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The A&C Azzini Velocipedes and Antique Bicycles Museum and the history of Italian brakes

By Alfredo and Carlo Azzini

My son Carlo and I started to collect old bikes in 2008 [**Figure 1**]

I used to be an enthusiast of the so-called "marvelous mechanical" as Enzo Ferrari used to call it, but I, personally, had a passion for vintage cars. However, about 30 years ago I bought a Triumph bike, which had been built back in 1911, and then promptly forgot about having it stored in my garage.

When my son was sixteen, I gave him that Triumph, once I recovered it, and from that moment on he became a vintage bike enthusiast and involved me in this adventure. During the first three or four years of our passion for old bikes, we bought about a hundred of them. We bought as many as we could anywhere in Italy, compulsively. In 2011, we organized our first exhibition of vintage bikes and, while I was sorting out the cycles, I realised that we had collected examples representing an almost complete history of the bicycle. So, from that moment on we began to target our purchasing. Thanks to English and French enthusiasts, we were able to find many interesting and rare cycles. We are thus now able to show the public the complete history of velocipede.

Figure 1. Alfredo (l.) and Carlo (r.) Azzini with a small slice of their bicycle collection.

Since 2009, my son and our friend Augusto, an old and skilled mechanic, have been directly involved in the restoration of old cycles because modern mechanics are not able to repair them. Unfortunately, Augusto passed away five years ago, but the depth of his knowledge and mechanical skills have been inspirational for us and have allowed us to continue with the restoration of our cycles.

In 2014 we opened our museum, the "Velocipedes and Antique Bicycles Museum in Soresina" to the public. At the time of the opening we had 140 cycles on display; we now display 240 cycles, although the complete collection numbers around 300 cycles. We are now proud to show our visitors one of the most important and complete collections of vintage cycles in Italy.

The collection is organised in 10 sections that we shall now see together.

The section named "The Origin" [**Figure 2**] includes cycles from the 19th century, the oldest of which is an Italian Michaux-type velocipede attributed to Giovanni Greco of Milan [**Figure 3**] and manufactured around 1869, but there are also Quadrant, Baylees, Faugeot, Clement, Overman Victor, Giraffe, Singer, Bianchi's Model B, Windsor and Swift cycles. In this section, the lion's share are tricycles, with various models such as the Starley Rotary, the Howe, the Cripper, the Peugeot, the Centaur tandem and the Humber Beeston [**Figure 4**]

In the second section, we find bikes with inverted levers. Foreign brands are represented by three Triumphs with oil bath chain

Figure 2. A view of some of the machines on display in "The Origin" room of the Azzini museum.

Figure 3. Michaux-type velocipede attributed to Giovanni Greco of Milan.

Figure 4. A selection of tricycles from "The Origin" room.

Figure 5. Bicycles with inverted brake levers.

boxes and a Royal Enfield with a special rear brake. The Italian models are numerous and include a Fiat mod 1 built in 1912. Fiat produced a few bicycles in 1911 and 1912 and then stopped to focus production on building military vehicles.

Among the many Bianchi models on show, the 'Rinnovato' model is very interesting. It has a frame made in 1910 but the pedals, handlebars, mudguards and some other parts were built in 1925. What happened to this model? Is it a fake? No, not at all: Edoardo Bianchi layed it out for us by including the word 'Renewed' in the head-badge under the famous eagle, because this bicycle was born in 1910 and returned to the factory in the mid-1920s to be renewed.

Other brands in this section are Prinetti & Stucchi, Maino, Frera, Legnano, and Atala. **[Figure 5]**.

The classical section is dedicated to Italian bicycles and showcases cycles with internal lever brakes and sport touring frames. The first of these were the most elegant and expensive bikes in the middle of the 1920s. The brands exhibited in this section represent the apex of Italian style with various Edoardo Bianchi, Stucchi, Gloria, Olympia, Maino, Monterosa, Atala, Umberto Dei and Velox machines **[Figure 6]**. Sport-touring frames were bicycles with touring cycle parts (pedals, handlebars, mudguards, chain box, brakes) mounted on a sport frame. One of the first models of this type of bicycle was the Dei Bordino, a fantastic example of which can be found in our collection.

On show in the Wunderkammer there are many curiosities from the cycling world such as the Victrix, the Pedersen, the Premier Helical, the Albarel, the Stagni, the Traldi, the Velocino and so on.

Figure 6. "Classical" Italian cycles.

Figure 7. Racing bikes.

The technology section was the last section to be opened to the public (two years ago). The theme of this part of the exhibition is the technology between the 19th and 20th centuries and here we exhibit the military technology of Bianchi Bersagliere, BSA, Capitain Gerard and so on.

