

Volume 52 | Number 6  
April 2018

# Flypast



Newsletter of the CAHS Toronto Chapter  
A division of The Canadian Aviation Historical Society  
[www.cahs.ca/chapters/toronto](http://www.cahs.ca/chapters/toronto)

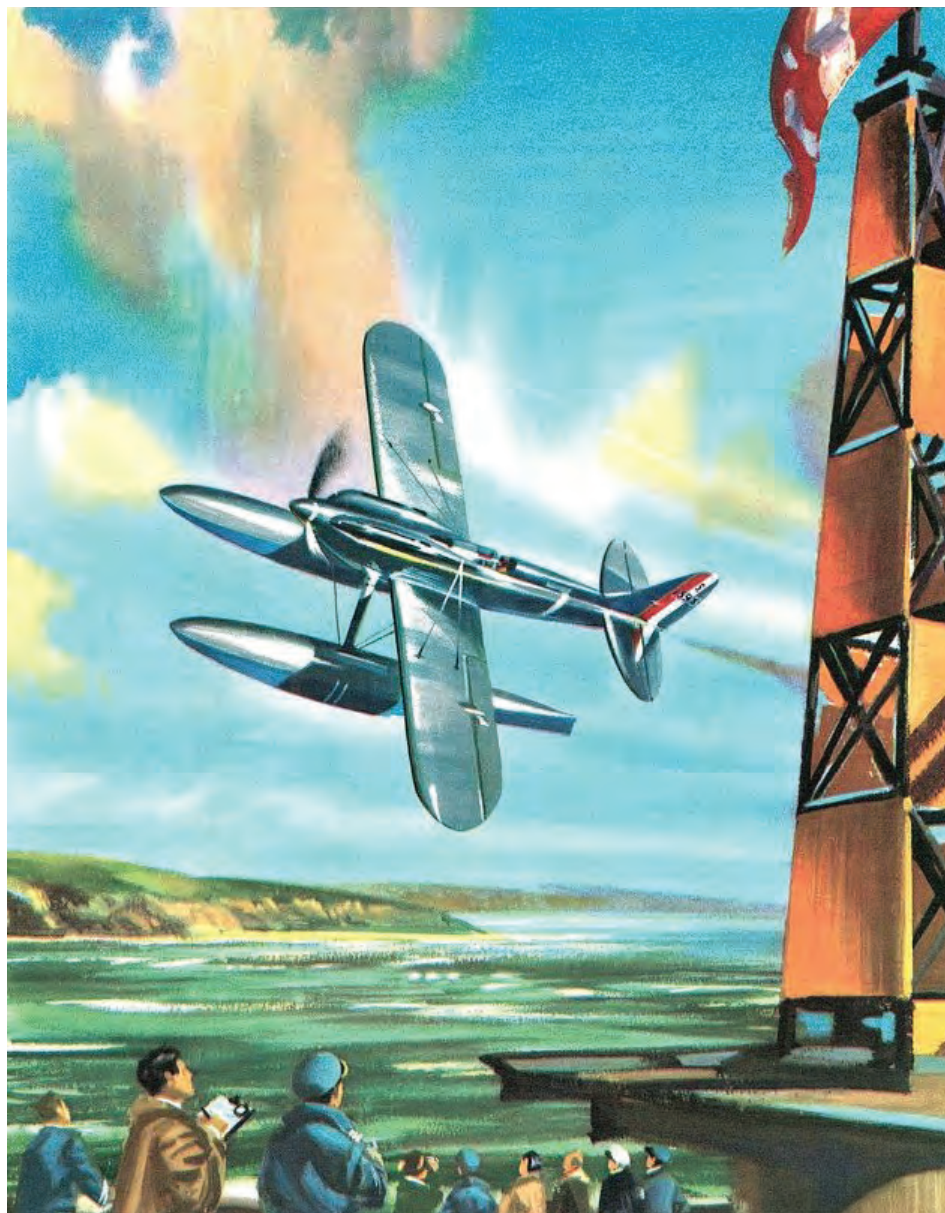
## CAHS Toronto Chapter Meeting WEB EDITION

### **CANADIAN FORCES COLLEGE**

*215 Yonge Blvd. at Wilson Avenue, Toronto*

**Speaker: Martin Keenan**

**Topic: The Golden Age of Seaplane Racing**



Flypast V. 52 No. 6

## March 3, 2018 Meeting

Topic: The Golden Age of Seaplane Racing

Speaker: Martin Keenan

Reporter: Gord McNulty

Historian Martin Keenan, a longtime member and former Chapter treasurer, hardly needed an introduction but it was my pleasure to welcome him. He has made five previous presentations to the Chapter, with the most recent being “Research and Presidential Aircraft --- The new gallery of the National Museum of the USAF” in April 2017.



