CHAPTER 5

CAFFEINE: DOUBTS AND SCIENTIFIC EVIDENCE

Confusion in 1988

The Australian Team Briefing

5.1 Mr Watson's pentathlon manager, Mr R. Barrie, in a statement to the AOF advised: "I cannot remember his [Dr Sando's] exact words but I believe he may have said 20 cups of coffee in an hour.' (*Mr R. Barrie, Statement to the AOF Executive Board, Schedule 4.2 to AOC Submission No 48B,* p.3) Mr Barrie conceded, however, that his recollection may have been inaccurate, and that Dr Sando might not have mentioned any particular number of cups of coffee. He stated that Dr Sando had said that an athlete would have to drink a lot of coffee in a short period to exceed the allowable limit. (*Mr R. Barrie, Statement to the AOF Executive Board, Schedule 4.2 to AOC Submission No 48B,* p.3)

5.2 In evidence to the AOF Executive Board appeal hearing into Mr Watson's case on 11 May 1989, Dr Sando stated that he could not remember specifically the words he had used at this briefing to advise athletes. He could recall advising, however, that the usual social use of a few cups of coffee, pieces of chocolate or cans of coca-cola consumed by a normal individual would not lead to an excess of Caffeine:

> I deny having made such a statement, as it is not possible to quantify caffeine consumption in such a manner due to the differing caffeine concentrations per cup of coffee.
>
> It is possible to exceed the IOC prescribed [sic] caffeine limit by consumption of coffee. (*Dr B. Sando, Summary of Statement to the AOF Executive Board, Schedule 4.3 to AOC Submission No 48B,* p. 1)

Dr Sando stated at the AOF appeal hearing:

> No, I have never - never prior to the Games, been prepared to say what quantity was required, because I must confess I did not know. But I knew it was well in excess of what would be regarded as normal - normal social use of coffee. (*Dr B. Sando, AOF Appeal Hearing Transcript,* 11 May 1989, *Schedule 4.4 to AOC Submission No 48B*, p. 157)

Questioned about whether it was possible to exceed the IOC proscribed limit by consuming coffee containing Caffeine, Dr Sando replied:

> Yes, though I did think that to consume that amount of coffee, probably there would be vomiting, and effects that would prevent a person in a short space of time, consuming that volume of coffee. (*Dr B. Sando, AOF Appeal Hearing Transcript,* 11 May 1989, *Schedule 4.4 to AOC Submission No 48B*, p. 158)

When asked at the AOF appeal hearing "if you had been aware that an athlete was consuming that amount [between 10 and 14 cups of coffee during a day's competition], would you have warned them that that would have been an excessive amount in your opinion?" (*AOF Appeal Hearing Transcript,* pp. 158-159) Dr Sando responded:

> ... I guess I would not have, at that stage, thought it would produce an excess quantity of caffeine in the urine from the point of view of drug testing. (*Dr B. Sando, AOF Appeal Hearing Transcript,* 11 May 1989, *Schedule 4.4 to AOC Submission No 48B,* p. 159)

Statements from Seoul

5.3 In his Seoul statements not only did Dr Sando quantify the number of cups of coffee required to reach Mr Watson's level but he described the strength of the coffee. At that time he felt qualified to state that not only could Mr Watson not

have reached a level of 14.45 mcgs/ml by the consumption of coffee, but he described the alternative routes of ingestion and stated that tablets or suppositories would have been taken several times during the course of the day to register a reading of 14.45 mcgs/ml. Dr Sando stated at the AOF appeal hearing:

> ... I think I was asked [at Seoul] what it would require and in an effort to say that I knew it was a large amount, I think I indicated that it could be as many as 30 or 40 cups, would certainly achieve that. (*Dr B. Sando, AOF Appeal Hearing Transcript, 11 May 1989, Schedule 4.4 to AOC Submission No 48B*, p. 158)

5.4 Recent expert scientific evidence indicates that Dr Sando's public comments in Seoul about Mr Watson were incorrect. Dr Sando stated during a Channel Ten television interview in Seoul that for Mr Watson to have reached his level of 14.45 mcgs/ml he would probably have had to drink more than 30 or 40 cups of coffee. He (Dr Sando) considered it unlikely that anyone could consume that amount of Caffeine by drinking coffee because of the likelihood of their becoming physically ill before that amount of Caffeine could be ingested. Dr Sando, went on to say that:

> ... one could only assume that to have that high level of Caffeine, the thing that would have been done is to have had Caffeine in another form and probably not just once during the day but at various times during the day when you realise that it was probably about a 12 hour day that that person had to compete over.

