

# TECHNOLOGICAL PROGRESS

## AND THE OLYMPIC GAMES

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### (A) VAULTING POLES- "LEVIUS + FORTIUS =ALTIUS" (Note: 'levius' = more flexible)

The origins of pole vaulting go back to prehistoric times, and almost certainly had the practical application of crossing streams or ditches. There are references in Early Irish Literature to "Cleas an Chuaille" (trans. : "the feat of the pole" - note the Irish word for athletics is "lúth-chleas"). There is a well-known legend about Diarmuid and Gráinne in the "Fenian Sagas" which has a reference to "Cleas an Chuaille" where Diarmuid used a spear to vault clear when surrounded. The earliest date recorded for "pole jumping" is 829 B.C. in the Tailteann Games at Tailte, Co. Meath - these Games may predate the Ancient Olympic Games, although starting dates for either are unreliable. The Book of Leinster (c. 12th century) refers to Celts in Ireland and Scotland practising pole jumping for distance; for this event, like the Triple Jump, Shot Putt, and Hammer Throw, there is strong evidence of Irish (or Scottish) origins.

When track and field athletics began to be organised on a competitive basis in the mid-19th century, Pole Vaulting for Height was an event at the first English championships and Pole Vaulting for Distance was on the A.A.U. schedule. Poles were made from locally-available timber, incl. ash, hickory, cedar, fir, etc. Three iron spikes were often attached at the base of the pole. There are references to bamboo poles in a book published in 1855. Breaking of poles meant that there was a serious risk of impalement. Because of safety considerations and their lighter weight, bamboo poles came into general use by about 1920. In the United States, when bamboo became scarce during the Second World War, Aluminium and Swedish Steel Poles (both hollow) were used during the 1940s and 1950s, despite their heavier weight.

Although Bill Falk, a former coach and seller of vaulting poles, informed me that the first fibreglass pole was developed in the 1960s, there are reports (from two sources) that Bob Mathias used an experimental fibreglass pole either in the 1952

### Summary of some of the main highlights of the development of pole vaulting over the past century

Year	Pole type	World Record	Olympic Record	Notes
1896	Unknown	Either 11' 5" (3.49m) by W. Rodenbaugh (USA) or 11' 8½" (3.59m) by E.L.Stones (GB)	10' 10" (3.30m) W.Hoyt (USA)	
1900				Bamboo first used in O.G.
1927	Bamboo	First 14' (4.27m) vault		S.Carr (USA)
1928	Bamboo		13' 9½" (4.20M.)	S.Carr (USA)
1940	Bamboo	First 15' (4.57m) vault		Cornelius Warmerdam (USA)
1942	Bamboo	4.78m (15' 7¾")		Cronelius Warmerdam (USA)
1956			4.56m (14' 11 ½") R.Richards (U.S.A.) (bamboo pole?)	Fibreglass first used in O.G. by bronze medal winner G.Roubanis (Gr.) 4.50m (14' 9")
1961	Fibreglass	4.83m (15'10") G. Davies		First W.R. with fibreglass
1972	Fibreglass "Cata-pole"	5.63m (18' 5") R.Seagren (USA)	5.50m (18' 0") W.Nordwig(GDR)	Controversy over new model of "Cata-pole"
1988	Fibreglass	First 6m (19' 8")		Sergei Bubka (Ukraine)
1991	Fibreglass	First 20' (6.10m) (indoor and outdoor)		Sergei Bubka (Ukraine)
1996	Fibreglass	5.92m (c.19' 5")		J.Galfione (France)

Olympic Decathlon, or before the 1952 Olympic Games. Cornelius Warmerdam, who lost his chances of Olympic medals because of the cancellation of the 1940 and 1944 Games, took the World Record with a bamboo pole to its maximum in 1942 with a vault of 15' 8 ¼" (4.78M.) indoor; his grip was measured at 13' 2 ½" (4.02M.), giving a differential of 2' 6" (76cm.). About 50 years later, Sergei Bubka (Ukraine) - Olympic champion in 1988 and multiple World Champion and record-holder - has developed the technique with a fibreglass pole, with corresponding figures: vault 6.14M. (20' 0 ¾"), grip c.5.10M. (16' 8 ¾"), differential 1.04M. (3' 4").

