
Chapter 1

History

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“When one rows, it’s not the rowing which moves the ship: rowing is only a magical ceremony by means of which one compels a demon to move the ship.”

Nietzsche

Development of rowing

In parallel with the two milestones in the development of human transportation on land—the domestication of animals and the discovery of the wheel—the construction of water-borne vessels enabled the transport of large amounts of goods long before the development of extensive road networks. The effective use of leverage which facilitates propulsion of even large boats and ships independent of the direction of the wind established the oar as the most cost-effective means of transportation. Even though the first representation of a rowing boat dates to 5800BC in Finland, larger trading boats propelled by oars were developed by the Phoenicians and the Egyptians in ~3000BC. Rowing cane boats by means of long oars can be seen in frescoes from the 5th Dynasty of the Pharaohs in Egypt in 2500BC and an inscription in the tomb of Amenophis II shows him rowing ~1430BC. Representative cultures where rowing was important, as illustrated in times of war, were the ancient Greeks, the Romans, the Vikings and the Venetians.

Large rowing vessels were used for transport and fighting sea battles in ancient Greece and Rome, but

neither the Olympic nor the Spartathlon games included on-water competitions. The earliest record of a rowing race, *The Aeneiad*, written between 30 and 19BC by Virgil, describes a competition in the Greek fleet that was in Troy around 800BC. Also, there is evidence that more than 100 boats and 1900 oarsmen participated in rowing regattas organized by the Roman Emperors Augustus and Claudius. A reconstruction of an Athenian *trieres* (three rows of oars; Fig. 1.1), the warship of the classical world, 37 m long and 5.5 m wide with up to 170 oarsmen, named *Olympias*, was built in Piraeus in 1987 and was used in the torch relay of the 2004 Olympic Games in Athens (Fig. 1.2).

Because modern humans are on average approximately 20 cm taller than ancient Greeks, the construction of a craft with the precise dimensions of the ancient vessel led to cramped rowing conditions and, consequently, restrictions on the crew’s ability to propel the vessel with full efficiency. Accordingly, the ancient speed records stand unbroken. Without use of the sails and aided by a hull structure similar to the “bulb” of modern large commercial boats her speed reached 8.9 knots. Such speed allowed the *trieres* (“spear ship” according to Aeschylus) to gather momentum to ram enemy ships with her bronze ram fixed on the prow at the water line, and distinguished her from the *pentecontor*, which had 50 oarsmen and two rows of oars. These ships were light for their size and, in contrast to the Roman and North African fleets, the Greek boats were propelled by freemen. Rowing takes its name from the “wineglass” outboard



Fig. 1.1 Detail from the Lenormant relief, the most famous pictorial evidence for a three-banked Greek galley, which can be seen in the museum of the Athenian Acropolis.



Fig. 1.2 *The Olympias*, a reconstruction of the *trieres*, used for the torch relay of the 2004 Olympic Games.

arrangement of the rows of oars placed one above the other.

Similarly, rowing and sailing were integrated in other parts of the world. The longboat, of which the largest was *Ormen hin Lange* which accommodated 60 rowers, was a major factor in the conquering success of the Vikings (Fig. 1.3). These ships, characterized by planks fastened to a skeleton with wooden or iron nails, were fast and able to handle both the open seas and rivers. Their shallow draft meant that fully loaded boats could be sailed in water only

0.9 m deep and they could be put ashore. The longboats also had intricately carved decorations on the bow; often a dragon, hence, the name *drakkar*, while at the right near side of the ship was a large paddle tied to the hull for steering, giving the term “starboard” from *steor*, rudder or steering paddle, and *bord*, the side of the ship. Records of these ships trace them back to the 8th century AD when the Vikings commuted between North America, Italy and Constantinople (Istanbul). Rowing competitions on the lakes of Sweden involve *Kyrkbåtar*



Fig. 1.3 Rowing the *Hugin*, a replica of the Norwegian Gokstad Viking ship on display in Bygdøy, Oslo.

(church boats) which were used to carry parishioners across the lakes, while boats of similar construction were used for fishing along the coast of Norway and the Faroe Islands.

With the (re-)establishment of trade routes between Asia and Europe, Venice became a dominant power in the eastern Mediterranean from ~1200 to ~1500 AD, a status that was secured by the *longship*, a maneuverable warship that used both sail and oars. The Venetians as well as the Romans, Carthaginians and the Knights of Malta all had extensive fleets of rowing galleys, the most famous being the *great galley*, a huge merchant ship with a similar shape to the longship but wider and deeper. While most galleys were rowed *al scaloccio*, meaning that men on a bench pulled on the same oar, the Venetian galley was rowed *alla sensile*, where three men sharing the same bench each had an oar.

The first recorded regatta was organized in Venice in 1315 by the Doge Giovanni Soranzo to celebrate

the glory of the *Serenissima* and the name originates from a festival with *gondolas*. This ~11 m long and ~1.4 m wide boat is rowed by a single standing *gondoliere* who faces the direction of travel while the oar is not fixed into the oarlock, so that it can be withdrawn and used in narrow and crowded canals. The present shape of the gondola, where one side is larger than the other, allowing the vessel to turn on its own axis, was developed in the 1880s by Domenico Tramontin. A popular race in the Grand Canal of Venice is the *Vogalonga*, which is a 30-km competition for any vessel moved by oars.

Reconstructions of traditional rowing boats are used for sport, pleasure or in ceremonies throughout the world, while original boats are on display in the museums of Paris, Roskilde, Greenwich, Oslo, Dublin and Barcelona.

A long tradition of rowing can also be found in Malta since the Knights of St. John in 1642. The unique feature of Maltese rowing is that two men sit in the bow facing the back and pull while two others stand in the stern and push. Also, traditional “races” took place in the water where “knights” with oared boats replaced the horse. Such matches still take place in France and Denmark (Fig. 1.4).

Another rowing competition in *traineras*, sardine fishing boats manned by 12 rowers and a cox, began in 1879 in San Sebastian, Spain. Since then racing developed into a major betting event and remains popular among more than 35 clubs along the Basque coast. The races, which are rowed in four lanes round a stake, 2.8 km each way, take place in rivers, harbors and at sea. The distinguishing characteristic of these boats is that they are capable of rowing in heavy seas thanks to the *palka* or “false bows,” a sock-like breakwater which is fitted over the bow.

