Pandora's Subatomic Box

The idea that matter is made of microscopic, indivisible particles goes back to ancient Greece –a time when great philosophers debated about the basic substances underlying all things in the cosmos. The Greek root of the word *atom* is atomos **(**ἄτομος**)** which means « indivisible ». The concept of the atom is attributed to the Greek philosopher Leucippus, who used it during the early part of the fifth century BCE.

For the next 2,000 years, humanity was content to leave matter stand inviolate --awed at the knowledge that there were limits beyond which it would be unwise to pry. But scientific curiosity and industrial progress since the 19th century respected neither barriers nor heeded warnings.

The first subatomic « particle » to be discovered was the **electron**, identified in 1897 by J. J. Thomson. After the nucleus of the atom was discovered in 1911 by Ernest Rutherford, the nucleus of ordinary hydrogen was recognized to be a single **proton**. In 1932 the **neutron** was discovered. The use of Greek to baptize these three new subdivisions of the indivisible, demonstrate the respect which scientists still afforded to their endeavours at that time.

As everybody knows, Western scientists' efforts to split the atomic nucleus to release titanic amounts of energy gave birth in 1945 to the atomic bomb, thus changing our world forever. The Manhattan Project which produced The Bomb, cost American taxpayers about $ 2.2 billion in today's money, and cost 240,000 lives just from the bombings of Hiroshima and Nagasaki. No one has yet calculated the cost of environmental degradation caused by continuing nuclear tests.

Starting in the latter half of the 20th century, physicists working on the structure of atoms have attempted to describe and classify all new nano-atomic elementary « particles » and fundamental forces therein; but in the process have discarded the traditional nomenclature using Greek or Latin to label the new. Thus, we now have a partial unconfirmed menagerie of « flavors » of « quarks » they labeled: *up, down, strange, charm, bottom* and *top*. Apart from the whimsical charm of these labels, this propensity testifies to the Anglo-American culture of the labelers.

This is the Standard Model of these « particles »:

Even though budgets for high-energy physics experiments can run into the billions of dollars, physicists never know exactly what they will discover about the nature and behavior of matter, or how the knowledge will pay off. Public money invested in such experiments, opponents argue, would be better spent on scientific work with more relevance and clear applications, like medical research, programs that directly improve people's lives, research that leads to feeding the world's population, and research into energy alternatives for non-renewable resources. The price of particle physics research remains high, with duplicated efforts in several labs in the United States and Europe.

The European-built CERN Large Hadron Collider, at 27 kilometers in length, is the world's highest-energy particle collider. It took a decade to build; and cost around $4.75 billion. It is also the largest machine ever built by human hands. But CERN is now planning to build a second, even larger collider to further study the Higgs Boson. This one could end up being 100 kilometers long, and may cost up to $23 billion to produce.

In the last few decades many observers have warned us of the apocalyptic dangers of continuing to bombard one nano-atomic particle with another --such as more Hiroshimas, a black hole swallowing the planet, etc. -- but today’s billionaire Pandoras continue to pry open sub-atomic boxes, as we all hope and pray for the best harmless outcome.