NUTS NOTES

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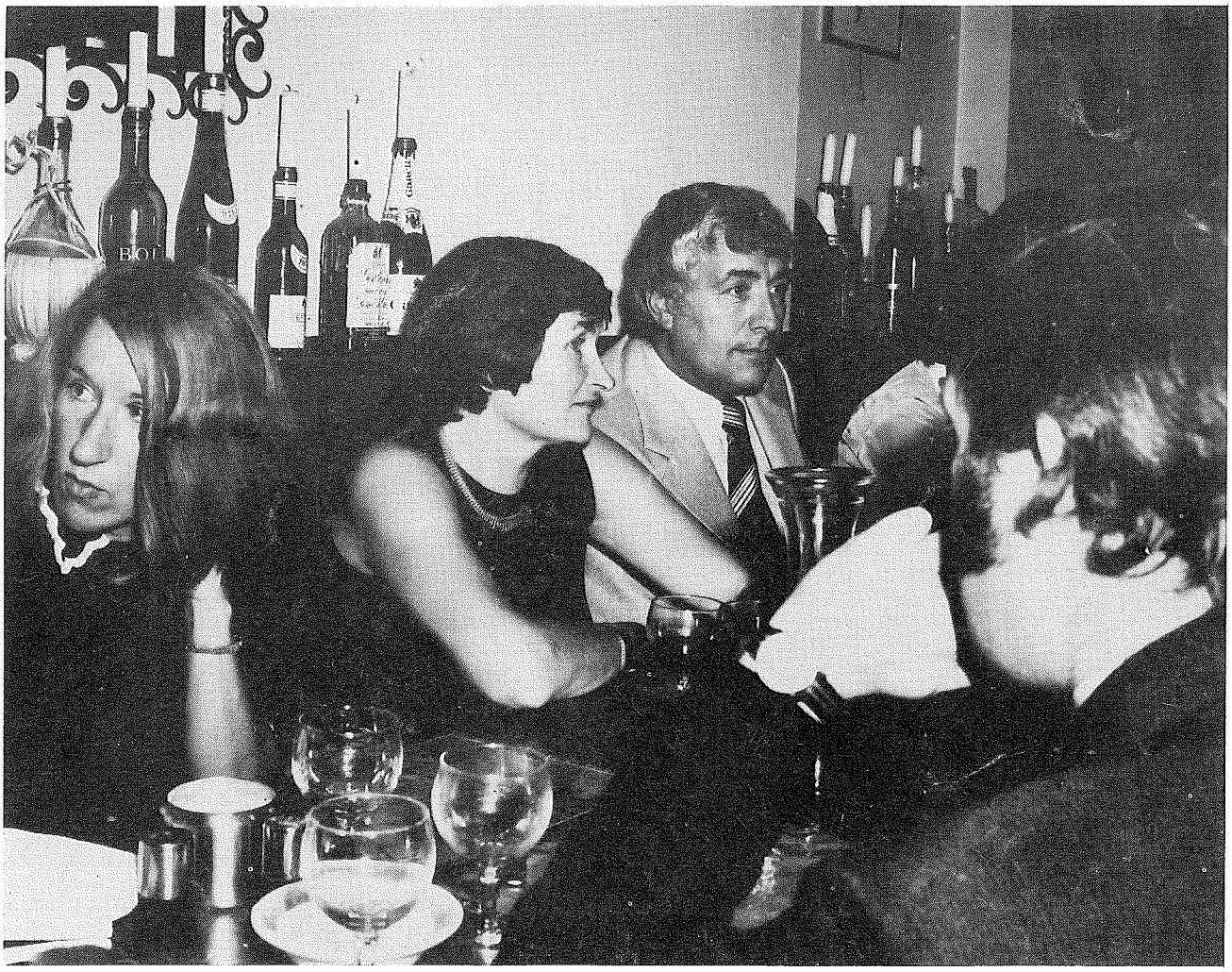

Andrew Huxtable

JEAN & RON PICKERING (centre), guests of honour at 1977 NUTS members' annual dinner.

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NUTS NOTES

Volume 16 Numbers 1/2

Quarterly Newsletter of the National Union of Track Statisticians

EDITORIAL

We are dedicating this issue to the memory of Harold Abrahams, the first NUTS President; this homage takes the form of an anthology of his writing in books, but not in magazines or newspapers. We are grateful to the respective publishers for giving us permission to reproduce extracts: individual acknowledgments are given at the end of each excerpt.

Christopher Brasher wrote in The Observer:
"Not many men of his physical and mental stature had such a long and full life in the sport they loved. ... he would always listen to an opponent's views and if he thought there was merit in them he would throw his influence behind an attempt to right a wrong."

The Marquess of Exeter wrote in The Times:
"He had a first-class brain and decisive views which he never hesitated to express strongly. However, those of us who knew him well realized that behind this was a cheerful and kindly man and a loyal friend."

These two tributes typify the respect and affection in which Harold was held by all who encountered him in the world of athletics.

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31. 8.73	Vic Small
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6.12.74	Dave Bendy
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	Eddie Powell
17. 2.78	Reg Dickins
	Ian Hodge

HAROLD ABRAHAMS 1899-1978

In many ways the qualifications necessary for a good long-jumper are very similar to those required for a sprinter, and these two events often go reasonably well together. The present holder of the world's record, De Hart Hubbard, who cleared the amazing distance of 25 feet 10⅞ inches some few months ago, has beaten even time for the 100 yards; and if one were to take all the jumpers who have cleared over 24 feet, one would find that they were probably sound 10.2 second men, if not even-timers.

This is sufficient to show that speed is an essential factor - you would never find a three-miler who could jump - but its importance is often exaggerated by people who imagine that a long-jump is simply a sprint with a jump at the end of it. In truth a long-jump is a controlled sprint culminating in a projection of the body through space. The first point to be impressed upon the would-be long-jumper is that he must appreciate that he has to approach the take-off board not at full speed, but at the maximum speed which he can attain without loss of that control which will enable him to make a balanced jump.

The second point which must be emphasized is that the run-up is the really important part of the jump. Once a jumper has left the board his momentum is finished with, in the sense that he cannot increase or decrease it. The only thing, then, that can give one the maximum momentum, is an accurate run-up which finds the jumper in the right position for making his jump without the necessity of changing his step or lengthening or shortening his stride. One of the most difficult things to get rid of, once it has become rooted into the system, is the bad habit of 'feeling' for the board. By this I mean, realizing when you are perhaps ten yards from the take-off that you are not going to reach the board accurately and consciously adjusting your stride so that you do, but at the price of the sacrifice of speed.

The long-jumper will obviously find the sort of training described as beneficial for sprinting - the quickening exercises, etc. - a good preliminary foundation for his efforts. Once he has got his muscles into some sort of trim he can begin the jumping. But for the first week or two the actual jumping should consist only of standing-jumps, or at the most of short runs of from ten to fifteen yards. The full run up is generally somewhere between 33 and 43 yards - though that great runner and jumper, E. Gourdin, who cleared 25 feet 3 inches, runs nearer fifty than forty yards.

In these standing-jumps, the jumper should merely concern himself with control of the knees and the shooting out of the legs. Since the parabola which any jumper will describe is determined when once he has left the ground, it follows that any action which he may take in the air will be calculated only to prolong the jump in so far as it enables him to adjust the position of his body relatively to the parabola which his centre of gravity describes. Thus the drawing up of the knees so that they approach the chin, the shooting out of the legs at the correct moment, and the proper control of the body in the air are all vital factors which can be practised by means of standing-jumps and jumps from shortened run-ups.

In practising the short jumps (these should be somewhere about fifteen to eighteen feet in length), it is helpful to have a piece of white cardboard in the pit at about the distance which you expect to clear. This enables you to keep your eyes and attention fixed on some definite object; it is also an assistance to the jumper in flight to strain his body to clear the paper. The white cardboard is also helpful in competition.

After perhaps a couple of weeks or more at these short run-ups, and when the jumper is beginning to get some sort of form, he may then begin to get his full run-up accurately. There is no mistake about it that to get one's run-up to the board perfectly regular requires many months of training. The great thing is to set about in a systematic fashion, and to realize that certain adjustments will have to be made, varying according to the state of the track, the wind, and the fitness of the performer.

As regards the length of the run-up it is impossible to be dogmatic, and every jumper must discover for himself, by the method of trial and error, his correct distance. Start in this way. Measure (from the side of the take-off board which is farther away from the pit - because these boards vary in width) a definite distance - say 115 feet. Now run up to the board with a perfectly regular stride and an even acceleration. Notice which foot was in front when you started. Be very careful to keep this stride regular. Do not change step or shorten or lengthen your stride in order to reach the board. At the first effort you will probably find that your take-off foot (right or left as the case may be) was perhaps four feet over the board. Take your mark back four feet and try again. By a series of adjustments you will find the mark by which you get a perfectly accurate run-up. You should make a careful note of the distance and record it in your diary.

Next time you go out start from this mark. You may find that it is not quite accurate, but it is certain that after a couple of weeks you will get a mark which with a few adjustments of a minor character will be quite accurate.

I have observed that the run-up should not be taken quite at full speed. The reason for such an assertion is that it is far more important to hit the take-off board with the body under absolute control than to hit it at the maximum speed. It is also vital that the jumper leaves the board at the right angle. Mathematically the highest point of the parabola will be in the middle of the jump. Thus if a man leave the board at too steep or too small an angle he is not getting the best result. The regular acceleration is also important as this ensures accuracy of striding. Some long-jumpers have more than one mark. I adopted the one-mark principle. The other scheme is to have two marks - the one about the same distance from the board as my mark described above, which is the starting-point, and a second about twenty-five to thirty feet from the board. The idea is that the jumper knows that unless he gets his take-off foot accurately on the second mark he must not jump because his run-up is not accurate. There is a good deal to be said in favour of this latter method, particularly for the novice. I may add that it is only a 'no-jump' if the foot touches the ground the far side of the board. Many people erroneously imagine that the jumper is not allowed to touch the board itself.

It is a mistake to practise too much, and the jumper should rigidly refrain from being tempted to take more than two or three full jumps during any one training spin. Avoid the temptation, if you are jumping well, of going on in the hope of excelling, or, if badly, in the hope of doing better. Let well (or ill) alone.

A long-jumper will find that he is liable to suffer from a bruised heel on his taking-off foot. To avoid this it is advisable that he wear a rubber pad inside the shoe, so that it will provide a cushion as the foot comes down.

One or two points about competition. Never jump into a pit without being certain that it has been properly prepared. Always measure your run meticulously and warm up thoroughly before you jump. Keep warm also and rest between your jumps. A good warming-up exercise is to jump about on the grass springing off both feet into the air and attempting to strike one's chest with one's knees.

