

A HISTORY OF AUSTRALIAN SWIMMING TRAINING

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October 9, 2004

A presentation at the World Swimming Coaches Clinic in Indianapolis, Indiana, under the auspices of the American Swimming Coaches Association.

[I would like to thank ASCA for the invitation and opportunity to present here at the world's premier Swimming Coaches' Conference. I agree with Nort Thornton that "the older one gets it seems the less one knows". This became clear to me as I prepared this paper.

Presenting the history of Australian swimming training in one hour is a daunting task. My delivered speech will be a shortened version of the prepared text that follows.]

The development of Australian swimming has very much depended on what happened in England from the mid 1830s, and later in the twentieth century in the USA. Australia has certainly made important contributions to swimming, but especially in the early stages, progress came from England. Later, it will become evident that it was American coaches and swimmers who had considerable influence on world competitive swimming.

Historically, training to swim was driven largely by necessity, for example, in warfare to cross unfordable steams. There always has been the power of circumstance, the influence of climate, the availability of suitable water, and dependence on social attitudes that have influenced the sport's development.

In antiquity, it is known that the Greeks and the Romans built many pools and indulged in swimming as a form of exercise, education, and recreation. The legendary Leander is said to have swum the Hellespont to meet with his beloved. However, in the Dark and Middle Ages, water often, and probably rightly so, was blamed for the scourge of deadly epidemics that swept Europe. Wars, living conditions and long working days, were not conducive to sports, especially swimming in open, and usually cold, water. Even for the most enthusiastic, swimming most of the time would not have been a particularly pleasant experience. In 1836, we know the first swimming races were held in the Lambeth Baths, London. In 1846, in the former penal colony of Sydney, Australia, the earliest swimming races were held in the harbour near the Botanic Gardens.

At that time the stroke of choice was the *sidestroke* with both arms submerged and the legs propelling with a wide scissor kick. Old records tell us, many ventured to swim over a mile into Sydney harbour, from Woolloomooloo, just around from where the Sydney Opera House stands today, around Garden Island and back. However a fatal encounter with a shark dampened this enthusiasm and prompted the construction of the first shark-proof harbour swimming enclosure in Australia in 1850. It was a meshed area, at a spot called Fig Tree in Woolloomooloo Bay.

This was 30 years before the Englishman, 'Professor' Fred Cavill, father of the famous Cavill family of swimmers, in the 1880s built Sydney's first "floating baths" in Lavender Bay. The first NSW championships were held in 1889 in the long- since demolished

Sydney Natatorium, an indoor pool near Central Railway Station. It was filled with salt water pumped two miles from the harbour.

Early Training

A recent search through early swimming books and aging newspaper files provided few details of how training was carried out in the early days of competitive swimming when, both in England and in Australia, racing in enclosed pools and in open water was becoming increasingly popular. It can be surmised that the centre of attention was on improving the efficiency of swimming techniques because of the obvious progress which could be made by swimmers who over a period of more than three-quarters of a century successfully experimented with and adopted new, and faster, swimming styles. The comfortable and time-honoured breaststroke gave way to the underarm sidestroke, and then to the *one*-arm-over the water sidestroke. Next came the “Trudgen”, with both arms recovering over the water with the scissor kick, often called the “double overarm”. This was followed in Sydney in the early 1900s by the revolutionary stroke from the South Seas, the Crawl stroke. With the evolution of new stroke techniques major gains resulted. At this time there appears to be little concern for training (physical conditioning).

The “professors” of swimming offered some advice. During the second half of the nineteenth century, their primary training advocacy mainly was support for what was regarded as a healthy life style, for example, leaving one’s bedroom windows open at night and eating the “right” foods.

The first book on competitive swimming was the highly acclaimed work of Charles Steedman, published in 1867. Steedman, born in 1830, was a professional champion of England and later in Australia having migrated to Melbourne. He died there in 1901. Ralph Thomas (*Swimming*, 1902) says, ‘*Steedman informed me that he never trained and there is little doubt that other champions of his day (1850) did not either*’. Thomas quoted William Wilson, from the *Swimming Instructor* (1883) in its day another influential treatise on competitive swimming, after listing foods to avoid, “*One must be temperate in all things, in food, in drink and exercise*”. Good advice no doubt, but there was not too much about swimming training.

An Early Training Model

Specifically, Steedman (1867) advised a model training schedule (Cecil Colwin, *Breakthrough Swimming*, Human Kinetics, 2002, pp. 124-125. This is my abstract of the model.

5 AM Rise. Then, following walking a mile briskly, run up a hill for a half-mile as rapidly as possible, followed by four miles at moderate pace.

7 AM Breakfast. Rump steak or mutton chop, underdone without fat and a small piece of stale bread followed by rest or take very gentle exercise with dumb-bells for the remainder of two hours.

9 AM Walk two miles at moderate pace. Swim sharply for a quarter of an hour or 20 minutes [this would be not much more than half a mile]. Either plunge at once into cold water or have a sponge bath; be well rubbed down with a dry, coarse towel; dress quickly and eat a dry biscuit or a small piece of stale bread. Then walk three or

four miles at moderate speed, lie down on a bed for half an hour and on rising take a glass of old ale or sound sherry, and eat a hard biscuit.

1 PM Walk four miles. Exercise for 1½ hours to develop the muscles of arms and trunk; Rest for half an hour.

4 PM. Dinner. Rump steak or mutton chop, one or two mealy potatoes and a little greens; no pastry or cheese. Rest until 5 PM.

5 PM Walk a mile sharply. Run a half mile at top speed and walk 4 miles at moderate pace followed by a half-pint of old ale or wineglass of sherry, and a hard biscuit. Gymnastics for arms and chest until 8 PM.

8 PM Rest, amusing conversation or light reading.

9 PM Body to be well rubbed down with coarse towels and bed until 5 AM the next morning.

A booklet published in 1915 by the English Swimming Association, *Swimming by Champions of the World* included an article by Professor Tom Hatfield, a prominent long distance swimmer and leading coach of his day. His advice as a “*first matter to be strictly observed is . . . to sleep in a well ventilated room (with a window open) and to remember always to keep the bowels regulated*”.

“*Fifteen minutes daily of kneading of the muscles*”, he claimed to be essential together with the warning that “*late night dancing and other excesses*” *should not be indulged*”. There follows the advice not to smoke, “*especially cigarettes*”. Contrary to suggestions by Steedman and earlier trainers, Professor Hatfield warned “*to abstain from alcohol*”.

The “*extreme*” swimming distance in a day’s training advocated by Hatfield was one mile. His words then however were prophetic. Tom Hatfield wrote, “*It is necessary to practice distance swimming both for sprint and distance . . . a man can then stand more punishment than one who has confined practice to sprinting*”. Most of us would agree with that today.

Australia’s First “Golden Age”

I have not found any detailed training schedules of great Australian swimmers of our first “Golden age” of swimming, after the turn of the twentieth century. Then there were swimmers such as Fred Lane, winner of the gold medal for 200-m freestyle at the Paris Olympics in 1900, the trail-blazing Fanny Durack, winner of the first Olympic swimming event for women in 1912 at Stockholm, and other outstanding swimmers such as Barney Kieran, Frank Beaurepaire, and Cecil Healy, the latter being a swimming scholar and prolific writer who pioneered the use of the stylised Australian 2-beat Crawl stroke with regular breathing. It seems very little was ever written about their training or conditioning as it might have been called in those days. Writings were about technique, but very little about training.

