PET Scanning: What On Earth Is a Positron and How Was It Discovered?

Introduction and Objectives: PET scans are now in routine use; the positron was heralded by a series of theoretical mathematical predictions that were all later confirmed experimentally.
Materials and Methods: A review of the historical events pertaining to the description of the electron as a fundamental particle and the subsequent prediction of the existence of antimatter and its proof with relevant photographs.
Results: Rutherford's atom had a positive nucleus with a vast amount of space and tiny orbiting electrons with negative charge. Why don't the electrons crash into the nucleus? Planck had shown, with black body radiation, that heat energy consists of packets of energy, quanta. Einstein showed light consisted of particles, the photoelectric effect. Young's double slit experiment showed light as a wave. Bohr said electrons can only occupy certain allowed energy states around the nucleus and that these orbits are specific multiples of a lowest energy threshold of angular momentum. A moving charge generates a magnetic field. Zeeman had shown spectral lines split into two when an atom lies in a magnetic field. Perhaps an electron not only orbits a nucleus but spins on its own axis? De Broglie says particles can be described as waves, and waves as particles. This applies to light and also to electrons. Schrodinger shows a probability of a wave having certain characters at certain times. Heisenberg emphasis the particle approach jumping from one energy state to the other along with the uncertainty principle. Dirac unifies this and gives two possibilities for the electron. One is a traditional result, the other the exact opposite, an "anti-electron". This could explain the Zeeman effect. Anderson, using a cloud chamber discovers the aparticle with the same mass to charge ratio as an electron, but moving in the opposite direction within a magnetic field, a "positron".
Conclusion: Negative energy did not correlate with anything in the then-known physical world, but mathematically it should exist. Since, antiparticles for all the elementary particles have been found to exist, and antimatter, once the realm of science fiction, is now used in hospitals around the world.