Olympic rowing

Race rowing is the oldest modern organized sport and originated in England during the reign of Henry VII (1509–1547) among the Thames professional watermen licensed by the Crown (1555). In 1714, an Irish actor founded the (Thomas) Doggett Coat and Badge boat race for professional bargemen held over 7.4 km on the Thames. The first international fours regatta took place in 1825 between England’s Thames watermen and New York rowers in the



Fig. 1.4 Danish sea contest.

American Star while the first international amateur eights race took place in 1858 between England and France.

In 1778, an eight-oared race took place in London, in boats called “coques,” between naval officers returning to college from the Brest blockade fleet during the Napoleonic wars (Fig. 1.5).

The first recorded Procession of the Boats was held in 1793 at Eton College, a boy’s school located on the Thames at Windsor, where groups from the same master’s house obtained a boat for pleasure or a contest with another house. Oxford University established rowing in 1822, Cambridge in 1827, and the first Boat Race took place in 1829 over 7.75 km on the Thames from Putney to Mortlake.

The Royal Henley Regatta was established in 1839 and has been held annually, except during the two



Fig. 1.5 An eight-oared coque. Reproduced from Cleaver, H. (1957) *A History of Rowing*. Herbert Jenkins, London, with permission.

world wars. While it was originally staged as a public attraction revolving around a fair, the emphasis changed so that competitive amateur rowing became the main purpose. The Regatta received royal sponsorship in 1851 and occupies a unique status by maintaining its own rules rather than being under the jurisdiction of the English Rowing Federation or the Fédération Internationale des Sociétés d’Aviron (FISA). Henley operates a heat system with only two boats racing, which entails the organization of up to 100 races on 5 days. The length of the course is 2112m (Fig. 1.6).

The Head of the River race, funded by Steve Fairbairn (Fig. 1.7) in 1926, also takes place on the Thames on the same course and distance as the Boat Race but in the opposite direction (i.e., from Mortlake to Putney). It is the largest rowing event for eights, with the entries limited to 420. On the

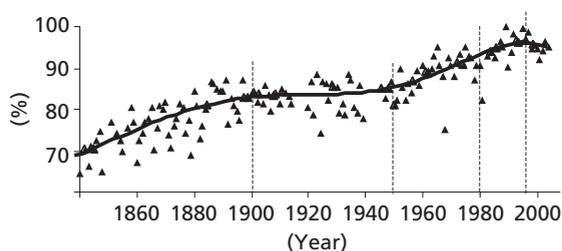


Fig. 1.6 Rowing speed (percent of fastest) from the records of the Grand Challenge Cup (M8+) of the Royal Henley Regatta.



Fig. 1.7 Steve Fairbairn.

same course similar events with comparable participation are organized for singles, pairs and fours also for women and veteran rowers.

Another type of race is the *bumps*, as held in Oxford and Cambridge for example, where all the crews are lined up along the river at set intervals, and start at the same time aiming to catch up with the boat in front and gain a *bump*. Then both crews pull to the side, as they take no further part in that race. In the following race, the bumping crew starts

ahead of the crew that was bumped. The *bumps* are held over several days and the position at the end of the last race determines the position on the first day of the race the following year. Also, there are *Town Bumps* races in both cities, open to all crews.

USA

The first organized boat races in the USA took place in New York in the mid 1700s by professional barge-men. Amateur clubs were formed in Boston, New York and Philadelphia in the 1830s. The University of Pennsylvania (The College, Academy and Educational Trust) rowing history dates to 1760, when a challenge was issued to New York to a 6-mile race. The Amateur Boatclub held a regatta on the Schuylkill on November 12, 1835, in which the Blue Devil club rowed a boat of that name, and seven eight-oared barges took part.

However, the dominant organization of rowing in the USA came from universities when Harvard and Yale started rowing in 1843 and 1844, respectively, and first raced each other in eight-oared shells in 1852 over a distance of 7.4 km. The Head of the Charles in Boston is the world's largest rowing event and was initiated on October 16, 1965. Today more than 5400 athletes from around the world compete in 19 events over a distance of 5.6 km.

Germany

Rowing came to Germany through Hamburg (1836) following an initiative of British rowers. The German Rowing Association (Deutscher Ruderverband, DRV) was established in March 1883 and lightweight rowing races were introduced in Germany in 1925. After World War II there were two German rowing teams and rowing associations, DRV and DRSV (1965–1991), but with the fall of the Berlin wall in November 1989 they were reunited in 1991.

Rowing in northern Europe and Scandinavia is not only about competing in racing shells, but is also a leisure sport practiced in inriggers where oarlocks are on the side of the boat (Fig. 1.8).

Many clubs developed an interest in the leisure rowing scene, *wanderrudern*, with trips being organized on splendid waterways. Long distance tours



Fig. 1.8 The Danish inrigger four winning the 1912 Olympic regatta in Stockholm. Reproduced from Meuret, J.-L. (1992) *The FISA Centenary Book*. Fédération Internationale des Sociétés d’Aviron, Oberhofen am Thunersee.

and gig races were also introduced to the regatta schedules. National and club championships in two- and four-oared inriggers encompass races from 500 m to 50 km.

Italy

A significant Italian contribution to the development of race rowing was the buoy system for courses, named Albano after the city in the northwest of Italy. The system encompasses a series of small buoys on the side of each racing lane, which are 15 m apart and run the length of the course. The buoys start out red for 100 m, turn to white and then back to red for the final 100 m, with one red buoy for each 500 m. On a six-lane 2000 m course, this is accomplished by a grid of wires about 1.2 m below the surface of the water suspended by the small buoys and a few larger ones. These cables are anchored on each end, pulled with 100 kg and stabilized by lateral cables and anchors at each 500 m junction, resulting in a symmetrical formation referred to as “military cemetery,” meaning that the buoys are aligned both across and diagonally.