An Australian swimmer became prominent at the Paris Olympic Games of 1924. At 16 years of age, Andrew “Boy” Charlton won the 1500m in world record time and established himself as an icon in Australian swimming. Riding high in the water with what may best be described as a Trudgen crawl stroke with a sideways and vertical

kicking action; it is known that Charlton swam for only 3 or 4 months of the summer. He seldom covered more than half a mile as well as a few laps of kicking in a typical daily training session.

The belief was, at the time, that more than this would lead to over-training and the few Sydney coaches, including Charlton's coach Harry Hay at the Manly harbour pool, advised through most of the 1930s that to swim further was to invite "staleness".

Australia's Decline in the 1930s

In the USA and in Europe during the 1920s and 30s there were increasing numbers of club and college indoor pools built for year-round swimming. Australian competitive swimming slipped backwards until by the time of the 1936 Olympic Games the country had only five swimmers selected for Berlin and only one made a final with backstroker Percy Oliver finishing seventh. Australians had disappeared from the list of world record holders. They were in awe of American and Japanese swimmers.

In Sydney, where for years the majority of Australian swimming champions had been spawned during the summer months at beaches and harbour pools, there was only a 20-yards long indoor pool, at Tattersall's, a private club in the city. It was built in the early 1930s as a replica of the pool at the Illinois Athletic Club, Chicago, where Johnny Weissmuller trained. It was not until the late 1960s that even a handful of Sydney swimmers could train indoors during the 6-month "winter" period. The situation was a little better in Melbourne but there were no indoor swimming facilities in other Australian cities so in the 1930s we watched as the Americans and Japanese swimmers practically, swept the Olympic Games medals in 1932 and 1936. Both those countries, with very much better facilities and many times our population, had collegiate competition and in the summer outdoor training. The competitive gap widened between us.

Searching through old documents and newspaper files at the NSW State Library I came across a swimming program for a Mosman Amateur Swimming club carnival held at Clifton Gardens, a harborside pool, which like most of the original open water pools is now long gone. There, included amongst the names of starters in a 50m-handicap race was one F. Carlile. The date on the program was March, 1931. This was 73 years ago when I was 10-years old. I think this was my first appearance at a swimming "carnival" as such meets have long been called in Australia. So, swimming has been an important part of my life for a long time.

As a schoolboy in the latter years of the 1930s, periodically during the summer, I "trained" in a fairly haphazard manner at the Spit Baths in Middle Harbour and eventually became the Spit Club's junior champion and captain. It was at the Spit I remember watching the Hawaiian-American distance champion Keo Nakama give an exhibition swim amongst the jelly fish in this tidal pool (demolished many years ago). At the North Sydney Olympic Pool, which opened in 1936, I watched American Jack Medica, winner of the 400-m freestyle at the Berlin Olympics give an exhibition swim. We had no Australians who could give him a good race. A later US visitor was Ralph Wright who demonstrated what seemed an efficient low recovery of his arms in the

breaststroke (butterfly), which I taught John Davies who later went on to win an Olympic gold medal.

Johnny Weissmuller

In “*Swimming the American Crawl*” (1930), Johnny Weissmuller, voted America’s “Greatest Swimmer of the First 50 Years of the 20th Century” made the bold statement (p. 56), “*If my records are beaten to any great extent in the near future, it will be due to superior physical development coupled with perfect execution of the stroke as now conceived*”. It was generally thought then that he had a near perfect technique. In this much read book, there is reference to the fact that Weissmuller’s training as a rule consisted mainly of a *quarter mile swim*, in a 20-yard pool.

Throughout the 1930s in the USA the competitive swimming scene was buoyant although it was clear that the Japanese, at the Olympic level, very largely with their college groups were well in front in men’s freestyle. Reported as swimming up to 5 miles (8 km) a day, they were far out-training the Americas with a zeal, which their rivals called *fanaticism*.

Coach Robert Kiphuth of Yale University

Bob Kiphuth at Yale University and Coaches Ulen and Larcom at Harvard wrote in the late 1930s about a total of a mile or less training daily during the three-month college season. All the evidence I have reviewed suggests that in the USA the consensus around that time was that at the most covering a mile in a day was what was required for high-level performance. Stan Brauninger, from the mid 1930s to mid 1940s coach at the Chicago Towers Club and coach of the American swimming hero Adolph Kiefer, spoke of the training of his star team, “*My kids swim a mile every day---sometimes more than that*”. It seems that only about a mile of swimming was the norm.

Jimmy McLane

By 1944 Coach Harry Minto of the Akron Firestone Club developed a youngster who won the US long distance, open water National Championship and was runner-up to Keo Nakama in both the 800 and 1500m national championships. Nakama, the middle distance freestyle champion nurtured in Coach Sakamoto’s group in Hawaii would almost certainly have been doing many training miles. However, what startled the swimming world at least on the mainland was the knowledge that the 13-year-old “boy wonder” Jimmy McLean, besides having big feet and above normal “flexibility”, was regularly covering the almost unthinkable distance of three miles a day.

Up to the mid-1940s in Australia, we continued to look to America for swimming inspiration. We picked up dryland strengthening, which Yale and US Olympic Coach Bob Kiphuth had his swimmers working on. His “callisthenic” exercises included pulley weight strengthening, and medicine-ball training.

Australia still had very few indoor facilities although Municipal Councils were beginning to build outdoor pools for summer use only. They were mainly 55-yard “Olympic Pools” with diving towers and often a diving facility and a children’s splash pool. However, the water in those pools as a rule was unheated and the pools were open for less than six months of the year.

The 1945 Renaissance

In 1945-46 a handful of us, very much aware that Australia was embarrassingly a very long way behind the USA, were determined to do something about it. I believe that period represented a watershed in the revival of Australian swimming. The leader of this group was Marsden Campbell, an outstanding freestyle sprint swimmer and backstroker who was friendly with famous former Olympic swimmer Frank Beaurepaire and Coach Bob Kiphuth. In an effort to promote swimming as a sport, he persuaded the NSW Swimming Association to cooperate with his entrepreneurial effort of promoting swimming carnivals, which were a mixture of swimming races and other entertainment. He also was the prime-mover in having the Speedo company sponsor the production of a clubroom wall chart explaining "*How to Train*". The information on this chart was largely gleaned from prominent American coaches. This chart represented an underlying ferment aimed at having Australia reach a higher place in world swimming and to approach its past glories.

Professor Frank Cotton

As a young and ambitious Honorary Secretary and Chief Coach of the NSW Swimming Association Coaching Committee, I swam and coached as an amateur. My "day job" was Teaching Fellow in the Physiology Department at the University of Sydney. My boss there was then Senior Lecturer, Frank Cotton, D.Sc., with whom as an Honours student I had become closely associated. He had been an outstanding competitive swimmer having just missed selection for the 1920 Olympic team. He was affectionately known in swimming circles as an "eccentric" for his physiological approach, which included the taking of heart rates at poolside.

During the Second World War, Frank Cotton led a scientific project for the Royal Australian Air Force, directing research into the development of the anti-gravity suit aimed at reducing blackout of pilots in fighter aircraft during tight turns. By the mid-1940s, Frank Cotton had determined to divert his academic interest away from the human circulatory system to exercise physiology. He became Research Professor of Physiology, and was soon appointed to the full Chair and Head of the Department. He began work, which was to cement his place as the "*Father of Sports Science*" in Australia.