Gear technology was very important at the beginning of the 20th century and we have showcased the story of the Terrot and Hirondelle with its "retrodirect" gears, the Peugeot Badoit Patent, and the Royal Sunbeam, with two gears of which the rear one is a normal gear on the hub and the front one is a planetary gear mounted on the central hub. We cannot forget the Magnat Debonne, the Facel Wega and many shaft cycles such as the FN, Columbia, Metropole, Durkopp and Imperial.

Another very popular section for our visitors is that of the racing bikes [**Figure 7**], where we have displayed around fifty cycles that were built up until the end of the 1950s. The oldest is a De Dion Buton track bike, which is also the only foreign brand on display because we preferred to showcase the great Italian racing bike builders, also known as the "bicycle tailors."

There are many Bianchi cycles (we have examples of the entire production line of racing cycles from the Coppi era) but we also have the Legnano, the Gloria, the Frejus, the Cinelli, the Masi, the Dei, the Wolsit Taurus, the Maino, the Galmozzi, the Gerbi, the Quaglia, and the FB, with many more manufacturers also present here.

The other sections are tandems, work cycles, and children's cycles, while the last one on the tour is the Taurus room.

Taurus was the most refined and expensive Italian brand, which started production in 1908 as an assembler of German Victoria bicycles; by the early 1920s, Taurus was building their own designed cycles. In the some 40 models on display, our collection traces the factory's entire production, with the top models being the 25 and the Superlautal. The former was the most technologically advanced cycle ever built in Italy, with internal lever brakes and a self-adjusting brake pad system. The Superlautal, on the other hand, was a touring bike built in 1942, weighing less than 10 kilos, and equipped with mudguards, chain box and sports gearbox. It was made of Avional, an aluminium alloy used in the construction of military aircraft.

The collection is located in the historical Vertua-Robbiani Palace in Soresina, built in 1821 and designed by the architect Giacomo Moraglis of Milan [**Figures 8, 9 and 10**]. The location of Soresina, not far from Milan, Garda and the Iseo lakes, allows us to have many foreign tourists, but domestic visitors are also very numerous. Visits to the museum are always free and accompanied. We also are able to completely organise our guests' visits, including a tour of many other interesting spots in our countryside, and to accompany them to the local restaurants to eat our home specialties.

While I am the historian of the family, it is my son Carlo who is the technician tending the cycles being restored in our workshop next to the collection. Before each restoration, Carlo studies the model he is going to work on and he therefore has become familiar with many construction details, especially those of Italian bicycles; this experience has enabled Carlo to produce his own report on the evolution of brakes.

Alfrredo Azzini

Figure 8. Entrance to The A&C Azzini Velocipedes and Antique Bicycles Museum in the Vertua-Robbiani Palace in Soresina.

Figure 9. Internal courtyard to the palace.

Figure 10. Entryway to the A&C Azzini museum.

The main mechanical features of Italian touring bikes between the belle époque and the second post-war period: analysis of points in common with the main European brands and special patents.

A generalization about the origins of the cycling industry in Italy is difficult. Circumstances around their start-up are rather different among all factories and each company has its own history, so much so that it is almost impossible to outline a common logical thread useful for comparison.

For this reason, I will not here discuss a single manufacturing company but rather attempt an analysis to understand the common points between the main European manufacturers and the Italian producers and the unique characteristics of Italian bikes.

Due to the complexity of development trends in the bicyle industry as a whole, the research has been focused only on touring bicycles, especially on the technical and stylistic choices made for the braking system and its application over the years. This research has brought to light, as you will discover later, common solutions probably the result of technical solutions shared by multiple industrial entities.

The comparison has been based upon looking at the bicycle models that share the same technical solutions inherent to the braking system.

Before delving into the technical specifications linked to the evolutionary history of brakes, it is necessary to posit a series of premises that explain the rarity of Italian bikes in the European collecting world:

- The cause of the scarcity, or total absence in some countries, of Italian-made bicycles is the low level of industrialization in Italy in the period between the 1920s and the 1940s. This, combined with the protectionism of the time, inevitably led Italian manufacturers to market bicycles on national or colonials' soil and dedicate themselves sparsely and sporadically to exports.
- Contrarywise, European (especially English) and American companies had achieved a much higher level of exports than Italian companies mainly due to greater local resource availability, the ability to attract investments and a generally higher level of wealth when compared to the Italian situation of the time.
- During the World War II period, from 1940 to 1945, in Italy, the regime requisitioned a large quantity of metals of all kinds, from bronze church bells to steel fences, in order to meet the high demand for these metals by the war industry. There are several

testimonies of bicycles and other vehicles being melted down so that the steel could be repurposed.