Holland

The first manmade rowing course, built at Bosbaan, Amsterdam, in 1936 for the Olympic Games, originally had five lanes but was widened to six even

bigger lanes in 1954 for the European Championships, which was the first international event where races for women were included, and today it features eight lanes. The first “European Championships” for single sculls (the Holland Becker) was introduced on August 14, 1886 and takes place annually as part of a regatta with that name (Fig. 1.9).

Australia

The first rowing race in Australia took place on May 16, 1818, when a four-oared gig stroked by John Piper won a race from Bradley’s Head on the north shore of Sydney Harbour, to Sydney Cove. The Melbourne University Boat Club was established in 1859. The first official race for eights took place on March 6, 1878, on the lower Yarra, where a crew from the Mercantile Club in Sydney, representing New South Wales, was defeated by a crew from the Victorian Rowing Association. The Australian Henley with a series of Challenge Cups has been run by the Melbourne Amateur Regatta Association annually since 1904, except during the two world wars. In its heyday, the Australian Henley ranked with the Melbourne Cup and Australian Football League grand final as a major sporting event including an inter-university contest for a cup presented by Oxford and Cambridge oarsmen and a social occasion where a Miss Henley contest was held.



Fig. 1.9 The Holland Becker.

Japan

Rowing came early to the Far East with the first rowing club in 1866 and the first rowing regatta in Kobe on December 24, 1870.

Rowers and achievements

As the cultural and sociologic status of sport in general is changing, the increased commercialization of all Olympic sports in the last 20 years has enabled rowers to compete for longer. While Jack Beresford's career span and achievement—five medals in successive Olympic Games from 1920 to 1936—was unprecedented for his time, today several international rowers have succeeded in com-



Fig. 1.10 Steven Redgrave winning his fifth gold medal at the 2000 Olympic Games.

binning a professional and a rowing career, with the average age of Olympic rowers in the late twenties. At the Sydney Olympics, Steven Redgrave at the age of 38 won a fifth successive gold medal (Fig. 1.10). Similarly, James Tomkins of Australia, the only rower to win World Championship titles in every sweep oar event, and Elisabeta Lipa of Romania, who holds the rowing record for most Olympic medals won (eight, five of them gold), were both at end of their thirties (Fig. 1.11).

Coastal and ocean rowing

Coastal and ocean rowing is a type of rowing performed on the sea. Because of the harsher conditions encountered at sea, the boats are wider and more robust than those used on rivers and lakes. Coastal rowing was developed out of sea-going versions of racing shells, the *gigs*. These four-oared

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vessels were not only light enough to be launched from a ship's deck by two men, but they were also fast and suitable for carrying pilots to ships in rough weather. Professional gig racing began in the 1840s and thrived until the 20th century. These pilot boats were the forefathers of the revival of pleasure and competition sea rowing in New York, San Francisco, Finland and Sweden.



Fig. 1.11 Elisabeta Lipa (center), the most decorated rower.

Within the Guinness Book of Records' ideology of first and fastest, sea rowing events are created, for example from the Faro Islands to Copenhagen rowed by Joensen in 1987 (3093 km in 41 days). The Atlantic Ocean was first successfully rowed by the Norwegians George Harboe and Gabriel Samuelsen in 1896 and since then it has become an organized challenge for singles, doubles and fours, with the present record for the single being 42 days and 13 hours by the Frenchman Emmanuel Coindre using an east to west route (www.oceanrowing.com).

In the Netherlands, *sloeproeien*, rowing in lifeboats and Navy instruction longboats, is well developed, thus allowing for the preservation and restoration of traditional boats. As all boats are different, there is a system for time correction with a C-value to obtain comparable results.

The sport of coastal and offshore rowing is thriving across Europe, although at present most British sea rowing is "traditional" fixed seat rowing and competition is of a regional nature (Fig. 1.12). France is leading the development of modern sliding seat sea boats, *yoles*, and national competition is well established. With the establishment of the FISA World Rowing Coastal Challenge, the use of the French *yole* is gaining popularity and most European countries have adopted this type of boat. The event is open to club rowers without pre-



Fig. 1.12 A coxed four *yole* riding on high surf.

qualification, in this way acknowledging the participatory nature of coastal rowing and confirming FISA's support of sea rowing traditions through rough water competitions that require seamanship and navigation in addition to technical skills. Boat categories include the single, the double and the coxed four.

This competition is considerably different from Olympic rowing. No lanes are defined and the course is triangular with a total distance of 6000m. Women cover the course once and men twice, with only one race per boat category. The first FISA Coastal Rowing World Championship event is planned for 2007.

In North America, the sport of "open water" rowing relies on longer, lighter and faster boats while having an emphasis on safety through the use of positive flotation and self-bailing capacity, supplemented by the rower's seamanship skills. North American boats do not conform to the minimum standards established by FISA because they are too long and do not weigh enough. Open water racing in North America is popular in New England, California and Washington. The pre-eminent open water race in New England is the Blackburn Challenge.

The Cornish Pilot Gig Association (CPGA) is the largest British sea rowing group and preserves a tradition using both original and new boats made to a closely controlled specification. The CPGA has seen a continuing growth over the past decade or so and new boats are constantly being built. The Cornish gig has been adopted by rowers in the Netherlands and there is a successful gig club in Wales.

The 22-mile London Great River Race is the major British event for traditional boats attracting up to

350 crews, but there are many regular events throughout the long March to October season. The Welsh Longboat Rowing Association, for instance, organizes a total of 21 offshore and estuary events each year. These range from 5-mile league races to the Celtic Challenge rowing race, an epic Irish Sea crossing. The Celtic Challenge rowing race is a gruelling 90-mile rowing race from Arklow in Ireland to Aberystwyth in Wales. It is classed as the longest sea rowing race in the world. It is a biannual event, which usually takes place on the first Saturday in May with crews from Wales, Ireland, England and as far afield as Germany.

Celtic sea rowers in Wales and Ireland have adopted modern designs of fixed seat boats, loosely based on the Irish *curragh*, which is still used by sea rowers in both countries. The annual All-Ireland Coastal Rowing Championships involves up to 350 crews each year and is believed to be second in size only to the CPGA in the Scilly Isles. The New Celtic Design boat which was introduced only 4 years ago is gaining in popularity and is used as a bridge to link the various Irish classes of boats. However, since 2006 FISA dimensions are followed in hull design.

