any one happen to get caught by the machinery, the simple pressing of a button in the most distant part of the factory will stop the whole as quickly as could be done were the engineer standing ready to instantly obey a given signal.

### Work and Wealth.

Edward Atkinson, at the opening of the Exhibition of the New England Manufacturers and Mechanics' Institute in Boston, summarizing the conditions of work and wealth in this country as compared to those abroad, concludes that ninety per cent of our working population earn their daily bread by their daily labor. The great problem is to make the struggle for life easier, and the first requirement toward its successful solution is to develop hand and brain together so as to increase the purchasing power of every dollar. We are the most wasteful nation in the world, mainly because there is greater abundance here than elsewhere. Our crops might be increased one-half by applying the last discoveries of science to our methods of agriculture. Economy in machinery is the field that will yet yield the best results. The best steam-engine and boiler waste nine tenths of the potential energy of the fuel it consumes. In our great locomotives and heavy trains of cars only one pound in a hundred of the fuel used is actually applied to the movement of the load. In the self-operating carding engine, spinning-frame, and loom, four-fifths of the power is wasted in operating them, and in putting cotton fiber into cloth three-fourths of its original strength is lost by rough treatment. Half our vast crops of food and more than half our fuel are wasted before their work is done. Saving in this and in every other form of production or transportation goes, for the largest part, to the benefit of consumers and helps them in the work of gaining their subsistence. Every application of science to manufacturing industry, to mining or agriculture, by which the aggregate of things is increased, while the labor is diminished, tends to increase the commodities to be divided among the laborers and enriches the workmen in far more rapid proportion than the capitalist. The great purpose of world's fairs and local exhibitions is to bring into prominent notice every new application of science by which production may be increased, and to develop the natural resources of the country. They are great object-lessons in human welfare. The first requisite, however, is to qualify boys and girls, men and women, to take advantage of the opportunities thus spread before them. If methods of industrial instruction can be added to the mental training of the public schools, if the hand and the head can be educated together, the causes of want may be wholly removed.

The greater the skill, the larger gain alike to workman and capitalist. The more effective the application of labor and capital, the larger the profit to the latter and the payment to the former. Abroad, a large proportion of the annual product of labor is taken from the people to maintain great standing armies. Measured by the standing armies of France and Germany, the United States, with its population of fifty-four millions, would have to keep seven hundred thousand men in arms, more than one in twenty of all the adult males in the country, who would be withdrawn from the producers to become consumers only, and one man in every nineteen of those remaining would be forced to labor in order to pay the taxes necessary to sustain the seven hundred thousand idle men. We keep that army to work in the field, the forest, the mine, the ship, the workshop, the office, the school, in building houses and railroads, etc.

The cost of the great European armies of destruction is more than equal to the sum of all the wages earned in this country by all the iron miners, all the iron workers, and all the men, women, and children in our textile factories put together. The wages and earnings in this country are higher than in any land burdened with great standing armies. The quantity of things to be divided, the true earnings must be just so much greater, and the cost of making them just so much less. The last man or woman discharged in hard times is the one earning the most. The first to be discharged is the one that does the least work and earns the least wages. As it is with persons, so it is with whole countries. Where the conditions are best, where the natural resources are the greatest, there will be found the most skillful workers, the best machinery, and the largest production. The lowest cost is always measured by the highest wages of those who do the work that is most important. Where mental capacity and manual dexterity are combined and applied to the best machinery, there will be found the largest production, the highest wages, and the safest and most adequate return for capital. This country has the advantage over all others in its natural resources, capable of being worked with the least effort, in its widespread education, which, even if it is imperfect, yet, on the whole, does qualify its pupils to apply the greatest versatility, and to combine mental and manual capacity to the greatest advantage, and, in its freedom from destructive taxation. Our higher wages are the sign of low cost, and the product of a single day's work of machinery, directed by one skilled man, will buy the product of fifty days' labor in the coffee plantations of Java or Brazil, or of one hundred days' labor in the tea fields of China, or of twenty days' labor in the sugar plantations of Cuba, or the hemp fields of Manila, or of ten days' labor in the wool-growing sections of South America or Australia. To utilize our strength, we must perfect our methods of instruction in the application of science to the useful arts. Every mechanics' fair, every Franklin Institute Exhibition, ought to be a convincing appeal to the successful manufacturer, the great iron worker, the large coal miner, to give of his abundance to the endowment and establishment of industrial schools. The best possible investment of present profits for future returns is in liberal aid to the struggling schools where the higher branches of technical education are taught, with manual instruction in the mechanic arts, and to the development of the great work of instructing the brain and hand to work together. The supply of skilled workmen has never yet been in excess of the demand. Boys trained in a knowledge of tools and in the principles that underlie all mechanics are needed in every workshop, and the country has need of all the skill that education can give.