The three premises above explain the significant absence of examples of Italian bicycles outside of Italy both from the contemporary collecting scene and from the trade of the time.

As a matter of fact, the scarcity of Italian bicycles since the end of the 19th century until the 1920s made the flagship models of the Italian houses (Bianchi, Umberto Dei, Atala, Prinetti and Stucchi etc.) milestones highly appreciated by national collectors but, unfortunately, they were unattractive to European collectors who preferred older, established, interernationally-known brands (Humber, Coventry Machinist Company, Singer, Quadrant etc.).

Historically, the dedvelopment of the brake as represented in our timeline [**Figure 11**] has involved the development of about 4 different technologies, in different periods, shared between European and Italian industries:

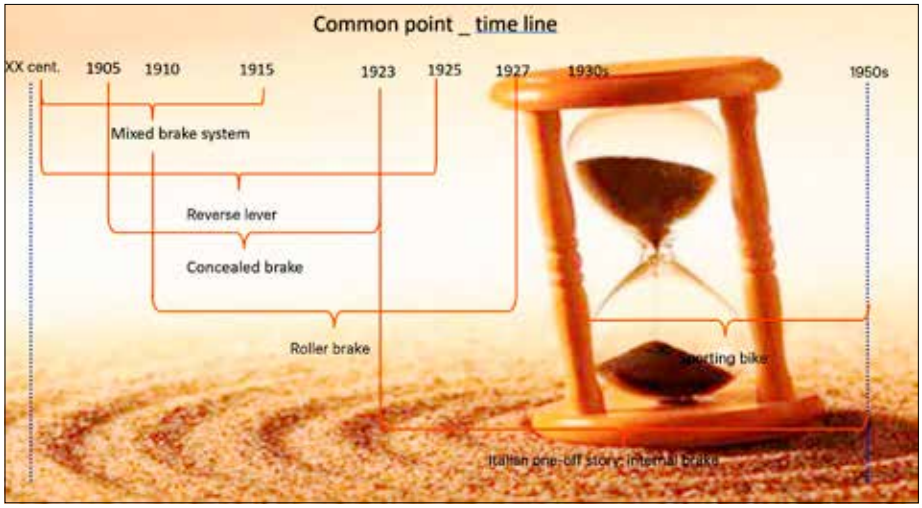

Figure 11. Time-line for developments in bicycle brake technology.

- **First, we had Mixed braking.** In a comparison of Humber Beeston 1898 tricycle [**Figure 12**] and Bianchi mod. A 1912 [**Figure 13**], we can see that the handlebars of both bikes are equipped with rigid rods that work on the front wheel while, for the rear, they are equipped with a steel cable attached to the reverse lever attached to the handlebar.
- **Reverse levers:** this technology was most popular from the 1910s until the second half of the 1920s. It relyed on the use of two reversed brake levers identical in shape and size which pull steel cables placed inside the handlebar tube and employ traction to actuate, on the one hand, a rigid tie rod usually placed on the front and, on the other, a cable that works the rear arch to which the brake pads are attached. Examples of the technology are: the Atala reverse lever 1919 [**Figure 14**] and Royal Enfield 1902 [**Figure 15**]
- **Internal brakes:** examples of bikes with Internal Brakes are the Lea Francis from 1909 [**Figure 16**] and the Bianchi mod. R of 1922 [**Figure 17**] (in the Bianchi catalogue since 1911). The main points in common consist in the fact that in both, the brake mechanism runs inside the handlebars, while, for the front brake linkage, it was decided to put it inside the fork tube, which included a series of mechanisms containing the spring brake recall [**Figure 18**]. The extreme evolutionary aspect of internal brakes in Italy will be examined later and remained

Figure 12. Humber Beeston tricycle, 1898.

Figure 13. Bianchi mod. A, 1912.

Figure 14. Atala reverse lever, 1919.

Figure 15. Royal Enfield, 1902.

Figure 17. Bianchi mod. R, 1922.

in vogue until the 1950s.

- **Roller brakes are a technology** widely used in the UK and consist of rigid rods, placed outside the handlebar tube, which pull the front and rear brake assemlies, employing traction links placed on the frame and fork. This technology has been very popular since the 1910s. up to the present day for UK-style bikes. [**Figure 19**]. Some Italian bikes adopted this technology such as, for example, the Legnano mod. Electa from 1921 [**Figure 20**] and the Bianchi mod. S Roller built only in 1922 and 1923.

It is necessary to make a clarification regarding the Bianchi mod. S Roller. This model was only included in the catalogue for one year (1922). It was removed from the catalogue for 1923, despite the continued sale of this model to the public. The reason for this choice is unclear and, to this day, it remains a dark chapter in Bianchi's history. However, we can force an assumption with the hypothesis that the technically avant-garde R model (in the catalogue since 1912) equipped with brakes inside the handlebars and linkage included inside the

Figure 16. Front brake detail of Lea Francis, 1909.

