

WHAT IS ELECTRICITY.

Far in the depth of space and time there floated a dead orb; cold and dark and silent, motionless and lifeless. It contained all the elements which compose the majestic mountains and the abysmal depths; which made the valor of an Alexander and the beauty of a Cleopatra. But it lacked life, that is energy, which is the life in nature, the thing which moves and pushes, which turns the wheels of industry, which in different forms or manifestations is light and heat and sound, and chemical affinity and electricity.

And another dead orb in space attracted it by the law of gravitation, and gradually and slowly both began to move towards each other, and with increasing velocity they approached, until with terrific speed they finally collided and the energy of motion was changed to heat, and in the terrific conflagration both of the dead orbs dissolved into a flaming mass of gases, and a spiral nebula was born, as we see many now studding the sky.

Ageons passed, and nuclei condensed in the nebula, a large one which formed a central sun, and smaller ones revolving around it as planets, and moons revolving around the planets, and so our solar system originated, and one of the planets is our earth. First it shone with its own light as a fiery orb like the sun; but gradually it cooled, its surface became cold and dark, the water vapors surrounding it condensed and oceans and continents formed, and the earth in its turn would have become a dead orb, if it were not for the sun, which continuously in the rays of

sunlight sends an inconceivable amount of energy to our earth, and so has kept it alive and will keep it alive as long as the sun shines, and life is change and transformation of energy.

And eons again passed and life appeared in the oceans and then spread over the land, as plants and animals; and the brainless monsters of past ages made room for the more intelligent, though smaller animals, and finally, from apelike ancestors developed a being which learned to think and reason, and not blindly to submit to nature, but fight and conquer it, and bend the forces of nature to his service, make energy man's servant. The fire was conquered first; from the destroyer of the works of man, it became the willing servant, giving heat and light. Mechanical energy then followed: first the energy of animals came to supplant the strength of man, then wind and water were put to work and finally came the steam engine and its modern successor, the steam turbine and the gas engine, and increased the strength of man a thousand fold, and our generation has seen the conquest of lightning, that is of electricity. Electricity is one of the many forms of energy. But electricity is the last of the forces, which has been conquered by man; therefore it still appears mysterious to us and we ask "What is Electricity", but we do not ask "What is heat" or "What is motion", because we are familiar with heat and motion, and have been so for ages, while electricity is new to us. But to the physicist, heat and light and motion as forms of energy are just as mysterious as electricity. The form of energy which we call electricity, appears more mysterious

to us, because we have developed senses for perceiving the other forms of energy; we see the energy of light; we hear the energy of sound; we feel the energy of motion, we perceive by the temperature sense the energy of heat; but we have no sense which responds to electric energy: if we see the lightning flash, it is not the electricity which we see, but the light produced by the electric energy; if we feel an electric current, it is the biochemical changes produced by it which we feel, etc.

But while no sense has been developed by man to respond to electric energy, there have been manifestations of electric energy throughout all the ages.

When the moisture condenses to rain in the thunder cloud, and the cloud breaks into storm and deluge, the lightning flashes and the thunder rolls; when the earth quakes and the volcanoes vomit forth fire and destruction, again the lightning flashes. A vast electric field spreads from the sun through the solar system, and the earth revolves in the electric field of the sun, and electric currents circulate around the earth, underground as well as high up in the atmosphere, and produces magnetic effects, make the earth a huge magnet with a north pole north of America and a south pole on the Antarctic continent. And wherever in nature violent changes and cataclysms take place, electrical phenomena appear. Thus when on the sun those violent convulsions occur, which we see as sun spots -- many so large that they could engulf the whole earth many times over -- electrical storms accompany them, and sweep across the solar system, and here on earth, a hundred millions of miles away, the northern lights

flash forth to the sky, and the magnetic needle trembles, and the earth currents rise and disturb the telegraph in response to the electric disturbances in the sun.

Thus electricity has been the harbinger of change, the messenger of destruction, the most terrifying of nature's phenomena, until Ben Franklin showed us what lightning is and how to tame it, and protected by the lightning rod, we may now defy nature's lightning, and finally we have learned not only to protect ourselves from lightning, but make electricity our most valuable and efficient servant.

But still electricity has, even in the service of man, remained the messenger, the carrier of energy, which is valuable not by itself, but by what it becomes.

Why is it, that electricity is rapidly replacing all other forms of energy? Why is it, that even where you burn coal under steam boilers and drive mighty engines or turbines by steam, you do not use the steam power directly, but more and more convert the mechanical power of steam into electric power, and use electric power?

It is the great advantage, which electric power offers over all other forms of power in its simplicity and high economy of transmission and distribution, and of conversion into any other form of power, and the great flexibility of its application, which makes it the most useful power, and in many cases the only power which can be used.

Whether we want heat or light, or mechanical motion; whether we need the small amount of power to run a fan motor or a sewing machine, or the hundreds of horse power to propel the trolley car or drive the tools in the factory or mill, or the thousands of horse power to carry the electric train over the mountain ranges and drive the electrically propelled ship at high speed across the ocean: we press the button, or close the switch, and the light flashes up, or the motor starts, with practically no attention.

Energy, or power, is the great requirement on which our civilization depends, and electricity is becoming the messenger, the carrier, which brings the energy from where we find it in nature, in coal mines or waterfalls, transmits it to the place where we need it, the big city and the industry, there distributes it to all places of use, and then converts it again into whatever form we desire it, does whatever we desire it to do, and that promptly and reliably, economically and safely and simply. Thus electricity today is organizing the world's energy supply, through the system of electrical transmission lines which rapidly spread over the country, just as last century has seen the organization of the world's material supply in the system of railroads spread over the country.

Illustrations: Spiral nebula. Lightning flash. Northern lights. Niagara Falls. Power house. Transmission line. Electric train.