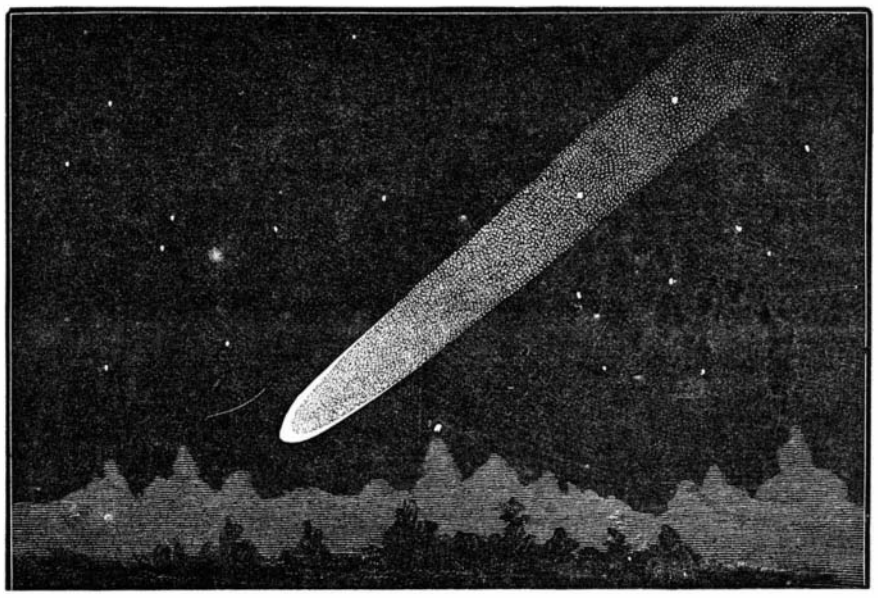
There is much in the above, put in such sententious and rather positive style, that is subject to dispute; but Mr. Atkinson being a practical manufacturer, well acquainted with the large industries of the country, and a broad and competent observer and thinker, what he says on such subjects is well entitled to the thoughtful attention of all who give intelligent consideration to these important matters.

### THE GREAT COMET OF 1882.

Telescopic and naked eye observations were made at my observatory of this fine comet on the mornings of the 24th and 25th inst. The comet was discovered by Cruls, at Rio Janeiro, on the 14th of September, and was at one time so brilliant as to be seen with the naked eye within a few degrees of the sun at noonday. It is now passed perihelion, and has moved so far west of the sun as to be visible in the eastern sky before sunrise.

The accompanying drawing represents the comet's appearance as seen by me on the 24th of September before sunrise. Its appearance was magnificent, the head and peculiar shaped wings glowing like burnished silver on the bright yellow twilight of the eastern sky. The tail, even in the brightness of approaching day, could be seen extending upward, and nearly parallel to the ecliptic, to a distance of from twelve to fifteen degrees, and by glimpses much further. As it moves west, and after a time rises before dawn, the tail will doubtless be visible to a great distance from the head. It is believed by some eminent astronomers to be identical with the great comets of 1843 and 1880—the latter discovered by Gould in South America—and by some powerful influence is having its period rapidly shortened, but this as yet is not conclusive. As it will be visible some time to the naked eye, and much longer telescopically, it will be attentively observed. WILLIAM R. BROOKS.

Red House Observatory, Phelps, N. Y., Sept. 25, 1882.



COMET ACCORDING TO BROOKS' SKETCH.

### A Glacier on Sale.

The enormous glacier Fonor Svartisen, on the Senjen Island in Norway, which is the northernmost of its kind in Europe, will shortly, says *Nature*, be made the object of a remarkable enterprise. It appears that a number of speculative merchants in Bergen have obtained the right of cutting block ice for export from its surface. Some blocks have already arrived at the latter place, and as the quality of the ice has been found to be good, large shipments may be expected. The glacier is about 120 square miles, and as the distance from its border to the sea is only a couple of miles, the ice may be obtained very cheaply. A similar attempt to utilize the glacier Folgefonden was made some years ago, but failed, owing to the blocks in their downward course repeatedly breaking through the wooden bore or conductor in which they were slid down to the sea.

### Electricity in the Shoe Factory.

An attractive feature of a model shoe factory in the Cincinnati Industrial Exposition appears in the application of electricity as a conveyer of power for driving the Goodyear Sewing Machines used in the manufacture of ladies' fine shoes. This is believed to be the first time that shoes have been bottomed by electricity.

