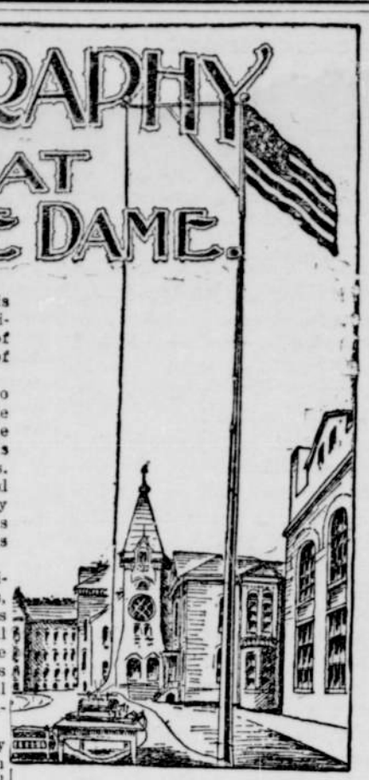
EXPERIMENTS IN WIRELESS TELEGRAPHY AT NOTRE DAME.



THE practicability of Marconi's system of wireless telegraphy was demonstrated at Notre Dame University by Prof. Jerome J. Green of the department of electrical engineering. It did not require elaborate mechanical devices to put the new system to a practical test. The

PROFESSOR MARCONI.
Inventor of Wireless Telegraphy.

material of the apparatus used was taken entirely from the physical laboratory of the university. A storage battery that is common to any electrical workshop, a relay and key from the telegraph room, an induction coil from the X-ray apparatus and a coherer and choking coil made by students under Prof. Green's instruction constituted the paraphernalia. These were all that was needed to generate the power, charge the vertical wire and project into ether a volume of magnetic waves that flashed unguided through space with the velocity of a ray of light and descended with their message into the tick of the coherer.

A brief description of the apparatus used in wireless telegraphy will aid to an understanding of the principles involved. There is a marked analogy between Marconi's system and the system of telegraphy now in use that was invented by Morse. Each has an instrument called the transmitter, so adjusted as to produce electric phenomena, and each has an instrument called the receiver, to reproduce the sounds. But while the Morse system is dependent on an electric current to conduct the signals, the Marconi system uses the ether as a conductor, and propagates the signals by electric waves.

The transmitter consists of an eight-inch induction coil, which is operated by a storage battery of twenty-five volts. From one of the binding posts of the induction coil a wire runs to a galvanized iron ball that is suspended from some object that rises above surrounding buildings. Ground wires complete the circuit. Electric disturbance is produced by forcing sparks across the space intervening between the discharging knobs on the induction coil. These knobs are adjusted and can be arranged so as to produce a spark of varying length, depending on the capacity of the metal ball and vertical wire which is attached to one terminal of the induction coil.

The rapid-oscillating, high-frequency (sometimes 200,000) between the knobs on the induction coil affect the ether in the vicinity of the vertical wire and metal ball so that electric waves are propagated in every direction. These electric waves continue until they reach a ball and wire similar to those connected with the induction coil. This ball and wire intercepts the waves, and conducts them to the receiver. The receiver consists of an instrument, called the coherer, which is connected with a high-resistance relay, such as may be seen in any telegraph office. This relay actuates an ordinary telegraph sounder.

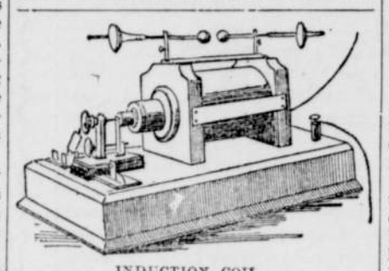
Prof. Green became interested in the work after reading Marconi's paper read before the Institute of Electrical Engineers in London. When the successful experiments were made in transmitting messages across the English channel he determined to make an experiment for his electrical classes.

A number of visiting college presidents called at the laboratory during the experiment and witnessed the first working of the system. Among them were President Whitney and Vice-President Conway of Georgetown University, Washington; President O'Hara of Mount Saint Mary's College, Emmetsburg, Md.; President Lehy of Holy Cross College, Worcester, Mass.; President Fox of Saint John's College, Fordham, N. Y., and the president of the Ottawa University, Canada. This trial was made between two rooms in Science hall and the instantaneous click of the coherer made known the success of the experiment.

