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Electricity

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Electricity





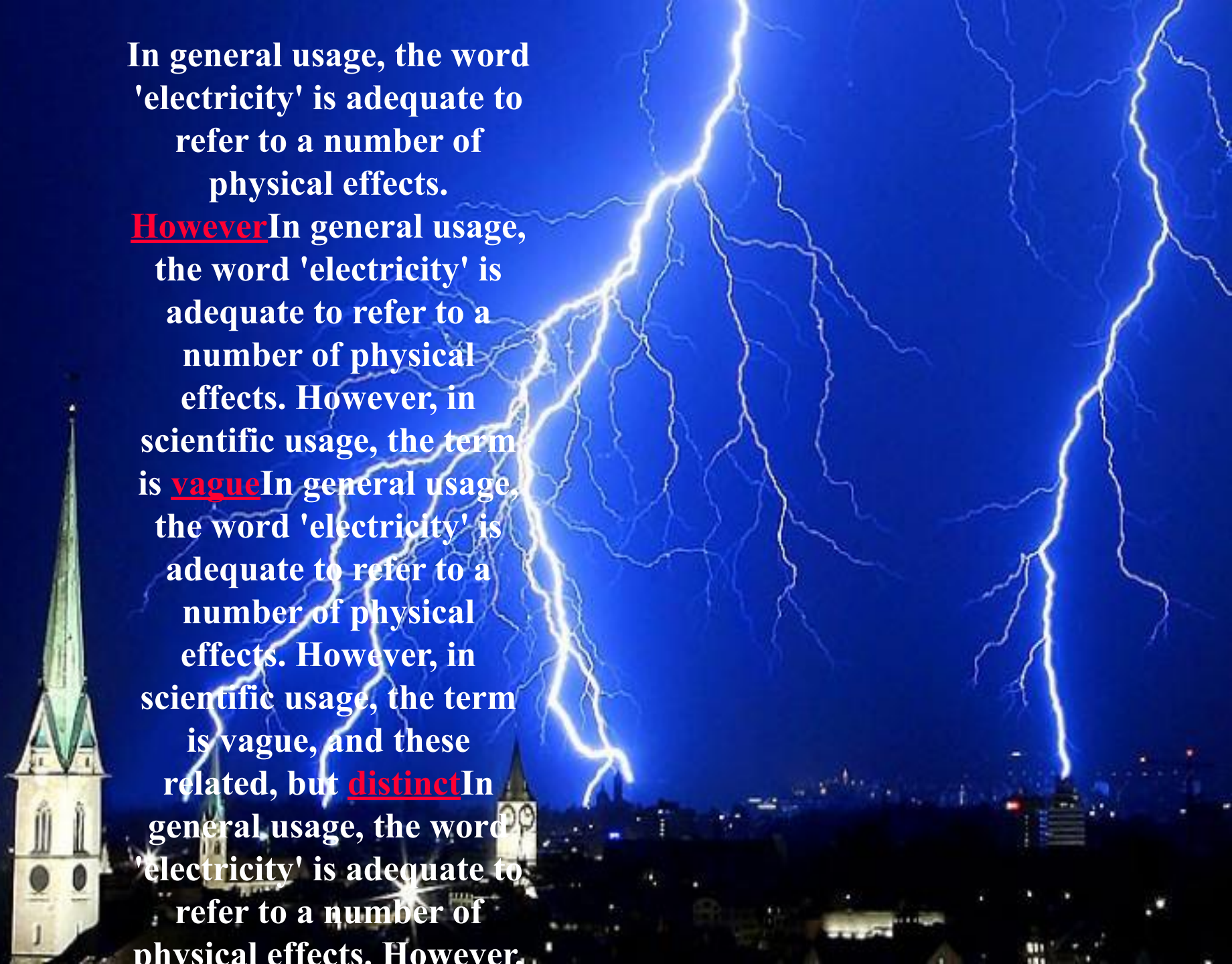
Electricity (from New Latin *ēlectricus*, "amber-like") is a general term that encompasses Electricity (from New Latin *ēlectricus*, "amber-like") is a general term that encompasses a variety of phenomena resulting from the presence and flow of electric charge. These include Electricity (from New Latin *ēlectricus*, "amber-like") is a general term that encompasses a



term that encompasses a

In general usage, the word 'electricity' is adequate to refer to a number of physical effects.