I happened to be in the right place at the right time. Professor Cotton was to have a lasting influence on my life set during the 10 years from 1945 to 1955. This was cut short by the Professor's premature death in September, 1955, one year before the Melbourne Olympic Games.

Long discussions in the professor's office became a daily occurrence for me. It was as though I had daily tutorials. Our aim was to help produce athletes of high enough standard to gain selection for the 1948 Australian Olympic. Training ideas were discussed and principles articulated, many of which, I believe, have become part of the history of sports coaching in Australia. I concentrated on coaching swimmers.

Training in the Mid-1940s

We advocated very much more swimming than in the 1930s when the popular version of training had been small daily amounts of continuous swimming, with sometimes an added few laps with the legs tied or on the kickboard, and occasionally some sprints thrown in at the end.

More training became the norm from the mid 1940s in Australian pools. The descriptions of the training items we recommended, such as “basic” swimming, “efforts”, “broken swims”, and “tapering” were decided on in Professor Cotton’s office. Much of this training terminology is still in use today.

Fifty years ago I wrote a booklet, which outlined our training from 1945. These were the items, which were built into the training of most of the Australian team at the London Olympics, of which I was appointed coach. An interested parent, a director of a book company, produced the booklet for me. The following are from *Training for All Sports* (Dymocks, 1953).

“The greatest distance covered in training will usually be basic work for both sprinters and distance people. Both the sprinter and distance person will benefit from any amount of easy swimming but too much fast work will spoil both types of athletes.

The bread and butter training for all distances should be analogous to walking during everyday living . . . The greatest distance covered in a training session item will usually be this “basic” work.

It is the interesting fact that slow work will not bog down the sprinter but too much fast work will spoil both types of athletes. There should be a blending of various types of pace work.

2. RACE PACE--WITH BASIC: The full race distance should be divided by four and each quarter swum, run, or rowed at approximately the speed of the race—not faster. Every second “recovery” quarter should be at slow (recovery) pace.

3. “BROKEN” SWIMS: Alternately 50m, nearly (but not quite) all out, and 50m slow recovery. Swimmers cover about a half-mile daily of this at a session.

4. EFFORTS are repeated at the athlete’s race distance at distinctly less than all out speed.

The instructions continued: *“To get the utmost benefit from this training plan, 100% efforts over the full race distance should be a relatively rare occurrence. Athletes have individual amounts of nervous energy, which should be reserved for big occasions. Realise this, and cover the miles a day and you will be well on the way to reaching your best. Being too keen to go “flat out” has ruined many an athlete”* [This was an early version of setting a training base of aerobic training].

From the mid-1940s in Australia some training groups, including those I coached, were swimming as far as 5 miles (8 km) a day, albeit much at an easy pace.

Sports Science 1945

During 1945 in the Physiology Department of the Old Medical School at the Sydney University, Room 22 became the first Sports Science laboratory in Australia. Electronic measuring equipment was only of the most rudimentary kind. There was an emphasis on measuring work output on ergometers on Cotton-designed stationary bicycles and rowing machines. Professor Cotton became the “Scientific Adviser” for numerous athletes from a variety of sports including the group of swimmers I was coaching, which produced many National champions and Olympians. I spent my time between twice-daily coaching of these swimmers, working on research projects, and teaching. I could have been called Professor Cotton’s “Assistant Professor for Swimming”. Professor Cotton, usually in suit and tie, only occasionally came to the pool. He was busy, daily advising coaches and athletes from a number of sporting disciplines with rowing a high priority. He was a pioneer in measuring work output under simulated rowing conditions. Not surprisingly, we found a close relationship in many sports between success and an individual’s work capacity. This was put to practical use in the selection of successful rowing crews and single scullers at the Olympic level.

There had been some outstanding sports scientists on the world scene before Frank Cotton, notably T. K. Cureton (1901-92) at Illinois, A. V. Hill (1885-1977) of Trinity College, Cambridge University -- among others, but Cotton’s influence on the Australian scene, on track and field, rowing, and particularly on swimming marked a very significant period in the progress of Australian sports and sports science.

I want to make it clear that in a brief 10-year period Professor Cotton was the brilliant instigator and driving force behind the application of scientific thinking to training for swimming and other sports in Australia. Concepts were conceived and practiced, which I believe influenced much of the competitive swimming world at that and later times.

Applied Science in Sports

In general the aim of our self-appointed two-man commission was to apply science to sport. In the words of Brent Rushall (personal communication) it became a matter of applying as far as possible “*evidence-based (scientific) principles rather than relying on belief-based coaching as in the past*”. With my experimental research I was fortunate in being given a free hand to pursue any problem that interested me. I did not have to ask permission to embark on a project, but it had to be funded within a very tight, almost non-existent research budget.

Some initiatives from 1945 were the use of pool clocks with sweep minute hands so that swimmers could self-monitor their training performances; and the requirement that swimmers keep training log books. I carried out experiments which included investigating the aspects of active and passive warming-up of the body, following circulatory changes in arterial pulse waves, studying changes in blood parameters, and following progressive changes in the electrocardiogram after severe exercise stress.

In his book on the *History of Sports Coaching in Australia* (University of NSW Press 2000), Murray Phillips, a sports historian, drew into perspective the scientific initiatives which he recognised as emanating from the University of Sydney.

He summed-up the progress which occurred in the mid-1940s and 1950s in Australian sport, not only in swimming. Phillips said:

From the time men started to pass on their expertise to athletes, coaching was devoid of modern science and coaches acquired their expertise by watching what others had learnt, by trialling new techniques, by experimenting with different regimes for conditioning and by dabbling in diets that they hoped would provide advantages. The 1950s witnessed a radical change in this approach. Led by Cotton, Carlile, and Gallagher [the coach of 1956 Olympic Gold medallists Dawn Fraser and Jon Henricks and a disciple of Frank Cotton], scientific experimentation and methodology were used to build a set of principles on which athletic performance could be evaluated.

Many ideas, such as the theory on warming-up, using electrocardiograms, and the application of interval training to swimming helped to secure Australia's international sporting success (p. 88).

Phillips commented on leading coaches of various sports:

These coaches may not have been at the forefront of testing athletes like swimming coaches, but they were quick to adopt any new techniques that were going to benefit their charges.

He went on to say:

Certainly they realised that good coaches had to be adventurous in their approaches . . . The legacy of the 'Golden Era' of Australian sport was that the previously dominant paradigm of non-scientific coaching had been gradually, albeit not totally, usurped by new models based on rudimentary application of scientific principles, principles which are now accepted by many coaches as crucial and inseparable from developing all levels of sporting prowess."

Hans Selye and Stress Adaptation

Many of my research studies regarding training stress were stimulated by the work of Hans Selye in Montreal who in the late 1940s and early 1950s proposed his famous theory of the General Adaptation Syndrome. He drew attention to the various signs and symptoms of "failing adaptation", which he showed could develop variously into what he called "Diseases of Adaptation". Selye's concepts immediately made a great deal of sense to me. I wrote about them that in addition to training exercise, life stresses could act cumulatively on athletes, and about the possible signs and symptoms of failure in adaptation for coaches to monitor.

Sydney swimmers from the mid-1940s were very interesting subjects for physiological studies. This was a very good example of the power of circumstance.