Surf boat rowing is popular in Australia and New Zealand and to a lesser extent South Africa. Usually associated with surf life-saving clubs, surf boat crews are trained in life-saving skills as well as learning to be competent oarsman. The Australian form of the sport attracts wide media coverage and is often featured on mainstream sporting shows in the summer months. Surf boats are four-oared vessels with a pointed bow and stern. The boat is steered by a sweep who stands in the bow and uses an oar-like rudder to control the boat (Fig. 1.13).



Fig. 1.13 The start of a surf boat competition at Bondi Beach, Australia.

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Table 1.1 Age categories for Masters rowing.

A	27–35 (31–35 in the UK)
B	36–42
C	43–49
D	50–54
E	55–59
F	60–64
G	65–69
H	70–74

During competition, surf crews start on the beach and row through the surf, proceed to a certain number of turning points (referred to as the can) and then race back to the beach. As the boat nears the beach oars are raised and the boat is literally surfed ashore. Surf boat races are conducted on a weekly basis throughout the Australian summer with hundreds of crews participating.

Masters rowing

Masters (or veteran in the UK) rowers classifications begin at 27 years of age and the distance covered is 1000 m. Masters events also include a letter designation indicating the average age of the crew in years (Table 1.1).

Professional rowing

The first English professional sculling championship race was held in London in 1831 between two watermen, C. Campbell and J. Williams. From 1831 to 1952 there has been a World Professional Championship, with R. Arnst from New Zealand and E. Barry from England (Fig. 1.14) dominating in the early 19th century. Arnst beat Barry in a 3.25-mile race above the Victoria Falls on the Zambezi River in 1910 in what may have been the first serious high altitude competition. During the 1870s and 1880s, professional sculling was a major attraction on Lake Victoria, Canada, where the first organized club with some 75 members was founded in 1865. Early records of rowing in Whitehall boats include reference to an 1859 race on the Gorge Waterway and Inner Harbor.



In the heyday of professional sculling, Ernest Barry's arrival on the towpath at Putney necessitated this kind of escort. The year—1913. The occasion—after Barry's race with H. Pearce of Australia for £500 aside, which Barry won.



An old-time group of famous professionals. On the right is Ernest Barry. Next him, with the cap, "Bossie" Phelps with Ted. Also in the group are Herbert White of Marlow and C. W. Wingate.

Fig. 1.14 Ernest Barry after racing H. Pearce of Australia in 1913 for £500 at Putney.

Development of equipment

Boat design and materials

Early racing boats were descended from the clinker built boats of the English river Thames, and the New York Whitehall skiffs, named after Whitehall St. at the Battery. These boats were often involved in betting races. Henry Clasper of Oxford built the first keel-less boats and spoon-shaped oars in 1848. Some early Schuylkill boats had staggered rowing seats

with wicker ladies seats alongside the rowers. Up to this time the largest sweep racing shell were six-men boats without a coxswain although there were 10 and 12 person shells built in England. The last six-oared barge race recorded in Philadelphia was in 1884. Wood boats were the norm, although pressed paper boats were made in the 1870s and aluminum boats in the 1920s. George Pocock, the son of the Eton School boatbuilder, immigrated to Seattle and produced wood shells from 1920 to 1960, and became known as the father of American rowing. Compost carbon fiber, Kevlar® and epoxy resins boats developed rapidly in the 1970s, and minimum weight requirements were introduced by FISA to control the cost of the lightweight shells (Table 1.2).

Around 1828 Anthony Brown in England developed riggers, used at bow and stern, to compensate for the narrowing of the boats and to increase leverage. Boat speed is significantly improved with the use of sliding riggers, where the body mass remains fixed while the rigger or foot-stretcher unit slides. When the body mass is stationary, the boat does not pitch bow to stern as much, thus less hull resistance is created and rowing efficiency is increased. The sliding rigger concept dates back to 1877 when Michael Davis of Portland, Maine, USA, used a

sliding footboard and outriggers with a fixed seat to eliminate the excessive friction from the loaded (body weighted) moving seat. The sliding rigger concept was tried in the 1920s by Walter Hoover (USA), and in 1954 by C.E. Poynter of Bedford (UK). *The Illustrated London News* of September 25, 1954, described the invention of a double scull. The concept surfaced again in 1960 when Nick Smith (Australia) fitted a practice boat with a sliding rigger system and the FISA single championship in 1981 was won in a boat with a sliding rigger by Michael Kolbe (Fig. 1.15). However, that construction was

Table 1.2 Classes of boat recognized by the Fédération Internationale des Sociétés d'Aviron (FISA) and their minimum weight in kilograms.

Single Sculls (1×)	14
Double Sculls (2×)	27
Pair (2-)	27
Coxed Pair (2+)	32
Quadruple Sculls (4×)	52
Four (4-)	50
Coxed Four (4+)	51
Eight (8+)	96

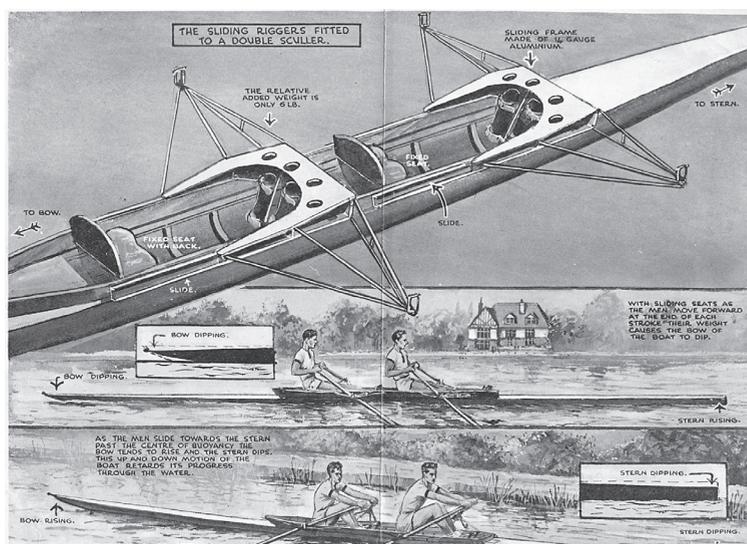


Fig. 1.15 Sliding rigger.

banned by FISA in 1983 because it was thought to be more costly than sliding seat boats.