The receiving station was then moved to machinery hall, a distance of 200 feet. The doors and windows of both buildings were closed and here it was seen that walls were no barrier to these magnetic waves. Whether the waves penetrate or go around a building is not known. The next day the coherer was removed to the various buildings on the campus with success equal to the first day's trial.

Prof. Green then suspended the vertical wire from the flagstaff on the campus, a height of 135 feet. The instruments were more accurately adjusted and a trial was made at St. Mary's academy, a mile and a half away. Here again the tappings came as accurately as when a single wall divided the sending and receiving instruments.

In the laboratory at St. Mary's academy was an induction coil that had been brought from Paris by Rev. Provincial Zahm. This coil could be pressed into service in establishing a sending station at

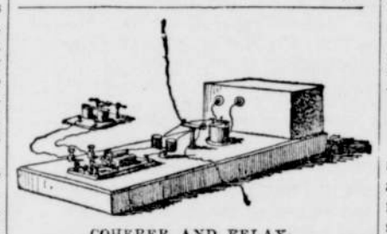


INDUCTION COIL.

St. Mary's, and Prof. Green set his students at work to fit up another set of instruments for that purpose. The instruments used in transmitting the messages require no more space than a sewing machine, and those at the opposite end may be carried in the hand. The storage battery used in the Notre Dame experiments had a capacity of forty ampere hours. The power was conducted to an eight-inch induction coil that transformed the low tension electricity of the battery to the high tension oscillating current that propagated the waves, which, discharged from the vertical wire and metal sphere, travel at the rate of 186,000 miles a second.

These waves resemble in length the waves of sound rather than those of light. A vertical wire and sphere receive the impulses and convey them to the coherer. This instrument is the essential one in the wireless system. It consists of a glass tube a few inches in length, the ends of which are closed with adjustable brass plugs. The space between these plugs is filled with filings of silver and nickel, which cohere when affected by the electrical wares. The cohesion of the particles reduces the resistance sufficiently to cause the relay to operate. The normal resistance of the coherer in Prof. Green's trials was 10,000 ohms; when affected by the impulses it was reduced to between ten and fifty ohms. The power of transmission is increased fourfold by doubling the height of the vertical wire. The waves can be concentrated in one direction, like the rays of a searchlight. This is effected by means of a Rigi oscillator and a reflector.

Some experiments in the Marconi system of wireless telegraphy took place recently between Wimereux, a village on the French coast three miles north of Boulogne, and the South Foreland. A pole 150 feet high was erected at Wimereux and the necessary instruments were placed in a small station. A pole of the same height was erected hard by the South Foreland lighthouse and the instruments put in one of the rooms. The distance from station to station is thirty miles. The tests were conducted with the assent of the French Government, under the per-



COHERER AND RELAY.

sonal supervision of Mr. Marconi. The tests proved highly satisfactory. They were conducted in the presence of delegates from the French war office and the French postoffice, who expressed themselves much gratified at the excellent working of the system.

THE LATE EX-SENATOR TABOR

Was Bred in Poverty, Acquired Millions and Died Without a Cent.

The career of Horace A. W. Tabor, the former Croesus of Colorado, who died recently in Denver of appendicitis, was characteristic of the frontier communities in which he lived. It illus-

HORACE A. W. TABOR.

trates the ups and downs of life in striking manner. He was a poor storekeeper, then a rich miner. He lived in a cabin, then in a palace. He sat in the United States Senate, one of its wealthiest members, and last year was glad to get the salary of postmaster of Denver upon which to eke out an existence.

Tabor was born in Vermont in 1830 and went to Kansas, where he served one term in the Legislature. After fighting grasshoppers and drought for some years he packed his wife and some things to eat and some tools to dig with into a prairie schooner and started to find gold. Sometimes he kept store in mining camps, selling flour for $25 per 100 pounds and bacon for 50 cents a pound. Again he would test fortune in a placer claim, and then set up a forge and sharpen tools for the miners.

From 1861 to 1878 he led a monotonous existence, working drearily and profiting little. With the proceeds of the sale of his last yoke of oxen he opened a little store in a desolate Colorado gulch, about 10,000 feet above sea level. In April, 1878, he supplied "grub stakes" to two shoemakers who were prospecting. These cobblers, August Riche and George F. Hook, dug for ore on the top of a hill. Other miners laughed at their folly, but the cobblers stuck to their picks, and after digging twenty-six feet struck a vein of carbonate ore of surpassing richness. This was the Little Pittsburg mine. Tabor made a million or more from his interest. The site of his store became the center of Leadville and Tabor grew immensely wealthy. His fortune was estimated at from $6,000,000 to $9,000,000. Then he moved to Denver.