I should add a word about the so-called 'kick' in the air. It is described in an American volume as follows: "The 'hitch-kick' jumper actually kicks or jerks himself ahead at a faster rate than he would ordinarily travel if he used the orthodox form, hoping by this speed to gain some additional distance before gravity pulls him down. In the delayed hitch-kick, when the jump is half completed the athlete endeavours to speed up his lagging momentum by a series of sharp forward-and-back running kicks."

In the face of so many fine American and Scandinavian performers who utilize this 'kick', it is difficult to assert that there is nothing in it; but I cannot see that it is mechanically possible by any means to 'run through the air' or to increase one's momentum once one has left the ground. As I have tried to point out earlier in this chapter, the great thing is to get the projectile (the body) to leave the board at the right angle and with the maximum momentum compatible with steadiness. I suggest that once one has left the ground there is no method by which the momentum can be increased, and that the jumper's only concern must be so to regulate the position of his limbs as to prolong his flight and maintain his balance.

I should add one word to the long-jumper as to the danger of worrying too much over bad performances in practice. Whereas the sprinter, unless he be timed, cannot tell whether he is running well or not (within many yards), the long-jumper's performances in practice are recorded for him to see. I have often jumped barely 20 feet in practice, and yet two days later cleared over 23 feet. Stick to the training and you will gradually achieve such consistency so that even on an 'off-day' you perform reasonably well.

ATHLETICS (Chap. VII - Long-jumping); George G Harrap & Co. Ltd, 1926.

HAROLD ABRAHAMS

There are no false starts in this first-class production of the brothers Alan Ross and Norris Dewar McWhirter. They have been all set to publish a book of this kind for some time and, now that they have done so, I am quite sure that it will go with a bang. Its contents combine the seemingly incompatible - a mass of extremely accurate factual information, together with vivid and exciting description. I can claim to have some knowledge, acquired over a period starting before the existence on this earth of our twin authors, of the work involved in ferreting out the best Empire and United Kingdom performances of all time. It must have been stupendous, and I am happy, and much complimented, to have been asked to be associated with this work. I wish it the success it deserves and that would be success indeed, and can only add that I should have been extremely proud to have written it myself.

I commend it particularly for the inspiration which the achievements of the past will provide for the adventure of the future. There is so much evidence of a greatly improved standard in athletics in this country that, if, as I hope, the book is to be brought up to date, I am willing to wager (within the limitations imposed by the AAA rules on betting) that the list of performances will need drastic revision.

GET TO YOUR MARKS! (Foreword) by Ross and Norris McWhirter; Nicholas Kaye (Kaye & Ward Ltd), 1951.

* * * * * * * * * * *

The VIIIth Olympic Games, at Paris, reached a new peak so far as competitors and competing countries were concerned. The events, reduced from thirty to twenty-seven, occupied eight days from July 6th-13th. By this time entries had been limited to four per country for each event. The United States won twelve titles, Finland ten. Three other countries only provided Olympic winners, Great Britain three, Australia and Italy one each. Again a whole crop of new Olympic records was provided.

My own good fortune in the 100 metres is, I believe, sufficiently far away to make it possible to refer to it without seeming self-satisfied. The truth of the matter is that until twenty-four hours before the final I never thought I had any real chance of defeating the four American sprinters headed by Charlie Paddock, of whom I had had a very long-distance view in a second-round heat of the 100 metres at Antwerp four years before.

Success in athletics depends to a degree on everything going just right at the right moment. I had trained really hard - perhaps not to the extent that modern athletes train, but, in my generation, a good deal harder and, I think, more scientifically than most. I had the good fortune of a really first-class coach, Sam Mussabini, a man who made me think for myself.

Best luck of all - if there is such a thing as luck - I had been dead stale at the championships a fortnight previously and I was not the favourite. I had everything to win, but little to lose.

The fact that I equalled the Olympic record in my second-round heat, and that all my opponents had done (on the watch) one-fifth second slower, was a tremendous help psychologically. In those days I was not so analytical as I later became, or I would have realised that that fraction of a second was worth but little and due in all probability to the mechanism of the watch. In those days timing was to one-fifth of a second, so that there might be two yards, or nearer to two inches, between a runner who was given 10.6 sec. in one heat and another given 10.8 sec. in the next.

I had not enough time between winning my second-round heat and running in the semi-final and final - less than twenty-four hours - to worry.

In my semi-final I got the worst start I ever had had in my whole career and still managed to reach the tape first. After that I just could not help winning the final.

I am still amazed at the enormous difference to my life that ten seconds or so on the evening of July 7th, 1924, has made. To be second in a race, however close the margin, is really worth no more than being last, so far as public prestige is concerned. An unbroken association with athletics for not far short of forty years has trained me to examine performances in a really objective way - but it is just no good telling the man in the street that someone finished less than two inches behind the winner (as did Herbert McKenley in the 100 metres at Helsinki) and that his performance (compared with the winner) is as 99.95 is to 100. His reply would be "So what! The other fellow won, didn't he?"

THE OLYMPIC GAMES BOOK; James Barrie, 1956.

I have been lucky enough to participate in two Olympic meetings and to witness many more. I have followed the quite fantastic improvement in performances, an improvement which must, as a matter of fact, have some limit, but which limit still seems a very long way off. I sometimes wonder if we should not enjoy these contests much more if we were forbidden to employ a stop-watch and a tape measure, and if the winning of a contest could really be regarded as of less importance than taking part. But this kind of phantasy gets us nowhere. For better or for worse we have got to accept the Olympics today as an enormous sporting festival, and try somehow to see the prestige value in better perspective.

There are some who suggest that since the modern Olympian has to undergo the kind of preparation which in most cases would not be exceeded by a professional performer, it would not be more logical and more honest to abandon all the pretences of amateurism, abolish the amateur definition, and throw the whole Games over to professionalism.

I am one of those who believe that there is much of the amateur definition which is hopelessly out of date and meaningless. But I do not believe that the solution lies in an abandonment of any restriction on the qualifications of the competitors. The trouble is that to many people the amateur definition is regarded as something sacrosanct. These people never, apparently, delve into its origin and history, and they ignore the fact that over the years the definition has changed very considerably. The word 'amateur' has become one of those words which inevitably excites great emotion whenever it is used. In point of truth what those who believe in non-professional competitions should do, is to construct a code of rules designed to retain in modern conditions the proper spirit of competition among unpaid sportsmen. In essence the emphasis in the case of professional sport is entertainment of the spectator. The professional performer is selling his skill to those prepared to buy it - the watchers. Now, modern non-professional competition of the highest class is of such public interest that the entertainment value is far more important than it was sixty years ago when the Olympic Games were revived. And, moreover, the standard demanded, if you are to be successful in reaching the final of an Olympic event, let alone winning one, is so high that the kind of training required must occupy an ever-increasing part of the would-be champion's life. This is a fact, which no amount of regret on the part of those who still yearn for international competition as a casual affair can change.

It would be far better to accept these facts as they are, and to redraft our rules of 'amateurism' so as to exclude any activity on the part of the would-be competitor which would destroy what is really fundamental to the retention of non-professional competition.

I would, for example, omit the word 'amateur' from the rules. What the Bodies governing a particular sport ought to be concerned with is to draft a code of rules to control competition in the sport. They should not concern themselves with theoretical principles, principles first expounded well-nigh one hundred years ago. And, it should be added, even then not conceived from a moral point of view, but designed to restrict participation to those whom the organizers wished to include.

One final word. We have got to accept that we cannot limit the amount of time which any particular individual is prepared to give up to training, and we have also got to accept that some people are in a position to give far more time than others. Once admit that, and you are inevitably driven to accept that a particular individual may be ready and able to train just as hard as any 'professional'. Every sport has its own problems and its own niceties in definition. The so-called overall definition of an 'amateur' for the purposes of the Games itself is quite unrealistic and ignored by the vast majority of those selected. A great many of the so-called 'barring clauses' could be abolished tomorrow without any damage at all to the sport, and I am certain that in the not too distant future they will be.

XVII OLYMPIAD, 1960; Cassell & Co. Ltd, 1960.

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This book is a most valuable contribution to British Athletics, since for the first time we have in one volume the detailed results of nearly sixty International Matches together with the names of over eight hundred international athletes. It is greatly to be hoped that when it is next published, the opportunity will be taken of including Great Britain's women athletes.

The appearance of this work deprives me of being able to assert that I am the only person in the world who possesses a complete list of all the United Kingdom men internationals in track and field athletics. I must now amend my egotistical claim, to what must remain a permanent distinction, that of being the first person to have had such a list.

HAROLD ABRAHAMS

A lifetime in athletics surely enables me to be able to appreciate to the full the hundreds of hours of research which has been necessary to produce these 272 pages of fifty years of athletic history. What changes have taken place in the standard of competition during that period. How many outstanding champions in their day have been completely forgotten except by the very few. In the list of best performers in this book, less than twenty who competed before 1945 now merit inclusion.

I have been lucky enough to have seen most of the matches the results of which are given, and to glance through these can recapture hundreds of pleasant and exciting memories. But I am surprised at how many incidents I had forgotten, and how many facts I had not previously observed.

I should like to express my sincere pleasure at being asked to assist at the launching of this ship with its cargo of athletic gems. May those who take a passage in it be legion.

ENCYCLOPAEDIA OF BRITISH ATHLETICS RECORDS (Foreword) by Ian Buchanan; Stanley Paul (Hutchinson Publishing Group Ltd), 1961.

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There is no doubt that there is room for much improvement in the presentation of athletics. Many of our top class meetings are conducted in such a hurry - so many things are happening at once that the spectator, even the experienced spectator, very often misses the start of a race or some important happening in a field event. Athletics, like many other sports, has been feeling the draught of diminishing gates in the last few years. This diminution is not due to a lack of interest on the part of the public, because there is much evidence that athletics, largely due to television, is far more popular than it was a decade ago. But the fact that people will watch with keen interest an hour's athletics on television does not, alas, mean that even a tiny fraction will be bothered to make the journey to the White City. Television presentations of athletics have come to stay, and until the time arrives when the B.B.C. or Independent Television sponsor athletic meetings (and I predict that this will happen one day), unless through lack of finance amateur athletics is to suffer acutely, we have got to attract the public to our National Championships and international meetings in greater numbers. I believe that with a real concentration on presentation we could improve our sports programmes beyond all knowledge. The presentation of an afternoon's sports meeting should be a professional job, worked out with the precision of a revue or circus. The public must be made to feel that they are taking part in every event - by good commentaries (but not too much talking); and much more intelligent attention must be given to the field events, which after all constitute almost half of any international match, and from the time point of view occupy at least double if not treble that of the track events. There are some people who think that 'open' competition, that is to say competition for money prizes, should be introduced into athletics. This is not my view, though this is not the place to consider its practicability (apart from desirability), but there can be no doubt that our amateur laws are regarded by the vast majority of people as out of date.