Mitchel Davis of Yale invented the swivel oarlock. The slide with wheels has been variously attributed to Dr. Schiller of Berlin (1863), the Canadian Ed Hanlin and Captain John Babcock and was first used in a crew boat in 1870. Walter Brown of England raced a sliding seat single in 1861. Before that time the same effect was accomplished by sluicing the seat with grease and sliding on leather bottom trousers.

From around 1965, some crews preferred to have the coxswain positioned lying down in the front of the boat rather than sitting at the end of the boat. By doing so the cox's body becomes more stable with the variation in the speed of the boat through each stroke and the view of the course is obviously enhanced. On the other hand, the cox has less control of the crew and the arrangement is therefore more popular for pairs and fours than eights, although this limitation is compensated for with the introduction of microphones rather than a megaphone for inboard communication.

Blade design

The early oars were straight with a very long flattened surface and square looms but in the 1700s oars became a little more contoured with a curve to the blade, but still a long slender blade. In the 1800s and the 1900s many blade shapes, "Macon" being the most popular, were used to make oars with different materials: wood, aluminum and composite materials (fiberglass, carbon fiber, Kevlar). The challenge using composite materials in the 1970s was to make an oar that would perform, be durable and be cost effective. In 1972, a British company, Guest, Keen and Nettlefolds, produced a set of carbon reinforced oars; however, they were very costly. In 1977, the Dreissigacker brothers, Dick and Pete manufactured carbon fiber oars and later developed a composite oar that became the choice of all North America and much of the rest of the world market. In the fall of 1991 the Dreissigackers introduced the asymmetrical *hatchet blade* (Fig. 1.16) design that took its name from its cleaver-like shape. Today, many manufacturers are producing the hatchet blade ("big blade") that has become the standard in racing rowing.



Fig. 1.16 Macon (left) and "big blade" (right) oars.

Rowing ergometers

Rowing machines have been in use since the mid 19th century as evidenced by a patent for a rowing machine by William Curtis in 1871. Ergometers have been used in rowing training since the 1950s and 1960s in many countries

The introduction of the Gamut ergometer to the USA initiated changes in training and selection processes. The 1980s saw the development of some lighter ones, such as the Repco, which had a wheel that acted against air resistance. Some years later, the Norwegian Gjessing ergometer became the accepted standard measuring device around the world. In 1980, a rowing ergometer using a bicycle wheel, a wooden handle and an odometer was developed in the USA as an off-water rowing training aid. This ergometer was used by CRASH-B (a group of 1976–1980 US Olympic and World Team athletes) which formed a regatta of about 20 rowers in Harvard's Newell Boathouse (Fig. 1.17).



Fig. 1.17 The “Concept II” rowing ergometer.

Today, ergometer competitions have official FISA status with an annual world indoor championship regatta and regional qualifying satellite regattas around the world (Table 1.3).

Most recently, an application of functional electric stimulation (FES) modified on a rowing ergometer has enabled paraplegics to compete in whole body ergometer rowing events. Also, the rowing ergometer has been put on slides to better simulate on-water rowing and the ergometers can then be combined to simulate the teamwork of the pair, four- or eight-oared boat. The work output produced is projected onto a screen, allowing comparisons with other competitors, or can be transmitted via the Internet to facilitate worldwide competitions.

Prior to the widespread use of the rowing ergometer, off-season rowing training was facilitated in rowing tanks encompassing up to eight rowers (Fig. 1.18), although winter training often included “general” cross-training for a balanced body development.

Rowing style

By the turn of the century, rowing style had become a center of controversy. The traditional English orthodox style featured a long straight-backed body swing where, as the crew is pulling together and recovering uniformly, the shell moves faster and further between strokes than it does while the oars

are in the water; thus, control of the recovery enhances the chance of winning (Fig. 1.19).

George Pocock’s adage was that “oarsmen must row with the boat,” meaning they must not “row faster than the boat is going” otherwise they will rush their slides to attain a higher stroke rate and therefore check at the catch and reduce the run of the boat.

In the USA, Hiram Conibear, an athletic trainer, took over the rowing program at the University of Washington and developed the American Conibear style. This style required a hard quick catch, with shoulders and body vertical within 5–7.6 cm after the catch, a quick zip out of the bow with the arms at the finish, fast first part of the slide slowing at the last moment of the recovery. Conibear, together with George and Dick Pocock, influenced many prominent US coaches of the 20th century.

In England, Steve Fairbairn (1862–1938), a rower in the 1880s and later a coach in the early decades of the 20th century at Jesus College, Cambridge (Fig. 1.7), revolutionized the style of rowing and his coaching had an immense influence on the sport not only in Great Britain. Fairbairn’s first principle was that the legs were the strongest part of the body and thus the beginning of the stroke must be characterized by a good leg drive. The oarsman must not think too much about his body but concentrate on correct blade movements and during the recovery the blade must be kept well clear of the water.

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Table 1.3 World records for 2000 m ergometer rowing in 2006. Heavyweight (HWT) and lightweight (LWT, 75 kg for men and 61.5 kg for women) status is indicated. Updated records can be found at www.concept2.com.