At that time Denver was a placid town of 50,000 people. Tabor believed in its future. Near the city, "out on the prairie," he built La Veta Place at a cost of a million. This was his dwelling. Then in the city he built the Tabor Block and the Tabor Grand Opera House at a cost of $2,000,000. His building enthusiasm provoked a boom in Denver.

Tabor was ambitious to be a great figure in his state and in the country. In fulfillment of his ambitions he needed, or thought he needed, a seat in the United States Senate and a fair young wife. He got both. He paid $400,000 to the faithful woman who had ridden with him in the prairie schooner and had shared in the privations of a prospector's life and the cruel cold of the high plateaus of the Rocky Mountains. Though protesting, she obeyed her husband and sued for divorce on the ground of desertion. The decree was granted. Pretty "Baby" Doe, of Leadville, immediately became Mrs. Tabor No. 2. One ambition was fulfilled.

The seat in the Senate next was obtained, but for thirty days, to fill the unexpired term of Henry M. Teller. He failed of re-election. After his thirty days in office in Washington his fortunes began to wane. The need for ready money sent him to the lenders. Mortgages were the result. Mines failed. His buildings were not profitable.

SENATOR TABOR'S LAST HOME AND MINE.

One by one the properties were sold. Millions slid from him as rapidly as they had come to him. Tabor became penniless.

He went out from Denver, lived in a cabin near Ward, Boulder County; located a mine and tried to dig new fortunes out of the ground. Success was not so familiar as it had been at Leadville. For eight months he dug and found nothing and was forced to apply to Millionaire Stratton, a former $3-a-day carpenter, who had struck it rich, for a loan. Stratton advanced him $30,000 and Tabor continued his mining.

In the spring of 1898 President McKinley appointed him postmaster of Denver, the city he had built up. The miners of Colorado were not displeased that at 68 years of age Tabor might have adequate shelter and food.

THE AMERICAN JOKE.

"Intercivic Humor" and Some of Its Amenities in America.

Under the somewhat solemn title "Intercivic Humor," Tudor Jenks has gathered together in the May Century many jests, old and new, that illustrate the readiness of the American in "getting a grind" on his fellow-countryman in other parts of the land of jokes.

"Seems to me that all the sharpers here come from Chicago," said a New-Yorker once, without due consideration for his friend's native place. "Yes," said the Chicago man, musingly; "they do seem to know where to come."

But the Chicago Record is responsible for reporting that one of its own citizens was "cutting a great dash in his Chicago overcoat," and explains that the garment is "fur on one side and a linen duster on the other." And the Tribune of the same city prints the following:

He (after the introduction)—I feel acquainted with you already, Mrs. Sky-

"By his accent."

"But he didn't speak."

"I overheard him eating a piece of pie."

It will be well here to repeat that these stories may be considered as formed of adjustable parts. The American joke, like other articles of home manufacture, is made on the interchangeable principle.

Thus we may apply to any of our growing cities the case of the farmer who wished to exchange his farm for city property, and drove out on a tour of inspection with the agent. The city lots were inspected. "Now, where is your farm?" asked the agent. "We passed it five miles back, said the farmer.

Of Boston such anecdotes as the following circulate:

Mrs. Beanleigh (of Boston)—Baby spoke a sentence to-day, Oscar.

Beanleigh—What was it, Constance?

Mrs. Beanleigh (proudly)—She said, "Mother seems to have astigmatism in her left optic."

And the reply of the child who said, when asked if she would like a talking doll: "Certainly, if you have any that converse intelligently. I could not abide one that giggled."

Madame Melba's First Appearance.

Madame Melba lately gave an interesting account of her first public appearance. "I was quite a young girl in Australia," she said, "when, notwithstanding the persistent discouragement of my father, who was averse to the idea of a singer's career for me, I engaged a hall in which to give a concert, and sent round a notice to all my friends.

"Unfortunately for my plans, somebody mentioned the little scheme to my father, and he, furious at my clandestine enterprise, begged every one of his acquaintances to uphold his parental authority by ignoring the performance. But I wasn't disheartened, and, at the hour announced for the commencement of my concert, stepped on to the platform—to find myself face to face with an audience of two people. And nobody else came."—Saturday Evening Post.

The Rock of Refuge.

In the Sandwich Islands there is a spot called the Rock of Refuge. If the criminal reaches this rock before capture he is safe as long as he remains there. Usually his family supply him with food until he is able to make his escape, but he is never allowed to return to his own tribe.