I have been associated with the administration of both national and international athletics for nearly forty years, and I have formed some very decided views on the amateur question. Many people responsible for the government of national and international athletics seem absolutely obsessed with the amateur definition (I am speaking only of athletics; every sport has its own rules), viewing it with a kind of religious awe, as if at some date (unspecified) a formula was spoken which must remain inviolate. I remember some fifteen years ago during a debate on amateurism, Mr Avery Brundage, the President of the International Olympic Committee, said 'the laws of amateurism are immutable'. I asked to be further enlightened as to the exact date on which they became immutable. People talk of the 'principles of amateurism', as if these principles are fixed and unalterable. They forget the many changes which have taken place from time to time. How many of those who get so heated in defending amateurism have ever taken the trouble to delve into the history of their sport? Amateurism did not originate in some high-minded ethical desire to establish a supreme principle; it was devised, and I speak of the very first amateur definition, by the 'aristocracy' of the eighteen-sixties, who were determined (in rowing and athletics, in both of which sports there had been for years much professional competition) to exclude the undesirables from participation in the competitions they were organizing. Let us remember that the original definition excluded from competition 'mechanics, labourers and artisans'.

The trouble about the use of the word 'amateur' is that it is a word which immediately produces strong emotional reactions; and a calm, rational consideration of what those responsible for controlling a particular sport really want to do seems almost impossible. I myself would abolish any kind of amateur definition in athletics, and would concentrate on an objective consideration of what conditions should be imposed on anyone wishing to take part in competitions organized by the governing body. I would not allow people to be paid directly or indirectly for competing. But I would allow sensible rules about expenses (which should be rigidly enforced). The test for any rule should be not 'would a true amateur be allowed to do this, that, or the other?' but 'will this activity, if it becomes widespread, harm the sport which we are trying to control?' Quite obviously money prizes and the payment of appearance money would change the whole complexion of athletics (we must remember that we are legislating not only for the handful of top athletes but for the tens of thousands of ordinary performers). We want a 'new look' in our rules. The attitude adopted by the International Olympic Committee with its new definitions is completely unrealistic. The result is that no one seriously believes that the rules are complied with. We want rules that are reasonable, logical, and generally recognized as properly directed towards the goal of controlling the sport. The attempt to arrive at a universal definition for all sports is a wild goose chase. The International Olympic Committee should leave the amateur problem to the various international bodies. By all means let the I.O.C. exclude a sport from the Olympic Games because they are not satisfied with the rules governing that sport; but the attempt to legislate for the status of every one of the thousands of competitors should be abandoned. To conclude this subject, I think it would be a very great mistake to try and dispense with all qualifications relating to those who wish to compete under the rules of the governing body of athletics. But we should get right away from this 'status' bogey, and look at the problem entirely as one concerned with eligibility to compete under the rules. These rules should not concern themselves with morality or ethics, but simply with what is designed to keep the sport along the right lines.

A much more important and difficult problem facing amateur athletics is its organization. In the last two decades conditions have changed considerably. People have nothing like the spare time to give voluntarily to the organization, which in itself has become far more complicated. Somehow we have got to keep the existing pattern of voluntary (i.e. unpaid) work, but at the same time to employ more paid staff. Again I have little doubt that eventually we shall have to employ paid secretaries of the Amateur Athletic Association and the British Amateur Athletic Board. Possibly the same official might fill both posts, especially if honorary secretaries were also appointed. Many people think that there ought to be one governing body for all United Kingdom athletics, that the existing Associations, the A.A.A., the Women's, the Scottish, and the Northern Ireland, should be abolished and their powers handed over to a new United Kingdom A.A.A. Logically this is what should be done, but practically it is unlikely to come about for a very long time (if at all) and I am far from convinced that a change of organization would be beneficial. All the problems for national and international athletics would be the same; the new supreme body would quite clearly have to delegate regional autonomy at least to England, Scotland, and Northern Ireland. There would not be very much saving, if any, in staff and expenses; indeed there is already a very close liaison between the Board staff and A.A.A. staff, a sharing of premises and expenses. Like so many institutions in this country, the B.A.A.B. (a compromise solution to the difficult problem of securing proper recognition for Scotland and Northern Ireland in international athletics) works pretty well. There is not much wrong with the set-up, though I would be the first to concede that we want some much younger blood in the B.A.A.B. and the A.A.A. But it is equally true that the experience of the 'old men' should be retained in suitable measure.

MODERN ATHLETICS (Chap. II - The Future of Athletics) by the Achilles Club, edited by H. A. Meyer; OUP, 1964 (2nd edition).

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During the past twenty-five years I have more than once been asked to perform the launching ceremony of a book on athletics - such is the privilege of those regarded as belonging to the 'elder-statesmen' group of ex-athletes - but on no occasion have I approached my responsibilities with more pleasure.

'But though the compliment implied
Inflates me with legitimate pride,
It nevertheless can't be denied
That it has its inconvenient side.'

And the 'inconvenient side' is the anxiety that I shall not do full justice to this first-class production.

HAROLD ABRAHAMS

Only those who have experienced the difficulties of research into athletic history and have spent hours and days, as I have, in the Newspaper Library at Colindale, can realize just how much work Peter Lovesey has put into this volume. And how superbly he has performed his task: presenting accurate historical information in a most attractive way, and making many famous races really come alive. One would have thought that he had seen all the events about which he writes.

Of the five Kings, I frequently saw Paavo Nurmi and Emil Zátopek in action, and I also met Walter George and Alfred Shrubb on more than one occasion. A.B. George who won the American steeplechase title in 1889 and the British five years later was Team Manager of Great Britain's Athletic Team at the Paris Olympic Games, and through him I had more than one conversation with his most distinguished elder brother. Alfred Shrubb was coach to the Oxford University Athletic Club in the four years that I competed for Cambridge, and in those days, 1920-1923, was still the holder of some ten world records.

It is, I suppose, inevitable that we should try to determine which was the greatest of the five Kings of Distance, but this very human desire to find the Ace can never be satisfied - except possibly by a contest (of course under I.A.A.F. Rules) on Elysian Fields. Any comparison of 'times' is fraught with fallacies, for the cost of winning varies from generation to generation even more than the cost of living. Ben Hogan, winner of the British Open Golf Championship in 1953, said that 'a man who could be a champion in one era could be a champion in any other, because he has what it takes to get to the top'. And the great Bobby Jones said quite simply on the same subject 'All that a man can do is to beat the people around at the same time that he is. He cannot win from those who came before, any more than he can from those who come afterward'. In another sphere, the late Lord Birkett in his book Six Great Advocates, wrote: 'Men must be judged by the standards of the age in which they lived and worked', and if we apply this same criterion to the five Kings in this volume, we shall surely come to the conclusion that each was one of the truly great figures of the athletic world. You may say the times they accomplished look like schoolboy performances today, but this does not in any way detract from their greatness.

Perhaps Peter Lovesey may be persuaded to follow this fine work with a companion one on 'Five Queens' - or even 'Five Knaves'. I might qualify for inclusion in the latter volume, though perhaps I would prefer to be one of 'Five Jokers'.

If this book achieves the success it so richly deserves, it should not be very long before the sequels I have ventured to suggest are forthcoming.

THE KINGS OF DISTANCE (Foreword) by Peter Lovesey; Eyre & Spottiswoode (Associated Book Publishers Ltd), 1968.

NCAL: A HOPE REALIZED
Peter Lovesey

"I have one great hope for our second decade," wrote Norris McWhirter in the 10th birthday issue of NUTS NOTES in 1968, "that is, that somewhere - perhaps in one of our now 43 university libraries - a home will be found for a national collection of material on athletics."

That hope was swiftly realized. In 1969, as a result of meetings between NUTS members and Dr K.W. Humphreys, then Librarian of Birmingham University, the National Centre for Athletics Literature was established at Birmingham. Malcolm Warburton, on vacation from Oxford, spent the summer at Birmingham circularising possible donors of material. As books, programmes, magazines and other items came in, D.W. Evans of the Library devised a classification scheme and the NCAL began to take shape.

For this 20th birthday issue I revisited Birmingham and talked to John Bromhead, who took over as librarian in charge of the collection in 1971. John is quick to declare that he has no specialised knowledge of athletics - his own sports are cricket, hockey and table tennis - but for my money he is the most knowledgable non-specialist around. Warmly committed to the project, he has a positive concern to acquire, preserve and make accessible the material NUTS are nurtured on. He works from the room that has been the NCAL's home since 1974, on the upper ground floor of the Main Library, a mere hammer-throw from the University track (fortunately Howard Payne, on the Birmingham staff, is a satisfied customer). When I arrived, John was partly hidden from view by boxes of books: no barricade against my invasion, but the freshly-arrived collection bequeathed to the NCAL by our late President, Harold Abrahams. Literally monumental, it will be preserved in a way that keeps it identifiably Harold's, yet makes it available for enthusiasts to consult.

Already it is a comprehensive library; John's estimate is 650 volumes of British and foreign literature on all aspects of athletics. Some are rarities. I noticed W. Thom's PEDESTRIANISM (1813), the first book to deal fully with competitive running; 'Stonehenge's' BRITISH RURAL SPORTS (1856); C.A. Wheeler's SPORTASCRAPIANA (1867); H.H. Griffin's ATHLETICS (editions of 1893 and 1898); W.G. George's 100-UP EXERCISE (1908); and Sophie Elliott-Lynn's ATHLETICS FOR WOMEN AND GIRLS (1925), with its plates of such doughty pioneers as Mary Lines and Florence Birchenough. Many are inscribed by the authors. There is an excellent collection on road-running and race-walking from the library of the late Ernest Neville. A total of 118 individuals have donated books since 1969, among them some familiar names - Jim Coote, Sandy Duncan, Geoff Dyson, John Jewell, Charles Reidy, the late Dave Roberts - and NUTS members it would be invidious to list. The UK National Documentation Centre for Sport, Physical Education and Recreation, located on the floor above, has also provided some valuable items. Publishers, too, have been generous with donations. Two acquisitions that interested me as a historian were the bound volumes of SPORT AND PLAY dating from 1876 and the MIDLAND ATHLETE for 1879 and 1880.

I asked how the NCAL is financed. John Bromhead's salary (he divides his time between the NCAL and the cataloguing of Modern Greek and Byzantine Greek Literature) is paid wholly by the University, which additionally provides sufficient funds for the purchase of new books and materials. If there is a constraint, it is in accommodation. There is clearly a problem in storing so much material in a small room, and the problem has become a crisis with the arrival of Harold's collection. Relief in the shape of additional shelving has been promised.

Books are by no means the whole of the collection. I counted 22 pamphlet boxes containing the late Joe Binks's sedulous tabulation of results; and a further 230 filled with handbooks, statistics, programmes, letters, photos and press-clippings. There is a complete set of ATHLETICS WEEKLY - to which the NCAL subscribes - and sets of almost any other track or general sports journal, English or foreign, you care to name.