HoweverIn general usage, the word 'electricity' is adequate to refer to a number of physical effects. However, in scientific usage, the term is vagueIn general usage, the word 'electricity' is adequate to refer to a number of physical effects. However, in scientific usage, the term is vague, and these related, but distinctIn general usage, the word 'electricity' is adequate to refer to a number of physical effects. However,





Electric charge – a property – a property of some subatomic – a property of some subatomic particles, which determines their electromagnetic interactions. Electrically charged matter is influenced by, and produces, electromagnetic fields

Electric field – an influence – an influence produced by an electric charge on other charges in its vicinity.

Electric potential – the capacity of an electric field to do work, typically measured in volts.



Electromagnetism – a fundamental interaction between the electric field and motion of electric charge.

Electric current – a movement or flow of electrically charged particles, typically measured in amperes.





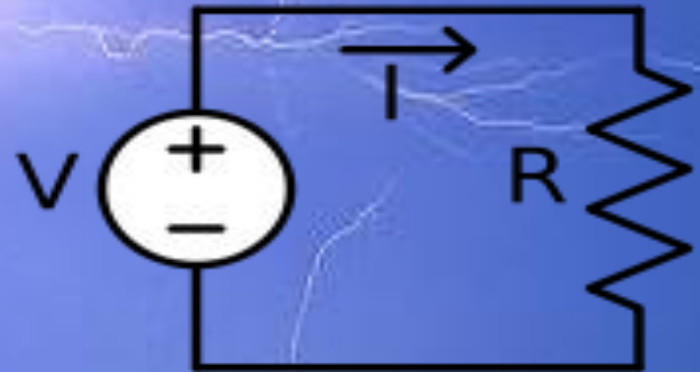
Benjamin
Franklin
conducted
extensive
research on
electricity
in the 18th
century





Electric circuits

An electric circuit is an interconnection of electric components, usually to perform some useful task. An electric circuit is an interconnection of electric components, usually to perform some useful task, with a return path to enable the charge to return to its source. The components in an electric circuit can take many forms, which can include elements such as resistors, capacitors, switches, transformers and electronics. Electronic circuits contain active components, usually semiconductors, and typically exhibit non-linear behaviour, requiring complex analysis. The simplest electric components are those that are termed passive and linear: while they may temporarily store energy, they contain no sources of it, and exhibit linear responses to stimuli.



A basic electric circuit. The voltage source V on the left drives a current I around the circuit, delivering electrical energy into the resistance R . From the resistor, the current returns to the source, completing the circuit.

The capacitor is a device capable of storing charge, and thereby storing electrical energy in the resulting field. It consists of two conducting plates. The capacitor is a device capable of storing charge, and thereby storing electrical energy in the resulting field. It consists of two

conducting plates separated. The unit of capacitance is the farad, named after Michael Faraday, and given the symbol F; one farad is the capacitance that develops a potential difference of one volt when it stores a charge of one coulomb. The capacitor is a device capable of storing charge, and thereby storing electrical energy in the resulting field. It consists of two conducting plates separated by a thin insulating layer; in practice, thin metal foils are coiled together, increasing the surface area per unit volume and therefore the capacitance.

The inductor is a conductor, usually a coil of wire, that stores energy in a magnetic field in response to the current flowing through it.