After a 6-month lay-off, October in Sydney marked the start of the summer swimming season, and as soon as pools opened, heavy training loads were often undertaken in cold, unheated water at a temperature in the low 60s (16°C) or even colder. In the main, coaches were working with school children and students with busy lives who were

endeavouring to reach peak performances by January and early February when State and Australian Championships were held.

After six months of swimming detraining, although some had engaged in other sports and carried out the Kiphuth "callisthenic" exercise sessions two or three times a week during the off period, swimmers found themselves suddenly being driven by enthusiastic coaches to log many miles, often in 12 sessions a week, and usually under difficult, uncomfortable conditions. In those days, for many this was a formula for the disaster of severe over-training.

One reason we undertook testing lay in the hypothesis that marked physiological changes would serve as a good guide for detecting the overtrained state. There were a number of parameters which could be measured without expensive equipment. Areas of physiological breakdown showed up in our test results. However, although it was often clear to us from diminished performances of swimmers that "adaptation reserves" were low, the bodily changes we found were not common to all totally exhausted athletes. However, with some of these tests in a way we "hit the jackpot". We quite often found marked physiological changes coinciding with poor performances. Nevertheless, it should be said that the testing approach turned out in one respect to be a false trail because these tests only touched on unravelling the complexity of the situation of overtraining. No one test or even a group of tests can be all revealing or common to all overtrained athletes. Furthermore, Ursula and I observed during our 1965 six-month stay in Indiana, that Coach Jim Counsilman's outstanding Indiana University team, which adhered to a swimming program through much of the year, suggested such continuity of training resulted in a marked reduction of the overtraining problems which were frequently observable in the lesser, six-month trained Australians.

Year-round Training

I think the following is important when considering the progress of competitive swimming in Australia-- to tell something of winter training.

There were some intrepid individuals in Sydney who trained during the cold weather during the six month off-season. I have been reminded by one of my old pupils, Brian Browne, now living in San Francisco, of the winter swimming in which he was involved. I asked Brian and Olympic Gold medallist John Devitt, to share their recollections with me.

A number of Sydney surf clubs and swimming clubs held sprint races throughout the winter in ocean-side pools on Sunday mornings. Two such clubs were the Coogee Penguins and Bondi Icebergs. There were some Sydney swimmers who trained twice daily, year-round. Tom Caddy (I think he swam himself!), Tom Penny, and myself encouraged enthusiastic and hardy pupils to train in the ocean and in rock pools at such places as Coogee Surf Lifesaving Club, Clovelly Inlet, and Bronte. During winter, the water was often very cold with the temperature as low as 13°C (55°F). There were no lights, and often storm-surf presented the real possibility of a swimmer being washed out of the pool into the ocean. Some, including Brian Browne and John Devitt who became Olympic 100m Gold medallist, trained consistently, twice daily, in most weathers. In 1955, Brian left Australia to swim at the University of Michigan.

Coach Penny had Barry Darke, a brilliant young swimmer, John Devitt, and others sometimes train in more comfortable conditions in the coolant outlet channels of Sydney's power stations at Bunnerong and White Bay where the water was usually warm (75-80°F). The water flow was approximately 2 to 3 mph and the swimmers wore shoes to protect their feet from oysters, which lined the course. A small rope, dangling from a cross wire at Bunnerong, was the only chance of reprieve from being washed out into Botany Bay. There were a few Sydney swimmers who gained regular access to the Tattersall's Club indoor 20-yard pool. Most swimmers who maintained their swimming fitness in this way usually performed well in the summer, many winning State and National Championships. The importance of year-round training was becoming apparent.

London Olympics 1948

The Second World War caused the Olympics of 1940 and 1944 to be abandoned so in the mid-1940s, athletes set their sights on competing at the 1948 Games scheduled for war-damaged London. Remember, Australian swimmers had been completely outclassed in Berlin 12 years before and despite the fact that we, like the USA, had not had our country devastated by war, Australia was considered to be well out of contention.

John Marshall

Melbourne Schoolboy, John Marshall sensationally appeared on the Australian swimming scene at the 1947 Nationals. Laboratory testing later by the famed exercise physiologist Professor Tom Cureton at the University of Illinois showed that Marshall, physiologically, was outstanding. For instance, his heart could produce a stroke volume greater than any other athlete measured by Cureton. He had the greatest range of movement ("flexibility") in extension backwards that Cureton had seen. John Marshall was an exception to the rule when it came to training. Up to the London Games, Marshall's training under Coach Tom Donnett in Melbourne consisted each day of only 1000 metres of swimming and 1000 metres of kicking. With this small amount of training, even for that time, Marshall had no trouble in winning all freestyle events from 200m to 1500m at the Australian Championships.

Most of the 1948 Olympic swimming team gathered for six weeks pre-Olympics training during a depressing Melbourne winter. They were drawn to the southern city because Richmond provided the only 50m indoor pool in Australia. Ten swimmers were selected for London, an increase from the five sent to Berlin in 1936. The 1948 team had five Olympic finalists compared with one in Berlin. Performances improved from no medals in Berlin to winning 2 silver and 2 bronze with a very close fourth place in London. John Marshall was third in the 400m, and finished second to American Jimmy McLane in the 1500m. After the Games, between 1949 and 1952, while swimming at Yale University under Bob Kiphuth, Marshall benefited greatly from strengthening exercises -- (he went to Yale not being able to chin the bar even once). He had a rigorous water preparation, swimming around 3000m a day which he chose consistently to swim at close to "all-out" pace. I was informed of this recently by Phil Moriarty, an assistant coach at Yale at that time. Marshall set around 30 world records between 1950 and 1952 [there were many more world records to be had, in yards and metres than FINA provides for nowadays]. Australian team-mate John Davies, who later gained prominence as the Californian trial judge for the famous "second Rodney King case", continued his swimming career after

the Games at the University of Michigan with Matt Mann. In 1952 he won Gold at Helsinki in the 200m breaststroke performing what was soon to be called butterfly.

Helsinki 1952

The Australian team four years after the London successes was singularly unsuccessful in Helsinki, John Davies who had trained at the University of Michigan being the only medal winner with his Gold. In its questionable wisdom, the Australian Swimming Union sent a team to the Helsinki Olympics without an official team coach. The continuing battle of professional coaches with the hierarchy of the Australian Swimming Union is another story.

From five medals in London, then one medal at Helsinki followed by eight gold and six other medals at the Melbourne Olympics four years later was a phenomenal move forward. How did that happen?

Early 1950s

After 1952, Sydney-based professional coaches, Gallagher, Guthrie, Herford, and myself, and soon a rising Don Talbot, discovered in the crucible of tense competition that swimmers performed best after they had included in their training intensive “interval” training, borrowed from European science-guided track coaches. Better and harder training is not the only explanation for Australia’s leap forward in that four-year period. There were other factors, including the fact that Melbourne was for us a home Olympics. Better crawl stroke technique was another important reason for explaining Australia’s step forward. However, undoubtedly a crucial influence was the *training* factor. Training and technique continue to be central themes in swimmer preparation today.

Most of Australia’s prominent training squads in the early 1950s lead-up to Melbourne had in common at most sessions swimming a mile of short rest 50m swims “on the minute” in addition to race distance repeats, quite easy basic swimming, some kicking and legs tied swimming.. There were increasing numbers of repeat “efforts”, usually spaced out 100m, 200m or 400m swims at from “80% to 95%” of all-out speed with varying rest intervals. Intensity of effort made was often checked by taking heart rate counts.