*Speaker Martin Keenan*

*Photo Credit - Jennifer Keenan*

Martin's presentation included vintage newsreel films, starting with the 1925 Schneider Trophy race and then later British Movietone clips complete with sound. He focused on the Schneider contests from 1923 to 1931, a dramatic and exciting competition that took aircraft from speeds of 200 miles per hour to 400 mph. Jacques Schneider, heir of a French armaments manufacturer, trained as an engineer. He was enthusiastic about racing speedboats and set altitude records in balloons. After seeing Wilbur Wright fly in France in 1908, Schneider turned to aviation and received a French pilot's licence in 1911. When a serious flying accident forced him to stop, he became a financial supporter of flying competitions. Most notably, he donated and underwrote a trophy for an event to be held at Monaco in April 1913 --- la Coupe d'Aviation Maritime, later known as the Schneider Trophy. Schneider's family armaments firm was driven into bankruptcy in the wake of the First World War. He died in poverty in 1928.



1929 Schneider Trophy Contest Programme

*As it turns out Martin has a family connection to the Schneider Trophy Races. His grandparents actually attended the 1929 race and kept as a souvenir the Official Programme as shown on this page. It was given to Martin by his grandmother and is one of Martin's favourite souvenirs.*

The contest was envisaged as a competition among various national aeronautical clubs, to advance the progress of seaplanes for civil aviation. While the race was intended to be a speed contest, entrants also had to meet handling and seaworthiness requirements. The race was held over a relatively long distance, making reliability as important as speed. Any nation that won the trophy three times in five years, or failed to be challenged for five consecutive years, would win the trophy outright. Two Trophy contests were held at Monaco before the First World War, with the series resuming after the war's end.

Italy won two successive victories with the Savoia S.12, at Naples in 1920, and the Macchi M.7, at Venice in 1921.

The initial Trophy races, funded primarily by aircraft manufacturers hoping to promote their products, had not been particularly high-profile events. Seaplane racing speeds were not much greater than achieved by landplanes. The British Supermarine Sea Lion II racing flying boat won the Trophy Race at Naples in 1922. All of these aircraft were biplane flying boats that didn't look much like high-performance racers. Supermarine produced an improved Sea Lion, the Sea Lion III, for the 1923 race held in Cowes, England. There were originally 11 entrants, but the actual race boiled down to only four. The French entered a CAMS 38 flying boat, while the U.S. Navy sent two more advanced Curtiss CR.3 floatplanes originally designed for landplane racing.

The navy introduced significant innovations, including a powerful Curtiss D-12 engine. It was one of the first aircraft engines featuring cast aluminum cylinder blocks, lighter and much stronger than individual steel cylinders. The design was highly influential. After British manufacturers started importing them for their designs, the Air Ministry practically ordered Rolls-Royce to produce an equivalent that became the Kestrel. The CR.3s were equipped with aluminum propellers instead of traditional carved wood. Also, to replace drag-inducing external radiators, the surfaces of the upper and lower wings were turned into radiators for the engines. The two CR.3s came first and second. The winner, Lt. David Rittenhouse, posted a speed of 178 mph, 20 mph faster than the third-place Sea Lion III.