When the current changes, the magnetic field does too, inducing a voltage between the ends of the conductor. The induced voltage is proportional to the time rate of change of the current. The constant of proportionality is termed the inductance. The unit of inductance is the henry, named

Production and uses



Generation



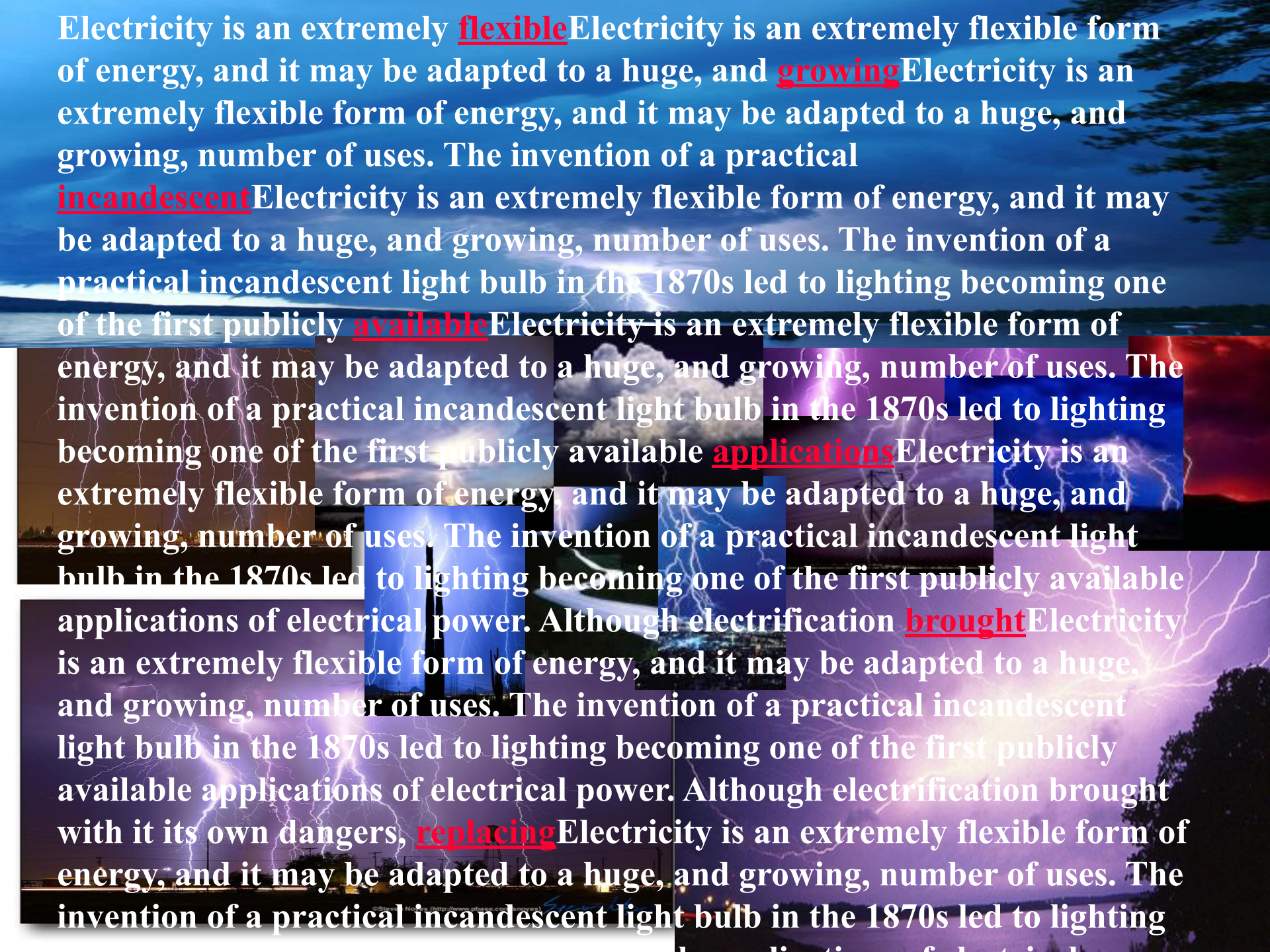
Electrical energy is usually generated by electro-mechanical generators driven by steam produced from fossil Electrical energy is usually generated by electro-mechanical generators driven by steam produced from fossil fuel combustion Electrical energy is usually generated by electro-mechanical generators driven by steam produced from fossil fuel combustion, or the heat released from nuclear reactions Electrical energy is usually generated by electro-mechanical generators driven by steam produced from fossil fuel combustion, or the heat released from nuclear reactions; or from other sources such as kinetic energy extracted from wind or flowing water. Such generators bear no resemblance Electrical energy is usually generated by electro-mechanical generators driven by steam produced from fossil fuel combustion, or the heat released from nuclear reactions; or from other sources such as kinetic energy extracted from wind or flowing water. Such generators bear no resemblance to Faraday's homopolar disc generator of 1831, but they still rely on his electromagnetic



