

# The history of vaccinology and hygiene through Achille Sclavo and the cultural patrimony conserved in the archives and museums: the key role of medical museology

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## Summary

*Over the centuries, the oldest universities have amassed an extraordinary patrimony of material and immaterial cultural assets, which have been created or acquired for the purposes of research or teaching. Now on display in museums, they testify to the evolution of knowledge and its diversification in various disciplines. In order to safeguard, conserve and study this precious heritage, we need to implement a cultural project that activates that “process of awareness” on which cataloging is based. This is a “reasoned awareness” that enables an object to be framed*

*within a system of scientific knowledge and historical-critical relationships, which are essential to its conservation and, consequently, to its public exploitation. Through this process, we can uncover the history of an object, its characteristics and its uniqueness. This is the case, for example, of an optical microscope on display in the Museo di Strumentaria medica (Medical Equipment Museum), which is part of the Museum System of the University of Siena.*

## Background

Achille Sclavo (1861-1930) graduated in medicine at the University of Turin in 1886, and belonged to the second generation of Italian hygienists. In 1887, he was called by his mentor Luigi Pagliani (1847-1932) to the General Directorate of Health (Direzione Generale di Sanità), as a member of the work-group founded by prime Minister Crispi to reorganize national healthcare policy [1].

He was therefore able to acquire great experience in the fields of Hygiene and Public Health through his collaboration with Pagliani himself, Pietro Canalis (1856-1939) and Alfonso di Vestea (1854-1938).

At the beginning of the 1890s, following his promotion to Director of the Bacteriology Laboratory and his appointment as a teacher at the Upper School of Hygiene (Scuola Superiore di Igiene), Sclavo undertook original studies on anti-diphtheria and anti-anthrax sera.

He maintained and broadened this research activity when, in the academic year 1896-1897, he was appointed to teach Hygiene at the University of Siena, where, in 1898, he became Extraordinary Professor of Hygiene and Director of the Laboratory of Hygiene.

## The microscope used by Achille Sclavo to study anthrax

The microscope used by Achille Sclavo to study anthrax (Fig. 1), was made by the Fratelli Koristka company (1900), it comes from the Laboratory of Hygiene of University of Siena and it is now preserved in the Medical Equipment Museum of the University, of course.

Its first inventory tag (IG4) indicates that it came from the *Regio Istituto di Igiene e Batteriologia* (Royal Institute of Hygiene and Bacteriology) of the University of Siena; this provenance is confirmed by the new and still existing inventory tag numbered 116 of the same Institute.

The *Fratelli Koristka* company was founded in Milan in 1881 by Franz Koristka (1851-1933), an Italian optician and entrepreneur of Czech origin. It soon became the most important manufacturer of microscopes and one of the few precision industries in Italy at the time, with clients even in America. Thanks to his personal friendship with the physicist and research director at Zeiss Ernst Abbe (1840-1905), Franz Koristka was able to build microscopes and photographic lenses under Zeiss patents [2].

The microscope is equipped with a wooden case, which houses the containers of its three eyepieces; together

**Fig. 1.** Microscope Koristka Brothers used by Achille Sclavo (Medical Equipment Museum, Museum System of the University of Siena).



with a range of technical information, it also bears the name of its owner: Achille Sclavo.

Thus, as indicated by the note that accompanies the instrument and which attests to its use by the great hygienist, we can affirm that this microscope was used in the studies that led to the discovery of Sclavo's anti-anthrax serum.

Anthrax is a zoonosis that chiefly affects cattle and sheep, and more rarely horses and goats. It can sometimes be transmitted to humans [3].

It is caused by *Bacillus anthracis*, which was discovered in 1877 by Robert Koch, who was the first to demonstrate the causal link between this microorganism and the disease; the demonstration by Robert Koch of *Bacillus anthracis* as the cause of anthrax was a cornerstone of proving the germ theory of disease [4].

In humans, the disease may develop in three different forms:

- *cutaneous* (by far the most frequent);
- *respiratory*;
- *gastrointestinal*.

The infection can be cured by means of antibiotics, but in order to be efficacious, the treatment must be initiated immediately after contagion.