Mr Watson's Understanding

5.5 Of relevance to the Caffeine levels registered by Mr Watson is his understanding of safe levels of coffee consumption. He told the AOF appeal hearing that prior to the Los Angeles Olympic Games, when the limit of 15 mcgs/ml applied:

> ... the general understanding amongst all pentathletes is that an unlimited amount of coffee can be consumed without putting yourself at risk. (*Mr A. Watson, AOF Appeal Hearing Transcript,* 11 May 1989, *Schedule 4.4 to AOC Submission No 48B*, p. 18)

When asked if he thought he might be "... pushing the risk a bit high?", by consuming so much coffee, Mr Watson responded:

> No, it never crossed my mind, because it is the general understanding - there's - I can give you two examples, the Swedish manager, Bent Lager, who is a very experienced competitor, and now manager, he's told his athletes that they can drink, " sixty cups of coffee and not be at risk, and that's just a figure to indicate that it's unlimited. When I was giving my appeal in Monte Contini, I spoke to Carlo Massulo who is in his final year of passing medicine who was a bronze medallist from LA in pentathlon, and his understanding is also that you can drink an unlimited amount of coffee and not be at risk.
>
> ...
>
> ... my manager, Bob Barry [sic] has been to two Olympics as a competitor and another one as a manager. Steven [sic] Paul, my coach, has fenced in two Olympics for Great Britain. All of us, it never even crossed out [sic] mind that I would be being put at risk by drinking the coffee I did. (*Mr A. Watson, AOF Appeal Hearing Transcript,* 11 May 1989, *Schedule 4.4 to AOC Submission No 48B*, pp. 40-41)

5.6 A statement by Mr W. Ronald, Section Manager of the Fencing Team in Seoul, while casting no light on the briefing, does give some indication of the Fencing Team's understanding as to the quantities of caffeine they would have to consume to reach the proscribed limit:

> In August, 1988 I attended the Australian Olympic Federation Team General Assembly which was held at Canberra for the Australian Olympic Team attending Seoul. I believe this occurred on the weekend of 26 to 28 August. During that weekend there were numerous presentations including presentations by sports

psychologists but I am unable to specifically recall any briefing on drugs.

However I do recall that a similar briefing was held at the Sheraton Hotel in Melbourne and I believe this to have been prior to the Los Angeles Olympics. This briefing was held by the Australian Olympic Federation. I recall that either Brian Sando or Ken Fitch the Medical Representatives for the Australian Olympic Federation addressed us on the subject of caffeine. As a result of that address I came away with a clear understanding that the Olympic caffeine limit could not be reached by normal injestion [sic] of caffeine. Indeed my impression was that they were suggesting that to exceed the limit one would have to take caffeine in some form of tablets, suppository or drops. I recall that the talk was on having to drink "pots of coffee and several litres of coca cola" over a very short period of time.

On the basis of that information provided to me as the Team Manager in the sport of fencing that sport has approached the use of caffeine on that basis. Indeed we have passed that information on to our fencing athletes and have spoken to them of the sorts of quantities of caffeine they would have to consume to reach the limit. (*Mr W. Ronald, Statement to the AOF Executive Board, Schedule 4.2 to AOC Submission No 48B*, pp. 1-2)

Accepted Views in Pentathlon in 1988

5.7 In a letter of 4 December 1988 from the Danish Modern Pentathlon Association to the UIPMB amongst others, the Association stated that "The Danish Modern Pentathlon Association would like to underline that the UIPMB has published that an athlete would have to consume 30 to 40 cups of coffee to achieve the limit of 12 milligrams of Caffeine per litre of urine". This view appears to have been widely accepted. Mr M. Kellam, counsel for Mr Watson at the AOF Executive Board hearing, tabled a statement from Mr R. Phelps, an English competitor in the Modern Pentathlon, in which he expressed the view:

... that the amount of caffeine required to be ingested to exceed the IOC limit is far less than athletes have been

> advised. Pentathletes and indeed British athletes I know believe that something in the order of 40 cups of coffee (an undrinkable amount), or in other words pills or suppositories containing super concentrations of caffeine have to be taken to exceed the IOC limit.
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> This belief filters through our managers, coaches and competitors. Along with other team members I drank coffee and coke on the day of the fencing in Seoul.(*Mr R. Phelps, Statement to the AOF Executive Board, Schedule 4.2 to AOC Submission No 48B*, p. 2)

5.8 Those members of the Australian Olympic Pentathlon team who provided evidence at the AOF appeal hearing all stated a belief that a much greater consumption than 12-14 cups of coffee would have been necessary to reach the proscribed limit. As Dr Sando stated, he would not have advised Mr Watson that a consumption of some 10 to 14 cups of coffee would produce a positive dope test had he known that that was Mr Watson's consumption.

5.9 We are convinced, on the basis of the written and oral evidence, that a great deal of misunderstanding and confusion existed in the minds of the AOF team officials and doctors at Seoul as to the probable safe limit of coffee consumption for competing athletes. The level of advice and instructions given to the athletes reflected this uncertainty. Undoubtedly, the generalised and vague nature of the information provided to the athletes was capable of misleading them.

