Chemistry Essay, Research Paper

Robert Boyle is considered both the founder of modern chemistry and the greatest

English scientist to live during the first thirty years of the existence of the Royal Society.

He was not only a chemist and a physicist as we know him to be, but also

an avid theologian, a philanthropist, an essayist, and a beginner in medicine. Born in

Lismore, Ireland to Richard Boyle, first earl of Cork, and Katherine Fenton, his second

wife, Boyle was the youngest son in a family of fourteen. However he was not

shortchanged of anything. After private tutoring at home for eight years, Robert Boyle

was sent to Eton College where he studied for four years. At the age of twelve, Boyle

traveled to the Continent, as it was referred to at the time. There he found a private tutor

by the name of Marcombes in Geneva. While traveling between Italy, France, and

England, Boyle was being tutored in the polite arts, philosophy, theology, mathematics,

and science.

As the years went by, Boyle became more and more interested in medicine. His

curiosity in this field led him to chemistry. At first Boyle was mainly interested in the facet

of chemistry that dealt with the preparation of drugs, but soon he became genuinely

interested in the subject and started to study it in great detail. His studies led him to

Oxford where he joined such scientists as John Wilkins and John Wallis. Together in

1660, they founded the Royal Society of London for the Advancement of Science.

From this point onwards, Boyle seriously undertook the reformation of science.

For centuries scientists had been explaining the unknown with the simple explanation that

God made it that way. Though Boyle did not argue with this, he did believe that there was

a scientific explanation for God s doings. Boyle s point of view can be seen by his dealings

with the elements. At this time it was thought that an element was not only the simplest

body to which something could be broken down, but also a necessary component of all

bodies. Meaning that if oil was an element, it would not be able to be broken down, and it

would be found in everything. Boyle did not accept this theory, whether it referred to the

earth, air, fire, the water of the Aristotelians, the salt, sulfur, and mercury of the

Paracelsans, or the phlegm, oil, spirit, acid, and alkali of later chemists. He did not believe

that these elements were truly fundamental in their nature. Boyle thought that the only

things common in all bodies were corpuscles, atom-like structures that were created by

God and that occupy all void space. He began to perform experiments, concentrating

on the color changes that took place in reactions. He started to devise a system of

classification based on the properties of substances. By showing that acids turned the blue

syrup of violets red, Boyle claimed that all acids react in the same manner with violet

syrup and those that did not, were not acids. Similarly, he showed that all alkalies turned

the syrup of violets green. Observing that the blue opalescence of the yellow solution of

lignum nephriticum was destroyed when the solution was acidified and could be restored

by the addition of alkali, Boyle used this experiment to test the strength of acids and

alkalies. His system therefore consisted of three categories: acids, alkalies, and those

substances that are neither acids nor alkalies. However, he purposefully avoided any

investigation of corpuscles. Boyle continued his work on acids and alkalies. He devised

tests for the identification of copper by the blue of its solutions, for silver by its ability to

form silver chloride, with its blackening over time, and for sulfur and many other mineral

acids by their distinctive reactions.

Therefore, knowing that it was not actually Boyle who discovered his law, but

Towneley and Power who did in 1662 and then Hooke who confirmed it soon thereafter,

it can be said that this was Boyle s greatest achievement. His achievement being the

conversion of scientific thought from one in which the spirits and the heavens were kept in

mind at all times, to one based on experimentation and the use of deduction, not

assumption. It cannot be stressed strongly enough what this did for science in general.

Boyle s work sparked the beginning of a new era, one in which careful experimentation

was the justification for a hypothesis, and thus he is accordingly bestowed with the honor

of being the founder of modern chemistry.

Boyle also did extensive work with the air pump, proving such things as the

impossibility for sound to be present in a vacuum, the necessity of air for fire and life, and

the permanent elasticity of air. Also using the air pump, Boyle discovered that fixed air

was present in all vegetables. Through other experimental methods, mainly the use of steel

filings and strong mineral acid, he also found hydrogen. Yet his greatest achievement,

apart from his influence on scientific thought, were his writings. Boyle wrote about the

connections of God with the physical universe. He wrote numerous books on religious

subjects, not all of which were related to science, but the most influential being so. At his

death in the December of 1691, Boyle left a sum of money for the foundation of the Boyle

lectures, a group of sermons that were intended for the disputation of atheism. Robert

Boyle opened the way for future scientists, changing their methods of experimentation,

thought, and outlook on chemistry as a whole, forever.