The practical theme of this issue of NSA is the sprints. In order to give some background information on these events our panel has been asked for the definitions they use for some basic terms regarding sprint training as well as questions on training. The panel for this installment is made up of past contributors Jim Alford (GBR), Vern Gambetta (USA), Victor Lopez (PUR), and Tom MacWilliam (CAN) as well as first time contributors Dr. Ruth Fuchs (GDR) the 1972 and '76 Olympic Gold Medallist in the Women's Javelin and now a member of the IAAF Women's Committee and Frank Dick, who is the British Amateur Athletic Board's Director of Coaching.

What is the definition you use or your concept of understanding for the term "speed"? From what source have you taken this?

ALFORD
Rate of motion. This is from any dictionary or text on mechanics.

FUCHS
The ability to carry out specified movements in the shortest time possible under the given circumstances. This is from the text «Training from A to Z» and from the text «Coach» by Haare.

GAMBETTA
The ability to move the body or parts of the body through a range of motion in the least amount of time with a high degree of coordination. This working definition was developed by myself and Gary Winckler, Women's Track and Field Coach at the University of Illinois. To us the key to the definition is the last phrase "with a high degree of coordination". Coordination is the key to speed whether it is leg speed in sprinting or arm speed in throwing.

LOPEZ
This term is very deceptive because any motion is done with a certain speed, the difference being the rate or
frequency. In relation to training for the sprints I would rather use the term absolute speed or neuromuscular education which means running at maximum velocity and maximum neuromuscular system activation for a given distance which is usually very short (20 to 60m).

MACWILLIAM

In terms of training we mean high intensity (95% + effort)/low volume (3 to 6 repetitions) at distances up to 60m. These runs may be done from blocks, from the low starting position, from the high standing start position or on the fly. The runs may be done on the straight or into/on/out of the bend. This and the other terms are the standard terms used all across the country as the principle components of the Canadian Sprint Programme and are taught as the basis for coaching the sprints in the technical component for the Canadian Coaching Certification Programme. They were introduced by Gerald Mach, presently the CTFA's head Coach and High Performance Consultant, in 1973 and the success of the Canadian Sprint Programme since then is directly attributable to Mach's leadership and this standardized programme.

What is your definition for Speed Endurance?

ALFORD

The ability to maintain a high (maximum or sub-maximum) rate of motion - sustained speed. This is my own definition based on "Fundamentals of Sports Training" by L. Matveyev and from G.H.G. Dyson.

DICK

Speed Endurance requires high quality speed of movement in a climate of endurance factor. It can be considered more an extension of technique and speed because the neuro-muscular system plays a major role. This is my own definition.

FUCHS

The ability to resist a speed decrease caused by fatigue in events with maximum demands as to the locomotive speed (sprints) or the contraction capacity of the muscular system. Speed endurance is important for events which require frequent repetition of movements at a maximum speed during competition as well as during training.

GAMBETTA

Gary Winckler and I have developed the following definition: The ability to express high qualities of speed performance in the presence of anaerobic waste products. Speed endurance encompasses the following: ALACTATE SHORT SPEED ENDURANCE, SPEED ENDURANCE, LONG SPEED ENDURANCE AND LACTATE TOLERANCE. For explanation see the accompanying chart on the following page.

LOPEZ

This term defines the capacity of an athlete to maintain high velocities for long periods of time, but, in terms of the energy system, we have to define the terms short speed endurance which uses the alactate energy system and long speed endurance which uses the lactate energy system.
MACWILLIAM

Again as a type of training, high intensity/lowl volume runs over distances of 60 to 100m and up to 120m for top level athletes. The starting position will vary as will the use of the straight and bends depending on the specific goal of the training session.

Both Speed and Speed Endurance training stress primarily the anaerobic alactic energy system. The recovery between repetitions must be long enough to allow complete recovery of this system to minimize lactic acid accumulation in the muscles and the involvement of the anaerobic lactic energy system in subsequent runs. This training also places a very high stress on the central nervous system and recovery between training sessions of this type must be-

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<th>A</th>
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<tbody>
<tr>
<td>Common</td>
<td>Length</td>
<td>Component and Description of Objective</td>
<td>Energy System</td>
<td>% of Predicted Perform.</td>
<td>Rest interval Between Reps/Sets</td>
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<td>of Run</td>
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<td>Aerobic &lt;69%</td>
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<td>Tempo</td>
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<td>Aerobic 70-79%</td>
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<td>Tempo</td>
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<td>20-80m</td>
<td>Speed Anaerobic Power</td>
<td>Anaerobic 90-95%</td>
<td>3-5’/6-8’</td>
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<td>Anaerobic Power</td>
<td>Alactic 95-100%</td>
<td>3-5’/5-8’</td>
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<td>&lt;80m</td>
<td>Alactic Short Speed End. (ASSE)</td>
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<td>6-10’</td>
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By: Gary L. Winekler, University of Illinois, 1986
sufficient to allow full regeneration. The emphasis of this training is on quality throughout the training session. Perfect running form must be maintained. If the athlete cannot maintain form the training session should cease or switch to another component.