5.10 Dr A. Reynolds, Acting Deputy Director (Treatment) of the Alcohol and Drug Dependence Services of the Queensland Department of Health stated:

> I have concerns that the senior medical director of the Australian Olympic Team, Dr Brian Sando, stated on several occasions on television that Alex Watson would need to have consumed 35 to 40 cups of coffee in order to achieve a urinary caffeine level of 14.25 micrograms per ml, as detected in the tests performed on Alex. The data provided by the Royal Brisbane Hospital experiment indicates that this may be quite incorrect. In addition, Dr Sando stated that in Australia one could not obtain

> caffeine containing medications from a chemist without a doctor's prescription. Of course this is also incorrect since it has been possible for quite some years to obtain NO DOZ (each tablet of which contains 100mg of caffeine), over the counter from a pharmacist without a prescription. I do not wish to be overly critical of Dr Sando; he must be regarded as highly competent in order to have been selected as one of the Australian team doctors. However, given the high relevance and significance of the impact in drugs in sport, I would hope and expect that all Olympic team doctors from all countries would have a thorough knowledge of the impact of drugs on human performance and in particular, the toxicology and physiological responses in relation to the drugs which are banned and the drugs for which limitations are set. (*Dr A. Reynolds, Letter to the Committee, 4 November 1988, Schedule 4.2 to AOC Submission No 48B*, p. 3)

5.11 To the extent that it is relevant, Mr Watson's consumption of Caffeine on the day of his test can reasonably be described as well above 'normal daily consumption'. Having said that, we are mindful of the definitional difficulty in describing normal consumption. We regard approximately six cups of coffee as a normal daily intake which, in Dr Miners view, is 'the average for normal Caffeine consumed in the general population'. According to Mr Watson, his normal daily consumption is 4 or 5 cups of coffee a day. (*Evidence*, p. 13; *Mr A. Watson, Submission to the AOF Executive Board, Schedule 4.2 to AOC Submission No 48B*, p. 7)

5.12 Mr Watson complained that the level of caffeine concentration set by the IOC was changes prior to Seoul: since it had been 15 mcgs/ml at the Los Angeles Olympics in 1984, had he been tested then he would have been under the limit.

5.13 Senator Crichton-Browne wrote on several occasions to Juan Antonio Samaranch, President of the International Olympic Committee, Prince Alexandre de Merode, Chairman, International Olympic Committee Medical Commission and Professor Manfred Donike, Chairman of the Doping and Biochemistry Subcommittee of the IOC Medical Commission requesting advice of the

scientific evidence and grounds upon which the IOC reduced the proscribed limit from 15 mcgs/ml to 12 mcgs/ml. Each of these gentlemen declined to respond to the numerous requests notwithstanding subsequent urgent facsimiles.

5.14 Dr Fitch, a member of the IOC Medical Commission responded to a simular request by advising that the reduction of the proscribed level of caffeine was a decision of the IOC Medical Commission on the recommendation of its Doping Sub-Commission and as he is not a member of this Sub-Commission he does not receive minutes of the meetings. He suggested Senator Crichton-Browne write to Professor Donike. Simular requests by the Australian Sports Drug Agency's Chairman (Professor P. Baume) and its Chief Executive (Mr S. Haynes) to Professor Donike on 11 July 1991 and 27 March 1992 respectively failed to elicit a response.

5.15 Given the lack of co-operation by the various senior members of the IOC and their failure to respond to requests for information we are unable to further advance this matter other than to say we have no knowledge of any scientific grounds which influenced the IOC's decision to reduce the allowable level from 12 mcgs/ml to 15 mcgs/ml.

Recent Scientific Studies

5.16 Although scientific knowledge regarding the secretion of Caffeine has emerged slowly, real advances in understanding this complex subject are beginning to occur. Several scientists have conducted studies and identified their relevance to Caffeine use by athletes.

Article by Professor D. Birkett and Dr J. Miners

5.17 Professor D. Birkett is Head of the Department of Clinical Pharmacology at Flinders University. His evidence before the Committee and his published articles make two facts clear:

(i) The IOC proscribed level of 12 mcgs/ml of Caffeine can be reached by the consumption of a moderate daily intake of coffee; and

(ii) The urine Caffeine concentration levels of individuals who have consumed identical quantities of Caffeine can vary as much as twentyfold.

5.18 In regard to point (i), a recent study by Professor Birkett and Dr Miners examined the relationships between plasma and urine concentrations and clearances of Caffeine over successive dosages. For the study, successive dosage intervals at steady-state were investigated in six healthy volunteers who were administered Caffeine, at the rate of 150 mg eight hourly for six days. The study found that the intra- and inter-individual variability in urine Caffeine concentrations were similar to those for plasma, the overall range of urine Caffeine concentrations being 0.7 mg per litre to 11.1 mg per litre (15.9-fold). (*Prof D. Birkett and Dr J. Miners, Caffeine Renal Clearance and Urine Caffeine Concentrations During Steady State Dosing: Implications for Monitoring Caffeine Intake During Sports Events, Journal of Clinical Pharmacology (31), 1991, pp. 405,407*)