In a recess adjacent to the room is an NCAL exhibition; the current items include Sam Mussabini's confident letter to Harold Abrahams on the eve of the 1924 Olympic 100 metres Final; a large colour-printed souvenir of the 1908 Olympic Marathon; badges and competitor's number worn by Audrey Brown, sister of Godfrey and Kilner, at the 1936 Olympics; and the Greek flag flown at the 1969 European Championships. Richard Szreter - also on the staff at Birmingham - often talked to John of his vision of this exhibition, and it is good to see it realized, but they are determined to add to it. An article by John outlining the work of the NCAL appeared in the IAC NEWSLETTER last August, and included an appeal for exhibits.

An enterprise of imagination and significance that is well under way is the collection of tape-recorded interviews with distinguished athletes. Encouraged by Harold - who himself gave a characteristically lucid interview - John has made tapes with Sir Roger Bannister, Guy Butler, Audrey Court (nee Brown) and Godfrey Brown, Sydney Cross, Robert Howland, Douglas Lowe, Philip Noel-Baker, Howard Payne, Jannette Roscoe and Rex Salisbury-Woods. John Jewell has donated tapes he made with Professor Arnold Beckett of the IOC Medical Commission, Sam Ferris and Pete Gavuzzi, and there are shorter recordings - some from BBC sources - of Lillian Board, Lynn Davies, David Hemery, Ron Hill, Paul Nihill, Ian Stewart, Dick Taylor, Ron Taylor, Bill Toomey, Mary Toomey and John Whetton. The tapes are primary sources for writers and researchers on athletics. They are there to be used at Birmingham!

Who does use the NCAL? By far the largest group is rightly the student population of the University. Many are on a combined Arts/PE honours course, and they use the facilities for research into projects. Members of staff and the University AC also come regularly, but the visitors' book records many browsers as well. Then there are researchers from

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farther out, like Harry Mawdsley, Senior Lecturer at Crewe and Alsager College of HE, studying 'The Development of Athletics in the Potteries 1850-1900' (see ATHLETICS COACH Vol. 12 No. 2). International athletes often call; I noticed the recent signatures of Mike Kearns and Sydney Cross. Then there are the NUTS; if we haven't yet beaten our own path to the door, there are many familiar names in the book, and I think the steady expansion of the NCAL is certain to draw us more frequently to Birmingham. NUTS of the next generation have already found their way there; a 17 year-old makes the pilgrimage regularly from Effingham in Surrey to do statistical research.

I asked John Bromhead how the NCAL might develop in the next ten years. He is keen to make up deficiencies in the book-list - Wilkinson's MODERN ATHLETICS (1868), the later editions of Shearman's ATHLETICS and W.R. Loader's TESTAMENT OF A RUNNER (1960) are on his immediate list of 'wants' - and he plans to add to the stock of taped interviews - B. Howard Baker and the Marquess of Exeter have agreed to participate next. He hopes better facilities can be provided for recording and listening to tapes. The Author Catalogue, last published in 1972, is due for revision, and will run well beyond the 18 pages of that edition. John is very enthusiastic to add to the collection of exhibits that appear from time to time in the display cabinets. And by the amount of correspondence he is getting from abroad, the NCAL is becoming internationally known.

If you haven't been to Birmingham lately, or at all, I think a visit will surprise and delight you. It is open Monday to Friday 9-5, and on Saturday mornings by request. The address is: National Centre for Athletics Literature, Main Library, University of Birmingham, PO Box 363, BIRMINGHAM B15 2TT. Write first to John Bromhead and he'll send you a map of Birmingham and the campus. If you decide to send some books or that pair of spikes you wore the day you won the gold, the donation will be gratefully acknowledged and duly enshrined. And the postage refunded. End of commercial.

THE NUTS IN PREHISTORY

Stan Greenberg

The National Union of Track Statisticians is the only organisation in Britain, and probably in the world, which was founded in the middle of the Baltic Sea. Though the exact location, latitude and longitude, is lost in the mists of time, the Aland Islands were certainly the nearest landfall. The occasion was the return journey from the 1952 Olympic Games in Helsinki - in those days ordinary mortals travelled by boat, not by aeroplane - and the date was 4 August 1952. The people involved on that momentous voyage were Len Gebbett, Alf Wilkins and the writer. They had originally met for the first time on the journey out, via the North Sea, Gothenburg, Stockholm and Turku. Alf and Len shared a cabin and soon realised their common interest in not just watching track and field, but collecting and collating statistics about the sport. I had shared with a young lad who had won the National Junior walking title, and who wore a metal brace on his back due to a malformity. I remember thinking how remarkable this lad was to overcome such a handicap. His name was Norman Read and he later won the 50km Walk in Melbourne (1956) representing New Zealand.

But back at the ranch - oops, sorry, the boat - the founding fathers were stoutly defending a table in the boat lounge on which they were assiduously filling in their Olympic programmes from a set of official results. (In those days they were more difficult to obtain than gold dust.) At intervals they discussed their overriding passion - and also talked about athletics. It was agreed that it would be much more pleasant to attend meetings, at the White City and elsewhere, together than go alone, and such contact would enable them to share the odd items of news which they had variously collected. To this nucleus, who usually met in T-block at the White City, or on the back straights of Motspur Park, Chiswick, Paddington et al, were added others at intervals.

The following winter, Len and I were returning, by coach, from watching the Inter-Varsity relays meeting at Oxford. There were only a few other people on the coach, one of whom was a not unattractive young lady. While we were pondering situation, there appeared from the back of the coach a gaunt figure clutching the largest bag of sweets ever seen. Ingratiatingly he offered one to the girl, and then with less ardour, offered them to us. The fellow introduced himself as Denis Briscoe (President of the Pirie for King Club) noting that he had often seen us at various tracks, and another future NUTS member was pinpointed. (There is no truth to the rumour that it is an invariable rule now that on long journeys Len and I stock up with chocolate and sweets - just in case!)

In the early 1950s Alf and I used to train regularly at Victoria Park, and in 1953 we were overheard discussing the German sprinter, Heinz Fütterer, by a youngster who couldn't believe that anyone else had ever heard of him, then a comparatively little-known athlete. He was from my former school, Grocer's, and he struck Alf as excellent NUTS material. I didn't think so at first because the 'kid' was too much of a know-all (i.e. he knew of things that I didn't). For quite a long time Alf was the link between the two rivals who kept their respective lists of performances very much to themselves so that the other one shouldn't find out any rare unearthed data. But finally Mel Watman (oh, so that's who it was!) was a fully-fledged and most welcome member of the T-block Mafia.

Our walking expert, Colin Young, and his sidekick, Robin Campbell (along with other members of the Zátopek for President Club), were met at the 1954 Leyton Floodlit meeting on 5 May. Generally speaking, we had not been very walking oriented until then, but Colin's infectious enthusiasm, as well as his wide knowledge of the sport, not just walking, made us take notice of what at that time was the most 'winningest' facet of our sport. That night will always remain in my memory - not that Colin made that much of an impression on me - as it was then that I decided, due to the diabolical weather, that I would not go with Len to Iffley Road the following day to watch the AAA v OUAC match. That following evening after a 'phone call from a near hysterical Len, I realised that it may well have been the most disastrous decision that I have ever taken in my life. (No prizes will be given to those who have worked out why.)

We had seen Martin James on many of those wonderful Wednesday evening meetings at Motspur Park, but it was not until the AAA v OUAC match of the following year (1955) that we formally met. Martin had also been at the European Championships in Berne the previous year, but had only been a cursory acquaintance till then. He was to take his obsession with the sport one step further than most of us and marry a top-class athlete.

Our erstwhile secretary-to-be, Peter May, came into the group in a rather roundabout way, starting with Len meeting a couple of 'ordinary' enthusiasts from Wigmore Harriers in Helsinki. They mentioned that they had a friend with similar strange notions back in London, and later they introduced Peter. Last heard of he was in the US (where, in the days prior to the current jogging fad, he was once picked up by squad cars in the Beverley Hills area, and taken to the police station on charges of loitering with intent - they wouldn't believe that anyone would be out running at night, in 'sneakers', and dressed in black, the colour of Peter's track suit.)

It is probably not very surprising that our ever-youthful looking Chairman, Bob Sparks (I am only nice to him every 20 years), first came to our attention as an expert on junior performances. We had heard about him for a long time in that connexion before Mel had made personal contact with him. We all got to know him first at Hurlingham on 4 May 1957 when Mike Lindsay threw a world junior discus record of 58.96 in the London v Paris Schools match. Bob was rushing around making sure that all the conditions were correct for a record application. Though he has gone on to greater things I still feel that in his heart he would prefer to deal exclusively with the (comparatively) pure world of junior track and field achievements.

Also during 1957, the group were noticing a bespectacled young man whenever they went to Motspur Park. After some tentative communication, including many of those 'famous' postcards, we we decided surrender was better than retreat, and on 22 March 1958, at the Oxford v Cambridge match at White City, we were all introduced to Andrew Huxtable. With his remarkable ability to appear and disappear virtually at will, it was many years, however, before I was convinced that he was not merely a figment of my imagination.

At that time (1957) I was working for the Unilever combine, and I discovered in one of their subsidiaries, the United Africa Company, a chap named Pat Brian. I had walked into an office one day and found this chap being questioned closely on Olympic Games history. He was very good, but was a trifle put out to find that he was not unique in his ability to give the correct answers. Pat holds a special niche in NUTS

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history, in that he is one of the few members, of the early ones perhaps the only one, whose writing was always 100% legible. There are those amongst us who feel that such a trait should, in fact, debar him and his like from membership.

Having been a Welsh, and then Birmingham, correspondent for some time, our most peripatetic (you can tell Norris's influence can't you) member, Les Crouch became personally known to us under delightful circumstances. It was along the back straight at Chiswick in May 1958 watching Mary Bignal long jumping in the Southern Championships. She only came second, but as I am sure you will all agree, who cared. They don't make 'em like that any more - or as a jumper either. Another early memory of Les is connected with long jumping, but that is another story altogether.

And last, but not least, of our merry little band was Chris Lindsay. He was already an avid collector of statistics, probably for the Anglo-Scottish Club, and was editor of the Queen's Park Harriers newsletter. Alf met him training at Paddington in 1956-57, and his statistical interests, the fact that he was a top-class runner himself, and his brother Mike a world class junior thrower, gave him all the qualifications for becoming an embryo NUTS member. Some credit must be given to Chris for the eventual formal arrangement of pooling knowledge for the common interest of the group, as he was always pushing for the abandonment of the "sectional interests" which originally beset the early members of the group. He, too, gave his all to the sport and married a first class athlete (only joking, Jill!).

