# Historical Overview

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## 1.1 New Science

Understanding the origins of 'new' scientific knowledge, understanding what and who took the first steps towards breaking free from superstition, supernatural, rigid and immutable beliefs, is a considerable cultural step and one which brings full enjoyment of what science can offer us both as individuals and as members of the scientific community. Above all, intellectual effort calls for a critical mind, in order not to simply accept what is transmitted to us. Thinking can and should be remodelled by everyone, according to well-accepted methods to make it ever more detailed and in keeping with the reality we wish to convey. It requires intellectual honesty, as well as specialised training, and once conclusions have been reached about any piece of work, the results should be conveyed to everyone involved. While 'our' centuries-old science has managed to overcome superstition, an anti-scientific attitude has remained on the side-lines of human thought, threatening its very foundations whenever an immediate explanation to a phenomenon cannot be provided. Science takes time and requires patience, a sound mind and method.

Let us not forget that many of the western world's values and perceptions are inspired by the scientific method and the resulting technical progress. The 'Scientific

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Method', its concepts and its dissemination underpinned the veritable knowledge revolution of the seventeenth century. The Scientific Method represents 'the rules of the game' and covers three elements in its scope:

1. LOGIC and its *inductive* methods (the effects are observed to confirm the causes, according to a process of subsequent reasoning) and *deductive* methods (from the cause, the effects are hypothesised, according to a process of prior reasoning).
2. Systematic application of OBSERVATION, not for mere description purposes, but rather in order to inspire EXPERIMENTATION. Every hypothesis must go hand in hand with repetition and reproducible tests in order for it to be affirmed.
3. Speaking the same language: the language of MATHEMATICS. Galileo Galilei claimed that 'the universe is written in the language of mathematics'. Used in Plato's era as the language of nature, especially in geometry, to avoid being misled by pure sensory experiences.

The main advocates of this development were three scientists closely linked to one another by the knowledge that 'we have been too inefficient thus far', Galileo Galilei, Renè Descartes and Francis Bacon.

Nevertheless, New Science figured little, at least to begin with, in the world in which it emerged. Inevitably, new institutions were needed; composed of people involved with specific scientific fields, supported by patrons or corporations with the aim of facilitating communication and debate in the scientific community—the SCIENTIFIC SOCIETIES were born.

1606 saw the launch of Rome's Lincean Academy, quickly followed by the Accademia del Cimento (1657), Paris' Academy of Sciences (1666) and the Royal Society (1660). In the latter, the influence of the new cultural climate was so strong that the fine arts, rhetoric, metaphysics and theology were excluded from the Articles of Association (without, however, undermining their prominence). The importance of communicating ideas was supported by their own dissemination means and journals such as the Philosophical Transaction, Acta Eruditorum and the Journal de Savants.

At all levels, scientific research products should therefore be made accessible, employing the correct language for the target audience.

## 1.2 Young People in Science

When we speak about young people in science, particularly about the contribution, young people have made, make and will make, is not only a matter of age. Being young implies a new mental approach and boundless physical endurance. One could wonder who was the first 'young surgeon' to have both a young mind and a youthful age. There is no doubt as to the answer: Giovanni Battista Morgagni (Forlì 1682-Padua 1771). He studied under Valsalva in Bologna before moving to the Republic of Venice and finally settling down in Padua in 1711, when he was called to the second chair of theoretical medicine.

One of his many accomplishments was the sacrilegious method of 'looking into a body' according to a new perspective that began to weaken the old assumption that diseases were linked to an imbalance of humours (humourism), opening the door to the idea of diseased organs and of symptoms being the 'cry of the suffering organs'. From Morgagni we can draw inspiration for the times in which we are about to move away from clinical practice, touching upon research and experimentation: curiosity, critical analysis, accepting findings which are in contradiction with previous hypotheses (indestructible unless proved otherwise) and dissemination capacity. Morgagni's work marked the beginning of pathology as we know it today: the result of systematic observation and experimentation.

When Morgagni was aged only 22, he was named president of the Accademia degli Inquieti, which managed to make reforms, drawing on the experience of the Accademia del Cimento, by bringing to the fore investigative enquiries and consultations, and relegating theoretical debates to a marginal role. The turning point came in 1705 when he gave a reading of the first volume of his publication, *Adversaria Anatomica.* The publication of all of these papers when Morgagni was only 24, gave him instant international recognition as an anatomist.

Another positively larger-than-life young man, and probably for this reason, highly creative and steadfast, was Thomas Fogarty (1934). We all know his name thanks to his famous catheter for embolectomy which we use in our operating theatres, but probably only a few people are aware that the commercialisation and widespread use of this instrument began when Fogarty was only 29 years old. During the years spent at the Good Samaritan Hospital (where he worked as a medical instrument maintenance technician) he met Dr. Jack Cranley—his main mentor—and the man who inspired him to study medicine. The fact of being present during a number of surgical procedures, meant that he witnessed the death and suffering of a several patients suffering from acute artery ischemia. After resolving various technical difficulties, he managed to develop his instrument in 1960, but no one acknowledged the significance of the idea. Only a few years later, as he was finishing his specialisation at Oregon University, did he successfully put forward his idea to the cardiac surgeon, Al Star, who helped him to obtain the final patent in 1969. From this instrument came the idea in 1965 for the design of the first angioplasty balloon.

Of course, Gianbattista and Thomas are only two well-known examples of what a young person driven by interest and passion can achieve. Unquestionably, the history of surgery is brimming with contributions by young, motivated men and women to whom we should express our gratitude each day and from whom we should draw inspiration.