5.19 The relevance of this finding is that an individual consuming 450 mg of Caffeine per day or 150 mg eight hourly for six days may record a reading of slightly less than the allowable IOC limit. 150 mg is approximately two cups of coffee. As Professor Birkett stated in his evidence:

> So a reading of 11 is very close to the legal limit and this person had what would be three to four cups of strong coffee per day for four or five days. (*Evidence,* p. 230)

5.20 Further, in regard to point (ii), the Birkett - Miners study found wide variations in Caffeine readings between individuals. In Professor Birkett's view:

> These compounds are really not well eliminated in the urine by the body and with caffeine about 98 to 99 per

> cent of the elimination from the body is by being broken down in the liver to other substances which are then excreted. So the urinary excretion pathway is only about one per cent to two per cent of the total elimination from the body.
> It turns out therefore that the concentration in the urine, when you are drinking coffee on a regular basis, is determined by an individual's ability to metabolise the drug in the liver because that determines the concentration in the blood. The group of enzymes that does this in humans characteristically varies up to about twentyfold in its activity between individuals. So, in thinking about setting limits, you have got to bear in mind a background variability of something like twentyfold at least in the population. That is a healthy population. Therein lies the difficulty, basically, that the urinary caffeine concentration is determined in the end by the rate at which the liver metabolises the drug, and that can vary about twentyfold between individuals. When we are treating patients, we bear these factors in mind, but a difference of two in the dose for an individual may not make a big difference, so we try to find doses that suit a majority of the population. When you are looking at a situation where the consequences of an individual exceeding the limit are very severe consequences, you really have to think in terms of individuals rather than populations of people. Therein lies the difficulty of legislating in this sort of area. (*Evidence,* p. 206)

5.21 Professor Birkett went on to say when discussing other factors that are capable of influencing urine caffeine levels:

> So there is a range of genetic and environmental factors - diet, smoking, what you eat and drink and other drugs that can interact that will change the activity of these enzymes and then change the rate at which an individual can metabolise Caffeine. (*Evidence,* pp. 221-222)

In response to a question from the Deputy Chairman of the Committee, Senator N. Crichton-Browne, Professor Birkett stated:

Senator Crichton-Browne - Are you saying that another athlete standing next to Alex Watson who had taken exactly the same amount of coffee could have won the bronze medal?

Professor Birkett - An athlete who had taken exactly the same amount of coffee could have had a level of one or two at the extreme, but certainly below 12. So it is what I referred to at the beginning. It is all right looking at populations but where you have individuals who are going to be banned for life from something if they transgress a particular limit, then you have really got to allow for the extremes in the population, not just the one or two standard deviations around the average. So that normally in a population that went like that, you might cut off there and leave 10 per cent of the population at the extremes. (*Evidence*, p. 223)

5.22 Professor Birkett provided extensive advice to the Committee during the public hearing on 5 December 1991. In summary, he claimed that:

- Caffeine is not well eliminated in the urine; the urinary excretion pathway is only about one per cent to two per cent of the total elimination from the body. (*Evidence*, p.206)
- The urinary caffeine concentration is determined by the rate at which the liver metabolises the drug, and that can vary twentyfold between individuals. (*Evidence*, p. 206)
- Caffeine does not turn on its own metabolism. It can be turned on, however, by cigarette smoking and barbequed steak, for example. (*Evidence*, pp. 219, 220)
- Dehydration does not affect the concentration of Caffeine in the urine. (*Evidence*, p. 207)
- On average, measuring Caffeine concentration in urine is quite a good measure of blood concentration. (*Evidence*, p. 208)
- Caffeine is a stimulant which can enhance performance in endurance events like cycling. (*Evidence*, p. 217)

- An athlete consuming the same amount of Caffeine as Mr Watson did at Seoul could have reached a level of one or two mcgs/ml, but certainly below 12. (*Evidence*, p. 223)
- A conventional social drinker of coffee consuming two or three cups of coffee a day could be disqualified from an Olympic Games. (*Evidence*, p. 230)
- Urine concentrations of about five cups of coffee a day range from less than one up to just on twelve micrograms of Caffeine per millilitre. (*Evidence*, p. 211)
- Caffeine is extremely well absorbed into the body so virtually 100 per cent will get into the bloodstream. (*Evidence*, p. 211)
- The average half-time to eliminate Caffeine from the body is about three to four hours. (*Evidence*, p. 212)
- Lean body weight is capable of influencing Caffeine urine concentration level readings. (*Evidence*, p. 216)
- A number of drugs such as cimetidine and erythromycin will block the enzymes in the liver that metabolise Caffeine. (*Evidence*, p. 220)
- A range of dietary factors will have the same effect. (*Evidence*, p. 221)