Thus, in the words of the Venerable Bede on another historic occasion, my history is complete. I hope we are all around for the Golden Anniversary, which by my reckoning is only in 2008 - we know what the long jump record will be, don't we, but imagine that for 800 metres!

ALF WILKINS INTERVIEWED

Mel Watman

MFW: Alf, your involvement in athletics has been extremely diverse over the years. As a club athlete, Senior MD Coach, founder member and first Chairman of the NUTS, founder member and Vice-President of the British Milers' Club, globe-trotting spectator - let's deal with these various aspects.

We'll start first with you as a runner. Your first race was in 1945 according to NUTS NOTES, the first issue I ever did, and your last was, as you said then, in 1958. Now what, apart from an incredible flukey win over me in a certain 660 yards handicap, has been your most memorable moment as a competitor?

APW: It was running the first leg of a medley relay at Victoria Park in the Stepney Borough Sports.

MFW: What year was that?

APW: I was about 16, so it was probably in 1948. I wasn't in the team and our quarter-miler, who was the best quarter-miler at Grafton at the time, did not turn up and I ran the first leg. On the same leg was a boy who had placed third in the Middlesex Junior 440y that previous weekend and Sammy Dias, and I beat both of them. I remember my friends rushing round to my parents saying that I was going to be a champion athlete! The other athlete, who was from Victoria Park Harriers, had done about 56 odd on the Saturday in the Middlesex Championships and I estimate my time as anything between 54 and 90 (we weren't timed in those days!), but it must have been between 54 and 58. I remember going round the top bend and recalled the week before Parlett had beaten Harris and Wint in the AAA 880y; Parlett said that all he did when he passed them was say to himself "I must relax, I must relax." I did the same thing and 'flew away' and did a fantastic leg and have never run the same since. That was my ultimate.

Also another good race - I remember beating Albert Pattison in an 880y at Eton Manor (and Pattison went on to international class, just losing to Klaus Richtzenhain over 2M at White City). The race was won by George Smith in just outside 2 mins. I was second or third, with Pattison behind me.

MFW: Was there a time in your early years as a runner when you thought you were really going to reach the top?

APW: People told me when I was young that I was an excellent runner but maybe it was only compared with the people I was running with. What with studying and injuries and I suppose lack of real ability, I was never able to make the grade. The thing I regret is never running in a Marathon.

MFW: Me too! Is that something you think you might yet do?

APW: Never - it's too far.

MFW: Well, that brings us more or less on to the next question. It's about 20 years now, in fact, since your last official race and you are still training fairly regularly. Is that purely for health reasons? Or can we expect you to ever make a comeback to racing as a veteran or whatever?

APW: I run for two reasons: one - I enjoy it; two - you've got to be fit to coach. You can't jog around with athletes puffing and blowing - you've got to be able to run and talk at the same time. I do a lot of talking to athletes when coaching and rather than standing talking it's best to jog with them. I find it very helpful in coaching to talk to athletes whilst they're jogging in between their fast repetitions on interval running or on any other occasion. I enjoy running and enjoy the company of the people I run with.

MFW: Right, now you've mentioned coaching. How and when did you take up coaching?

APW: At my youth club I was a helper with the junior boys - that's the under 13s - and I used to take a road running class when I was about 17. I met Harry Kane at that time at the youth club and he used to help me. Once a week we used to take out between 20 and 50 boys running in "twos" on the road. We used to take them for two or three miles, bring them back and then do our own training. Harry and I used to train together two or three times a week. We found a road near the Bank of England which was made of rubber. It must have been the first all-weather track in England! We used to do all our fast training on this road after taking the kids for a run. I got interested in helping these kids, found some of them had improved and got interested in coaching from there. I was the manager in charge of road running and athletics and it developed from that.

MFW: I think a lot of people, particularly the NUTS, will remember you as being the coach of Len Walters, amongst other athletes. Would you say Len was your greatest coaching success or was he your greatest frustration?

APW: Len was my greatest failure. Len, I'm still convinced, would have won the gold medal at the Munich Olympics at 800m if he had carried on running at that distance. My greatest success, I think, was Tony Miller - you may remember Tony?

MFW: We should point out not <u>the</u> Tony Miller of the NUTS - another Tony Miller!

APW: Tony joined Grafton only because his uncle was the chairman. He had no ability whatsoever. As a first year youth when he joined he was running about 65 for 440y and yet as a junior he broke 2 mins and won the Middlesex junior 880y. I think that was a better achievement getting a boy with no ability to a county title than someone like Len with fantastic ability to international class.

MFW: So Tony Miller is the athlete who gave you most satisfaction or what about someone like Danny Wiseman?

APW: All my athletes, when they improve, give me satisfaction. Danny gave me satisfaction in the fact that I was able to help him not only in his athletics but just help him generally. Allan Cowen gave me satisfaction in that he kept at the top so long but Allan, I think, was a failure because he never reached his true potential. He admits it now and is sorry.

The most satisfying performance by one of my athletes was undoubtedly that evening at Motspur Park when Ray Roseman eventually broke four minutes.

The greatest satisfaction I have had is that most of my ex-athletes are still close personal friends.

ALF WILKINS INTERVIEWED

MFW: But as a coach would you agree that there is just as much satisfaction in guiding a guy who really hasn't got much talent, say from a six-minute mile to a five-minute mile as there is a really talented guy from four and a half minutes to four minutes?

APW: There is personal satisfaction - but then you get all the outside people asking "Who have you ever coached?" and it's good to say or for people to know that at least you've coached somebody who has made the grade. But every coach's ambition is to get somebody from novice stage to Olympic champion or World record holder. Everybody wants to do this but not everybody can or will.

MFW: I think another of your coaching highlights must have been the Maccabiah 4 x 400m squad. What year was that?

APW: And the sprint relay - 1961. Two sprint relays, in fact - the women's and the men's as well as the 4 x 400m. The 4 x 400m squad were three Grafton members (all my athletes) plus Dave Segal. And the same team (with Gerry Simons instead of Segal finished fourth in the AAA 4 x 440y championship, when the first three teams included many internationals. The winners being Birchfield with an all international squad: Brightwell, Salisbury, Rawson and Farrell. I knew then that the team had a chance of winning the Maccabiah but I think the greatest thing was the sprint relay because there were three moderate sprinters plus Segal against four international class sprinters.

MFW: The Americans?

APW: Yes!

MFW: Lastly, on the coaching side, are you a sort of disciple of any coach in particular like Lydiard or Cerutty or have you just taken ideas from everybody and made your own judgments?

APW: I think I have made my own judgments with ideas from everybody. Obviously my views today are not what they were when I first qualified 20 years ago. For example, in those days nobody knew the effect of distance work - nobody bothered about long runs but now I think it's really imperative for middle distance runners to do distance work as a background. Most athletes are doing this nowadays.

MFW: Now on the next aspect. The very first meeting of the NUTS we had actually took place in your office in Mansfield Street in the west end 20 years ago. Looking back now do you think the NUTS have achieved most, or all, of what we set out to do? Or have we sort of fallen short?

APW: I remember saying at one of our first meetings that in ten years we'd be running athletics in this country. Well, we're not actually running athletics but I think we have a great influence on how athletics is being run in this country. When we were first formed only the winners or the first three were being timed even at major meetings like the Inter-Counties. If you remember they used to fire a gun for standards. It's through our insistence that all athletes are now timed at all meetings - not only at Championships. I think this is a great thing we have done for athletics. Well, not only for athletics but for the athletes themselves. I think we've made our mark.

MFW: A lot of our individual members have reached very high positions in all sorts of ways.

APW: Tom McNab? That's what I meant by us running athletics.

MFW: Now, as a spectator you have attended most of the Olympics since 1952.

APW: One day at 1948.

MFW: And most or many European Championships since 1954?

APW: I've missed one European, at Athens (1969), and I missed Tokyo and Melbourne.

MFW: Has anything, in fact, surpassed for atmosphere and excitement, the Helsinki Olympics for you?

APW: No - that's still the ultimate! And the greatest race ever was the 5,000m at Helsinki. I think that was better than Chataway-Kuts at White City (1954).

MFW: That was one of the things I was going to ask you - which of the races ....?

APW: Helsinki 5,000m. I can still feel the atmosphere with the British shouting "Chat-a-way, Chat-a-way" and all around the stadium the shouts for "Zát-o-pek, Zát-o-pek" and cries "Allez Mimoun" and for Schade. When Chataway fell there was just complete silence for a few seconds and then the whole stadium roared for Zátopek and the look on Zátopek's face was unbelievable. I was watching him through my binoculars. He looked in such agony. It was fantastic the way he burst into the lead and that was it. I still think that was the most exciting race I have ever seen.

MFW: And if you had to name one athlete you admired most of all would it be Zátopek?

APW: Ron Clarke, and most probably Steve Ovett in the future. I am sure that Steve will prove to be the greatest runner this country has ever produced.

THE NUMBERS RACKET

Mike Woolf

In the 10th birthday issue of NUTS NOTES I had an article entitled 'Isomarks?' about scoring tables for track and field. At that time I had intended to do some work on scoring tables but my usual indolence won, and despite the occasional flirtation with some of the mathematics involved I made no progress. Last summer Andrew Huxtable gave me copies of papers written by J Gerry Purdy detailing work he had done on producing a new set of tables which he hoped to have accepted by the IAAF. I believe them to be no improvement on the present official tables, and in part this article is a critique of Purdy's papers.

When Andrew first mentioned the papers to me I hoped Purdy had made efforts to provide a physiological basis for his tables, possibly along similar lines to my suggestion in 'Isomarks?' that internal power be the criterion by which performances were rated in track events. Purdy mentions the possibility, but does not pursue it.

His approach is along conventional lines, except that he advocates point scores of the order of 1000 and which include 3 decimal places, i.e. a total of seven significant figures. The arguments for being (i) that this ensures a unique point score for each performance and (ii) that ties in a decathlon or pentathlon would be highly improbable. In some events performances are only measured to three significant figures and it can be argued that tables with four significant figures cannot be relied upon to justly resolve a close decathlon or pentathlon. Resolution using 7 figure scores in which for a given performance in some events three of the figures are essentially random is not a tenable idea. Purdy's statement that a performance mark is an exact measure overlooks that a long jumper does not jump exactly 8.01 or exactly 8.02. His dismissive remark that error of measurement does not concern him can itself be dismissed. Simply stated precision is not accuracy.

In his theory he lists ten scoring table principles to govern their construction. Throughout the papers some stress is laid on scientific method. An eleventh scoring table principle suggests itself: that of economy. As few assumptions as are necessary should be made. The scoring function used demands too many.

