

## IN THE SHADOW OF LOUIS PASTEUR

**Maxime Schwartz** – The fame of Pasteur overshadowed most of his collaborators; collaborators that I like to call his “lieutenants” in reference to François Jacob who compared Pasteur to a general. What could a general have accomplished without lieutenants? Pasteur had become famous quite early, let’s say between the ages of twenty and forty, and he had already made important discoveries when, progressively, a handful of outstanding young men gathered around him, such as Duclaux, Roux, Calmette, Yersin, Metchnikoff, etc.

Duclaux was the first, and if he were to join Pasteur, it was because he prepared the entrance examination for Ecole Normale in an institution, the “pension Barbet”, where Pasteur had been a few years before. Since Duclaux was very bright, the director of this “pension” decided that Duclaux should work with Pasteur and convinced him to do so. Duclaux admired Pasteur deeply but always remained behind him, even though he had very important contributions in works such as the study of the diseases of wine or of the silkworms. Duclaux’s main contribution was first to be the “apostle of the pasteurian gospel”, spreading Pasteur’s ideas both “in the field”, convincing the farmscientifiers to use the vaccine against anthrax or the wine makers to pasteurize their wines, and by his writings. He wrote books, established the “Annales de l’Institut Pasteur”, etc. But then, it is really Duclaux who, so to speak, provided the initial spirit to Institut Pasteur, making it a sort of cooperative scientific institution, in which scientists were fully independent but were united by common aims...

As for Roux, an important fact was that he was an MD! And he joined Pasteur’s laboratory when Pasteur was shifting from the study of fermentations to that of infectious diseases. There, Roux immediately played a major although often forgotten role, mainly in the conception of the first vaccines. It is to him that we owe the techniques to attenuate the microbes, be it that of fowl cholera, anthrax or rabies, in order to use them as vaccines! The most important contributions of Roux, fully independent from Pasteur, were those concerning diphtheria. First, with Yersin, he discovered that the diphtheria bacillus secretes a poison, diphtheria toxin. It was the first discovery of poison of microbial origin. Then, once Behring and Kitasato had shown, in Germany, that the inoculation of a toxin to animals induced the appearance of an antitoxin, an antipoison, in their serum, Roux developed serotherapy, the use of antitoxin containing serum to cure children from diphtheria. For the first time in history, serotherapy provided a means to cure an infectious disease.

Duclaux and Roux were really the creators of what is often called “the pasteurian spirit”. The two of them, together or successively directed Institut Pasteur during forty-five years, i.e. practically one third of the total life of the institute up to now. They gave it a spirit that can be defined by rigor and excellence in the way to conduct research, the maintenance of a permanent link between the most basic research and its applications, of which Pasteur’s own career gave an example, and a dose of humanism, leading one to display an

interest for diseases that hit the most disadvantaged populations. This is how the “pasteurian spirit” can be summarized, it was created by Duclaux and Roux, and is still alive today.

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