Billiards.

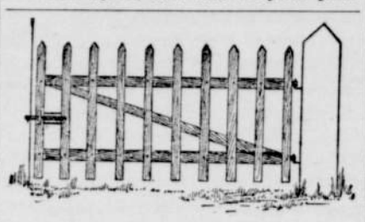
The game of billiards was introduced into Europe by the Knights Templars.

When you have sympathy with an ugly person it is a sign that you are ugly yourself.

All of us are very clever in finding excuses for not working more.

Farm Gates.

Upon every farm there must be gates. These gates should always be in good repair, but such is not always the case. It is a neat, tidy farmer, indeed, that never allows a gate to sag, so that it has to be lifted in opening, or has a broken hinge. There are many plans of making good gates, but the best we have ever tried is constructed as follows: Take two pine or poplar boards, six inches wide, an inch and a half thick and as long as you want your gate. Have pickets one by four inches and as long as you want your gate high. Then a brace one by four inches, long enough to reach from the lower corner of gate on hinge end to top corner, where the latch is to be placed. Lay the two rails down on barn floor or trestles, if you have them, the proper distance apart, and nail on your pick-



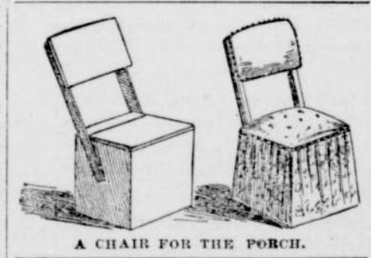
A NEAT FARM GATE.

ets, putting four nails in each end. Saw brace to fit in between rails without notching, and nail pickets to this. Bolt on hinges, having holes in same, so the bolts will pass through both picket and rail. At the other end bolt a paling on each side of the rail. Have a common latch made out of an old wagon tire or any old piece of bar iron and when this is properly secured your gate is complete. Always use dressed lumber, so you can paint gate any desired color, red being usually preferred. A gate made in this manner will last for twenty years, if kept painted, and it will never sag a particle, and is good and strong. It is the easiest gate made, and the best we have ever tried. —New England Homestead.

The Porch in Summer.

To live as much as possible out of doors is always desirable in summer, and if one has not a wide veranda they may have a nice tree or cluster of large shrubs, or a framework and covered vines. A few comfortable lounging places are to be desired. Old pieces of furniture may be renovated, painted and upholstered and made to stand the exposure and changes of the weather.

The illustration shows a chair. The framework consists of a box, two upright sticks and a board to form a back. The box should be 16 inches wide and long, and 10 inches high, with a hinged cover so the interior may be a receptacle for odds and ends. The uprights, which can be of pine two inches wide by one inch thick, are securely screwed



A CHAIR FOR THE PORCH.

to the outer sides of the box, pitched at an angle to make the back comfortable. A board 18 inches long by 12 inches wide is screwed to the upper ends of them and the framework will look like No. 1. The seat and sides are to be upholstered by using some old hair or cotton. First cover with strong unbleached cotton, then cover with any color of denim not easy to fade or show soil. At a hardware store get some japanned iron shanked buttons, and with stout strings tuft the seat like a carriage cushion, and around the back and the seat tack a row of large headed tacks over a strip of white leather or stiff canvas.

Berry Culture.

Every farmer should raise enough berries to supply the family all the year. There is nothing more delicious and healthful than strawberries, raspberries and blackberries, and no other crop on the farm pays as well for the small outlay and the land they require. September is the month to plant them, and when this is properly done a good crop can be grown the first year.

A northern slope that will drain well is best. A great many make the mistake of getting the soil too rich for strawberries, and get a big crop of vines with very little fruit. Land that will grow a good crop of corn is just right, and when properly planted and cultivated will always produce plenty of fine berries. The soil should be cleared of all weeds and rubbish, well pulverized with disk or cultivator and harrow, and then plowed deep and thoroughly pulverized after plowing. Mark rows three feet apart and set the plants in deep, putting a half pint of water with each plant and packing the dirt firmly around the roots. Late in the fall they should be mulched with clean straw, marsh hay or corn stalks. In the spring hoe or cultivate shallow, but not after the plants begin blooming, as it will cause them to rust.—Fruit Grower.

Cleaning the Cellar.