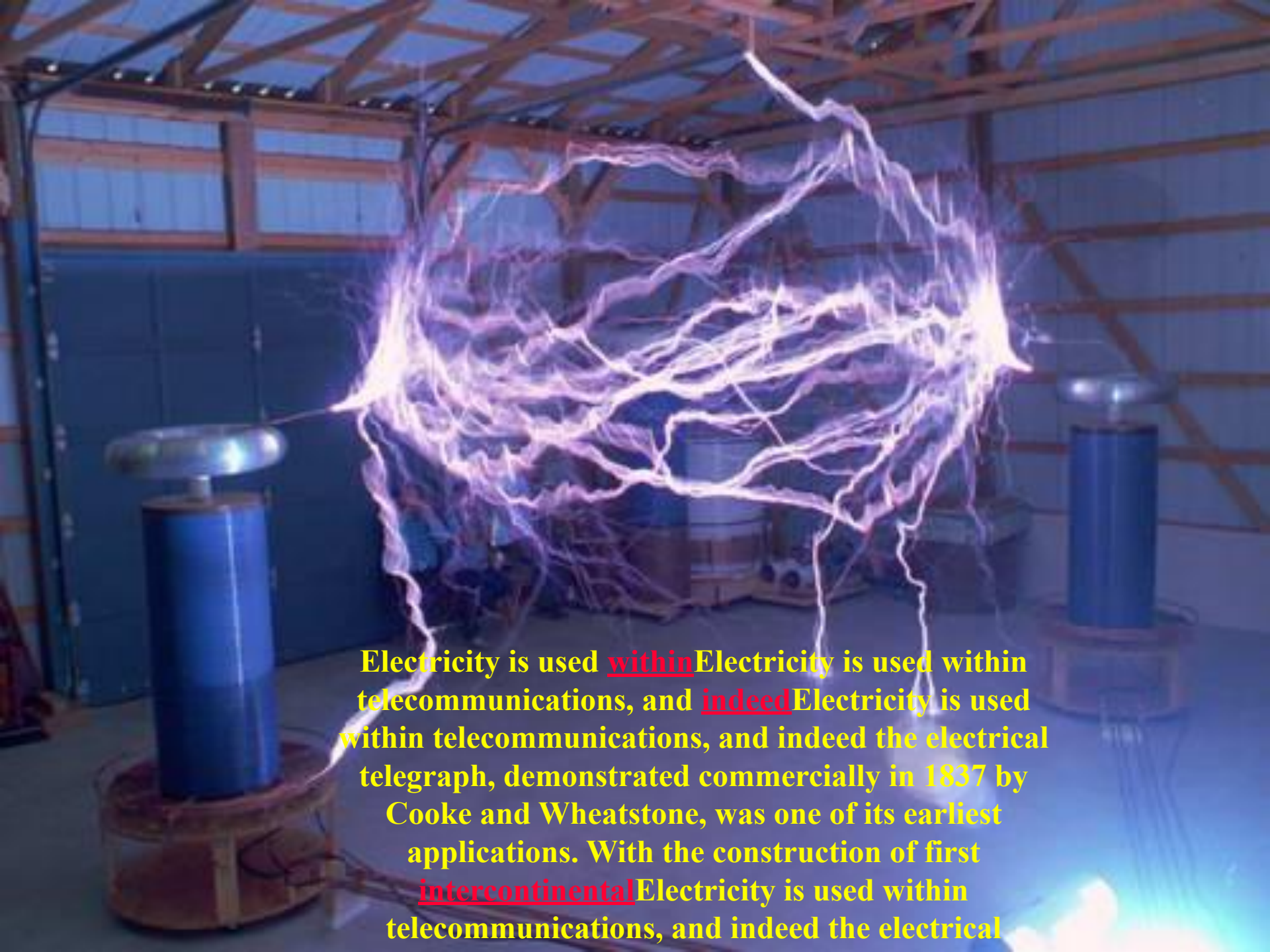
Demand Demand for electricity grows with great rapidity. Demand for electricity grows with great rapidity as a nation modernizes and its economy develops. The United States showed a 12% increase. Demand for electricity grows with great rapidity as a nation modernizes and its economy develops. The United States showed a 12% increase in demand during each year of the first three decades of the twentieth century, a rate of growth that is now being