In those days, however, there were no elective drugs for the treatment of this disease, which was a very common professional infectious disease among shepherds, farmers and, especially, tanners. Moreover, being a veterinary disease, anthrax had a heavy economic impact on cattle and sheep farming. Sclavo therefore decided to channel his efforts into the search for a serum that

could efficaciously cure this disease. Indeed, instead of using the vaccine that Louis Pasteur had proposed on the basis of his studies on the techniques of attenuating the virulence of germs in culture, Sclavo designed a new method of eliciting immunity to anthrax in humans and animals; this method utilized serum obtained from anthrax-infected sheep, which he then tested on rabbits in order to ascertain its preventive and curative properties [5].

Sclavo devoted many of his writings to this subject, from the first "*On the preparation of anti-anthrax serum*" (1895) [6], the year in which he officially communicated the first results of his research into the preparation of a hyperimmune serum against anthrax, to the last, when he was still working at the General Directorate of Health of the Ministry of the Interior, entitled "Concerning some properties of anti-anthrax serum" (1906), co-authored by his pupil Donato Ottolenghi [7].

Through these publications, Sclavo explained the mechanism of the immune reaction in anthrax-infected animals treated with his serum, and demonstrated that this serum could be used not only in humans but also in veterinary practice. Moreover, he ascertained that the donkey was the best serum-producing animal in terms of both quantity and quality.

In 1898, by immunizing two donkeys, he obtained a serum that displayed life-saving efficacy.

From the end of the 19th century onwards, much of Sclavo's research focused on finding the best animals to select as producers of highly efficacious sera. This research also included, for example, the somewhat unusual use of serum from the female deer (*cervus elaphus*) against anthrax [8].

The photographic archive of the Medical Equipment Museum houses a series of early 20th century photographs showing some of the serum-producing animals used by Achille Sclavo in his research. Among them are Eurialo and Niso, the first two donkeys used by Sclavo for the preparation of his anti-anthrax serum.

### **The Riberi prize and the foundation and development of the Tuscan Serotherapy and Vaccinology Institute**

In 1903, in recognition of his studies, Sclavo was awarded the "Riberi" Prize by the Turin Academy of Medicine. With the money he received, and a portion of his wife's inheritance, he bought a small country villa just outside Siena. In the 1825 land register of the Grand Duchy, this property appears as the "Villetta dell'Ebreo", very probably in a reference to a former owner.

It was on this property that the "Sclavo Institute" was founded in 1904. Subsequently, it was renamed as the "Tuscan Serotherapy Institute" (Istituto Sieroterapico Toscano), which was founded jointly by Sclavo and his hygienist colleague Ivo Bandi (1867-1926) "for the preparation of sera, vaccines, viruses, similar products and other therapeutic and prophylactic materials" [9]. However, Bandi split from Sclavo in 1908 to found

his own institute, named “Italian Serovaccinotherapy Institute” (Istituto Sierovaccinoterapico Italiano), in Naples a few years later (1914).

Following the introduction of vaccine production, the *Sieneese Institute* was later enlarged and it took the name of “Tuscan Serotherapy and Vaccinology Institute” (Istituto Sieroterapico e Vaccinogeno Toscano, ISVT). Thus, Sclavo embarked upon a new career as an entrepreneur – in much the same way as other colleagues, including Serafino Belfanti (1860-1939), the founder of the Milanese Serotherapy Institute (Istituto Sieroterapico Milanese).

Sclavo realized that he needed to have a production center where he could manufacture his anti-anthrax serum on a large scale, thereby contributing to public health policies aimed at avoiding or preventing the spread of infectious diseases in Italy.

We are able to reconstruct the history of the Institute and the decisions taken by Sclavo with regard to his research and the development of the Institute itself partly on the basis of the written and photographic documentation that was saved by the company’s employees when the company was sold in the 1980s. Despite the divisions and losses suffered over the years and the changes of ownership, this documentation constitutes one of the few company archives that have been preserved in Italy. The University of Siena has reorganized and inventoried this documentation [10], thereby rendering it accessible to the public.

The first great expansion of the Institute founded by Sclavo took place not only as a result of the advances made in microbiology, but also because of the increased demand for the products needed to vaccinate military personnel. Indeed, during the First World War, the soldiers at the front had to be immunized against numerous infectious diseases [11, 12, 13, 14, 15].