Caffeine Levels

5.23 In his evidence to the AOF on 11 May 1989 Mr Watson stated that he drank two cups of brewed coffee for breakfast and twelve to fourteen cups of brewed coffee and two cans of Coca-Cola (during competition) on the day on which he was tested at Seoul, 19 September 1988. Professor Birkett, who was present at the simulated test in Sydney on 29 October 1988, has claimed that:

- it is possible to reach 12 mcgs/ml (the IOC limit) in urine with a Caffeine intake of between five and ten cups of coffee over the course of a day;
- to reach 12 mcgs/ml it is not necessary to resort to Caffeine in tablet or suppository forms;

- the method of testing the concentration of Caffeine *in urine*, is 'scientifically unsound';
- Mr Watson's simulated test indicates that it is possible to reach the proscribed level of Caffeine by drinking the amount of coffee and Coca-Cola that he claimed to have consumed at Seoul; and
- the IOC Caffeine level rule is unfair because of variations in the way individuals secrete Caffeine from the liver, and because of the existing doubts about the ways in which individuals can reach the proscribed level.

5.24 The Birkett-Miners study found that:

- there was a marked inter-individual variation in the urine concentrations of Caffeine among individuals who had consumed identical amounts of that drug under controlled conditions; and
- a regulatory urine Caffeine concentration limit of 12 mcgs/ml may be exceeded by some individuals with coffee intake in the range of 3 to 6 cups per day.

Professor Birkett and Dr Miners concluded:

> In summary, the urine caffeine concentration is a measure of the unbound concentration of caffeine in plasma over a wide range of urine flow rates. For a given steady state caffeine intake, there is marked intra- and inter-individual variability in both urine and plasma caffeine concentrations, and the current regulatory limit for urine caffeine concentration in international sporting events is likely to place some individuals at risk after only modest coffee intake. The limit needs to be revised, or athletes advised to limit their intake to the order of

two to three cups of coffee per day or the equivalent in terms of caffeine intake. (*Prof D. Birkett and Dr J. Miners, Caffeine Renal Clearance and Urine Caffeine Concentrations During Steady State Dosing: Implications for Monitoring Caffeine Intake During Sports Events, Journal of Clinical Pharmacology,* (31), 1991, pp. 407-408)

5.25 In commenting upon Professor Birkett's study, Professor Richard Day, Professor of Clinical Pharmacology at St Vincent's Hospital Sydney wrote:

> I am familiar with the work of Professor Donald J. Birkett on Caffeine and have reviewed his paper entitled 'Caffeine renal clearance and urine caffeine concentrations during steady state dosing. Implications for monitoring caffeine intake during sports events'. Professor Birkett is considered a leading world figure in research into caffeine metabolism and he has contributed much to knowledge of the routes and mechanisms of caffeine elimination. I have reviewed his current work which is in a prestigious international journal. This paper would be reviewed independently by three individuals. This in itself is a measure of quality of the scientific work. The key points of the work are:
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> 1. Substantial intersubject variability in urine caffeine concentrations of the order of 15 fold.
>
> 2. The regulatory limit of 12 mg/l in urine could be exceeded by normal individuals taking 3-6 cups of coffee in a day.
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> This is a clear and well performed piece of work which supports the authors' conclusion that the regulatory level for urinary caffeine concentrations may be too low. (*Letter to Senator Crichton-Browne, 23 April 1992, see Appendix 5*)

Dr K. Donald

5.26 The conclusion of the Birkett - Miners study is consistent with an opinion by Dr K. Donald, Chairman of the 1982 Commonwealth Games Dope

Testing Laboratory, a member of the Doping Commission for the 1982 Commonwealth Games and author of *The Doping Game* (1983). In a statement to the AOF Executive Board Dr Donald wrote:

> It is my opinion that there is a real possibility that a 14.5 milligram per litre caffeine reading may be the result of Alex Watson consuming approximately 14 cups of coffee and a couple of cans of Coke without consuming caffeine tablets or using suppositories.
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> My opinion is based on experience and in particular laboratory research (of which I was a Chairman) conducted at the Royal Brisbane Hospital in Queensland.
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> The laboratory research was conducted in the lead up to the 1982 Commonwealth Games. The 1982 Games was the first sporting event in which a quantitative level for caffeine had been set, and I was very worried about that, which was why in fact this research (never published) was conducted. To my knowledge there was no other research in regard [to] this matter.
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> ...
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> The research conducted by the laboratory consisted of a group of 20 people who were given 500 milligrams of caffeine, which is the equivalent of somewhere between five and 10 cups of coffee, depending upon the sort of coffee you drink.
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> A single dose was given to each person and analysed thereafter for eight hours. Between a period of one hour and six hours following that ingestion, there were always members of the group above 12 milligrams/litre; in the first two hours a number of the group went as high as 10 milligrams/litre. The average over the two hours was 11, and members of the group of 20 went as high as 18.
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> ...
>
> It is my opinion that there is a real possibility that a 14.5 milligram [sic] per litre caffeine reading may be the result of Alex Watson consuming approximately 14 cups

of coffee and a couple of cans of Coke without consuming caffeine tablets or using suppositories. (*Dr K. Donald, Statement to the AOF Executive Board, Schedule 4.2 to AOC Submission No 48B*, pp. 2-4)