Uses





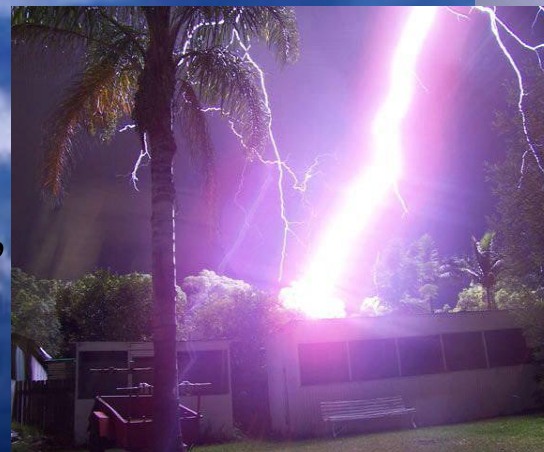
Electricity is an extremely flexible Electricity is an extremely flexible form of energy, and it may be adapted to a huge, and growing Electricity is an extremely flexible form of energy, and it may be adapted to a huge, and growing, number of uses. The invention of a practical incandescent Electricity is an extremely flexible form of energy, and it may be adapted to a huge, and growing, number of uses. The invention of a practical incandescent light bulb in the 1870s led to lighting becoming one of the first publicly available Electricity is an extremely flexible form of energy, and it may be adapted to a huge, and growing, number of uses. The invention of a practical incandescent light bulb in the 1870s led to lighting becoming one of the first publicly available applications Electricity is an extremely flexible form of energy, and it may be adapted to a huge, and growing, number of uses. The invention of a practical incandescent light bulb in the 1870s led to lighting becoming one of the first publicly available applications of electrical power. Although electrification brought Electricity is an extremely flexible form of energy, and it may be adapted to a huge, and growing, number of uses. The invention of a practical incandescent light bulb in the 1870s led to lighting becoming one of the first publicly available applications of electrical power. Although electrification brought with it its own dangers, replacing Electricity is an extremely flexible form of energy, and it may be adapted to a huge, and growing, number of uses. The invention of a practical incandescent light bulb in the 1870s led to lighting



Electricity is used within Electricity is used within telecommunications, and indeed Electricity is used within telecommunications, and indeed the electrical telegraph, demonstrated commercially in 1837 by Cooke and Wheatstone, was one of its earliest applications. With the construction of first intercontinental Electricity is used within telecommunications, and indeed the electrical