Purdy's scoring function giving the points (P) scored by a performance mark (M) in any event is

$$P = C_1 (M - z) + C_2 \{\exp (C_3(M - z)) - 1\}$$

where C_1, C_2, C_3 and z are constants that depend upon the event. Clearly z is the performance mark that scores zero. This is arbitrarily fixed for each event as it has been in all other tables produced so far. I share Purdy's view that all earlier tables set the zero level too high, but his assumptions as to what constitutes a zero mark are extremely contentious. To cite just one example the zero levels at high jump and pole vault are both equal to .80m. This may or may not be reasonable; what cannot be denied is that errors in the zero level have ramifications at higher levels.

This leaves three constants C_1, C_2, C_3 to be fixed for each event. This is done by determining three performances for each event that can be awarded 1400, 1100 and 500 points. They were determined as follows:

(i) the 1400 point performance : at or near world record level (mean of top few marks)

(ii) the 1100 point performance : the mean for the top 50 performers over five consecutive years

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(iii) the 500 point performance : the mean level for masters in the 57-70 age group

Criticism of this procedure is absolute. The sample for the 1400 point performance is totally inadequate. The basis for the 1100 point performance is too restrictive at the top 50 only and its implicit assumption that the top N of one event are equivalent to the top N in other events is questionable, since to misquote Bob Sparks "Athletics data does not arise from randomly chosen samples". In using master performances to fix the 500 point performances at least two serious errors are being committed: the relative strength of masters to the general athletic population event to event is probably variable, as also is the relative number of participants. Moreover, what justification can there be for assuming that the relative difference between masters and internationals and internationals and world record holders can be set at 2? I dislike analogies, but this fixing of four equivalent levels and their relative worth seems akin to fitting an ill measured carpet in a room by fixing the corners and stamping the bulges down. It can't be done.

Consider the track events. The distance run can be called X. Then C_1, C_2, C_3 and z are functions of X. We are dealing with a real physical situation so examination of C_1, C_2, C_3 as X varies should reveal smooth behaviour if the performances had been well chosen. Purdy's quoted values for C_2 and C_3 show extremely erratic behaviour, though in fairness I should add that the solutions of a system of three simultaneous non-linear equations as used by Purdy are likely to be sensitive to small changes in the data.

We can look at this another way. Let $G(P, X, \bar{v}) = 0$ be a generalised scoring function for track events where $\bar{v}$ is the average speed with which the distance X is run. Purdy's generalised function is

$$P - f_1(X)\{\bar{v} - z\} - f_2(X)\{\exp\{f_3(X)(\bar{v} - z)\} - 1\} = 0$$

Set P constant and this becomes a function relating the mean speed $\bar{v}$ at which distances X are run. The erratic behaviour of $f_2(X)$ and $f_3(X)$ as given by Purdy clearly indicates inconsistency in the chosen equivalent performances. This may be unimportant near the 1100 point level but above the 1400 point level errors will mount quickly. Extrapolation is always error-prone but in this respect a simple scoring function would be steadier than the chosen one.

The first and higher order partial derivatives of G should obey certain inequalities on physical grounds. Purdy recognised this when stating that tables should not be regressive, $\left[\text{i.e. } \frac{\partial^2 P}{\partial \bar{v}^2} > 0\right]$ as the 1952 and 1962 IAAF and the Portuguese tables are, and Amado, author of the Portuguse tables, pointed out that the 1952 IAAF tables for track events showed odd behaviour $\left[\frac{\partial^2 \bar{v}}{\partial X^2}\right.$ exhibits turning points$\left.\right]$. Yet Purdy's and Amado's tables also exhibit anomalous behaviour. Indeed such behaviour is highly probable when many assumptions are made in their construction.

A consistent approach to the problem must recognise that the generalised scoring function includes not only the relationship between P and $\bar{v}$ but also that between $\bar{v}$ and X and while these can be independent functions it does not follow that varying the P - $\bar{v}$ relationship as X varies will leave the $\bar{v}$ - X relationship unchanged. It was for this reason that I suggested in 'Isomarks?' that tables be based on physiological effort and effort will determine the $\bar{v}$ - X relationship. Consistency might be achieved.

Consider the differential equation offered in 'Isomarks?'

$$\frac{d\theta}{dt} = F_1 - F_2 \qquad \text{(i)}$$

where θ is the oxygen debt, which is not necessarily equal to the excess oxygen used in recovery. This latter view has been argued by Harris in a paper amusingly entitled 'Lactic acid and the phlogiston debt' (1969). This might invalidate much of the work done to measure the relationship between energy expenditure and work.

F_1 is the rate at which work is being done by the athlete both aerobically and anaerobically, and F_2 is the rate at which oxygen is absorbed. The units are essentially consistent since work can be quoted as an oxygen equivalent.

Equation (i) gives

$$\theta_{max} = \int_0^T (F_1 - F_2)\, dt \qquad \text{(ii)}$$

or

$$\theta_{max} = \int_0^X (F_1 - F_2)\frac{1}{v}\, dx \qquad \text{(iii)}$$

where T is the time to run a distance X when the oxygen debt has reached its maximum value of $_{max}$ which is required for minimal T or maximal X. $v = \frac{dx}{dt}$ is the speed.

Also $$T = \int_0^X \frac{1}{v}\, dx \qquad \text{(iv)}$$

and $$X = \int_0^T v\, dt \qquad \text{(v)}$$

Athletics demands T be a minimum with $_{max}$ held constant, or X be a maximum with $_{max}$ held constant. It can be shown that these are equivalent. So for T to be minimum with (iii) constant gives

$$\frac{\partial H}{\partial t} - \frac{d}{dx}\left\{\frac{\partial H}{\partial p}\right\} = 0 \qquad \text{(vi)}$$

where $p = \frac{1}{v}$ and $H = p + \lambda p\,(F_1 - F_2)$ and λ is an undetermined multiplier independent of x, t and p.

It is reasonable to take F_2 to be a function of t alone which with adequate warm-up quickly approaches a limiting value. If it is assumed F_1 is a function of v alone, (vi) solves to give p (and therefore v) constant. This is so for F_1 being any function of v though T is only a minimum if $\frac{dF}{dv} > 1$. This says even pace running is best. (ii) or (iii) can then be solved to obtain the x - t or x - v relationships. If this is done using the relationships between F_1 and v suggested by experimental laboratory results it is found that none give a reasonable fit with track data. Even the realisation that the track data would lie on the envelope to a system of curves obtained from (ii) and (iii) does not help: just the reverse, since the curvature is in the opposite sense. The discrepancy always arises from the 5000m and to a greater extent the 10,000m which seem to be too slow. The Marathon data is worse still but this is only to be expected since (i) is certainly inadequate for long distances. There could be two explanations for the apparent slowness of 5000m and 10,000m track data. There is a tendency for athletes to move up in distance until they stop at the distance which suits them. As a consequence, it is possible that the populations at various distances are not equivalent. A study of 5000m and 10,000m world lists shows that many world class 5000m men never run a serious 10,000m, but the reverse is seldom true. But allowance for this in no way removes the discrepancy. In addition, F_1 may depend upon another factor. If F_1 depends on θ then (ii) and (iii) become integral equations, and though it can be shown that v must then be a decreasing function of t numerical work is difficult. Simplest is the assumption that F_1 depends on t also with $\frac{F_1}{t} > 0$.

It can be shown that v is a decreasing function of time. Some physiologists have argued that for best results anaerobic reserves should be conserved till late in the race. This may well be true for racing conditions: mathematics indicates that for a lone performance the contrary is true.

(ii) and (iii) yield x - t, x - v relationships that track data fits superbly well. Too well, it could be argued! Also a value for $\frac{\theta_{max}}{F_2}$ of about 160 is obtained. Laboratory work yields a value of 150 to 180.

With the validated form of F_1 in terms of v and t the points P for a performance when a distance X is run in time T would be given by

$$P = \frac{K_x \int_0^T F_1\, dt}{T} \quad \text{where } T = \int_0^X \frac{1}{v}\, dx.$$

K_x is a constant dependent on X determined by just <u>one</u> equivalent performance at each distance.

The assumptions made in this approach are both fewer and more reasonable than those made in the conventional tables. In particular a zero point performance does not have to be arbitrarily fixed.

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Of course the practical difficulties are great. The field events would require sophisticated laboratory techniques if power were to be criteria by which performances were judged.

It can be argued that, since the only practical use of the tables is in decathlon and pentathlon events, there is no need for such sophistication as the present tables are reasonably adequate. Certainly comparisons between events is largely fatuous. "Which world record is best?" is no more meaningful than asking "Who is the best musician?". Purdy's suggestion that decathlon performance totals be reduced by the standard deviation for the ten individual point scores is alarming. Why not two or three standard deviations? If, as he suggests, the more balanced performer should be rewarded, a more reasonable idea is to take the geometric mean for the performances, rather than the arithmetic mean (which the process of addition gives). This would lead to an increase in the importance of the 1500m in the decathlon.

FALL IN STANDARD WITH AGE

David Burton

A comparison for most of the track and field events between the top and top 10 (in some cases top 5 due to lack of data) UK male athletes and UK male Veteran (over 40) athletes has been carried out.

Up to and including 5000m the % reduction in performance between top UK under and over 40 males is generally less than 10%. However, if the top 10 performances are compared the % reduction increases to 11.2-13.7%, the lowest value being at 800m where there was the highest (10.8%) difference for the top athletes.

If a comparison is made at 10,000m, 3000mSt, 110mH, 400mH, HJ and LJ the difference between the top men is 11.7-19.9% and 15.4-24.8% between the top 10. With the more technical and strong men's events - SP, DT, HT, JT, PV, TJ - the difference between the top men is 16-32% and between the top 5 athletes 25-35%.

Whilst obviously being biased towards the track events (as there are more Veteran competitors than in the field events) it does suggest that a higher relative standard of performance over the age of 40 can be achieved in the track events than in the field events compared to the top UK athletes.

	UK LISTS 1977		UK VETERANS LISTS 1977			
Event	Best	Mean of top 5 (*) or top 10	Best	% fall from UK Best	Mean of top 5 (*) or top 10	% fall from UK Mean
100m	10.3	10.34	11.2	8.7	11.76	13.7
200m	20.7	20.99	22.7	9.7	23.88	13.3
400m	45.9	46.98	50.5	10.0	52.83	12.4
800m	1:45.0	1:47.65	1:56.3	10.8	1:59.75	11.2
1500m	3:34.5	3:39.0	3:56.1	9.8	4:06.0	12.2
5000m	13:20.4	13:26.4	14:29.4	8.6	15:16.7	13.7
10000m	27:36.6	28:01.3	31:34.7	14.2	32:20.2	15.4
3000mS	8:26.6	8:31.2*	9:36.0	11.7	9:56.7*	16.7
110mH	13.8	14.14*	16.0	15.7	17.1*	20.9
400mH	49.7	-	58.1	17.0	-	-
HJ	2.14	2.11*	1.75	18.2	1.64*	22.3
PV	5.40	-	4.00	25.9	-	-
LJ	8.04	7.63	6.44	19.9	5.74	24.8
TJ	16.33	16.05*	13.67	16.3	12.09*	24.7
SP	21.30	19.43*	16.24	23.3	13.39*	31.1
DT	59.80	58.48*	46.26	22.6	41.89*	28.9
HT	74.24	68.02*	50.58	31.9	46.11*	32.2
JT	81.50	78.36*	60.20	26.1	50.74*	35.2

CONTROLLING DRUG ABUSE

Carole Endersby

Why do athletes take drugs?