Coaches were discovering that swimmers could absorb harder sessions and more training miles than had previously been attempted. Most coaches identified when swimmers showed signs of overtraining and needed careful handling. The net result for Australian top swimmers was in 1956 an increasing number of world records, followed by outstanding Olympic success.

In his book *Harry Gallagher on Swimming* (Pelham, 1970); Gallagher listed a typical training session carried out by his pupils Dawn Fraser and Jon Henricks, both Gold medallists in their Olympic 100m freestyle events. When training in Townsville, North Queensland, during the two-month pre-Olympics preparation, Gallagher’s pupils like most of the team were swimming 2 to 2.5 miles in twice daily sessions. The training often included “effort” swims (at around 90%) at 400m, 2 x 200m, and 2 x 100m, with some kicking and pulling. However, Coach Sam Herford had Murray Rose, eventual winner of the Olympic 400m and 1500m events, covering up to about three miles per

session, made up mainly of 10 x 400m “all within the hour” with an average time of 4m 45 seconds (representing about “90%” effort). In addition, weight training with light bar bell weights and Kiphuth exercises were carried out daily by most swimmers. A total of about 25 miles (40 km) was swum weekly but this was only for 4 or 5 months of the year, outdoors. Both swimmers and coaches at this time thought this was a lot!

There was a falling off in Olympic medals following the eight won from the more restricted number of events in Melbourne. At the next three Olympic Games however Dawn Fraser, Murray Rose, John Konrads, John Devitt, Robert Windle, Michael Wenden, David Theile (backstroke), Ian O’Brien (breaststroke) Lyn McClemments (butterfly) and Kevin Berry (butterfly) all won Gold medals at Rome, Tokyo, or Mexico City.

During the 1950s and until the late 1960s, there was still no indoor swimming training in Sydney, or winter competition held in Australia. Summer training miles, often in cold water increased somewhat during this period but training remained much the same in most Australian top groups. However, training clocks appeared in many swimming pools, serious competitors used log books, interval training became widely adopted, and coaches showed a readiness to apply scientific thinking to training.

The training of the Australian swimmers for the 1960 Rome Olympics in the warm semi-tropical climate of Townsville, after about five months lay off from hard summer swimming training, offered a wonderful opportunity to test for physiological changes in top swimmers starting from a relatively low base-level of fitness. We reported that in the two-month’s training, apart from being able to show physiological improvements in various aspects of the functioning of the heart and circulation, as well as with blood pressure modifications, we also uncovered instances of physiological breakdown coinciding with poor training performance.

Sherm Chavoor

American Coach Sherm Chavoor, at Sacramento in the late 1960s, picked up on the idea of interval training and with this and over-distance swimming in a year-round program he rode the concept boldly and greatly influenced world swimming. Mike Burton and Debbie Meyer, his star pupils and their performances at Mexico City in 1968 *popularised* Chavoor’s heavy volume and high intensity training carried out by these two great, and other well-performed swimmers. Twice daily sessions, six days a week, no easy days and continual over-distance work represented Chavoor’s training for most of his squad, age groupers and all, including Mark Spitz before his triumphant 1972 Olympics. Usually each training item totalled 1000m or 1500m with the program nearly completely made up of repeats of 100m, 200m, and 400m with 10-second and at most 30-second rests. In his book *Fifty Meter Jungle* (1970) Chavoor claimed up to 8000m in a session were covered nearly all in an interval manner. This was for distance swimmers and sprint swimmers alike. Chavoor’s training was, in his words, the “constant pressure method”. He told how Don Talbot observed his workouts in Sacramento and was *impressed*.

Late 1960s in Sydney

There were two top squads in Sydney and both had indoor training by the late 1960s, Talbot at Hurstville in the South and us at Pymble on the North Shore. It was evident that

Don Talbot was continually lifting the bar in the *quantity* and the *intensity* of training he demanded. His swimmers often came to early season Friday night meets barely able to lift their arms over the water and their early season performances were often abysmal. With a taper they usually swam well later on. We heard of an “incredible” 70 km per week by Talbot’s swimmers who were swimming further and harder than our team.

I was cautious, in retrospect perhaps overly cautious, of observed deleterious effects, sometimes *long-term*, on performance caused by over-training. For this reason I must admit to not having pushed some of our swimmers hard enough. It is very clear that some bodies are better able to withstand greater loads of cumulative training stresses. Some clearly have a greater capacity to respond with defensive resources, perhaps due in part to stress-combating hormones such as ACTH, (adreno cortico trophic hormone). It is clear now that there are some individuals who can be severely and continually stressed with training long after others show signs of breakdown.

At Ryde, our training philosophy incorporated the idea of starting fairly early to “bend the young twig”, continually encouraging the steady building of a high year-round mileage, and constantly repeating the mantra that “miles make champions”. We believed that swimming miles, not necessarily with excessive effort, not even fast enough to reach what we now call the aerobic threshold, would significantly increase both endurance and speed.

Speed through Endurance

I did not invent the concept or even the expression of “speed through endurance”, which I have been credited with. In 1947, the German sports scientist Ernst van Aaken had developed on the track the “endurance” method of training and Arthur Lidyard had outstanding success with New Zealand runners training with mostly “long slow miles” rather than with more intensive interval training.

Moras, Gould, and Turrell

Karen Moras was the first of Ryde Club’s very successful trio. Karen was followed by Shane Gould and Jenny Turrell. With them it was mainly regular aerobic, endurance training carried out with two-beat kicking. Two-beat kicking is another story.

All three pupils between 1969 and 1975 broke, and broke again world records at distances. For good measure Shane excelled down to the 100m sprint, eventually gaining all freestyle world records and the 200m IM world record as well. She won three Olympic gold medals at Munich.

In usually crowded lanes (often as many as 12 in a 25m lane at our indoor pool at Pymble), we placed emphasis on regular training for 11 or 12 sessions per week for most of the year, including 6 or 8 x 400m repeats at practically every session. We were taking advantage of the “window of opportunity” to enhance aerobic fitness with endurance training for young swimmers, when that is the capacity with which they are most endowed. We coaches seldom asked for and did not expect fast times in repeats but now and then when they felt like it during a session swimmers would ask to be timed with a dive. Such time trials were invariably fast.

Karen, who started off in Ursula's "tadpole" group when seven years old, by the age of 14 was swimming 1000 miles (1600 km) in the calendar year, Shane Gould reached 1500 miles (2400 km) and Jenny Turrell 2000 miles (3200 km). Karen, first on the Ryde scene, set the ball rolling with her world records at 800m and 400m when she defeated visitor Debbie Meyer in Sydney at 800m, in March 1970. Shane followed Karen Moras with a short but brilliant swimming career, and retired at 16 years of age. Jenny Turrell, hot on Shane's heels, in 1973 won the FINA world championship in Cali Columbia at 800m, incidentally from an East German and with a negative split. Jenny made a number of world records over the 800m and 1500m. It is noteworthy that as she progressed from first being awarded our Swim School's Tadpole certificate for being able to swim 200m that in 3 years and 8 months went on to become the world record holder for 1500m.

Shane and Jenny without too much pressure to swim fast in training, at times got up to 3.5 miles (5.5 km) a session, mostly with aerobic work. Each day the girls for their dryland training worked with the *Exergenie* upper body portable exerciser. We picked that up from Don Gambrill during a mid-1960s trip to Los Angeles, where we observed some workouts of his outstanding group. This upper body strengthening, "with elbows up", was usually carried out daily at home throughout most of the year.

