

TRUMPHS OF ELECTRICITY

The Year's Developments in the Realm of Science and Invention.

SOME WONDERFUL TALES ARE TOLD

Photography that Fatigues Secrets of the Soul, Machines to Measure Brain Power, and Other Marvels of Human Skill.

THE YEAR'S DEVELOPMENTS IN THE REALM OF SCIENCE AND INVENTION.

During 1896, a new civilization has been in process of incubation. When fully developed, as it probably will be early in the twentieth century, it will be as far ahead of the present as the present is in advance of the coast age.

Were all the projects now perfected which the brain of man has conceived during the last twelve months, says the Cincinnati Enquirer, the world as we know it would be our highways; phosphorescence would illuminate our homes with a mellow glow like daylight; all our heavy work would be done by wind, tide and compressed air; we would talk by wire with friends in the Antipodes and see them face to face; would solve the most intricate problems instantly by the application of electricity to the brain, and would photograph not only colors, but also reliefs, voices, dreams and emotions. Such ailments as pneumonia, epilepsy, lockjaw, snake bite and insanity would be as easily cured as the ordinary cold, and the body itself would be made proof against disease by the injection of microbe killers into the system. To sail to the North Pole and to circumnavigate the globe, to make an evening pleasure trip, and to communicate with the inhabitants of distant planets would be an everyday occurrence.

No sooner was this prophecy announced than the whole civilized world became interested in it, our own country most of all. There was scarcely an inventor or a college laboratory that did not begin working, and almost daily fresh capabilities of the new rays revealed themselves. At first only shadowgraphs were taken by camera and Crookes tubes, which were the instruments used, and, by means of the rays, the naked eye pierced wood as if it were transparent, and the narrow, and gazed upon the inner structure of steel plate.

THE NEW LIGHT.

The greatest achievement of the year was at its threshold. It was early in January when Prof. Roentgen discovered the rays, which astonished the world by showing that such substances as wood, leather, aluminum and human flesh are not opaque, but as transparent as glass, and that, like another and more powerful medium of vision than ordinary light—a mysterious medium which is itself invisible. This discovery never hinted or guessed at before, but was entirely new. It was found that few things were absolutely opaque, and that Roentgen's "X" rays were turned upon them, and that common glass is harder for these beams to penetrate than thick boards.

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Prof. Elinor Gates of Washington has been making shadowgraphs of the human hand by using a glow-worm's light. Prof. Salomon has been inventing a new kind of X-ray, which enables one to see through opaque objects with the new rays. Both Edison and Tesla have largely added to our stock of knowledge in the use of the new rays.

INVENTIONS OF THE YEAR.

It has long been the dream of inventors to find some method of navigating the air as easily as we now navigate the sea. The foremost of these was the dirigible balloon, which was invented by Count Zeppelin of Germany, yielded up his life for the cause, and after his fatal fall, like the hero he was, he only lamented that he had not other lives to give to the cause.

The other two best known experimenters are Maxim, the American-born Englishman, and the late Count Zeppelin of Germany, of Washington, with his aerodrome, the secret of which he carefully guards. Besides these three, there are imitators of less note, and it is to be hoped that the experiments of a winged boat near Chicago; Cowden of Virginia, with a paddle-wheel machine modeled after a salmon; and a Wolfert of the city of Brest, of England, with his cone-shaped balloons.

The only really successful experiments in air navigation were those made by the late Count Zeppelin of Germany, which are the old-fashioned kite principle, as Charles H. Lanson of Portland, Me., and William A. Eddy of Bayonne, N. J., who have constructed kites, strong enough to lift men into the air. With these the Government weather bureau is now exploring the cloud regions in search of data for making more perfect weather forecasts.

AMAZING DISCOVERIES.

Discoveries in photography during 1896 have been sufficient to stagger one who has not thought the collective result. The Roentgen discovery may be considered under this head. Prof. Gates has photographed in a dark room with invisible rays of light. The most startling discovery during the year for the use of the army, pictures the flight of projectiles. Photos in bas-relief, like canoes, have been taken.