Age (years)	Weight	Gender	Name	Country	Time
12 & under	Any weight	M	Marian Uroic	Croatia	7:13.2
	HWT	W	Fie Udby	Denmark	7:30.3
	LWT	W	Charlotte Manning	Canada	8:23.1
13–18	HWT	M	Karsten Brodowsky	Germany	5:47.0
		W	Sarah Hubbard	Australia	6:33.9
	LWT	M	Henrik Stephansen	Denmark	6:12.1
		W	Johanne Thomsen	Denmark	7:07.0
19–29	HWT	M	Rob Waddell	New Zealand	5:38.3
		W	Sophie Balmay	France	6:28.4
	LWT	M	Elia Luini	Italy	6:02.6
		W	Jo Hammond	UK	6:57.0
30–39	HWT	M	Matthias Siejkowski	Germany	5:37.0
		W	Sarah Winckless	UK	6:28.8
	LWT	M	Eskild Ebbessen	Denmark	6:06.4
		W	Lisa Schlenker	USA	6:56.7
40–49	HWT	M	Jens Doberschütz	Germany	5:58.4
		W	Carol Skricki	USA	6:48.2
	LWT	M	Mike Caviston	USA	6:18.2
		W	Lisa Schlenker	USA	7:09.6
50–54	HWT	M	Andy Ripley	UK	6:07.7
		W	Anna Bailey	UK	7:06.6
	LWT	M	Graham Watt	New Zealand	6:25.8
		W	Joan Van Blom	USA	7:22.6
55–59	HWT	M	Andy Ripley	UK	6:21.3
		W	Anna Bailey	UK	7:30.0
	LWT	M	Dennis Hastings	USA	6:40.8
		W	Helen Mandley	USA	7:57.2

(Continued.)

Table 1.3 *Continued.*

Age (years)	Weight	Gender	Name	Country	Time
60–64	HWT	M	Paul Hendershott	USA	6:23.7
		W	Mies Bernelot Moens	Netherlands	7:33.1
	LWT	M	Roger Prowse	UK	6:48.8
		W	Ingrid Petersen	Denmark	7:48.6
65–69	HWT	M	Peter Lekisch	USA	6:53.2
		W	Renee Camu	France	8:09.8
	LWT	M	Lyle Parker	Australia	6:37.7
		W	Luanne Mills	USA	8:00.0
70–74	HWT	M	Stephen Rounds	USA	7:02.6
		W	Ruth Doell	USA	8:42.2
	LWT	M	Geoffrey Knight	UK	7:13.4
		W	Sarah Keel	USA	8:52.9
75–79	HWT	M	Stephen Rounds	USA	7:22.3
		W	Ruth Doell	USA	8:54.0
	LWT	M	Dean Smith	USA	7:25.3
		W	Mavis Surridge	UK	9:13.1
80–84	HWT	M	Joe Clinard	USA	8:03.5
		W	Gertrude Lowther	USA	10:12.9
	LWT	M	Dean Smith	USA	7:52.5
		W	Jessie Welsh	UK	10:05.5
85–89	HWT	M	Stephen Richardson	USA	9:17.5
	LWT	M	John Hodgson	UK	9:22.0
		W	Jessie Welsh	UK	10:25.2
90–94	HWT	M	George Braceland	USA	11:01.9
	LWT	M	John Hodgson	UK	9:25.8
		W	Ernestine Bayer	USA	12:07.5
95–99	LWT	M	John Hodgson	USA	10:28.1

Fairbairn was the first to train his crews to slide in their seats to maximize the length of their stroke, and his adage that mileage wins races was a precursor of year round on-water training. “The

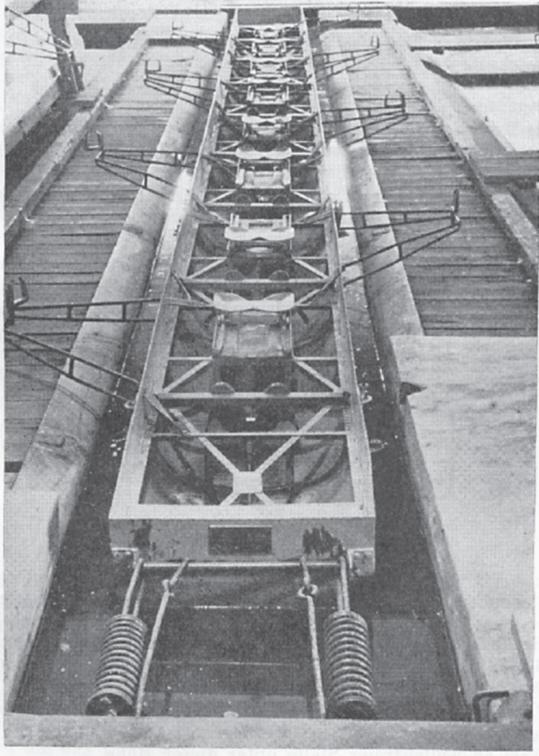


Fig. 1.18 An eight-seat rowing tank.

Fairbairns,” a rowing competition for novice rowers held on the River Cam late every autumn, is named after him.

Karl Adam (1912–1976), a professor of rowing and a coach, had a major impact on one of the most successful eras in German rowing history which started at the end of the 1950s (Fig. 1.20). He was co-founder of the Ratzeburger Rowing Club in 1953 and head of the rowing academy there. He was a great innovator of rowing and training techniques and introduced methods that had a major impact on the further development of rowing—known in the rowing world as the “Ratzeburger” style. In the 1960s, Karl Adam’s world champion crews from Ratzeburg pioneered advances such as speed play, interval training, shovel-shaped oars and “bucket” rigging (which put the number 4 and 5 oars on the starboard side of the boat; numbers 2 and 3 in the four, respectively). He also introduced longer tracks for the seat to travel forward more than 10 cm past the pin and allow maximal compression of the legs at the catch. Another novelty of Adam was the concept of systematic crew selection from rowers across Germany and his boats won in 1959–67 not less than seven titles at World and European Championships. In addition, his eight won an Olympic gold medal in 1960 in Rome and 1968 in Mexico — introducing the title of “Deutschlandachter.” Nothing since has matched the impact of the sudden explosion of Ratzeburg and Karl Adam onto the rowing scene.