The 1923 outcome completely changed the race. Flying boats were suddenly on the way out. Increasingly, competing teams were government-sponsored, with military backing. For the 1924 race, the U.S. Navy had prepared a Curtiss R2C2, a development of the CR.3, which would have won easily. However, no competitors were available to make the trans-Atlantic crossing for a race in the U.S. So the race was deferred to 1925, although the R2C2 set a seaplane speed record in 1924. The 1925 race was held on Chesapeake Bay near Baltimore. The U.S. entered two Curtiss R3C-2s, one flown by the army and one by the navy. The aircraft was a development of the 1924 racer, employing a larger, more powerful Curtiss V-1400 engine and an improved propeller. Britain entered a Gloster III biplane, a descendant of the Gloster II designed for the 1924 race. It had only a 20-foot wingspan. A private entry from Italy, a Macchi M.33, was the last flying boat to compete for the Schneider Trophy. Although a forward-looking monoplane, it had a wooden propeller and large external radiator. Lt. James Doolittle, flying the army R3C-2, won the race at a speed of 232 mph. The Gloster placed second and the Macchi third.



Lt. James Doolittle and his Army Curtiss R3C-2 Racer winner of the 1925 Schneider Trophy Race held at Baltimore, October 24, 1925.

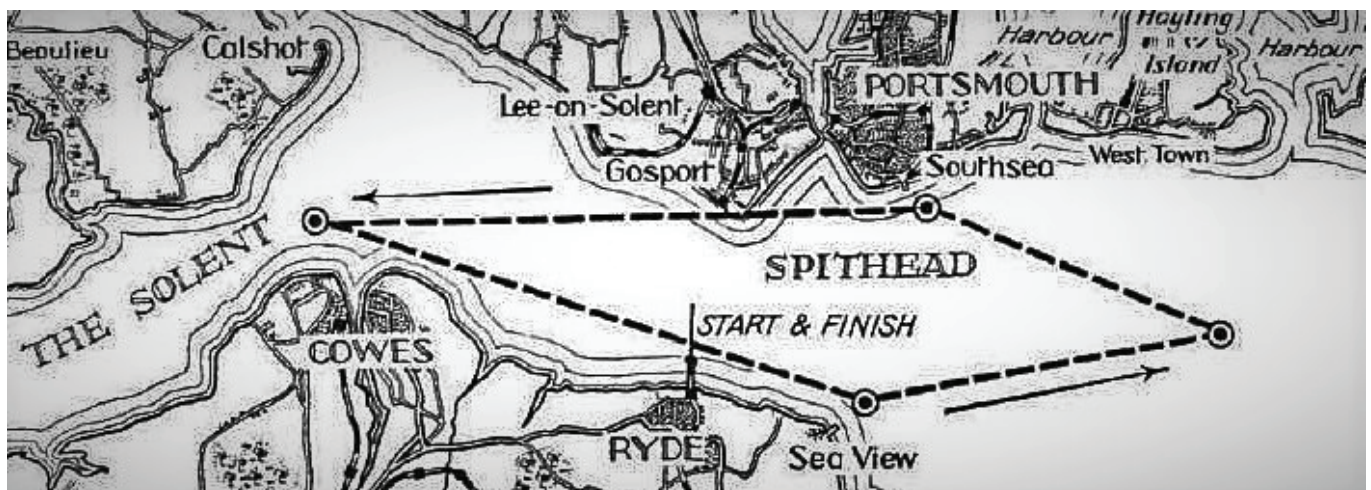
The 1925 race established a tradition where the trophy winner would attempt to set an absolute speed record. Doolittle achieved that, with a speed of 246 mph. The British should have entered a more competitive Supermarine S.4 at Baltimore, but it was destroyed in a practice flight. A sleek monoplane, the S.4 showed how air racing designs were rapidly advancing. The 1926 race, at Hampton Roads Naval Air Station in Virginia, sidelined the U.S. Army Air Corps, tied up in the aftermath of the court martial of Billy Mitchell. The U.S. Navy couldn't afford to develop a new racer, so it re-engined two R3C-2s --- the R3C-3 had a Packard 2A-1500 engine; the R3C-4 had a Curtiss V-1550. For its part, the Italian air force sent three Macchi M.39s. Designer Mario Castoldi, who saw the level of competition in 1925, managed a quantum leap in design with the M.39. It was powered by an 800 horsepower Fiat AS.2. Britain had requested the race be postponed until 1927, but was rejected. It didn't participate, with the British Air Ministry and

aircraft manufacturers opting to prepare for 1927 instead. The Italians took first and third in 1926 flying their M.39s, with Major Mario de Bernardi winning. A Curtiss R3C-2 flown by Christian Schildt, took second. It was the same aircraft that Doolittle had flown in 1925. The Curtiss R3C-4 ran out of fuel two miles from the finish line. Four days after his victory, Major de Bernardi set a new world seaplane speed record of 259 mph.