The first house cleaning in spring should be done in the cellar, removing whatever is left of the vegetables and fruits put up for winter use, and after clearing away mould from the walls giving them a coat of fresh whitewash, into which a weak solution of carbolic acid has been put in making it. This will destroy latent germs, which more often originate in the cellar than anywhere else. After the cellar is cleaned and whitewashed place a few lumps of unslacked lime in any places that seem to be somewhat moist. Keep the cellar windows closed on warm, sunshiny days and open them at night especially if rather cool. It is the warm air from outside in the cellar coming in contact with the cold stone walls and metal which it contains that deposits moisture and soon forms a mould on all such surfaces. Most people think it is cool air which is responsible for damp walls. On the contrary, it is the warm and apparently dry air from the outside which does it when this is brought in contact with any cool surface.

A Monster Hog.

The largest hog ever raised in Butler County, Ohio, was slaughtered on March 9, weighing 1,275 pounds. It was three years and ten days old, and was of Poland-China stock. His measurement from nose to rump (tail) was 7 feet and 4 inches; across the back when standing up was 2 feet 6 inches; around the neck close to his ears 5 feet 4 inches; girth around the heart near the forelegs 7 feet 7 inches; around the flank 7 feet 8 inches. After he was hung up and split through the back I measured the thickness at the shoulders and along the back; at the shoulders, 12 inches; along the back, 10 inches; there was 6 inches of fat and 4 inches of lean meat.

On November 24 this hog weighed 830 pounds, making a gain of 445 pounds in 105 days, or 4¼ pounds per day, the largest gain per day on record. During this period he ate forty ears of corn per day, and, as it takes about 100 average ears for a bushel, the total corn fed during the 105 days was forty-two bushels, making an average gain of 10 3-5 pounds gross weight per bushel of corn. Having experimented several years in feeding hogs to learn the gain in live weight per bushel of corn, with the choicest selected hogs and under the most favorable conditions the gain was ten pounds per bushel.

The net weight of this hog was 1,100 pounds, the loss being a fraction less than 14 per cent.; the general average loss from live to net weight ranges from 15 to 18 per cent. on large and well fattened hogs.—Cincinnati Price Current.

Dandelions for the Garden.

The stand-by for early greens in many country places is the dandelion, which grows spontaneously in the pastures, showing its location by bright yellow flowers. But when the dandelion is old enough to blossom it is not so juicy and tender as it is in the earlier stages of its growth. Besides, a further improvement is made by digging up the roots the previous year and planting them in some rich place in the garden. There is a slight tonic bitter to the dandelion greens which makes them liked by almost everybody, and those who do not entirely like the flavor eat the greens because they are healthful. Some gardeners claim that they have originated new varieties with larger, thicker leaves than those on dandelions that grow wild. It is possible, however, that it is the garden culture rather than differences in variety that makes the new sorts preferable.

Profit from Garden Herbs.

There are certain kinds of vegetables which have a good sale when dried that are far too little grown. We allude to such herbs as sage, thyme, fennel, coriander and the like. More money is often made from a sage bed than from the same area of land planted in anything else. There is always a good demand for it to use for stuffing when pork, turkey or chicken are to be roasted, and if the herb has to be bought at the grocer's or drug store several times what the farmer could well afford to sell it for has to be paid. There would be more profit in farming if farmers paid more attention to the small items which they now neglect, because they seem too unimportant to be worthy of notice.

Solid Floors for Stables.

Wherever there is a crack in a stable floor where horses or cows are kept, fertility, which is really money, is constantly being lost as the liquid excrement runs to waste. There are under many old stables several feet depth of soil filled with this excrement, which if drawn out on the fields makes the richest kind of manure. The stable floor should be solid, either made with matched plank, or, better still, laid in cement, which will not absorb the excrement or rot as it lies upon it.

Green Bone for Hens.

Fresh-cut bone contains the right kind of material to make an egg, the lime in it furnishing the shell. It is better than grit for fowls, as, unlike the bits of stone, it is ground and digested in the gizzard, thus serving a double purpose, helping to digest grain and being itself digested at the same time. Fowls that eat much green bone will make manure equal to that which wild birds make from eating fishes, and which when composted becomes the guano of commerce.

Strawberries.

The old plan of spading under a portion of the old strawberry bed, so as to leave the plants in rows, will not pay. Better reset clean land with vigorous plants, arranging to grow a crop of potatoes every third year to clean the land and mellow it. The picking of berries on heavy clay land causes it to become so packed as to require cultivating at least one season in every three with some hoed crop.—Barnum's Midland Farmer.