Further advances in color photography have been made, though the difficulty of printing off the colors from the negative has not been removed. Dr. Packer of England has caught the color of the sun through a metal film. The human voice has been photographed in Columbia college. M. B. Easton of Boston has taken impressions of dreams, each view of the sleeper making a different shadow on the sensitive plate, and even figures of persons appear in the color photographs.

Even now electricity for domestic use is peddled from house to house in New York City like milk in cans. Edison has improved the telegraph, invented the previous year, in a still better device for transmitting pictures by wire, calling his invention the autographic telegraph. Prof. Rowland of Johns Hopkins university has devised a method of printing telegrams by means of sending ten separate messages on a single wire. M. Kildisevsky has been experimenting with long-distance telegrams. Alexander Graham Bell has invented a radiophone, by which he transmits a sunbeam over the telephone for long distances.

ELECTRIC LINOTYPE.

James P. Pemberton, a Tennesseean, has the most wonderful project of all for using the wire. His idea is to operate linotype machines from central news agencies, like the Associated Press, by sending the types directly into type, wires being attached to the keys of machines all over the country and worked from the central agency by a single operator.

Among other 1896 inventions made possible by electricity are theophone, for determining the exact direction of sound at a distance by a sound telegraph, for reproducing pictures, Lumiere's cinematograph, which, like the kinetograph, already out of date, is a kind of electric camera, already mentioned, which reproduces pictures in a magnified form so that whole audiences may see them. Dr. Frank Close's telegraph, which telegraphs to each other face to face, and is separated by hundreds of miles; and the pendulograph, to detect the presence of disease by sound. This last is of such exceeding delicacy that it makes a wisp as audible as a cannon shot.

These scientific inventions are prolific in inventions for wholesale slaughter in time of war. During the year, in the struggle for supremacy between big guns and small ones, the machine gun, through increased power and improved projectiles, has become a more deadly weapon. The new portable boats, which are now being perfected, the Gatling and the Holland, threaten to make the most powerful battleship as defenseless as a small boat.

It would lengthen this article too much to even mention all of the inventions of the year, but it would not do to omit a few of the most important ones. The new method of making steel, a substitute for the Bessemer process, the invention of a saw manufacturing machine, the bicycle, the motor, and the submarine, are all inventions of the year.

DEEDS OF THE DOCTORS.

The progress of the healing art has kept pace with the march of invention. The biggest stride in advance, if it succeeds, is the method of the new light, which is itself invisible. This discovery never hinted or guessed at before, but was entirely new. It was found that few things were absolutely opaque, and that Roentgen's "X" rays were turned upon them, and that common glass is harder for these beams to penetrate than thick boards.

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HEALTH AND HYGIENE.

Some Points Based on Long Medical Observation and Study.

From a series of lectures delivered before the Academy of Natural Sciences of Philadelphia, the Record of that city furnishes the following health promoting facts:

A large trunk, a good chest, a generous framework to hold the heart, lungs and digestive organs, greatly promote longevity and are usually secured by early, regular skin, plenty of blood in the body and a good supply of vital force.

Insufficient mastication and food that disagrees with one's stomach, the palate should be avoided.

No one neglects bodily exercise to any degree without paying the way for future trouble.

A proper scheme for healthy living would involve the training of all the members of the body.

Unusually unused become smaller in size, flabby and weak; use hardens, strengthens and makes them more responsive to the will.

A quick person always has the muscles in good trim.

Ready obedience of muscles to will is a very important thing.

Exercise does more than strengthen and harden muscles. Microscopic examination shows muscles constantly used are the more healthy.

The value of a healthy organ depends upon its use. The oftener it is disengaged by action and rebuilt by the proper putting together of the food stuffs from the digestive organs, the more times it is remade, the better it is.

The use of the muscles exerts a notable influence upon circulation.