Britain then decided to employ RAF pilots in a special unit, the High Speed Flight, instead of civilian pilots, for future trophy races. Given the increased complexity of aircraft, it was decided that the contests would occur every two years. The trophy would be retired if any nation won three times in five years. The 1927 race, at Venice, featured Britain's upgraded entries: the Supermarine S.5, with a metal fuselage and wooden wings, and the Gloster IV biplane, somewhat reminiscent of the Curtiss racers. Both aircraft, powered by Napier Lion engines, were touted as "flying bullets" in newsreel footage. Italy's team entered Macchi M.52s, a development of the M.39 with a 1,000 hp Fiat AS.3 engine. These engines, equipped with magnesium pistons, were unreliable. Just before the race, one M.52 was re-engined with a less powerful AS.2. None of the M.52s finished the race, although the AS.2-engined aircraft completed six of seven laps. Britain's Gloster IV surprisingly managed to run a lap time almost as fast as the S.5, but withdrew on its sixth lap with a cracked propeller shaft. The two Supermarine S.5s were the only aircraft to finish. Flight Lieutenant Sidney Webster won at a speed of 282 mph. After the race, Major de Bernardi salvaged some honour for Italy, flying an M.52 to 298 mph over a three-kilometre course. He later became the first person to exceed 300 mph, flying an M.52 at Venice in 1928.



The winning RAF High Speed Flight Schneider Trophy team at Venice 1927



1929 Solent Quadrilateral 50 Kilometres (31 Miles) Race Course Courtesy -[www.hampshireairfields.co.uk](http://www.hampshireairfields.co.uk).



S.6 N247 Winner of the 1929 Schneider Trophy @328.63 MPH Artwork Courtesy - [www.tangmere-museum.org.uk](http://www.tangmere-museum.org.uk).

Britain made a key decision for the 1929 race. The Air Ministry decided the Napier Lion engine, which had propelled every British trophy winner since the First World War, had been pushed as far as it could. Sir Henry Royce, co-founder of Rolls-Royce, agreed to design a new engine in November, 1928. It was based on the Rolls-Royce Buzzard, a scaled-up version of the Kestrel. The new powerplant, the Rolls-Royce R racing engine, produced an impressive 1,900 hp compared to 800 hp for the Lion. Supermarine, meanwhile, produced the leading-edge S.6, similar to the S.5, but optimized for the more powerful engine.

The all-metal S.6 was designed by R.J. Mitchell, who anticipated an 1,800 hp engine and was pleasantly surprised with the 1,900 hp of the R engine. Such a powerful engine posed the risks of overheating and seizing up, but the cooling challenges were overcome. The entire wing surface of the S.6 was completely radiator. Mitchell also arranged for airflow through the internal wing structure. By this stage in the history of the race, all of the aircraft were essentially flying radiators. The most important instrument for the pilot was the temperature gauge.

Another sleek competitor, the Gloster VI, was powered by a 1,320 hp supercharged Lion. Forward visibility, a problem in many racers, was especially problematic with the Gloster. Italy entered four different designs for the 1929 race, at Calshot, England. The Fiat C.29, powered by a AS.5 V-12 of 1,050 hp, and a Macchi M.67, another upgrade of the M.39, with an Isotta-Fraschini Asso 1000 of 1,798 hp, were fairly conventional. More radical contenders included the Savoia Machetti S.65, with twin I-F Assos of 1,000 hp, operating in opposite directions to offset torque created by such powerful engines. Its tailplane was supported by two booms and the floats. Most unusual was the Piaggio-Pegna P.c.7, with a hydrofoil landing gear instead of floats, and a marine propeller. In theory, the engine would drive the marine propeller first, enough to get the aircraft up on its hydrofoil to bring the airscrew out of the water. The airscrew would then be engaged to fly the aircraft off the water. It sounded better in theory than practice, as they couldn't get the aircraft aloft. None of the Italian aircraft, however, were really ready to fly. Italy's request to postpone the race was rejected.