Professor A. Beckett

5.27 Emeritus Professor A. Beckett a member of the IOC Medical Commission and Founding Director of the Drug Control and Teaching Centre, King's College, London University, advised Senator Crichton-Browne that he did not question the validity or integrity of Professor Birkett's study and that speaking as an individual he had considerable concern with proscribed quantitative levels because there would always be "outliers", though he stressed that according to many reports they are likely to be rare. (*Prof. A. Beckett, Letter to Senator N. Crichton-Browne*, 10 April 1992) Professor Beckett also stated that had Mr Watson been able to prove at the IOC hearing that he had reached urine caffeine concentration levels of 14.25 and 14.45 mcgs/ml by the consumption of the coffee which he claimed to have consumed, then the IOC Medical Commission may well have considered a lesser penalty than banning him from the Games. Professor Beckett acknowledged that the IOC Medical Commission did not provide a formal appeals mechanism. He emphasised that he was speaking as an individual and not on behalf of the IOC Medical Commission.

Conclusion on the Scientific Evidence

5.28 We are satisfied that scientific evidence provided to both the Senate Committee and the AOF Executive Board hearing by Professor Birkett, Dr Donald and Dr Maslen compels the view that the proscribed IOC level of caffeine can be reached by a moderate consumption of coffee. We are also satisfied that it demonstrates a very wide disparity in urine caffeine concentration levels amongst individuals who have consumed identical amounts. Neither the Senate Committee nor the AOF Executive Board has been presented with contrary scientific evidence.

5.29 Despite variations in metabolisms, the limit set must be taken to indicate the point at which concentration of Caffeine in the human body acts as a stimulant providing an advantage over other competitors. Since the consumption of equal amounts of Caffeine is known to reveal different readings in different individuals, it could be argued that there is an inherent difficulty in creating a specific limit to disqualify competitors unless that limit is a high one. It remains to be demonstrated whether the IOC Caffeine limit is set high enough. The dilemma is that:

- the Caffeine limit needs to be set high so as not to disqualify athletes who have consumed only a moderate amount of coffee; and
- the Caffeine limit needs to be set low enough to prevent athletes achieving an ergogenic benefit from Caffeine.

5.30 With regard to this second point, a recent journal article by T. Graham and L. Spriet reports on a study which found that Caffeine can have an ergogenic effect at urine concentrations below the IOC limit at 12 mcgs/ml. Dr A. Pipe's abstract of the article outlined a study performed on seven elite runners who participated in four randomised double-blind trials using placebo or Caffeine. The Caffeine effect was associated with large increases in adrenalin and moderate increases in plasma-free fatty acids and glycerol. The article abstract stated:

> These data suggest that fat metabolism was increased and this could spare muscle glycogen. However it is also quite possible that caffeine was influencing the central nervous system.

Despite being below the IOC Caffeine limit, the subjects were found to have dramatic increases in exercise endurance performance after Caffeine ingestion. Every subject exercised longer during both the running and cycling trials. The journal article concluded:

> In summary, this study demonstrated that consuming 9 mg/kg of caffeine produced a powerful ergogenic effect during running and cycling to exhaustion in trained competitive runners ... This study also demonstrated that ingestion of caffeine in amounts that produce acceptable urinary caffeine levels (as indicated by the IOC) was associated with dramatic ergogenic effects. (*T. Graham and L. Spriet, Performance and Metabolic Responses to a High Caffeine Dose During Prolonged Exercise, Journal of Applied Physiology,* (71), December 1991, p. 2298)

The abstract of the article concluded:

> While our data clearly show the ergogenic aspect of caffeine, people should be aware that it is a drug with numerous side effects (irritability, sinus tachycardia, hypertension, gastric distress, peptic ulceration, cardiac arrhythmias) which could be detrimental to performance and/or hazardous to one's health.

The abstract ended with the recommendation that the IOC should **lower** the allowable level of Caffeine.

5.31 If the IOC Caffeine limit is to be lowered to prevent ergogenic benefits, it would be unwise to lower it to a level where moderate coffee drinking could entail breaches of the IOC drug code. The option that avoids that problem and prevents athletes from gaining an ergogenic benefit from Caffeine is to ban Caffeine altogether. Importantly, because recent scientific evidence about Caffeine suggests this conclusion, Recommendation 1 of the Committee Report is quite misguided in recommending that Caffeine be removed from the IOC list of proscribed drugs. Caffeine has a half-life of eight hours and therefore athletes who abstain from its use for twenty-four hours or so will ensure that a doping practice has not been committed.

5.32 The dilemma in setting quantitative proscribed levels for banned substances is that not only must by necessity the levels set be arbitrary but that the levels may be breached by different individuals ingesting different levels of the same

substance. Different individuals taking identical amounts may provide different readings. That different ergogenic benefits may be obtained by different individuals taking identical amounts of substance compounds the problem.