Perhaps the sportsman or sportswoman thinks that drugs will help him or her to achieve strength and stamina. He or she may wish to gain an unfair advantage over other competitors or, thinking that they are taking drugs, not wish to be left behind. In some cases it may be, not the athlete, but the coach, team physician or masseur who, in his enthusiasm to win, gives drugs to the uncomprehending competitor. Any advantage which may be gained could depend ultimately on the skill of the drug manufacturer in his design of new therapeutic compounds.

Some competitors may require drugs to treat illness, such as asthma, or joint and muscle injuries. These drugs, taken in normal doses, would be safe for the sedentary patient, but they are likely to mask the body's warning signs that would occur in conditions of extreme exertion, leading to serious injury or even death.

Which drugs are abused?

The list includes the stimulants, such as amphetamine, ephedrine and other drugs used for the symptomatic treatment of asthma, hay-fever and colds. Some of these drugs are ingredients of 'cold-cures' which may be purchased without a doctor's prescription. A number of deaths of sportsmen have been attributed to the effects of over exertion, such as cardiac arrest, while under the influence of stimulant drugs. Also abused are the anabolic steroids, which are thought to help increase muscle strength. While these steroids are used therapeutically for the treatment of muscle-wasting disease, their anabolic efficacy in healthy individuals remains in doubt. However, their side-effects are well-known, and include increased blood-pressure, dizziness, headache, reduced sexual activity and serious metabolic abnormalities, such as liver dysfunction. It is particularly hazardous for adolescents to take large doses of these drugs because of their similarity of action to normal body steroid hormones. In addition, if taken by women, the steroids are likely to produce masculinisation.

How are the drugs detected?

Much of the fundamental work in developing methods of analysis was carried out in the early 1960s in the Pharmacy Department of Chelsea College, University of London, under the direction of Professor Arnold Beckett. This major contribution to the subject is regarded as forming the scientific basis quoted by sports federations in the UK and overseas, including the Medical Commission of the International Olympic Committee.

Testing of samples at Chelsea College began in earnest after a comprehensive method for the detection of stimulant drugs had been devised. This formed the basis of today's analysis which begins with extraction of any drugs which may be present in the competitor's urine sample. This extract is concentrated and the components are separated chromotographically. The chromotographic data thus obtained are diagnostic for the various drugs. Further, confirmatory, tests (including mass-spectrometry) are performed to establish unequivocally the identity of the drug. Only at this stage is a positive result declared and a second analysis is then performed on a reserve sample of urine.

It was not until 1974 that suitable tests for the detection of anabolic steroids were devised. The analysis comprises two distinct parts: a preliminary, screening test, to select those samples which contain a steroid, was developed by Professor Ray Brooks at St Thomas' Hospital, London. Samples thus shown to contain a steroid are subjected to a complex extraction method developed at the Clinical Research Centre, Northwick Park Hospital, Harrow, Middlesex. Finally, the prepared samples are analysed by chromotography and mass-spectrometry.

Why establish a Centre for Drug Control?

Since the beginning of formal drug testing at international sports meetings, with the 1965 Tour of Britain cycle race and the World Cup in 1966, analysis of samples from athletes has continued at Chelsea College as a fringe activity of the Department's scientific research into drug metabolism. The development work has been carried out largely using University and Medical Research Council funds. Financial restraints on British research have curtailed further development of analytical methods and routine testing of samples. Up to now, there has been no British centre for the control of drug abuse in sport, although such laboratories have been set up in other countries, such as Germany and Canada in preparation for major sporting events.

The need was realised to establish such a centre in Britain and approaches were made to the Sports Council for funding of a centre at Chelsea College with its own staff and equipment, the prime purpose being to carry out drug control in sport and to develop methods of analysis for such controls as new problems arise. The Sports Council is to make grants totalling £25,000 per annum for three years towards annual and recurrent costs (salaries, equipment, administration), with the capital cost of some of the apparatus obtained from industrial sponsors. A further £5,000 p.a. for three years will go to St Thomas' Hospital, where Professor Brooks will link with Chelsea College to provide a joint testing centre.

Dr David Cowan will be responsible for the scientific day-to-day operation of the Centre at Chelsea College under the Director, Professor Beckett. The Centre hopes to be able to carry out a programme of education to alert athletes and the public to the undesirability of drug abuse in sport, as well as to encourage governing bodies of sport in the UK to introduce tests on a much wider scale. To this end, the Sports Council is to grant aid governing bodies at the rate of 75% on the cost of £5 for tests on stimulants and £7 for steroids.

I wish the Centre every success!

WORLD RANKINGS 1947-77

Peter Matthews

TRACK & FIELD NEWS has published the highly authoritative Top 10 World Merit Rankings of Don Potts and Roberto Quercetani each year since 1947, while women's events have been ranked since 1956 by Jan Popper. In this survey I review the performance of British athletes at all the standard events; note that some events have only been ranked in recent years, viz Men - Marathon (from 1969), Walks (from 1970), Women - 1500m (from 1969), 3000m (from 1974), 400mH (from 1977).

1. EVENT BY EVENT SUMMARY

1.1 Men

Event	No of GB men	No of plac-ings	Total Pts	No of years GB ranked	Highest Placing	Most Pts by an individual
100m	5	12	63	11	2 McD Bailey 51	41 Bailey
200m	7	12	64	12	1 McD Bailey 51	31 Bailey
400m	6	15	78	11	1 A Metcalfe 71 1 D Jenkins 75	31 Jenkins
800m	12	26	110	21	3 J Parlett 50 3 B Hewson 58 3 A Carter 71	23 Hewson
1500m	16	31	143	21	1 R Bannister 54 1 D Ibbotson 57 1 S Ovett 77	34 Bannister
5000m	18	48	275	24	1 I Stewart 70	39 G Pirie
10000m	31	67	329	26	1 D Bedford 70 1 B Foster 75,77	35 Bedford
Mar	10	19	94	7	1 R Hill 70 1 I Thompson 74	37 Hill
110mH	5	7	23	7	5 D Hemery 70	9 Hemery
400mH	12	25	132	19	1 D Hemery 68 1 A Pascoe 75	33 Pascoe
3000mS	8	15	82	11	1 C Brasher 56	24 J Disley
HJ	1	3	19	3	1 A Paterson 49	19 Paterson
PV	-	-	-	-	-	-
LJ	4	12	55	11	2 L Davies 64,66	44 Davies
TJ	2	3	18	3	4 F Alsop 64,65	14 Alsop
SP	3	13	81	13	1 G Capes 75	38 Capes
DT	1	1	2	1	9 M Pharaoh 56	2 Pharaoh
HT	3	5	12	5	5 M Ellis 57	8 Ellis
JT	-	-	-	-	-	-
Dec	1	1	7	1	4 D Thompson 77	7 Thompson
20kmW	4	5	27	4	3 P Nihill 71	14 Nihill
50kmW	1	1	2	1	9 P Nihill 71	2 Nihill

1.2 Women

Event	No of GB women	No of plac-ings	Total Pts	No of years GB ranked	Highest Placing	Most Pts by an individual
100m	10	19	101	13	1 D Hyman 62,63	35 Hyman
200m	13	21	93	13	1 D Hyman 63	32 Hyman
400m	14	25	127	17	2 L Board 68	24 Board
800m	10	26	136	16	1 D Leather 57 1 A Smith 65	25 Leather
1500m	4	7	21	5	5 R Ridley 71	12 Ridley
3000m	2	2	12	2	3 J Smith 74	8 Smith
80/100mH	6	11	44	9	3 C Quinton 60 3 P Jones 67	14 Quinton 14 M Rand
400mH	2	2	3	1	9 C Warden 77	2 Warden
HJ	6	19	77	14	2 T Hopkins 56	17 Hopkins
LJ	7	20	112	17	1 M Rand 59,60, 63,64	67 Rand
SP	-	-	-	-	-	-
DT	-	-	-	-	-	-
JT	2	3	13	3	2 T Sanderson 77	9 Sanderson
Pen	4	13	78	10	1 M Peters 72	47 M Rand

Not surprisingly the distance events score easily the highest, with at 10,000m 31 men clocking up 67 rankings since Frank Aaron led the way in 1950. Best year ever was in 1963, when five British athletes made the World Top 10 at 10,000m. Years in which four or more British men have ranked at one event are:

5 1963 10,000m 2 R Hill, 4 B Heatley, 6 J Hogan, 8 M Batty, 10 R Gomez
4 1959 10,000m 2 M Hyman, 3 S Eldon, 4 J Merriman, 5 M Bullivant
4 1961 10,000m 3 M Hyman, 4 B Heatley, 6 J Merriman, 8 M Bullivant
4 1969 10,000m 3 R Taylor, 4 M Tagg, 6 R Hill, 8 M Freary
4 1970 5,000m 1 I Stewart, 3 I McCafferty, 5 R Taylor, 10 A Rushmer
4 1970 10,000m 1 D Bedford, 3 L Stewart, 5 R Taylor, 7 R Matthews
4 1970 Mar 1 R Hill, 4 J Alder, 7 D Faircloth, 8 W Adcocks
4 1972 5,000m 3 I Stewart, 7 D Bedford, 8 I McCafferty, 9 D Black
4 1975 10,000m 1 B Foster, 4 D Black, 8 A Simmons, 10 B Ford

1970 was indeed the annus mirabilis for British distance running, with four men in the World's Top 10 at each of 5,000m, 10,000m and Marathon and the top ranked man in each event. Mary Rand's four top rankings (at long jump) is easily the best by a British athlete. On three occasions three British women athletes have been ranked in a year's top 10 at the same event:

3 1956 800m 4 P Perkins, 5 D Leather, 10 B Loakes
3 1962 400m 4 J Grieveson, 9 J Sorrell, 10 M Kyle
3 1968 800m 5 L Board, 7 S Carey, 8 P Cropper

2. TOP POINT SCORERS (10 for 1st to 1 for 10th)

2.1 One event

2.1.1 MEN

44	L Davies	LJ	33	A Pascoe	400mH
41	McD Bailey	100m	33	I Stewart	5,000m
39	G Pirie	5,000m	31	McD Bailey	200m
38	G Capes	SP	31	D Jenkins	400m
37	R Hill	Mar	30	J Sherwood	400mH
35	D Bedford	10,000m	30	B Foster	5,000m
35	A Rowe	SP	28	C Chataway	5,000m
34	R Bannister	1,500m			