In this way, as Sclavo himself had intended, a privileged link was forged with the State, which became the Institute’s chief interlocutor and client. Bacterial sera and vaccines, especially against typhus and cholera, were particularly required for the Armed Forces. The war therefore became a fundamental testing ground for the Italian pharmaceuticals industry.

Subsequently, at the end of the war, attention turned to the needs of the civilian population, which, exhausted and undernourished, fell victim to epidemics, the most disastrous of which being the tragic pandemic of so-called Spanish Flu [16].

At the time of its foundation, the Tuscan Serotherapy and Vaccinology Institute was a sort of “farm with scientific objectives” [17], its laboratories consisting simply of rooms endowed with the primitive equipment available at the time. Nevertheless, it achieved great results.

Among the products marketed by the ISVT at that time were anti-anthrax serum, antidiphtheria serum, antityphoid vaccine and anti-anthrax vaccine, as testified by a document dated 25 May 1907 in the historical archive of the Institute, which enables us to precisely reconstruct the list of products available [18].

## Sclavo's specialities and the popularization of scientific knowledge

Analysis of the archival documents and the equipment conserved by the Gruppo Anziani Sclavo (Sclavo Group of Elders) and the University Medical Equipment Museum, equipment, pharmaceutical products, and descriptive and advertising material also enables us to reconstruct the production of other specialties manufactured by the Institute – what would now be called “over-the-counter products”.

The very first of these products to be marketed was “Sclavo Jodogelatina”. “Discovered and introduced into therapy by Prof. Sclavo, it is a special combination in which iodine is incorporated into the molecule of gelatine”; it had numerous therapeutic indications: “scrofula, rickets, arteriosclerosis, organic decay, chronic forms of malaria, tubercular forms, goiter, syphilis, gout”, as claimed by advertising material of the time (from 1910 onwards) [19].

Unlike the Institute’s sera and vaccines, which required only the distribution of information to doctors, without the need for advertising, the specialties that Sclavo marketed had to be publicized, just like any other industrial product. This was chiefly due to the fact that they promised benefits that had not always been ascertained through research and experimentation. Moreover, it reflects the phenomenon of the popularization of scientific knowledge, which emerged at the end of the 19th century and at the beginning of the 20th. Thus, appropriately simplified medical information was circulated among the people, who were able to receive news of the most recent discoveries in pharmaceutical chemistry and of their application in the field of healthcare.

Another area of pharmacology dealt with by Sclavo was that of opotherapy products, i.e. extracts of animal organs for the treatment of endocrine diseases, e.g. the *Simiormina* (hormones of monkeys, testicles, thyroid, pituitary gland, adrenal glands) (Fig. 2).

To pursue this new line of research, he founded the National Opotherapy Institute (Istituto Opoterapico

Fig. 2. Advertising postcard Simiormina Sclavo 1927 (Elderly Group Archive, Sclavo, Siena).



Nazionale “Pisa”), together with other partners, in Pisa in 1916.

With regard to publicity, intense advertising campaigns were conducted in newspapers and magazines, as in the case of Sclavo Jodogelatina, for example.

In 1911, the newspaper “*Il Ponte di Pisa*” wrote “*Jodogelatina, discovered by Prof. Sclavo and introduced by him into medical practice, advantageously substitutes all other iodine preparations*” [20]. Advertising posters in the *Art Nouveau* style began to appear in pharmacy windows and city streets, inviting consumers to purchase creams, pastilles and elixirs, which were rendered all the more attractive by fantastic figures such as angels, dragons and snakes

In 1914, the Tuscan Serotherapy and Vaccinology Institute entrusted the graphic design of the advertisements for Sclavo Jodogelatina to Carlo Biscaretti di Ruffia (1879-1959), one of the most famous technical and advertising designers of the day.

A roaring dragon vividly evoked the regenerating power of Jodogelatina. The same mythical theme of the Dragon appeared in 1928 in the advertisements for *Adrenofer* (Fig. 3), again designed by Biscaretti, who inserted an additional element: the *Torre del Mangia*, which towers above the Campo di Siena, one of the most famous piazzas in the world. Two dragons are twisted around the tower; one holds in its mouth a vial of the potent preparation of “iron, manganese and total extract

of adrenal capsules” [19], while a drop of the same preparation drips onto the snout of the other.