Figure 20. Legnano mod. Electra, 1921, demonstrating roller brake.

steering tube led the Bianchi company to adopt retrograde and obsolete technical solutions with the Bianchi mod. S roller and therefore customers, who were used to a superior mechanical and stylistic level, commercially boycotted the model with roller--type brakes. The Bianchi company responded to the criticisms raised by customers in the winter of 1923 when, in December, at the Paris cycle show, the company officially presented the Bianchi model R Super with completely internal brakes.

- **The Bianchi R Super [Figure 21]** presented at the Paris cycle show in December 1923 constitutes the first example of the industrial construction of internal brakes in bicycles, testified to by articles. After this model entered the catalogue in 1924, numerous

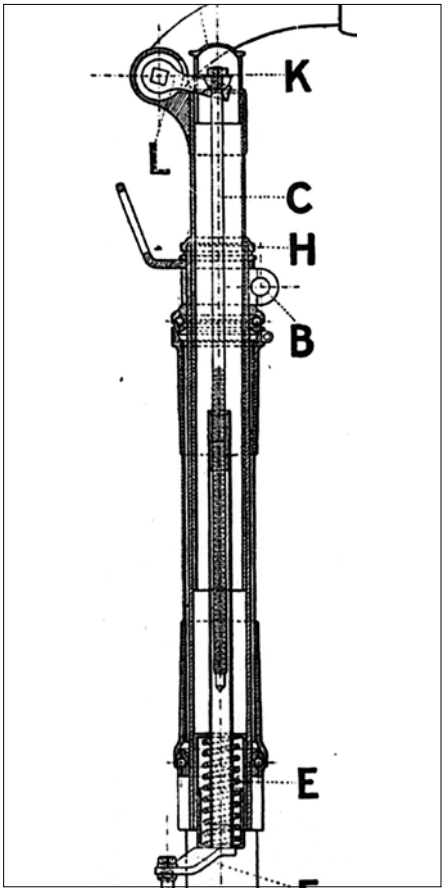

Figure 18. Detail of spring brake recall mechanism in Lea Francis.

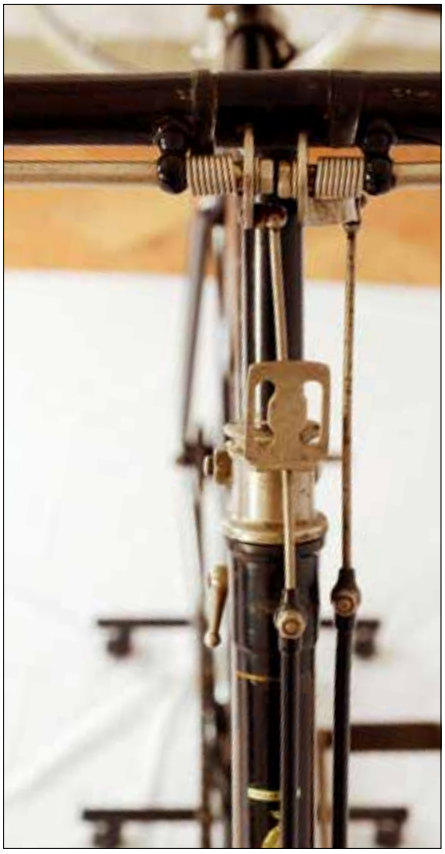

Figure 19. Handle bar detail of rigid mechanism use in Roller Brakes

Figure 21. Bianchi R Super, 1928, with internal brake.

Figure 22. Umberto Dei Bordino, 1931, a sporting bike.

brands in Italy copied and implemented this technology, so much so that it remained in vogue until the early 1950s. This technology was difficult to implement and cost considerably more than the standard rigid lever brakes; despite this, even small factories attempted numerous patents to keep up with customer requests.

- Sporting bikes form a category of bikes in Italy born with the use of competition frames that had been built, but not used in previous seasons. These frames were then equipped with components from travel bikes (e.g. mudguards and chain covers) and classic handlebars with linkages that connected from a rigid transmission to a flexible one useful for a racing brake linkage. One of the first examples in Italy was Umberto Dei Borodino [**Figure 22**] born in the mid-1920s. This bicycle is equipped with a rear wheel hub typical of road racing, narrow mudguards, a racing frame with rear dropout identical to the racing models and handlebars capable of transforming the transmission from rigid to flexible thanks to an installed mechanical exchange welded to correspond to the vertical tube.

Carlo Azzini