### Code of Rules for the Erection of Lightning Conductors.

The following rules, from the "Report of Lightning Rod Conference," 1882, published by Messrs. E. and F. N. Spon, have been abstracted under the directions of Major V. D. Majendie, H. M. Chief Inspector of Explosives, and sent by the Explosives Department of the Home Office to the occupiers of factories, magazines, or stores of explosive materials, and to the police authorities. Reasons, based on practical and theoretical evidence are given at length in the report for each rule and recommendation:

1. *Material of Rod.*—Copper, weighing not less than 6 ounces per foot run, the electrical conductivity of which is not less than 90 per cent of that of pure copper, either in the form of rod, tape, or rope of stout wires, no individual wire being less No. 12 B. W. G. (0·109 inch). Iron may be used, but should not weigh less than 2¼ pounds per foot run.

2. *Joints.*—Every joint, besides being well cleaned and screwed, scarfed, or riveted, should be thoroughly soldered.

3. *Form of Points.*—The point of the upper terminal* of the conductor should not have a sharper angle than 90 degrees. A foot below the extreme point a copper ring should be screwed and soldered on to the upper terminal, in which ring should be fitted three or four sharp copper points, each about 6 inches long. It is desirable that these points should be so platinized, gilded, or nickel-plated as to resist oxidation.

4. *Number and Height of Upper Terminals.*—The number of conductors or upper terminals required will depend upon the size of the building, the material of which it is constructed, and the comparative height above ground of the several parts. No general rule can be given for this, except that it may be assumed that the space protected by a conductor is, as a rule, a cone, the radius of whose base is equal to the height of the conductor from the ground.

5. *Curvatures.*—The rod should not be bent abruptly round sharp corners. In no case should the length of a curve be more than half as long again as its chord. A hole should be drilled in string courses or other projecting masonry, when possible, to allow the rod to pass freely through it.

6. *Insulators.*—The conductor should not be kept from the building by glass or other insulators, but attached to it by fastenings of the same metal as the conductor itself is composed of.

7. *Fixing.*—Conductors should preferentially be taken down the side of the building which is most exposed to rain. They should be held firmly, but the holdfasts should not be driven in so tightly as to pinch the conductor or prevent contraction and expansion due to changes of temperature.

8. *Other Metal Work.*—All metallic spouts, gutters, iron doors, and other masses of metal about the building should be electrically connected with the conductor.

9. *Earth Connection.*—It is most desirable that, whenever possible, the lower extremity of the conductor should be buried in permanently damp soil. Hence proximity to rain waterpipes and to drains or other water is desirable. It is a very good plan to bifurcate the conductor close below the surface of the ground, and to adopt two of the following methods for securing the escape of the lightning into the earth: (1) A strip of copper tape may be led from the bottom of the rod to a gas or water main—not merely to a leaden pipe—if such exist near enough, and be soldered to it. (2) A tape may be soldered to a sheet of copper, 3 feet × 3 feet × $\frac{1}{16}$ inch thick, buried in permanently wet earth and surrounded by cinders or coke. (3) Many yards of copper tape may be laid in a trench filled with coke, having not less than 18 square feet of copper exposed.

10. *Protection from Theft, etc.*—In cases where there is any likelihood of the copper being stolen or injured it should be protected by being inclosed in an iron gas pipe reaching 10 feet—if there is room—above ground and some distance into the ground.

11. *Painting.*—Iron conductors, galvanized or not, should be painted. It is optional with copper ones.

12. *Inspection.*—When the conductor is finally fixed it should, in all cases, be examined and tested by a qualified person, and this should be done in the case of new buildings after all work on them is finished.

Periodical examination and testing, should opportunities offer, are also very desirable, especially when iron earth connections are employed.

* The upper terminal is that portion of the conductor which is between the top of the edifice and the point of the conductor.

### A Taxidermists' Exhibition.

At a meeting of the Executive Committee of the Society of American Taxidermists, in Washington, Oct. 3, it was decided to hold the third annual exhibition in New York, from December 4 to 16, 1882, at Armory Hall, in Central Park. The following gentlemen were elected as a board of exhibition commissioners: Jacob H. Studer, President; Professor G. Brown Goode, Vice-President; Dr. Joseph B. Holder, Secretary; Andrew Carnegie, Treasurer; Professor A. S. Bickmore, Robert Colgate, James C. Beard, Dr. Wendell Prime, and Professor Henry A. Ward.