The much-anticipated event drew more than one million spectators. Britain competed with two Supermarine S.6s and one S.5. The Gloster VI had engine problems. The Italians, plagued by engine problems again, flew two M.67s and one M.52R, a 1927 racer with the wing span trimmed and lighter weight. An S.6 N247, flown by Flying Officer Richard Waghorn, won the race at a speed of 329 mph. The other S.6 was disqualified for accidentally turning inside a marker. The M.52R finished second, just ahead of the S.5. On Sept. 10, the Gloster VI was flown to a new absolute world speed record of 336 mph by Flight Lieutenant George Stainforth. Two days later, an S.6 flown by Squadron Leader Augustus Orlebar, set a new record of 358 mph.

Coping with the Great Depression, Britain decided in 1931 to loan the 1929 aircraft and the services of the High Speed Flight if 100,000 pounds in private money --- an enormous amount then --- could be offered to cover the costs. Lucy, Lady Houston, widow of a shipping magnate, offered the money, enabling the 1931 race. In March 1931, the Air Ministry ordered two improved versions of the S.6, the S.6B, intended

for an upgraded Rolls-Royce R engine of 2,350 hp. The Italians concentrated on a single design, the Macchi - Castoldi M.C. 72, equipped with two Fiat AS.6 engines turning two contra-rotating propellers to eliminate torque with a potential power of 3,100 hp. But engine problems couldn't be overcome. One of the M.C. 72 prototypes was lost in a fatal crash in August. The Italians couldn't compete for the race at Calshot in September. Britain entered the S.6. On Sept. 13, F/L John Boothman in S.6B, S1595 won the trophy outright for Britain with a course speed of 340 mph. Subsequently, on Sept. 29, F/L George Stainforth set a new absolute world speed record of 407.5 mph in the S.6B, thus ended the trophy competition and making the S.6B, the first plane to exceed 400 mph.



The 1931 Schneider Trophy winner the Supermarine S6B 1595 on a pontoon barge heading to the starting line.



The Schneider Trophy- A winged figure personifying the Spirit of Flight over Neptune and his three sons in the Silver Sea.

Despite Britain's victory, the Italians kept trying to solve engine problems. They ultimately succeeded, despite the loss of two aircraft and two pilots. On Oct. 23, 1934, they established a new world speed record. Test pilot Francesco Agello, in the M.C. 72, reached a speed of 441 mph or just over their goal of 700 kilometres an hour. The M.C. 72 wasn't flown again. It had set a world absolute speed record that remained until 1939. In fact, as a record for piston-engined seaplanes, it has never been beaten to this day. A surprising number of Schneider Trophy aircraft survive. Doolittle's RC3-2, the 1925 winner, has a place of honour at the Smithsonian museum in Washington, DC. The Italian Air Force Museum at Vigna di Valle in central Italy houses no less than four of the Italian contenders --- an M.39; an M.67; the last surviving MC. 72 (See Page 10);

and a Fiat C. 29. The Supermarine S.6B 1596 disqualified in the 1929 race now resides in the Mitchell Memorial Hall, Southampton Hall of Aviation at Southampton, England. The trophy-winning S.6B 1595 is displayed at the Science Museum in London, along with the Schneider Trophy itself, awarded to the Royal Aero Club in 1931.

Martin noted the greatest legacy of the races was their influence on aircraft design and engines, especially on subsequent military aircraft. The Rolls-Royce R engine was ultimately developed into the mighty Griffon. One engineer felt 10 years of development was compressed into two with the R engine. Those innovations were incorporated into a new V-12 engine, ultimately known as the Merlin, of which almost 150,000 were produced for a huge range of military and civil aircraft. The Schneider Trophy experience gained by R.J. Mitchell and Supermarine engineers gave the company what it needed to develop fighters best exemplified by the Spitfire. Perhaps the finest expression of the historical impact of the Schneider Trophy races is the Rolls-Royce Battle of Britain Memorial Window, now located at the company's visitor centre in Derby. Martin was well-prepared to answer several questions. His lively presentation covered one of the most colourful and significant chapters in aviation and he received a gift in appreciation on behalf of the Chapter.

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