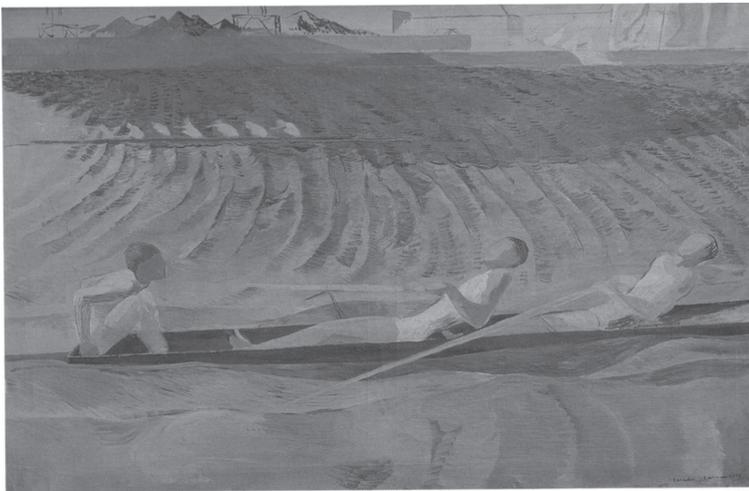


Fig. 1.19 Old time rowing (Harald Hansen, Danish artist).



Fig. 1.20 Karl Adam.

A significant contribution to the sport of rowing has been made by the world-renowned Norwegian coach Thor Nilsen (Fig. 1.21). Currently FISA's development director, Nilsen is also honorary chairman of the Competitive Rowing Commission and has served both on FISA's Council and Executive Committee. Nilsen has developed national training centres in several countries and has also served as national rowing coach in Norway and Sweden as well as technical director and head coach for Greece, Ireland, Spain and Italy. He has influenced many coaches worldwide and his coaching results include over 40 World Championships and eight Olympic gold medals.

Organization and FISA

History of FISA

FISA was founded in Turin on June 25, 1892, by delegates from France, Belgium, Switzerland, Italy and the Adriatic Federation (alias Austria-Hungary) as the first international amateur team sport governing body and is based in Lausanne, Switzerland.



Fig. 1.21 Thor Nilsen.

Early organization of rowing as a sport probably reflects the complexity of storing a large number of boats and therefore the creation of large boathouses establishing a unique club culture (Fig. 1.22).

In 1893, FISA held its first European rowing championship, in Orta, Italy, and then annually until it was replaced by the World Championships (Lucerne, Switzerland, 1962). Similar World Championships regattas were held for Juniors (Ratzeburg, Germany, 1967) and under 23 years (Nations Cup), the latter receiving official FISA status by 2005. By 2006, FISA included 118 national rowing associations. There has also been a one-off North American Championship (1967) while regional continental regattas are held in Latin America, Asia and Africa as part of FISA's development program.

Olympic Games

Because Baron de Coubertin was a keen sculler (Fig. 1.23), rowing was included in the program of the first modern Olympics in 1896 (Athens) but all five events scheduled were cancelled because of bad weather. However, the rowing events did take place in 1900 (Paris) and rowing is one of the five sports to have been in every modern Olympics. In 1912, inrigger fours were in the Olympic program and the

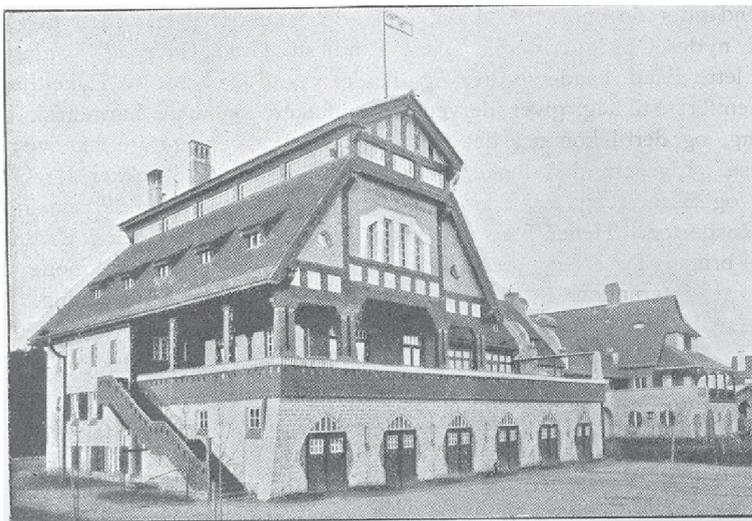


Fig. 1.22 The boathouse at Grunau, Berlin, Germany.



Fig. 1.23 Baron Pierre de Coubertin sculling on Lac Lemman.

event was won by Denmark (Fig. 1.8). Women's rowing was added only in 1976 and lightweight events joined the program in 1996. Thus, rowing has managed to maintain the third largest quota after athletics and swimming, having 14 sets of medals and more than 550 participants. In 2005, adaptive rowing was included in the Paralympics, which is also evidence of the growing popularity of the sport.

European Championships

In the 1893 European Rowing Championships there were only three events (men's single, coxed four and eight) and only 10 entries. Races were 3000 m long, except for singles which were only 2000 m.

The last European Rowing Championships took place in 1973 and were open to all countries. In 2006, FISA re-established the European Rowing Championships to start in 2007 at the end of September, and it will feature the 14 Olympic boat classes racing over 2000 m. While the World Championships are maintained as the main FISA annual regatta, the European Championships will be open only to National Rowing Federations from Europe.

Boat types and categories of rowers

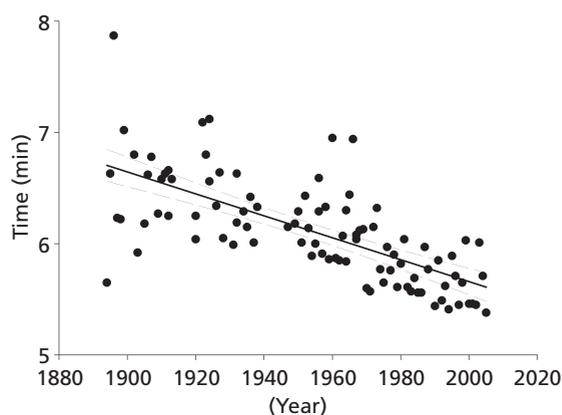
From 1896 up to the 1972 Olympic Games rowing included seven male events in the Olympic program

Table 1.4 Rowing events in Olympic Games (OG) and World Championships (WC) programs.