Don Talbot

Don Talbot trained his swimmers harder than we pushed our Ryde swimmers. In fact, his training was harder than any other coach in Australia. From the late 1950s after developing multiple-world-record holders Ilsa and John Konrads, Don Talbot has, together with the American coach George Haines, proved himself on the world scene to be the most productive coach of Olympic medallists. I digress to recognise Don Talbot's unprecedented successes both in Canada and Australia. Many of his impressive successful swimmers have won Olympic Gold and World Championships, starting back at Rome (1960) with John Konrads. Not too much changed in the years before he retired as Head Coach of Australian Swimming after the 2000 Olympic Games and when Australia was firmly established as the world's number two swimming nation.

Talbot's philosophy was hard work as his Melbourne Olympics pupil Ruth Everuss has summed up in her description of his training; "*If the effort was not there it was repeated*". There are many Olympic swimmers, Australian and Canadian, who can affirm this as truth.

After the success of the 1972 Australian Olympic team at Munich, Talbot coached in Canada. His absence was immediately felt. At the 1976 Montreal Olympics as in other sports, Australia slumped badly. Steven Holland's bronze medal was our only swimming medal. As a result of this "failure", the Australian Institute of Sport was established and opened by the Government in Canberra during 1981. Its Director was Don Talbot. It had resident swimmers recruited from programs around Australia. It is beyond the scope of this paper to discuss the functioning of "institutionalised" swimming in Australia. The AIS has had some successes, the most notable being at Athens (2004) by Petria Thomas, a long term AIS swimmer who won the 100m butterfly race.

The 1970s marked the era of greatly increased training volume as Australians observed American coaches closely. Short-rest repeats were the norm in Australian training. They

are believed to have contributed to high levels of Australian distance performances, and at the end of the decade to world records by swimmers Tracey Wickham and Michelle Ford.

Jockums, Schubert, and Rose

Californian coaches, Dick Jockums, Mark Schubert, and Bill Rose were setting a torrid pace in their training of distance swimmers, in particular before the 1976 Olympic Games, which even today makes for breathtaking reading from the accounts of the highly competitive training sessions which were carried out. Tim Shaw, with Jockums and Steve Holland with Laurie Lawrence and then Bill Sweetenham in Australia, separated by the Pacific Ocean, were duelling for the 1500m world record as it quickly dropped towards 15 minutes, the record being passed from one to the other. The story is well told by Coach Chuck Warner in his book *Four Champions - One Gold Medal* (1999) and in an article by Coach Courtney Beyer (*ASCA Newsletter*, 2004, Issue 8).

It is a story of big training mileages and sustained, high effort in training, 12 and even 13 sessions weekly, sometimes as much as 90 km a week, heroic repeats 100 x 100 and even 10 x 1500m. To this add heavy resistance work in the gym. Coaches swapped near “impossible” repeat sets, which their pupils accepted as a challenge and tackled enthusiastically.

Australians Steve Holland and Tracey Wickham both had training stints in American programs. Our Australian coaches were impressed by what they saw and were guided by what was happening there in Mark Schubert’s “animal lane” at Mission Viejo.

Brian Goodell (Mission Viejo) and Bobby Hackett from New York, in an epic Olympic 1500m in 1976 beat Holland into third place - the USA, first and second!

What was happening at Mission Viejo, was to a large extent emulated in the training pools of coaches Bill Sweetenham and Laurie Lawrence in Australia, both pushing their pupils in like manner, very hard. Tracey Wickham in her small book, *Swimming to Win* (1984) sets out a Sweetenham, 8400m training session carried out shortly before her 1500m world record in 1979 in the, even to-day, very respectable time of 16:06.63. The session included varied distances and rests between interval sets swum at least at 1500m race pace, and two 1500m swims (one with legs tied) at much more than moderate effort. The program included 10 x 150m FS on 2 minutes, averaging 1:50.00 to 1:55.00 as a warm-up, 1500m timed swim, 1500m legs tied, 4 x 200m kicking on 4:15.00 averaging 3:50.00, 100m FS easy, 4 x 200m FS on 2:50.00 averaging 2:13.00, 10 x 100 FS on 1:25.00 averaging 1:06.00, 8 x 100m BF kick averaging 1:50.00, 400m FS easy.

Charles “Chuck” Riggs

Chuck Riggs in the late 1970s at Riverside, California also provided another model for Australian coaches. His 1978 training program produced Sippy Woodhead whose world record established in 1979 of 1:58.23 for the 200m still stands up as a world class swim some 25 years later.

Riggs summarised his program as being distance swimming at race pace quality. It was a “high quality” program. Nearly all items were required to be swum at race pace over various distances. With a minimum of 70 km per week on an aerobic fitness base, the program usually called for around 80 km swimming with many relatively short rest repeats. “A swimmer”, Riggs said “*had to hurt from the hard work because there is no other way to achieve his or her full potential*”. His swimmers pushed weights at maximum effort three times a week. Riggs recently told me he did not hesitate to prescribe easy swimming when there were signs of breakdown.

Riggs’ training describes well the preparation which in Australia from 1976 into the 1980s produced world record holders and Olympic champions such as Steve Holland, Tracey Wickham, Duncan Armstrong, butterflyer John Sieben and a number of other world class swimmers, particularly in distance events. Massive training distances and the expenditure of high training effort were constantly required. It was hard training with little compromise.

Although Australian successes may seem moderate, it should be borne in mind that with our country’s 20 million population is small compared to the USA. However, the opportunity to swim around an extensive coastline, enthusiasm for swimming recreationally, and high media exposure of the sport of swimming assists the cause of competitive swimming in Australia.

Some top Australian coaches and many swimmers since 1978 have been exposed to the theories of Dr. Bob Treffene who for a number of years was a staff physiologist at training camps and with Australian teams. Although there was nothing new in extending swimmers in training to reach near maximum heart rates, Treffene’s theories and practice centred around the control of training intensities by the monitoring of heart rate responses and later on also using lactate measures. His postulations have not gained universal acceptance by sports scientists many of whom deny that heart rate and lactates are useful tools for prescribing or analysing swimming training. A popular Australian training item encouraged by Treffene has been so-called “heart-rate” sets, swimming up to about 10 beats below maximum. Heart-rate monitoring devices became popular with Australian coaches.

Perkins, Hackett, and Thorpe

Kieren Perkins won the 1500m Olympic event in 1992 in world record time, and repeated again in Atlanta. He was followed by Gold medal winners in Sydney, Grant Hackett and Ian Thorpe. All are tall. Physiotherapists and other swimmers talk about their “extreme flexibility” the notable range of movement of their joints, particularly extension backwards at the shoulders. All three have high ankle flexibility.

Perkins developed slowly in a 20m teaching pool in Brisbane with Coach John Carew. He first competed best at backstroke as a not particularly outstanding age grouper. Grant Hackett, with Coach Denis Cotterill, was developed on the Gold Coast, Queensland. Ian Thorpe, coached until December 2002 by Doug Frost, was developed in Sydney. These three swimmers came under the influence of their coaches in their swimming schools from about the age of about seven. They all swam regularly and competed when young. All were outstanding age-group performers, particularly Hackett and Thorpe.