Herb Jenks, an engineer from California, is credited with developing the first fibreglass pole as a result of his research on fibreglass fishing rods. There is a story that in 1960 he had just built a new deep-sea fishing rod, 10 ft. (more than 3M.) long and more than one inch (25.4mm.) in diameter. Jenks' son, a junior high-school vaulter, borrowed one of these poles or rods for a practice vault and surpassed his personal best by half a foot (150mm.). Jenks first developed a brand of pole called "Siloflex", which he sold out to Browning Arms, later broke with them and set up his own plant producing a new type the "Cata-Pole". This model created a major controversy at the 1972 Munich Olympics, when East Germany lodged a complaint that these poles contained carbon fibre; although I.A.A.F. rules had no prohibition on such material, they changed their mind twice and eventually banned the new model "Cata-Pole" at the last minute.

Jenks went into partnership with George Moore, and produced another model the "Pacer" pole. After the deaths of both these manufacturers, Steve Chappel (Moore's son-in-law) teamed up with UCS and developed the "Spirit" pole. Another company, Harry Gill Co., took over Pacer and also owned "Skypole". "Pacer" uses some carbon in special models. Otherwise, while fibreglass construction has improved, its composition is not much different than when first developed by Jenks in the 1960s. Fibreglass poles, because of their flexibility, have allowed development of "catapult" technique.

## (B) COMPUTERS AND ELECTRICAL EQUIPMENT AT THE 1972 MUNICH GAMES

While my memories of the Olympic Games go back 50 years, the Melbourne Olympics of 1956 provided special moments, with the last time an Irishman won a gold medal in a track event (R. Delany 1500 M.) and we had four Irish boxers among the medal winners. For live commentary on those events on the other side of the world, we in Ireland had to depend on radio and to see the action we had to wait until a film of the Games was distributed.

The rapid progress of electrical and electronic technology can be seen from a review of the facilities at the 1972 Olympics, where the Siemens organisation (which has one of its major factories and a museum in that city) provided a variety of equipment. Earlier that year at the Hannover Fair, Siemens displayed a special exposition "Technology for the '72 Olympics", which included a multi-media demonstration showing how technology is applied to sporting events, serving both journalists and spectators.

COMPUTER SYSTEMS comprised three Siemens model DVA 4004/45 computers for processing the results of all events in the 195 sporting disciplines, for which over 100 programs had to be compiled. The computer centre at the Olympia-Stadion operated with 300 teleprinters, video data terminals, and other input and output units. The remote data processing network involved links to all the Olympic sporting locations in München itself and throughout the then FRG (Federal Republic of Germany), as far away as Kiel (where the yachting events took place). As well as the "results computers", Siemens supplied the GOLYM information system where a computer held



Siemens computer centre

an “encyclopedia” of information on past Olympic events dating back to 1896, which could be accessed from terminals in München, Augsburg and Kiel.

(Note from the editor: the ‘encyclopedia’-data used in GOLYM were supplied by Erich Kamper, the late Honorary President of the ISOH).

ELECTRICAL EQUIPMENT had multiplied to such an extent by 1972 that the power requirement for the Olympic centre in München was above 35 MVA (equivalent to the electricity needs of a good-sized town). Over 300 km. cables and leads were installed. The variety of uses of electrical equipment (also supplied by Siemens) is shown by the following brief list:

1. Floodlights which consumed 2 MW of power. There were 550 high-power lights with halogene metal--vapour lamps mounted on two masts at the main stadium, with 8 further arrays mounted on the roof.
2. A new type of public-address system, adapted to the acoustic delays, was installed in the main stadium.
3. Medical electronic equipment was available to competitors at the medical centre in the Olympic Village. There was also an X-ray unit and modern pacemakers.
4. Telephone services required 15 PABXs, some with EMD switches and others with ESK relays, serving more than 2800 telephones.
5. The control room included mimic diagram switching facilities and the “Sitalux” lighting control system.
6. Radio and T.V. facilities included:
  - 13 GHz radio relay systems for reporting on the Marathon and on rowing events;
  - 13 T.V. programmes with 60 running commentaries in 45 languages were fed to German and foreign distribution networks;
  - at Raisting earth station, 3 large antenna systems were used for intercontinental transmission of T.V. programmes via satellites.

## (C) - 1 - TELEVISION DEVELOPMENTS AT ATLANTA 1996

While television does not directly assist the performance of athletes, it would be unthinkable nowadays to consider the Olympic Games (or other major sporting event) without live T.V. coverage worldwide via satellite.

The worldwide audience of course attracts major sponsors, and as a result since the election of President Samaranch in 1980 the I.O.C. income has mushroomed. For the Atlanta Olympics, television accounted for almost half (48%) of revenue, with T.V. income amounting to almost \$900 million, and sponsorship (being closely aligned with T.V. coverage) accounting for 34%. This increased income, of course, has enabled the I.O.C. to provide much greater support for N.O.Cs and for the athletes before and during the Games.

