These mysterious rays had been seen when an electrical discharge took place between two electrodes in a glass tube from which most of the air had been removed.

Эти таинственные лучи были замечены, когда произошел электрический разряд между двумя электродами в стеклянной трубке, из которой была удалена большая часть воздуха.

Amber is fossilized resin from trees and has strange properties as the ancient Greeks had found.

Янтарь - это окаменевшая древесная смола, обладающая странными свойствами, которые были обнаружены древними греками.

In a valve, negatively charged electrons driven out from the heated filament (the cathode) had moved rapidly to a more positive anode.

В клапане отрицательно заряженные электроны, вытесненные из нагретой нити накала (катода), быстро переместились к более положительному аноду.

By the time EMI had developed an electronic scanning system that gave much better pictures, the Second World War had begun.

К тому времени, когда EMI разработала электронную сканирующую систему, которая давала гораздо более качественные снимки, началась Вторая мировая война.

The beginnings of electronics can be traced back to the discovery of cathode rays in the closing years of the last century. These mysterious rays had been seen when an electrical discharge took place between two electrodes in a glass tube from which most of the air had been removed. Sir William Crookes called these cathode rays since they seemed to start at the negative electrode (the cathode) and moved towards the positive electrode (the anode). At that time, nobody had any idea what cathode rays really were. Nevertheless, during a lecture at the Royal Institution in London in April 1897, Sir J.J. Thomson declared that cathode rays were actually small, rapidly moving electrical charges. Later these charges were called electrons after the Greek word for amber.Amber is fossilized resin from trees and has strange properties as the ancient Greeks had found. If rubbed with fur or a dry cloth, it has the power to attract small pieces of dust and fluff. Neither the Greeks, nor the scientists who devoted so much time to studying its properties in the period from the seventeenth century, had a successful explanation of why amber behaved in this way. However, the discovery of the electron provided the answer.We now know that the electrical behaviour of amber (and of many other electrical insulators) is caused by static electricity. The friction between the cloth and amber causes electrons to be transferred from the cloth to the amber where they stay put to give amber an overall negative charge. This negative charge causes the amber to attract small bits of material to it. The first practical application of cathode rays was the invention of the thermionic valve by Sir John A. Fleming in 1904. In this device, the heating of a wire (the filament) in an evacuated glass bulb produces electrons. The word “thermionic” comes from “therm” meaning “heat” and “ion” meaning “charged particle”, i.e. the electron. In a valve, negatively charged electrons driven out from the heated filament (the cathode) had moved rapidly to a more positive anode. The flow of electrons stops if anode becomes more negative than the cathode. This electronic component is called a diode since it has two electrodes for making connections to an external circuit. In addition, it acts like a valve because electrons flow through it only in one direction, from the cathode to the anode, not in the opposite direction.It did not take long for an American, Lee de Forest, to make a much more interesting and useful thermionic valve. By adding a third electrode made of a mesh of fine wire through which the electrons could pass, he produces a triode. By adjusting the voltage on this third electrode (called the grid), he was able to make the triode behave like a switch and, more important, as an amplifier of weak signals. The triode made it possible to communicate over long distances by radio, and this development was demonstrated dramatically in 1912 when the luxury liner Titanic collided with an iceberg in the Atlantic Ocean. As this “unsinkable” liner was going down, her radio operator broadcast a SOS radio signal using Morse code (dot-dot-dot, dash-dash-dash, dot-dot-dot) that was picked by ships in the area.The First World War (1914-1918) did little to stimulate applications for thermionic valves. But immediately after was, electronics received a push. In London the British Broadcasting Corporation (BBC) was formed, and in 1922 its transmitter went on the air. Firms such as Marconi, HMV and Echo made radio sets from components and valves supplied by Mazda, Ozram, Brimar and others.The second major boost to the emerging electronics industry was the start of regular television transmissions from Alexandra Palace in London in 1936. By the time EMI had developed an electronic scanning system that gave much better pictures, the Second World War had begun. From 1939 to 1945 there were important advances in electronics. The most significant invention was radar, developed in Britain to locate enemy aircraft and ships. Radar was made possible by the invention of a high-power thermionic valve called the magnetron, a device nowadays commonly used as the source of microwaves in microwave cookers.