Kieren Perkins' Technique

Kieren Perkins came onto the world scene in 1990, then being the third ever to go under 15 minutes for the 1500m with 14:58.08. He remains, as I write, the second ever fastest man with his 14:41.66. Both his swimming style, which was a forerunner of techniques used by Hackett and Thorpe, and particularly Perkins' training under Coach John Carew showed a distinct departure from his predecessors. Perkins' technique, attributed to Coach Carew, was characterised by his being particularly horizontal in the water. Biomechanical analyses by Cappaert and Rushall (1994) showed him unsurpassed in maintaining this horizontal position. His streamlining was further helped by a 4 and 2-beat kick, being narrow enough to lie mainly within the shadow of his torso.

Perkins maintained a high elbow in his nearly direct push back by hand and forearm. The early high positioning of the push back on the water was helped by shoulder elevation made possible by his high range of movement in backward extension in his shoulder joints. This is also a characteristic of Hackett and Thorpe. Perkins' arms were more "opposite" in their action than "overtaking" and his shoulder rotation around the central axis facilitated the most effective use of large back and chest muscles in the propelling action of his hands and forearms.

The above description I believe also describes the techniques of Hackett and Thorpe. All three swimmers can be seen to swim with their heads well down, looking mainly to the bottom of the pool, particularly Perkins and Hackett. Thorpe carries his head slightly higher and uses a very effective "six beat" timing in his leg action. It can be argued that the "jury is still out" in assessing the relative values of the characteristically Australian and American freestyle techniques with a greater tendency for Americans to use a six-beat kicks, to use "overtaking catch up" arm timing, and to take hold of the water in the push back at a lower position relative to the water surface.

Perkins' Training

Now we come to the training of Perkins. The training of top distance swimmers has often involved sustained, near maximum effort, with swimmers reaching close to maximum heart rate during much of each session. Perkins was different. In 11 sessions weekly-- Coach Carew told me that his swimmer went as far as 88 km/week but a feature of Perkins' training was that he swam 5 of his 11 sessions at what can be described as easy pace, these sessions being designated as "aerobic" and "recovery". He did very little sprint training. During six mornings of the week there was a concentration on swimming repeats at race pace, not faster. With the focus placed on his 1500m events, 60 seconds for each 100m was very reasonably chosen to represent race pace.

Coach and swimmer counted heart rates, this procedure aimed at preventing excessive effort being expended. Carew told me that with Perkins, having a maximum heart rate of 180 bpm, in his so-called "heart-rate" sets which doubled as race pace practice he held the swimmer back to no more than 165 and preferred him to be around 160 bpm. The coach often had to tell Perkins to slow down. Race pace, seldom faster, was held in all those swims. His 100s were kept close to 60 seconds by adjusting the rest periods. No particular training items were undertaken aimed at "training a number of energy systems". Perkins was training the mix of energy systems required to swim at a pace of

around 60 second 100s (or a little better) as required in his 1500m races. John Carew told me: *“Training at race pace, very little faster, much of the time is of the greatest importance, just as adequate recovery swimming is essential”*. Some kickboard practice and legs-tied swimming was carried out by Perkins.

Carew said he never did believe in weight training for distance swimmers so Perkins’ dryland training consisted of Stretch cords – 5 x 30 minutes per week; Stretching 11 20-minute sessions; stationary bicycle 5 x 30 minutes per week. Some “core-strengthening” exercises of Kiphuth were also performed.

Although admittedly it is not good scientific practice to generalise conclusions on anecdotal evidence, my excuse is that swimming is still an inexact science. I am inclined to regard aspects of Perkins’ training as “straws in the wind”.

The Training of Current Champions

It is not for me to attempt to outline in any detail the training philosophies of the coaches of Australia’s current male and female champions. Clearly it is their prerogative to speak for themselves.

We know that both Grant Hackett and Ian Thorpe, like Perkins, are dedicated, very hard working swimmers, and are consistent in their training, covering high mileages usually in 10 sessions per week. Supplementary dryland training with weights, running, yoga, and boxing (by Thorpe) are carried out.

Coaches of these full-time, professional swimmers have reported up to 90 km/week. Published training schedules reveal what may be described to be “mixed bags” of distances in repeats with varied interval rests and paces. Various strokes and drills, kick sets, and fin use are added. The underlying theory driving the use of various paces in repeat efforts is that the functioning of all energy systems will be augmented. At various camps of Australian Swimming a system is adopted of swimming items maintaining various heart rates from 10 to 50 or so below maximum. Whole sessions do not as a rule, as seen in the Perkins’ model, appear to be devoted nearly completely to “aerobic, fairly easy, recovery swimming”.

Most Australian training cycles are divided into phases, commencing with an early concentration almost entirely on endurance/aerobic work. In the final “sharpening phases” faster quality repeats with longer rest intervals are swum and less total distance covered in these sessions. There is general agreement that 12 or 13 weeks are needed to complete the full cycle of preparation to be ready for making peak performances. Selection trials for major meets have generally been placed 12 or so weeks before major competition. I am not convinced that has worked.

Australia’s Female Sprinters

Coach Stephan Widmer has addressed you at this clinic regarding the training of one of our present very successful girl sprinters, Libby Lenton.

The coaches of our two recent female sprint world-record breakers, Widmer, and Sharon Rollason, the latter who until four years ago coached with conventional distance-swimmer-orientated programs, both have prepared their outstanding female sprinters in

what may be considered a fairly radical manner involving “reverse periodisation”, which is explained as having sprint swimmers in sprint training mode from the first workout of the training cycle. This training, not entirely new, can in a sense be regarded as the reverse of the traditional practice of periodisation of training, which places fast swimming mainly towards the middle and end of the training phases. However, there is more to Widmer’s and Rollason’s coaching and training than adopting the reversed periodisation principle. Bill Sweetenham, National Coach for Great Britain, has had many British coaches follow the general principle of reverse periodisation with interspersed aerobic recovery sessions.

Summary and Final Comments

Swimming training in Australia has developed early along a path parallel to England and then America, where, by today’s standards, only relatively small distances were swum in water preparation.

Systematic swimming training commenced in Australia in the 1940s and formed the basis for the preparation of competitive swimmers through the very successful Australian period of the 1950s into the 1960s. Professor Frank Cotton of the University of Sydney established himself as the Father of Sport Science in Australia.

In the mid-1940s there was a move in Australia to introduce what may be called a systematic applied science approach to training. For instance, the pool pace clock and log books were introduced. Light dryland exercises were widely used, training distances were increased, and there was a growing recognition of the Hans Selye concept that swimmers in training were using finite and expendable “adaptation energy”. Terms were introduced such as *basic swimming*, *efforts*, and *tapering* and used to describe items in the new training schedules.

The 1970s saw further increased training mileages, some Australian groups combining this with intense short rest interval training which helped produce Olympic Gold medal winners through the 1980s.

In Australia, in accord with much of the swimming world there has grown to be a wide use of dryland strengthening accompanied by the firm belief by many coaches and swimmers that strengthening with heavy weights enhances swimming performance. There is no good scientific evidence to support this belief in the value of heavy weight training (Rushall and Pyke, *Training for Sports and Fitness*, Macmillan, 1990).

Kieren Perkins, a distance swimmer did not touch weights and consistently covered high training mileages, which included regular whole sessions mainly of relatively slow “recovery” swimming. He closely adhered to a program that emphasised specific training at race pace with very little swimming faster than at that pace.