In the main Olympic Stadium at Atlanta, I noted from personal observation the following types of T.V. cameras:

1. Fixed cameras at various locations in the stands (it is not so long since these were all we were used to at many major sporting events).
2. Portable cameras used by cameramen before and after the competitions to get close-ups of the athletes.
3. Cameras on rails beside the two straights of the track, which ran back and forwards to follow the runners.
4. A camera mounted on a boom extended from a lorry parked on the outside of a bend in the track near the flag-poles; this camera could point downwards towards the runners on the track and also point up at the flags being raised on the flag-poles.
5. A camera at the end of the long jump pit to get a “head-on” view of the jumpers.
6. Another camera on a boom over the jumping pit to give an overhead view.
7. A camera “in the sky”, hanging from thin wires (which were difficult to see) suspended between the frame of the floodlights on one side and the top of a stand on the other side: this very small camera could be directed across over the track and raised or lowered to get overhead views of a group of runners in middle- or long-distance races.

These and other examples of modern T.V. cameras are largely made possible through technical advances. One such development is miniaturisation, with small cameras (the size of a tube of lipstick) that can be placed almost anywhere - e.g. next to the take-off board in long or triple jumps, or attached to the high bar in gymnastics, or attached to the net in volleyball.

Another development is that, instead to having to have a cable connecting the camera to the T.V. mobile unit, the camera can now send pictures by a R.F. transmitter. The camera on rails beside the finishing straight (that I mentioned above) is an example of a "tracking camera", travelling at the same speed as the sprinters in 100m., that uses developments in signal transmission to provide a simultaneous side-on view of the progress of the finish of a race; this development was first used in the Olympics at Barcelona and at LilleHammer (for speed skating).

Other technical developments in T.V. include:

1. underwater cameras;
2. a "divacam" following the diver from platform to entry;
3. improved videotape machines, smaller size, all digital.

#### FOOTNOTE:

Despite these great technological developments, problems still arise in communications. My experience in Atlanta is that only one of the 50+ T.V. channels available in our motel provided live coverage of the Olympics. Also U.S.A. newspapers were selective in giving results so that the Irish group which I accompanied had problems in following progress of Irish competitors in events for which we did not have tickets, especially those sports at distant venues.

On the other hand, this little story shows the benefits of modern technology. The last day of swimming competition coincided with the first day of track and field. Our group were in the main stadium for the latter and naturally we were anxious to hear of the progress of Michelle Smith (already a triple gold medallist) in her final event, 200m. butterfly. During an interval in the Stadium I went to get refreshments and met two young Irishmen who were working in Atlanta. When I mentioned Michelle Smith's final swim, one of them pulled out a mobile phone and called his father in Dublin. By a piece of luck he was watching the race on T.V. at that time, so we got the result (a bronze medal for the Irish swimmer) and I was able to bring the "hot news" to my friends in the stand.

#### (C) -2 - OTHER TECHNICAL FACILITIES IN ATLANTA

Personal observation in the main stadium again provides this list:

1. sensors on starting blocks to detect false starts;
2. electronic timing;
3. electronic measurement of height of bar in pole vault, and of distance in throwing events
4. electronic score-boards, large and small, to enable spectators to follow two or three simultaneous events; a big board showing the positions of all competitors in one event, and on a small board, the latest achievement from one jumper or thrower;
5. a huge T.V. screen showing pictures of a current event or a retrospective film of old Olympic Games;
6. a mobile rake to level the sand in the pit for long and triple jumps, the rake being moved on rails between jumps;
7. equipment to blow a spray of water towards runners or jumpers.

Another technical development (which I was not able to observe, of course) is that microchips can be inserted in the shoelaces of marathon runners, allowing accurate positioning of the field every five kilometres. This and other advances have enabled much faster and more accurate broadcasting of official results, in less than a minute for track runners.

These insert developments aid athletes and also spectators and T.V. viewers, as well reducing the risk of mistakes from human error.

#### ACKNOWLEDGMENTS AND SOURCES:

1. Information vaulting poles from Kevin Byrne (Dublin) and Bill Falk (M.F. Athletic Co.Inc., Rhode Island).
2. Information on computers and other equipment used at Munich Olympics 1972 from:
  - a) Dr. Lothar Schoen, Siemens A.G. München.
  - b) Brian Sweeney, Chairman, and Michael O'Connor, Siemens Limited, Dublin.
3. Article entitled "Technology" (mainly relating to T.V.) by Peter C. Diamond, Senior Vice-President, NBC Sports, in book *The Centennial President* (published by IOC).
4. Article: "High-Tech Olympians" by David Bjerklie in *Technology Review*.