### TABLE III

*David Bedford's training schedule in St Moritz (June 1972)*

Three sessions per week were on the track and varied between:

- 8 x 800m in 2 min 10.0 sec with 3½ min rest
- 20 x 400m in 62.5 sec with a 200m jog to recover
- 20 x 200m in 30.8 sec with a 100m jog to recover
- 30 x 300m in 45 sec with a 200m jog to recover

## DISCUSSION

**DR BROTHERHOOD:** You say that when Andy Carter returned from St Moritz he felt he would have liked more time at Munich doing speed work. Why did he say that? What were his subjective reasons?

**MR WATTS:** The 800m runners had only five days for re-acclimatization, which was at the bottom end of the time required. He felt tired and listless, his legs were dead, and he was just not “there”. His heat was something of a struggle for him.

**DR BROTHERHOOD:** Do you think he was getting into oxygen debt more easily? Was that the sort of fatigue that caused the fall-off in performance?

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<table>
<thead>
<tr>
<th>Event</th>
<th>Name</th>
<th>Whether in St Moritz</th>
<th>Best performance before Munich</th>
<th>Best performances in Munich</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>400m</td>
<td>J. Roscoe*</td>
<td>No</td>
<td>53.3</td>
<td>53.7 (Heat)</td>
<td></td>
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<tr>
<td>(women)</td>
<td></td>
<td></td>
<td></td>
<td>53.0 (Final)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>J. Simpson</td>
<td>No</td>
<td>52.5</td>
<td>54.1</td>
<td></td>
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<tr>
<td></td>
<td>V. Bernard</td>
<td>No</td>
<td>53.2</td>
<td>53.3 (heat)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>53.3 (S-final)</td>
<td></td>
</tr>
<tr>
<td>800m</td>
<td>P. Cropper</td>
<td>Yes</td>
<td>2:1.7</td>
<td>2:3.5 (Heat)</td>
<td></td>
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<tr>
<td>(women)</td>
<td>R. Stirling*</td>
<td>Yes</td>
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<td>2:3.6 (Heat)</td>
<td>7th</td>
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<td></td>
<td></td>
<td>2:2.4 (S-final)</td>
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<td></td>
<td></td>
<td></td>
<td>2:00.2 (Final)</td>
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</tr>
<tr>
<td></td>
<td>M. Coomber*</td>
<td>Yes</td>
<td>2:4.1</td>
<td>2:3.0 (Heat)</td>
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<td>1500m</td>
<td>J. Smith*</td>
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<td>4:9.4 (S-final)</td>
<td>10 days re-acclimatization</td>
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<tr>
<td>women</td>
<td>S. Carey*</td>
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<td>4:7.4 (S-final)</td>
<td>13 days re-acclimatization</td>
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<td>4:4.8 (Final)</td>
<td>15 days re-acclimatization</td>
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<td></td>
<td>J. Allison</td>
<td>Yes</td>
<td>4:13.2</td>
<td>4:14.9</td>
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* = Best personal performance at Munich. (Note: Janette Roscoe did not go to St Moritz).
MR WATTS: It was more a listless feeling. I did not go into this particularly with him.

DR BROTHERHOOD: Was this in his everyday life, as well as in his training?

MR WATTS: He had to rest a little when he came down. He had a long journey down — five hours in the bus. Then I had only one speed work session with him, which did not go well. He felt listless. And he had to rest before the race.

DR BROTHERHOOD: Why did the speed work not go well? You say it was because his legs were dead?

MR WATTS: Fatigue in the legs and body generally.

DR PUGH: Could you summarize the effects on the performance in the Olympics of the 22 athletes who had altitude training? You say that five improved, but how many deteriorated and put up worse performances?

MR WATTS: Quite a lot — but this needs going through carefully. A worse performance might, in fact, have been in the final and so, in a sense be a success. Ian Stewart, for example, won a bronze medal though not returning a best time. This was success. Who is to know how to judge this difficult matter.

DR PUGH: The difficulty is a statistical one.

CHAIRMAN: I think Dr Pugh is asking — and this is a point that I have made — whether it would be possible to measure statistically the success in terms of positional order, as opposed to success in terms of better times, and relate the result to previous pre-Olympic and Olympic performances, to get some statistical answers from a large group of athletes, not only in this country but elsewhere.