Over the years, *Adrenofer* was advertised in various ways, starting with a postcard (1911) in *Art Nouveau* style featuring an elegant lady dressed in red with a garland of roses in her arms, against a backdrop of the Campo di Siena and the Palazzo Pubblico. After the Second World War, the advertising of *Adrenofer* was entrusted to Giancarlo Rossetti, the founder of Studio Stile (1920-1994) in Milan.

### The creation of a single graphic layout for the Sclavo products

Not only the postcards and advertising posters have been conserved, but also, in many cases, the original drafts, such as those by Rossetti. Together, these constitute a patrimony of cultural assets that enables us to reconstruct not only the production of the Tuscan Serotherapy and Vaccinology Institute, but also the communication strategies that it implemented during the course of the 20th century. In this regard, we should also take into account the history of the “image-building” of the Sclavo Institute, which saw a turning point after the death of its founder in 1930.

A few years later, in 1935, Dario Neri (1895-1958) was appointed proxy for the Sclavo heirs. The husband of Achille Sclavo’s youngest daughter, Neri introduced into the Institute a new idea of work organization and, possessing the artistic sensitivity of the painter and xylographer, worked to create a new and strong image. His main objective was to create a single and easily recognizable graphic layout for the whole range of production. He used two colors, green and white, and a logo consisting of an arrow broken by another arrow, surmounted by the motto “*Contraria*” (“contrary”), which had previously been chosen by Achille Sclavo himself [10].

Realistically Sclavo intended to insert the research carried out in his Institute in the tradition of classical medicine, taking up the Hippocratic principle “*contraria contrariis curentur*” (the opposites are cured with the opposites) and opposing the theory “*similia similibus curantur*” (the likes are cured with the similar) typical of the homeopathic approach of Christian Friedrich Samuel Hahnemann (1755-1843).

According to Achille Sclavo and Dario Neri the logo “*Contraria*” (in Latin means “*antagonist*”) perfectly summed up the vaccination action: the ‘good’ arrow breaks the ‘evil’ one (same but opposite).

*Contraria logo* featured not only on the packages of the Institute’s products, but also, and especially, on its advertising material, thereby creating an incisive image that was based on the Institute’s prestigious past and the figure of Sclavo. They also conveyed an important message for the subsequent years and for the study of new immunological methods, which saw the Institute at the forefront of this sector at the international level in the middle of the 20th century.

Fig. 3. Advertising postcard *Adrenofer* Sclavo 1911 (Elderly Group Archive, Sclavo, Siena).



## Conclusions

Much work has been done by the Sclavo Group of Elders and by the University of Siena through its Museum System of conservation, inventorying and study, not only of archival documents but also of the instrumentation that Sclavo routinely used and of the descriptive and advertising material produced by his Institute over the years. This work has proved indispensable to the exploitation of the entire patrimony of the great hygienist. Indeed, cultural assets can be displayed in a museum only after the meticulous process of investigation and study described above.

In this work of organizing the material remains of the history of such an important Italian Institute of serotherapy and vaccinology – which, among others, was chosen in the late 1950s by Albert Sabin for the production of his anti-polio vaccine [21] – great efforts have been required in order to fill in the evident gaps that point to other documents and objects that have been lost or located elsewhere, and to correctly interpret the stories that the available testimony can “narrate”.

The future challenge lies in exploiting this patrimony in such a way that it can be publicly displayed, while at the same time ensuring that it is properly safeguarded. In this way, it will continue to “tell its story” to future generations and to illustrate the value of one of Italy’s great hygienists.

The objective is to ensure that, thanks to this historical testimony, Sclavo’s enormous scientific value will be brought to the attention of all in a museum setting where these cultural assets can become an effective means of communication with the public – a sort of open “window” on the history of hygiene and public health, to which Achille Sclavo contributed so much.

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## Conflict of interest statement

The authors declare no conflict of interest.

## Authors' contributions

DO and MM designed the study, conceived and drafted the manuscript; the authors revised the manuscript, performed a search of the literature. All authors critically revised the manuscript. All authors have read and approved the latest version of the paper for publication.

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