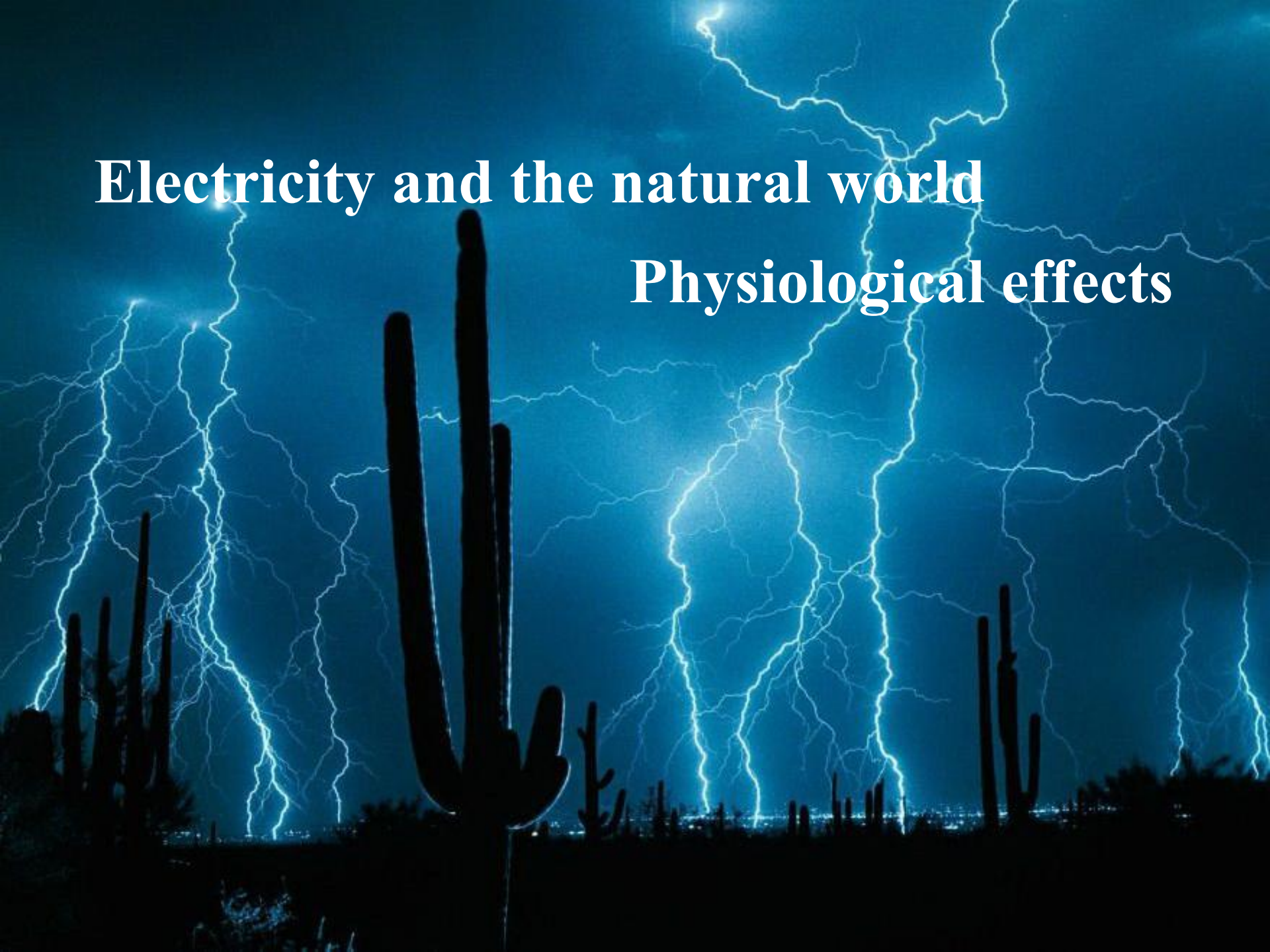


Optical fibre and satellite Optical fibre and satellite communication technology have taken Optical fibre and satellite communication technology have taken a share of the market for communications systems, but electricity can be expected to remain an essential part of the process.



Electricity and the natural world

Physiological effects



A voltage applied to a human body causes an electric current to flow through the tissues. A voltage applied to a human body causes an electric current to flow through the tissues, and although the relationship is non-linear, the greater the voltage, the greater the current. The threshold for perception varies with the supply frequency and with the path of the current, but is about 1 mA for mains-frequency electricity.

If the current is sufficiently high, it will cause muscles contraction, fibrillation of the heart, and tissue burns. The lack of any visible sign that a conductor is electrified makes electricity a particular hazard.

The pain The pain caused by an electric shock The pain caused by an electric shock can be intense, leading electricity at times to be employed as a method of torture. Death caused by an electric shock is referred to as electrocution.



Electrocution is still Electrocutation is still the means of judicial execution Electrocution is still the means of judicial execution in some

END