Asthma is a circulatory heart trouble either have not given their training judgment, or, having developed a large heart, neglect their athletic work and are then afflicted with trouble which could have been avoided by exercise.

After passing competent inspection of heart and lungs a would-be athlete need fear no danger from a gradual system of training.

Where the heart is organically diseased and the person enters immediately upon some strenuous muscular task the heart may fail.

Each man in an athletic team should always pass a preliminary examination before entering a contest.

Under proper muscular exercise the heart drives the blood in increased volume, not only through the muscles concerned, but through all parts of the body, and the oxygen absorbed by the lungs is conveyed through the system more thoroughly.

Every contraction of a muscle drives the blood out of that muscle by squeezing the vessels, which, as a network, pierce it, and the muscles are thereby kept active and again the blood is driven into the muscle and again squeezed out on the way to the heart, so that every muscular action helps to keep the heart in good trim.

In a man at rest the heart does practically all the work, when the man works the muscles aid largely in the blood-pumping process.

An overdeveloped heart will be of no inconvenience if the individual keeps up a normal amount of bodily exertion.

A man walking four miles an hour takes in five times as much oxygen as when at rest.

A laboring man will in a day excrete through the lungs in the form of carbonic acid gas, an amount of carbon equivalent to a lump of coke as big as his two fists.

Exercise should not be made too much more rapidly than we do normally, but deeper.

Most of us are too lazy with our lungs, not knowing how to fill them evenly, smoothly and fully.

Most people have hollows above their collar bones, which are the apex of the lungs should project up into the space and fill it pretty nearly full, making an almost even surface with the neck.

One should breathe as fully and otherwise the lungs are filled with stagnant pool of air, soon filled with dust and organisms of all kinds, and forms an excellent germ culture.

Most cases of phthisis begin in the apex of the lungs, which are closer housed and more away from the fresh air, do not have consumption as much as the lower parts.

The lessened liability to consumption enjoyed by women is due partly to their looser-fitting dresses, which permit expansion of the lungs at the apex, which most men do not use.

The blood of a person getting a sufficient supply of air through the nostrils, fingers and toes, and the elimination of waste matter in the food is much nearer perfection.

A man using his muscles demands more food than an inactive one, but, owing to the increased circulation of the blood through the muscles and to the increased supply of oxygen to every part of the man, the appetite and the digestive apparatus, and better digestion, absorption and assimilation.

Manual training and physical exercise are valuable aids in the development of the weak-minded and those who suffer from mental troubles.

INDIANA'S "GRAND OLD MAN"

Reflections of a Veteran of Fifteen Presidential Campaigns.

COLONEL "DICK" THOMPSON AT HOME

The Sage of Terre Haute Relates a Number of Reminiscences Concerning Noted Men of Long Ago.

One of the most delightful conversationists in this country is Colonel Richard W. Thompson of Terre Haute, one of the ex-officers of the navy and sole survivor of the Twenty-seventh United States congress and of the Indiana legislature of 1834. Colonel Thompson has passed through fifteen presidential campaigns, relates a correspondent of the Chicago Record, and has been a companion of all our presidents, except the first two.

He knew scores of revolutionary people, and is a gold mine of information on all matters pertaining to the political history of the United States. Far and wide the silver-tongued colonel is known as "the old man whom the very first men in America sought to know."

Colonel Thompson is a high regard as a popular speaker. He is now in the sixth year of his age, yet only a few weeks ago he spoke in the open air for almost an hour to an immense audience of his fellow townsmen, and it was one of the most eloquent and inspiring addresses ever heard.

Colonel Thompson may be found in his great library any evening, writing or reading. About 9 o'clock his grandchildren come running in and throw their arms about his neck and kiss him good night. An hour later his two daughters, middle-aged women, perform the same act of courtesy and affection.

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Manual training and physical exercise are valuable aids in the development of the weak-minded and those who suffer from mental troubles.

Proper bodily exercise causes the skin to throw off large amounts of waste matter, which otherwise would accumulate and cause bad complexion.