Boat type	Men		Women	
	Heavyweight	Lightweight	Heavyweight	Lightweight
Single scull (1×)	OG	WC	OG	WC
Double scull (2×)	OG	OG	OG	OG
Quad scull (4×)	OG	WC	OG	WC
Pair (2-)	OG	WC	OG	
Four (4-)	OG	OG	WC	
Eight (8+)	OG	WC	OG	
Pair with coxswain (2+)	WC			
Four with coxswain (4+)	WC			

(1×, 2×, 2-, 2+, 4-, 4+, 8+). The 2000m standard distance was originally defined as the entire length of the racing lane but now is defined as the length between the boat's bowball and the finish line. In 1976 the number of events was increased to 14 as one male event (4×) and six female events (1×, 2×, 4×, 2-, 4-, 8+ over 1000m distance) were introduced. Women's events were changed to the standard distance of 2000m in 1984, which made female rowing more aerobic with less demand for strength and power. The current Olympic program was introduced after the 1992 Games, when lightweight events were included (LM2×, LM4-, LW2×) at the expense of M2+, M4+ and W4. Yet, these events are maintained in the World Championships program (Table 1.4). For lightweight men's crews the limit is 70kg with no rower over 72.5kg, while for women's crews the limits are 57 and 59kg, respectively. For single sculls the limits are 72.5 and 59kg, for men and women, respectively.

The coxswain (or simply the cox) sits in the stern (except in bowloaders) facing the bow, steers the boat and coordinates the power and rhythm of the rowers. As coxswains are members of the crew, a women's crew may not be steered by a man nor may a men's crew be steered by a woman except in masters races. The minimum weight for a coxswain is 55kg for men's and 50kg for women's crews. To make up this weight, a coxswain may carry a maximum of 10kg deadweight, which shall be placed in the boat as close as possible to the coxswain's person.

**Fig. 1.24** Rowing speed based on Olympic and World Championship records (M8+). Regression line shown.

Trends of rowing performance

Long-term performance in rowing is difficult to analyze, because results are significantly affected by weather conditions and differences between the race courses used in European, World and Olympic events. Yet it is clear that there has been a steady increase in rowing speed over the years, with an average improvement of 0.7s per year (Table 1.5; Fig. 1.24).

A more detailed presentation of the progress may be obtained by comparison of records from a single regatta, and for that purpose the Royal Henley

Table 1.5 Predicted times for 2007 based on regression lines established from Olympic and World Championship records.

Boat type	Slope of regression	2007 Time
M4+	-0.84	6:07
M2x	-0.75	6:17
M2-	-1.06	6:23
M1x	-0.81	6:46
M2+	-0.93	6:51
M4-	-0.79	5:53
M4x	-0.43	5:47
M8+	-0.60	5:34
ML1x	-0.92	6:54
ML4-	-1.20	5:54
ML8+	-0.78	5:36
W2x	-1.42	6:43
W1x	-1.97	7:10
W4x	-0.31	6:23
W8+	-0.52	6:10
WL1x	-1.22	7:37
WL2x	-1.98	6:55
WL4x	-3.15	6:21
LM4x	-0.57	5:55
LM2x	-2.47	6:07
W4-	-1.30	6:30
W2-	-2.22	6:49
Average	-1.17	6:24

M, men; L, lightweight; W, women; +, with coxswain; -, without coxswain.

Regatta is ideal because it is the oldest still existing institution in race rowing. From these records it is possible to define the following periods of rowing development, as illustrated in Fig. 1.6.

Before 1900 there was a fast growth in performance of 1–1.5% per year, which may be explained by initial development of equipment (timber boats, outriggers and the sliding seat), in addition to sporting technique and training methods. The slower growth of ~0.5% per year from 1900 to 1950 may have been caused by the two world wars and the amateur status of the athletes. From 1950 to 1980, however, performance grew at a pace of ~1–2% per year. It may be consid-



Fig. 1.25 Ivanov, winner of three single scull Olympic championships (1956–1964).

ered that the competition level rose substantially when Eastern block countries joined Olympic sports in 1952. Thus, sport acquired a political dimension with the USSR (Fig. 1.25) followed by the DDR dominating international rowing (as many other sports) for decades.

Only as western societies became richer, a similar (semi-) professional status became widespread and boomed the training volume and methods, while one can only speculate whether the use of drugs in sport has played a part. This performance growth was even faster for women, because it coincided with the introduction of these events (1953).

In the period 1980–96 there was a slower growth of ~0.5–0.8% per year. This growth rate could be reflective of the training volume approaching its biologic limit and an improvement in drug control. However, rowing performance continues to grow relatively faster than in athletics or swimming, possibly because of significant developments in equipment which replaced wooden boats and oars with plastic or carbon fiber and the introduction of the “big blade.” Also, the proactive position of FISA on the wider promotion of rowing and the popularization of modern training technologies may have played a part.



Fig. 1.26 Thomas Keller.

Since 1996 results seem to be stable. We can only speculate that further performance development has been limited by strict doping control methods (such as the blood doping test) and, most likely, by the marginal development of rowing material in recent years.

For more than 100 years, it is likely that the increasing size of the population by about 1 cm per

decade has contributed to make the rower much bigger than was the case when international rowing competitions were introduced. As illustrated by the better results for heavy (~93 kg for men) than for lightweight (70 kg) rowing, increasing body size promotes results and, accordingly, selection of national teams among all rowers within the country rather than only within a particular boat club has contributed to make the competitive heavy rower taller and heavier. An effort to standardize the courses used not only for FISA championships but also for local regattas was made largely on the initiative of FISA president Thomas Keller (1962–1976; Fig. 1.26).

Recommended reading

- Cleaver, H. (1957) *A History of Rowing*. Herbert Jenkins, London.
- Dodd, C. (1983) *The Oxford Cambridge Boat Race*. Stanley Paul, London.
- Dodd, C. (1992) *The Story of World Rowing*. Stanley Paul, London.
- Herrick, R.F. (1948) *Red Top, Reminiscences of Harvard Rowing*. Harvard University Press, Cambridge.
- Meuret, J-L. (1992) *The FISA Centenary Book*. Fédération Internationale des Sociétés d’Aviron, Oberhofen am Thunersee.