

## WHY INCLUDE HISTORY INTO INDUSTRY, RESEARCH AND TEACHING?

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In 1803, Jean Baptiste Biot, in his “General history of sciences during the Revolution”, emphasized progress in sciences in historical approach.

### 1 THE PLACE OF HISTORY IN INDUSTRY

In 1835, the mine engineer Juncker had to innovate so as to design a new water column machine rejecting the water of a silver-lead mine in Huelgoat (Finistère), 155 m higher.

Without books focussed on practice, Juncker looking back into History allows to find that missing knowledge in the person of Reichenbach, general director of bridges and roadways of Germany. Twenty years before, he had constructed the most developed water column machines in Europe.

In 1867, the engineer Charles Combes wrote with the engineers Phillips and Collignon, a report on progress of applied mechanics for the universal exhibition of 1867 in Paris.

History shows that the evolution of technical progress reduces social distances, the railway for example. History also calms down antagonism, suppressing forgetfulness and to understand how they appeared.

### 2 THE PLACE OF HISTORY IN RESEARCH

During his lecture in Dundee in 1912, “Radiations old and new”, William Henry Bragg worked as an epistemologist and opened the way to de Broglie 12 years before the development of his wave mechanics theory.

The historical perspective allows to understand the quarrels between schools about wave and corpuscular theories of light which did not exist with Newton or Huygens in 17<sup>th</sup> century.

Bragg incites researchers to invent a new mathematical model much more open, of larger application, “which processes the capacities of both”. He suggested to vary hypotheses so as to progress. The conflicts between schools finally disappeared leading to a general peace, forgetting the present and refreshing minds in study of Newton and Huygens papers ... in order to see the present through a new light, understand it better; virtue of History, one again.

In 1926, on the method of contraries, Paul Langevin emphasises the paradox between scientific Research and Teaching in France, justifying “the educative value of history of science”.

### 3 THE PLACE OF HISTORY IN SCIENTIFIC TEACHING

Langevin shows how sciences are taught in excessively dogmatic way in France, restricting the knowledge of facts and laws. To this necessary adaptation to the requirements of economy, Langevin proposes to include an historical approach: “nothing – Langevin said – can replace the history of past efforts kept alive thanks to contact with the lives of great scientists and the slow evolution of ideas ... contributing then to general culture.”

Conclusion: The innovative manufacturer, the creative researcher and the teacher who educates resort to History in the same way as, at the end of the 19<sup>th</sup> century, the philosopher Nietzsche. He defines knowledge as clever, fervent and available interpretation so as to avoid sliding into absolute knowledge. He substitutes dualism to understanding of its history which gives fluidity to antagonisms. He restore the movement of reality. Finally he fights idealistic motivations which are often an obstacle to progress, lead to routine and keep men from effort and creation.