

## Bicycle and Bicycle Design History – How It Relates to Pedjo

### Twin-Tube Bikes and eBike Background.

To design a successful bike frame requires using features, often long-forgotten, often unknown. Two features are central: Twin tubes (using two smaller separated tubes rather than one large tube) and wheels of different sizes (Large front wheel, small rear wheel). Note: Clicking on image reveals source.

The 1892 Telegram High Wheel Safety Bicycle for example presents a nice aesthetic by using wheels of different sizes. This highly desirable bike sold for [\\$26,450](#) at a Copake Antique & Classic Bicycle Auction.



Not only do we find twin tube bikes in exotic and expensive new [titanium bikes](#), they were around more than a century ago. It is well to remember twin tubes were a feature that helped to break the grip of the old high wheelers. From 1888-1896, some of the standouts were the [1888 Columbia Hard Tire Safety](#) and the [1891 Columbia Roadster](#). These bikes and their twin-tube [successors](#) were mainstream products of the tycoon of the American bicycle industry, Pope Manufacturing.



Notwithstanding twin tube appeal, twin-tube bikes are more expensive to manufacture than single tube ones. By the 1900s under accountant's sway, public whim, and racing demands, the diamond frame came to dominate. Despite this, the twin-tube continues to be especially well suited for the modern market, which needs a bike that can be readily accessorized and which is suitable for use from childhood through adulthood. Twin-tube bikes more than one hundred and twenty years old can still be ridden, as this [video](#) shows.

In the same era a chief competitor to Pope, the 1893-1893 [Victor Model C](#) relied on twin tubes for both the down tube and on the seat tube, as shown when looking down at the bike. This classic is still rideable and sold at auction for \$8,775.



Like the Model C Victor, the twin down-seat tube principals and the chainring within the frame, can also be seen in the 1890 [Rudge Safety Model H](#), 1929 [Bachelier Intégral](#) (sometimes integral or integrale), and the 1955 [Elswick-Hopper Convincable](#)





Patented in 1926, the [Moorson Twin Tube](#) used both twin top tubes and twin down tubes, as shown in this aerial view. Several successful racers used it in England during the late 1920's -1930's.



The [BSA Airborne](#) is the most famous of all twin tube bikes. It folds and is suitable for parachuting. It has both twin top tubes and twin bottom tubes. It was used by paratroopers in WWII. It dropped with them from planes when they jumped. About 70,000 of these bikes were made and continued to be used throughout Europe long after the war. I have one of them. It is in as good condition as if it were made yesterday. BSA used the twin tube design for the Para bike because, as [Wikipedia](#) points out, the “traditional diamond design was too weak for the shock.”



In every bike boom that I can identify, twin tubes have been an aesthetic leader: 1) In the 1891-1896 bicycle craze, Americans found bikes to be more popular and less costly than horses. The love affair with the bike was so great that the common price then for a new bike was \$100, which [adjusted](#) for inflation is equivalent to \$2,638 per bike in today's dollars. At the outset only the rich could afford them. They were selling by the millions. Manufacturers could hardly keep up. Columbia, Victor, and other brands used twin tubes on their bikes. 2) In the 1937-1940s period [Elgin Twin Bar](#) youth bike was the American trend setter. 3) In the 1960s the American multi-tube [Spaceliner](#), [Schwinn Sting Ray](#) and similar youth bikes were the rage. Multi-tubes are so desirable, they were added just for style. And, 4) In the biggest bike boom of recent memory, more bicycles were sold than cars in the United States during the early 1970s. At that time [French twin-tube mixtes](#) for the first time gave American women a bike that could be ridden as aggressively as a man's bike.



The twin-tube mixte design, such as my Jeunet mixte, has its antecedents in 1888 cross-frame bicycle designs and in BMW motorcycles (especially the 1919-1931 vintage) which have continuous twin tubing from the head tube to the rear wheel. Some of 1886-88 cross-frame bicycles can still be ridden: [videos #1](#) & [#2](#).



The multi-tube bike reached its apex with the [Moulton Spaceframe](#). It is fast enough to win races and unique enough to be in the NYC Museum of Modern Art. This is a photo of my Moulton TRS9. It teaches two important design lessons: 1) Twin tubing can be nicely wrapped around the head tube, and 2) twin tubing (spaced even further apart than 3 1/8") does not interfere with pedaling and can be used to accessorize a bike giving a large space in the mid section of a bike suitable for storage – tablets, laptops, shopping and so forth, storage most bikes woefully lack.



A key contribution to bike design is the cargo bike. The [Xtracycle Edgerunner](#), like the old 1882 Telegram Safety Bicycle, provides the appeal of a small rear wheel. A low 20" rear wheel increases storage capacity and produces a low cargo center of gravity. The space for cargo is impressive as can be seen in this [video](#).



The Edgerunner also can be used with a Bionx internal hub motor and battery. The motor is nearly completely silent and greatly reduce required pedaling forces. It makes it possible to easily travel at speeds up to a 20 MPH pedal-assisted speed limit, as is common for eBikes. I have a Velosolex bike with an identical Bionx motor. It makes it easy to travel from Pulaski to Dublin and to return carrying a large shopping load.



Thank you for taking the time to consider bicycle design and history. I hope you will find the bike frames and bicycling accessories we are making worthy of having a significant place in the ongoing development of the bicycle.

And of course I hope one day you will have an opportunity to ride some of the bikes we will be now developing. I believe you will be proud of having taken a part in their development.

**Some images may be copyrighted. Please do not copy. Clicking on images usually reveals source.**

**This file is for private communications.**

**1/18/2015**