DR PUGH: I do not think this can be tackled in any other manner because of individual factors. Very many factors are at work and there is always an element of chance. The problem can be tackled on a statistical basis only; if we say that five improved, five deteriorated, and five stayed the same, the statisticians will say that this could arise by chance. We have heard today that five out of 22 improved. This is like a newspaper advertisement for a cough mixture!

MRS JANETTE ROSCOE (City of Leicester Polytechnic): Did the 22 athletes who went to St Moritz keep to their normal training pattern before going there, or did they increase their training? Could this have any relationship to the small number who achieved best performances?

MR WATTS: Many readjusted their training, by advice, up there. I think this was wise. Some managed to keep more or less to what they set out to do. For instance, Sheila Carey adjusted her training.

MRS ROSCOE: Having talked to Rosemary Stirling, I think she may have been in the minority in keeping to a regular pattern. In fact, she took rest days off while she was up there, and then produced the British record in the 800m final.

MR WATTS: Some of her training was very good. For instance, on August 15 she did 3 x 300m, with only 30 sec recovery, in 46.9, 47.2 and 45.8. After that she took 10 min rest, and then did 3 x 200m, with one-lap jogs, in 25.7, 25.4, and 25.4. That is excellent — she was training very hard at that time. However, to start with, she took it fairly easily.

DR PETER SPERRYN: (Honorary Secretary, British Association of Sport and Medicine): One obvious variable, which has not been raised yet, is that all the figures so far produced have taken no account of what previous official, or unofficial, exposure people had to altitude. For instance, one of the examples you gave of work load while training at altitude, made no mention of the fact that the athlete spent many weeks of the preceding six months intermittently at altitude.

MR WATTS: The case of Bedford?

DR SPERRYN: Yes.

MR WILSON: May I stress the point again that athletes will not go to Olympic Games to produce statistics for physiologists. They will go there to compete against other people. This is what is important at the Olympic Games:
beating men. If we are looking for statistical evidence for improvement at altitude, we will not find it in Olympic Games performances; we will find it under laboratory conditions or training conditions on tracks.

It is impossible to ask somebody like Ian Stewart to go out and run his fastest time. He is concerned about beating Viren, or Prefontaine, or whoever it may be.

CHAIRMAN: The suggestion was that the factor of place order should be incorporated, with statistical advice, as well as the time factor. Also, it was suggested that this would be possible by comparison with other Olympic Games, taking into account the exact point you make, that athletes may run slower in the Olympics and may — due to other competitive factors — do worse than might be expected of them. But we need a sufficiently large statistical sample.

MR WILSON: Nevertheless an athlete will always be concerned where he finishes in the Olympic Games. If he finishes third, even though his time was not as fast as he had done previously, this is better for him than not to get into the final but have a faster time.

CHAIRMAN: Would you agree that an athlete is doing his best in an Olympic final? That he is trying maximally? In other words, that the motivation is greater in an Olympic final that it would be in any laboratory experiment to investigate the problems of altitude?

MR WILSON: Yes, but it is not necessary to run your fastest to try to beat people. We had an athlete who, before the Olympic Games, was approximately one minute faster over 10,000m than any other person in the world, but he could not beat people.

MR WATTS: Carter thinks that he ran a very bad tactical race in the Olympics, apart from any physiological consideration. He said he could not understand how we could have been so stupid as to let Wottle run the race he did. Tactics also come into the problem.

DR RICHARD LIVERSEDGE (St George’s Hospital Group): Are there any comparative studies in other countries in which athletes have been subjected to repeated altitude training over a period of a few months, which have produced definite evidence of betterment in their performances?

MR WATTS: There must be, but I have no facts. The Russians must have a lot of data about the number of times they have been up and come down and the results of this.

DR LIVERSEDGE: Could we ask Professor Keul whether the West Germans have any similar data?

PROFESSOR KEUL: We have done no experiments in this field, but there are data from the United States for normal people. There was better performance after a residence of some months.

CHAIRMAN: I think there is no real data. The nearest we can get are the figures on Ryun and his friends in 1967.

The onus of proof lies on those who believe that altitude training is of benefit. But to prove it by a narrow margin and in a manner not demonstrable in athletes, would seem an inadequate basis for the continuing disruption caused by, and the great sums of money spent on, altitude training. That is a personal viewpoint.

My conclusion from the scientific evidence presented so far is that the matter remains unproven.