A growing belief in recent years by coaches in the effectiveness of “quality training” with long rest repeats, at the expense of aerobic training (repeats with short rest repeats) is claimed by some to be the cause of a falling off in the quality of Australian female distance swimmers. A common Australian training practice today provides for a “mixed-bag” of items offering variety (with alleged “minimising of swimmer boredom”), aimed theoretically at the training all of a number of energy systems.

Whilst recognising that a strong base of aerobic fitness is important in the preparation of all competitive swimmers, in some Australian programs, especially with sprinters, increased emphasis is being placed on the inclusion of periods of specific, sustained, race-pace, fast swimming.

And this brings us to just about where we are at today.

It seems to me to be pertinent to assess what progress has been made in recent years.

Progress?

With burgeoning knowledge in areas of sports science, with ever improving facilities, and now with full-time professional swimmers having more time to rest and recover between training sessions--and in recent years much else, including what we believe is knowledge of improvements in technique and training, we should expect to see marked improvements in top-level performances. Accordingly, it is reasonable to ask the question -- what is the extent of improvement by the world's top swimmers? Training and swimming science are supposed to have developed markedly, so what are the improvements that verify their value?

One way of assessing progress at is to look at the average times recorded by Olympic finalists (usually 8) in the 400m and 100m in men's and women's freestyle events. In freestyle there will be very little effect caused by rule changes.

Table 1 provides the average Olympic final times for men and women over 100 and 400 m Freestyle. It is self explanatory. It can hardly be claimed that there has been any marked improvements in average times of top Olympic performances over five Olympiads (since 1988).

Another way to assess progress is to look at the advance of the Olympic freestyle records. The 400m freestyle events for men and women have been chosen as examples (see Figure 1).

It can be seen by both these measures that progress clearly has flattened (stagnated) in the course of the last 4 or 5 Olympiads. Improvement has been non-existent or minimal at best.

Performances have not reflected theoretical improvements in training theory and practice content.

This is, well, sobering.

Advantage from the "fastsuits"?

Taking into account the various factors mentioned above that are claimed to have improved performance, we should be wondering what positive effect the "pseudo-scientifically" developed new racing swimsuit equipment has had, besides making expensive fashion statements and adding to the so-called glamour of the sport.

Have the various "fastsuits" really helped improve performance? There are some scientists whose researches say no.

The current situation of stagnation in top performance times should draw interesting explanations from the swimwear manufacturers, if as claimed, "advances" in swimsuit

technology have made a significant difference. It does not leave much room for other contributions from sport science and coaching.

Coaches should be looking beyond the promises of what new *equipment* might do for the swimmer, recognising that we may still be well short of possessing and using reliable, scientifically verified knowledge which will need to be widely applied to bring about significant improvement in the future. Of course, for freestyle, it may be possible that the laws of physics and hydrodynamics can explain why we may have come “just about as far as we can go”. However history tells us we can safely dismiss this possibility.

There should continue to be progress.

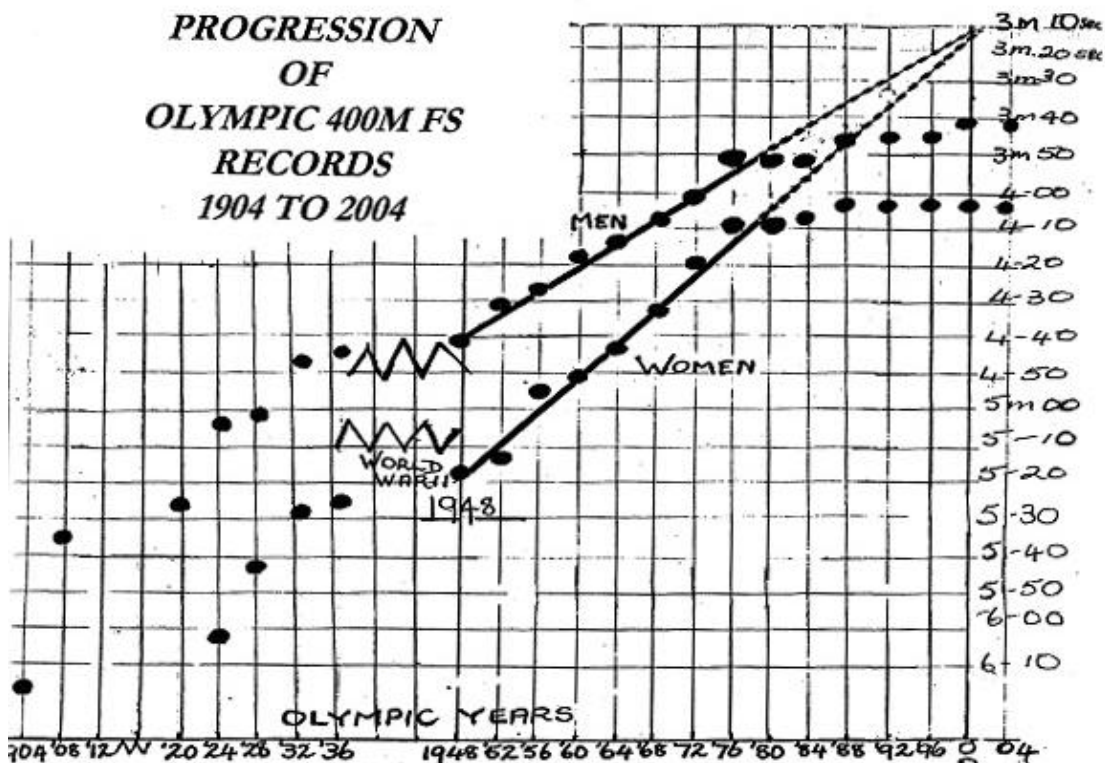
There must be a great deal more to learn and apply as coaches in Australia and throughout the swimming world to continue on the adventure of endeavouring to improve human swimming performance. At present, we do not seem to be doing that well.

It is to be hoped that future advances will not be dependent on drugs, genetic manipulation, or swimming equipment and gimmicks.

Table 1. Average Olympic Final Times for Men and Women over 100 and 400 m Freestyle.

<u>MEN</u>	<u>100m FS</u>	<u>WOMEN</u>	<u>MENS</u>	<u>400m FS</u>	<u>WOMENS</u>
57.1sec	1956	64.6 sec	4.34.1 sec	1956	5.10.3 sec
56.0	1960	63.5	4.23.5	1960	4.57.8
54.3	1964	61.5	4.14.4	1964	4.48.9
53.6	1968 altitude	60.8	4.16.0	1968 altitude	4.41.2
52.2	1972	59.5	4.03.6	1972	4.24.7
51.43	1976	56.73	3.57.05	1976	4.15.06
51.45	1980 Boycott	56.78	3.55.17	1980 Boycott	4.13.22
50.45	1984 Boycott	56.66	3.53.47	1984 Boycott	4.12.98
49.79	1988	55.78	3.48.66	1988	4.09.24
49.59	1992	55.47	3.47.83	1992	4.11.75
49.31	1996	55.37	3.50.57	1996	4.10.00
48.95	2000	54.75	3.46.21	2000	4.09.46
48.80	2004	54.12	3.45.92	2004	4.07.28

Figure 1. Progression of Olympic 400m Freestyle Records for Men and Women from 1904 to 2004.



Note: Extrapolating the line of what appears to be a linear progression for the 400m Olympic records for the past 100 years it would seem that by the year 2000 the women should have caught the men in a time of close to 3:10.00!. This did not happen and it probably never will. We must leave it to statisticians to explain this apparent anomaly.