No hard and fast hygiene rules can be devised. Every man is a personal equation and his own body is his own standard.

To maintain the health of a man of 150 pounds needs exercise equivalent to raising ten tons one foot in a state of active gymnastics, public gymnastics and the different games are to be recommended.

A cold bath is very unwise for some people. It should not go much below the body temperature.

Common sense and individual temperament should control the temperature of the bath. Some prefer a hot bath, while 70 to 75 degrees is generally favorable.

With a hardy person a cold bath invigorates and stimulates all the various functions of the body.

Beware of sea bathing immediately before or after meals.

Sea bathing soon after eating has caused the worst cases of cramps through indigestion, even where the digestive apparatus was in all surface indications appeared in the best order.

Do not eat too soon after surf bathing, as the violent exercise robs the digestive organs of the blood and indigestion results.

Most of these dangers are avoided by proper perspiration, not wet until fully cooled off, because you are then in a state of exothermic reaction, and various forms of contagion may follow.

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She was aware of his profligacy, and answered his request thus:

"Can you quit drinking?" "Yes, you I can," said Wirt.

"Who is the girl, 'prove your words by remaining sober for two years. At the expiration of that time, if you are still called, I shall be happy to become your wife."

Wirt accepted the proposition, vindicated his manhood and married the girl.

MERTING WITH WIRT'S SON.

The author of the "British Spy" became one of the best citizens of Culpeper Court House and was widely esteemed.

What is your name?" asked Colonel Thompson. "My name is Wirt,"

"Where were you born?" "Virginia,"

"What was your father's name?" "William,"

"Of Culpeper Court House?" "Yes, sir,"

"Why, my boy, your father and my father were old-time friends. If William Wirt was good enough for my father, I think his son will be good enough for me. I appoint you to the place."

During Jackson's administration Major Broadus, Colonel Thompson's grandfather, was yamstaver at Harper's Ferry.

The major was an astute man and handled those about him with a sure hand.

He was a great officer of the Revolution, and he was elected an effort was put on foot—a bit of gray in the dawn of the spolia system—to have the man named.

It was charged that his harshness unfitted him for the position he held.

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HOW MUCH IS A KNOT?

Few Landsmen Know Its Value Exactly.

In this day of record breaking by ocean steamers, when every big steamer that comes into port is expected to carry a record book at a yardarm, so to speak, how many landsmen know the meaning of the term "knot" in which rate of speed at sea is chiefly expressed? It is purely and wholly a nautical term, says the New York Herald.

The word "knot" is the mariner's term for a nautical mile, and its rate of speed is derived from the log line used by navigators of the ocean when they wish to determine the speed and the distance that the ship has probably sailed in a given time.

The log line is an important and a very necessary part of a ship's fittings; especially is this the case when, for several days at a time, the navigator is obliged to measure the sun's altitude by clouds or thick weather, from which the actual position of the vessel is ascertained.

Every one who studied the geographical table in his early school days will recall that part of the long-song recitation running like this: "Sixty miles to a degree, statute miles, or sixty geographical miles, equal one degree of longitude at the equator."

The difference between a statute mile and a nautical or geographical mile is that the latter is about 800 feet greater than the former. There are sixty geographical miles in each degree of latitude, or to each degree of longitude at the equator.

Miles are called "minutes" in the nautical vocabulary, hence the old saying, "a mile is equal to twenty minutes of an hour." The practice of defining a knot or nautical mile as equal to 6,080 feet, instead of 6,086.7 feet, has been generally adopted.

When the navigator desires to make a log-line by which to ascertain the speed which his vessel is making through the water, he follows the constant of knots. As the number of seconds in an hour are to 6,080 feet, so are the number of seconds in the time the glass is to be used for measuring the ship's speed to the number of feet in each knot.

If a half-minute (thirty seconds) glass is to be used, the knots must be made fifty feet equal to one minute of an hour, and the practice of defining a knot or nautical mile as equal to 6,080 feet, instead of 6,086.7 feet, has been generally adopted.

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