5.33 Caffeine and alcohol are the only two banned substances so measured although certain other banned substances now fall within 'the inadvertency category' to a certain level.

5.34 Testosterone doping is assessed by measuring the ratio of testosterone to epitestosterone. However, given that the set ratio of 6.1 is capable of being breached by an individual's natural physiology, in order to assist in this evaluation the IOC accredited laboratories shall report every case to the proper authorities according to the following criteria:

A. Negative if the ratio is less than 6 or
B. T/E greater than 6 and not greater than 10 or
C. T/E greater than 10.

5.35 In the case of B the Medical Commission recommends that further tests shall be conducted before considering the result as positive or negative. Such investigations may include:

- A review of previous tests.
- Endocrinological investigations.
- Unannounced testing over several months.

5.36 Given that athletes who cheat by taking testosterone may seek to disguise this by also taking epitestosterone to maintain a ratio of less than 6.1, if the epitestosterone concentration is greater than 150 ng/ml, the laboratories are required to notify the appropriate authorities. The IOC Medical Commission recommends that further investigations be performed.

5.37 No such precautions are taken with urine/caffeine concentration levels notwithstanding that natural physiological variations are capable of giving significantly different readings between individuals.

5.38 The distinction to be observed is that naturally occurring high levels of testosterone do not provide an unnatural ergogenic effect.

5.39 At the time of the Seoul Olympics, while inadvertency was accepted as grounds for the IOC Medical Commission deciding not to have a hearing into a 'positive dope test' or for imposing no penalty following a hearing the IOC Olympic Charter contained no such formal provision.

5.40 Inadvertency has been considered in a number of senses. Athletes may inadvertently consume a banned substance without knowing they have done so as in the case of pseudoephedrine which is contained in a number of medications. An athlete may knowingly take a substance in medication form not knowing it is on the banned list. Alternatively caffeine or alcohol may be taken deliberately and an athlete may inadvertently breach the proscribed limit as in Mr Watson's case. At the Seoul Olympics the IOC Medical Commission entertained and accepted the first two grounds while declining to consider the third.

5.41 The effect of that course of action was that some athletes who tested positive for banned substances for which there was no allowable level were not called before the IOC Medical Commission and received no penalty. One athlete (Mr Watson) who tested positive for a banned substance for which there was a proscribed level was brought before a hearing of the IOC Medical Commission found to have tested positive to a dope test and banned from further participation in the games.

5.42 No doubt the IOC considered such matters as the purpose of the ingestion, the athlete's knowledge that he had taken a banned substance, the detected level of the substance and its ergogenic benefit to the athlete.

5.43 Contrary to the strongly expressed views of the signatories to the minority report, the Chairman of the Committee declined to take expert scientific evidence on the question of caffeine-induced ergogenic benefit and we are thus unable to intelligently comment and report on this central issue.

5.44 Clearly in Mr Watson's case the IOC did not accept his explanation for the level of his urine caffeine concentration.

5.45 While the IOC were entitled under their rules to have found Mr Watson had tested positive for a dope test and impose the sanction they did, clearly they judged him to have deliberately cheated.

General Findings and Conclusions

5.46 There are a number of conclusions which can be reasonably drawn from events relating to Mr Watson's experience in Seoul.

1. Mr Watson breached the allowable IOC urine caffeine concentration levels.

2. The IOC Medical Commission was of the belief that Mr Watson did not obtain his urine caffeine concentration levels in the manner he claimed.

3. There is no evidence that Mr Watson reached these levels other than by the manner he claims.

4. Scientific evidence demonstrates that a urine caffeine concentration level of 12 mcgs/ml can be obtained by the normal consumption of coffee.

5. Scientific evidence demonstrates that Mr Watson could have obtained his urine caffeine concentration level of 14.45 mcgs/ml by the consumption of coffee.

6. Scientific evidence indicates Mr Watson could have reached his urine caffeine concentration level of 14.45 by consuming the amount of caffeine he claimed.

7. Mr Watson consumed coffee on the day of his fencing bouts to keep alert and to prevent dehydration.

8. The consumption of caffeine would have not added directly to his fencing skills.

9. The consumption of caffeine was capable of extending his endurance during the fencing bouts.

10. Scientific evidence indicates that Mr Watson may have obtained an ergogenic effect from his caffeine consumption.

11. The IOC medical commission could have recommended a lesser penalty than that imposed on Mr Watson.

5.47 Whether Mr Watson reached his urine caffeine levels by the consumption of the quantity of caffeine he stated or by the ingestion of caffeine tablets or suppositories is only within his knowledge. Scientific evidence provided to both the Senate Committee and the AOF appeal hearing by Professor Birkett, Dr Donald and Dr Maslen leads us to conclude that the proscribed IOC level of caffeine can be reached by the moderate consumption of coffee. We are also satisfied that it demonstrates a very wide disparity in urine caffeine concentration levels amongst individuals who have consumed identical amounts. Neither the Senate Committee nor the AOF Executive Board has been presented with contrary scientific evidence. The study by T. Graham and L. Spriet referred to earlier (which Dr Fitch provided to the Committee) supports Professor Birkett's conclusions:

> RESULTS
>
> ...
>
> Urinary caffeine concentrations after running and cycling were 8.7 ± 1.2 and 10.0 ± 0.8 mg/ml, respectively. These mean values were below the IOC limit if 12 mg/ml. However, running and cycling values for one subject were 12.0 and 12.4 mg/ml, respectively. A second subject had 12.1 mg/ml after cycling, and a third had 11.7 mg/ml after cycling. The time between ingestion of caffeine and donation of the urine sample was 2 h 21 min in the running trial and 2 h 9 min in the cycling trial. The subjects having the highest urinary concentrations had

the longest performance times and therefore the longest times between ingestion and donation. (*T. Graham and L. Spriet, Performance and Metabolic Responses to a High Caffeine Dose During Prolonged Exercise, Journal of Applied Physiology, (71), December 1991,* pp. 2293-2294)

Recommendations

5.48 Given the lack of conclusive scientific evidence and knowledge about Caffeine blood and urine levels reached by drinking coffee, the individual variations in Caffeine readings, even with uniform consumption by athletes and the reliability of urine analysis to determine levels of ingestion, we support the initiative of the Australian Sports Drug Agency (ASDA) in commissioning research into these and related matters. It is our understanding that the ASDA will be reporting on its findings during the first half of this year, and it is recommended:

. That the details of this research and the subsequent findings be made available to the Australian Olympic Committee (AOC) and the International Olympic Committee (IOC) Medical Commission.

5.49 In view of the events leading to Mr Watson's disqualification at Seoul, we recommend:

. That the AOC provide a thoroughly detailed and comprehensive drug briefing for Australian Olympic athletes both at the time of selection and immediately prior to departure for future Olympic Games.

5.50 In order to ensure that Australian Olympic athletes may appeal against any drug bans it is recommended:

. That the Australian Olympic Committee appoint an independent Sports Drug Tribunal to hear disputed cases of positive drug tests and to facilitate any appeals to international authorities.

5.51 While it may have been of limited assistance in Mr Watson's case, the Australian Institute of Sport (AIS) could assist athletes testing drug positive in the future. For this reason we recommend:

. That the AIS rule prohibiting access by (drug) banned athletes be amended to permit assistance to such athletes who may require AIS facilities in order to appeal against positive drug tests.

5.52 The Committee has noted that an advocate was not available to assist Mr Watson before the IOC at Seoul, but that an Australian advocate will be present at Barcelona in 1992. To ensure that athletes receive proper and qualified representation in cases arising from drug testing procedures and findings at Olympic Games, it is recommended:

. That the AOC:

(i) provide a legal adviser who can assist;
(ii) provide a technical expert;
(iii) formulate comprehensive procedures for Australian athletes found to have positive drug tests or alleged to have infringed IOC drug rules at Olympic Games;
(iv) provide all Australian Olympic athletes with a copy of the procedures; and
(v) ensure the availability of an appropriately qualified independent advocate for any Australian athlete infringing IOC drug rules.

. That Australian athletes found to have breached drug guidelines be penalised in accordance with internationally accepted standards: up to three months ban for inadvertent use, two years for a first offence, and a life ban for any subsequent offence.

5.53 Mr Watson's experience on returning to Seoul on 24 September was unwise and unhelpful to the rest of the team and officials. In order to avoid a recurrence we recommend:

- That the AOC devise and publish a protocol to be signed by Australian Olympic athletes covering the manner in which any athlete would return to Australia if disqualified from a Games. Such a protocol would determine aspects of travel, escort arrangements, communications with family, protection from media attention and the particular requirements of adolescent athletes.

5.54 Until the risks of exceeding the present IOC proscribed level of Caffeine are established it is recommended:

- That Caffeine in any concentration in the urine be proscribed.
- That an appeal against the finding of Caffeine in a sample could be based on inadvertent use and that a level for inadvertency be set.

5.55 The Committee considers that the significance of positive drug tests on prominent Australian athletes justifies discussion in relevant annual reports. We therefore recommend:

- That the Australian Sports Commission comment in its annual reports on positive drug tests by prominent Australian athletes and the procedures established to deal with them and other investigations conducted by the ASC into alleged doping practices including self admission of the use of banned drugs and possession of banned drugs.

5.56 That the IOC adopt the hearing and appeal provisions as set out in their brochure Annex 6 headed 'Rights and Responsibilities of Sports Organisations, Athletes and their Entourage' together with Annex 7 'Guidelines for Sanctions and Penalties'.

Senator N.A. Crichton-Browne

Senator I. Campbell

Senator W. Crane