

## Preface to A History Of Magnetism

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This is a book about the history of magnetism and magnetic theories covering the period from ancient times up to the beginning of the twentieth century. The story is a study in the history of an evolving concept in physical science. It takes the reader from the earliest ideas about the magnet and magnetic attraction up to the modern ideas of electromagnetism; from magic to field theory. Magnetism is an idea that has constantly been changing. New answers to the universal question are produced, questioned, accepted, and finally rejected to be replaced by new ones. This is the course of science history. The questions born from wonderment and fascination remain; the answers, however, are constantly changing.

What is science? One answer is that science is the systematic classification and explication of true knowledge. This broad definition permits history to be classed as a science. Its subject being the **collective memory of human experience**. All human thought is grounded in its historical context. New theories emerge from existing theories because the philosophical orientation of scientific thought has evolved to reveal new viewpoints. This may occur due to new facts, concerning the phenomena, i.e. breakthrough discoveries, or new mathematical methods. Theories change because new ideas need to be incorporated into them. Scientific theories are not pure logical constructions, they are frameworks of interpretation based on human understanding. Science history is the reconstruction of the change in these ideas. It is accomplished by combining the historical facts, the way it was, with an interpretation of why these facts indicate a conclusion.

One of the objectives of this analysis will be to critically reexamine the historical prejudices hidden within magnetic theory. These prejudices are worrisome because we have no assurance that historical development of theories and ideas is the correct logical development of the same ideas. The traditional approach to history of science has been to emphasize the positive progressive development of the truth in scientific theories. This proceeds from the assumption that the modern viewpoint is the correct interpretation. It has tended to emphasize what was wrong or incorrect in the ancient ideas up until the scientific revolution, when the correct way of thinking about scientific questions was developed. Since that time the march of science has always been in the right direction.

Behind the traditional historical approach, sometimes called the standard account or standard story, there is a hidden agenda, or prejudice. It conceives that only the modern is correct or true. It frames the historical record prior to 1600 in terms of incorrect belief, prejudiced by ignorance, superstition, and false religion. This is hardly difficult to accept when our modern culture still promotes the use of magnets to cure arthritis, and advocates the consumption of iron as a food additive. Both of these are ancient beliefs regarding magnets. One we believe to be false, the other true, yet both arise from ancient beliefs regarding the magnet. Our credulity is tasked. Are we really sure that magnets have no beneficial health effect to cure arthritis?

Beyond this we must ask, did religion promote false science as we are told? Did the christian church cause the dark ages, was it hostile to the development of true knowledge, and promote the maintenance of superstition and erroneous knowledge? Did true knowledge only arise when the bondage of false religion was thrown off and the church's power over the human mind was destroyed? These are the ideas that underlie the traditional histories. We will consider them as we proceed.

Fundamentally, it is unfair to contrast the ancient with the modern. We really don't know much about the practice of ancient science that is directed to its methods. We have only fragmentary summaries of its conceptions. Consider if all modern scientific books were lost with the exception of a portion of popular literature. This consisting of popular science and cultural beliefs, it is clear that the historical record would be confused. The historical interpretation would certainly not reflect the truth.

The historical view presented here is framed as follows. The modern age, from which a continuous historical development can be constructed really begins in the middle ages around the 10th century. During this period there was a recovery of the fragmentary literature of the ancient Greeks. This was added to the existing knowledge and traditions within the context of Christian belief. The record prior to this time is discontinuous both in western Europe and other cultures. We see this in the development of the compass, which appears in the 10th century without any prior development. The history of magnetic science is similar. Prior to this we have few solid facts. But, many discontinuous fragments.

A significant result presented in this study is the discovery of magnetic theories during the Greek pre-socratic era. These theories were of the same corpuscular materialistic nature as the scientific theories advanced during the seventeenth century. Another discovery was the identification of primitive field theories during the middle ages. These results were derived from an approach that seeks to recover as much as can be expected from the meager records, while constructing a continuous development of ideas. This development will be presented within the context of an historical interpretation. This interpretation is a theme or context of presentation. The theme is: The development of electricity and magnetism is the story of the development and conflict of two interpretive ideas or theories; the immaterialistic conception or field theory and the materialistic conception relying on tiny material particles. These ideas develop and mature. They change form and context, but they remain basically the same at the foundations. We see them present today in the idea of the electromagnetic field and its quantum particle or photon.

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