How do you define Speed Strength?

ALFORD

Speed Strength equals power, the ability to apply force in a short interval of time, i.e. the fast application of force. My definition.

DICK

In my definition Speed Strength is the same as Elastic Strength and this is where both the contractile and elastic components are assisted by reflex contraction in the expression of strength at speed.

FUCHS

The capability of the athlete to overcome resistance by developing high contraction speed. Again, this is from “Training from A to Z” and Harre.

GAMBETTA

With Gary, I define Speed Strength as the ability to exert force, against resistance (external or body weight) while maintaining the same quality of speed that is used in the actual performance of the event.

LOPEZ

In terms of the sprint events I associate Speed Strength with the ability of an athlete to maintain an optimal stride length throughout the whole race. In other words, it is a combination of the elastic strength and the speed endurance components. The methods to enhance this capacity are multi-jumps, uphill sprints and repetitions of 30-60m with short rest periods.

Do you differentiate between Speed Strength and Speed Power? If so what is Speed Power?

ALFORD

In my view, power must include speed.

DICK

They are the same.

FUCHS

Speed Power is explosive power. For example, starting power, which includes the capacity to develop initial motion as fast as possible in the first moments of exertion. This definition comes from Werchrosanski, Birll and Letzelter.

LOPEZ

The ability to overcome a resistance as fast as possible. In the sprint events I think about this in terms of the start where the athlete must overcome inertia as fast as possible. I think a better definition would be explosive power because that is actually what the athlete is trying to achieve, to explode out of the blocks. Ben Johnson’s start in Rome is a perfect example.

MACWILLIAM

We talk about Power Speed training
which is high intensity training done with weights and or running form drills. Power Speed with weights - maximum of 10 repetitions/10 seconds with a load of 50% of body weight or maximum. The exercises must be done explosively. Power Speed mixed - running form drills (High Knees or High Knee/Foreleg Extension, March, Skip or Run) done with or without added resistance such as sandbags, weight belts, weight vests and/or up an incline. Maximum distance is 20m, maximum time per repetition 10 sec., maximum number of repetitions 10.

What implications, if any, for the preparation of sprinters do you draw from the success, including the World Record, of Ben Johnson in the 100 metres?

ALFORD

I know too little about Johnson's preparation to draw any firm conclusions except that he appears to be definitely a 100 metres specialist and has first concentrated on developing great speed up to 60m and then on maintaining speed for the remaining 40m. His technique emphasizes the individual's interpretation of technique and the importance of not being too dogmatic about models of correct technique. But I would still take Lewis as a better model for the beginning sprinter.

GAMBETTA

Based on what I know of Johnson's training which I have gathered from presentations I have attended by his coach, Charlie Francis, there are several definite implications for the preparation of sprinters: A) A long term coaching relationship which allows the athlete to progress steadily to the elite level. B) High intensity anaerobic work, in other words train the energy system that is utilised in the 100 metres as preparing for this event is a quite different demand from preparing for 400 metres. C) High volumes of extensive tempo for recovery to allow the nervous system to recover. D) Extensive use of massage for recovery and regeneration as well as warmup, this is planned as part of the training. E) Levels of absolute strength raised to high levels during general preparation and maintained throughout the training year. F) Careful selective use of electrical stimulation to address specific weaknesses and muscle imbalances.

LOPEZ

Charlie Francis mentioned to a group of coaches the night after the World Record that anybody can develop a Ben Johnson. First of all, you need to specialise your athlete, then you need to know the sciences to be able to apply the proper system of training, you need to know the art of periodization and finally you need the athlete with the proper talent. The world is definitely full of Ben Johnsons, especially in the USA and Caribbean, as we all know Ben was born in Jamaica, but all of these great talents lack specialisation. Most of these athletes are running 100, 200 and even 400 and long jump. Ben does only the 60 indoors and the 100 outdoors. Charlie has been able to bring to perfection Ben's life as an athlete and apply his training system to the best advantage. The great talent of Charlie Francis is designing the perfect training system for Ben. This, combined with Ben's
ability to relax and the help of masseurs for regeneration and recovery, has produced the perfect 100 metres man.

MACWILLIAM

Greater emphasis on strength training both for maximum strength and power. More speed work from 20 to 80m and some runs up to 120m.

As the special topic of this issue is Women’s Athletics we should ask if you think there are any significant differences of emphasis in terms of technique or preparation between male and female sprinters?

ALFORD

No.

DICK

Only one difference and that is that progression is greater for men than for women. In training macrocycles we also ensure that strength programmes are continued longer into the season for women than for men.

FUCHS

In my opinion there are no differences.

GAMBETTA

I have to let Gary Winckler answer this one. He says that “men can gain strength more quickly and maintain it more easily. Conversely, women must work longer to gain strength and must make it a priority throughout the year”.

LOPEZ

I apply the same training process to my female sprinters as I applied to males in the past. I firmly believe that there are no differences in technique and preparation. The only differences are in the loads and intensities of those qualities that are by nature stronger in men. The only one of those which I can think of now is strength.

MACWILLIAM

In my opinion there need be no significant difference in emphasis in technique or preparation.