2.1.2 WOMEN

67	M Rand	LJ	26	M Peters	Pen
47	M Rand	Pen	25	D Leather	800m
35	D Hyman	100m	25	S Sherwood	LJ
32	D Hyman	200m	24	A Lynch	100m

2.2 All events

2.2.1 MEN

72	McD Bailey	100m, 200m
65	B Foster	1,500m, 5,000m, 10,000m
64	G Pirie	1,500m, 5,000m, 10,000m
56	R Hill	10,000m, Mar
47	D Bedford	5,000m, 10,000m

2.2.2 WOMEN

132	M Rand	80mH, HJ, LJ, Pen
67	D Hyman	100m, 200m
39	L Board	400m, 800m

MARY PETERS: CAREER RECORD

Andrew Huxtable

■1939 0607 Halewood, Lancs. Mary Elizabeth PETERS born

■1955 2007 Ballymena Pen 3253 (3) NI champ
(413 28.0 13.5 834 143)

■1956 0505 Belfast(C) HJ 142 (4)

0407 Ballymena Pen 3300 (2) NI champ
(444 28.5 13.8 902 141)

1509 BirminghamU Pen 3679 (2) WAAA champ
(487 27.4 12.9 924 146)
SP 1031 ( ) nda

■1957 0806 Belfast( ) HJ 147 (2) NIWAAA champs
SP 1072 (1)
100y 11.9 (1)
DT 2794 (2)
80mH 12.5 (1)
4x110y 54.0 (1)

2406/2506 Belfast( ) Pen 3770 (2) NI champ
(990 150 27.8 12.5 481)

0308 Ballymena Pen 3913 (1)
(505 26.5 13.1 1039 152)

3108 BirminghamU Pen 3676 (4) WAAA champ
(480 28.4 13.1 1120 143)
100y 11.6 ( ) nda
220y 27.4 ( ) nda
80mH 12.4 ( ) nda

■1958 0305 Belfast(C) HJ 150 (2)
75y 9.2 (1)

1405 Belfast(C) 4x110y 53.0 (1) NI champ 2nd leg

2805 Belfast(P) 4x110y 51.0 (1) 3rd leg
80mH 12.4 ( )

0406 Belfast(P) LJ 519 ( )

0606 Motspur Pk SP ( ) qWAAA champs nda

1806 Ballymena SP 1189 (1)

2806 Ballymena 100y 11.6 ( )

0807 Belfast(P) 4x110y 50.2 (1) 1st leg
SP 1199 (1) light shot
DT 2992 (1)

1907 Cardiff(AP) SP 1121 (8) BECG
(1108, 1121, 1076)

2207 Cardiff(AP) HJ 147(12) BECG

2607 Cardiff(AP) 4x110y 50.1 (3) hBECG 3rd leg
50.3 (6) BECG 3rd leg

1309 Stoke-on-T Pen 3641 (4) WAAA champ
(494 27.6 13.1 964 142)

2409 Belfast(O) Pen 3720 (1) NI champ
(503 29.2 12.7 1114 145)

■1959 2905 Belfast( ) 80mH 14.4 (1)
HJ 142 (1)
DT 3112 (1)

0606 Belfast(O) SP 1218 (1)
DT 3252 (1)

1306 Belfast(P) 100y 11.4 (2)
LJ 532w(1)
SP 1143 (1)

1906 Belfast(B) HJ 150 (1)

2006 Belfast(B) 4x110y 50.4 (1) 3rd leg

2406 Ballymena Pen 3905 (1) NI champ
(489 26.8 12.2 1112 142)

0307 Motspur Pk SP ( ) qWAAA champs nda

0808 Wolverhampton Pen 3761 (7) WAAA champ
(488 27.3 12.6 1094 139)

■1960 2005 4x110y 51.5 (2)

1806 LJ 524 ( )

2506 DT 3134 ( )

0907 Stevenston LJ 524 (3) Ireland v Scotland
SP 1261 (1)
4x110y 49.9 (2)

1807 HJ 150 ( )

1907 80mH 12.4 ( )

■1961 1705/1805 Belfast( ) 80mH 12.0 (2)
4x110y 50.3 (1) 2nd leg
LJ 523 (1)
SP 1169 (1)
DT 3144 (1)

2005 Belfast( ) LJ 484 (1)
SP 1307 (1)
4x110y 51.6 (1)

1706 Belfast( ) HJ 157 (2)
DT 3100 (1)

2406 Belfast( ) SP 1295 (1)

2806 Ballymena Pen 3940 (1) NI champ
(520 28.2 12.4 1143 148)

0807 London(WC) SP 1141 (4) qWAAA champs
1224 (3)

1507 London(BP) SP 1260 (1)

2607 's-Gravenhage DT 3540 ( )

0708 London(WC) SP 1230 (4) GB v Hungary

2608 Bradford Pen 3934 (1) Northern champ
(501 27.8 12.4w 1211 145)

0109 Oberhausen SP 1192 (4) GB v GFR

0709 Warszawa SP 1164 (4) GB v Poland

1609 Larne HJ 162 (2)

■1962 2602 Belfast( ) SP 1333i(1)

3103 Wembley SP 1319i(2) WAAA champs

0704 Wembley SP 1403i(3) GB v GFR

0505 Ballymena SP 1350 (1)

1205 Chiswick Pen 4190 (1) WAAA champ
(479 27.4 11.8w 1295 158)

1405 Belfast(S) SP 1257 (1)

1505 Belfast(S) 80mH 12.1 (1)
4x110y 50.5 (1) 2nd leg
DT 3406 (1)

1905 Blackpool SP 1348 (1) Lancs champs

0206 Belfast( ) SP 1312 (1) NI champs
DT 3688 (1)
LJ 494 (2)
HJ 160 (2)
4x110y 50.2 (1) 2nd leg

0606 Dublin HJ 162 (1)

0906 Bolton SP 1329 (1) Northern champs

1606 Belfast( ) SP 1379 (1)

1906 Dublin SP 1346 (1)

2006 Ballymena Pen 4089 (1)
(513 27.0 12.8 1270 152)

2306 Manchester 80mH 11.3w(3) Northern ic meet
SP 1328 (1)
4x110y 50.0 (3)

2906/3006 Norbiton Pen 4420 (1) GB v Neths, Belgium
(11.9 1354 157 538w 26.5)

0707 London(WC) SP 1248 (2) qWAAA champs
SP 1304 (2)

1207 Dublin SP 1324 (1)

1407 Dublin Pen 4205 (1)
(527 26.6 11.9 1265 146)

2807 Northampton 1MM 4:11.0 (3)

0608 London(WC) SP 1270 (4) GB v Poland

1808 London(WC) SP 1309 (2) BGII

2508 Bradford Pen 4380 (1) Northern champ
(536 26.1* 11.9 1302 153) * straight

0809 Aylesbury 80mH 12.0 (4)
LJ 515 (4)
SP 1349 (2)

1209 Beograd SP 1315(12) European champs
(1290, 1315, 1174)

1309/1409 Beograd Pen 4586 (5) European champs
(11.3 1330 160 542 25.9w)

2209 Bishops St. SP 1369 (1)

2809 London(WC) SP 1332 (3) England v Neths

0310 Glasgow(IP) 80mH 11.8 (4)

2010 Brighton LJ 545 (3)
SP 1333 (2)
4x110y 48.5 (2) 2nd leg

2411 Perth, WA SP 1331 (4) BECG
(1184, 1331, F, 1320, 1256, 1244)

■1963 1503 Wembley 60yH 8.4i(2) hWAAA champs
8.4i(3)

1603 Wembley SP 1373i(2) WAAA champs

2203 Stuttgart SP 1301i(4) GB v GFR

2903 Wembley HJ 152i(3=)

3003 Wembley 60yH 8.5i(3)

1904 Wembley SP 1460i(1)

2004 Wembley 60yH 8.5i(3)

1105 Leamington Pen 4385 (1) WAAA champ
(544 26.6 12.0w 1310 157)

1805 Blackpool SP 1302 (1)

0106 Belfast( ) SP 1321 (1) NI champs
DT 3502 (1)
100y 11.2w(2)
220y 25.6w(3)
80mH 11.6w(1)
HJ 155 (1)
LJ 529 (1)

1506 Manchester SP 1338 (1) Northern ic meet
80mH 11.3 (1) downhill
220y 25.9 (4)

2206/2306 Vlaardingen Pen 4527 (1) GB v Neths, Belgium
(11.5w 1299 161 535 25.9)

0607 London(WC) SP 1246 ( ) qWAAA champs
1393 (4)
80mH 11.5 (2) h
11.7 (5)

2707 Chiswick 80mH 11.8 (2) Norrköping trophy
HJ 162 (2)
SP 1370 (1)
DT 3290 (3)
4x110y 51.3 (4)

MARY PETERS

0308 London(WC) SP 1358 (4) GB v USA
1508 Dublin 80mH 11.6 (2) Ireland v Belgium
4x110y 48.2 (1)
2308 London(WC) SP 1338 (4) GB v GFR
2308/2408 London(WC) Pen 3611 (4) GB v GFR
(11.5w/+2.8, 1281, 0*; * failed 148, 570/+0.2, 26.3) opening height
3108 Hurlingham SP 1337 (3)
220y 26.5 (5)
80mH 11.8 (2)
LJ 561 (2)
DT 3422 (8)
10x110y 2:03.6 (2) 2nd leg
1309 London(WC) SP 1373 (3) GB v Neths
2809 Volgograd SP 1350 (3) GB v RSFSR
0210 Budapest 80mH 11.4 (2) GB v Hungary
0310 Budapest SP 1371 (3) GB v Hungary
■1964 2803 Wembley 60yH 8.1i(3)
3003 Wembley LJ 573i(4)
SP 1497i(1)
1704 Wembley SP 1455i(2)
1804 Wembley LJ 549i(5)
0205 Belfast( ) SP 1397 (1)
3005 BirminghamU Pen 4801 (1) WAAA champ
(566 25.2 11.4 1425 165)
0306 Belfast( ) SP 1500 (1) NI champs
220y 25.1 (1)
0606 Belfast( ) 80mH 11.0 (1) NI champs
DT 3696 (1)
1606 Belfast( ) SP 1477 (1) RUC sports
2006/2106 Brussels Pen 4492 (2) GB v Neths, Belgium
(11.3 1166 158 561 26.0)
0407 London(WC) SP 1395 ( )qWAAA champs
1422 (1)
80mH 11.5 (2)h -0.9
11.2w(2)sf +3.2
11.5 (6) -0.2
0808 Bolton Pen 4733 (1) Northern champ
(11.0 1302 162 544 25.0)
1508 London(WC) SP 1460 (2) GB v Poland
100m 12.3 (6) inv
1908 Belfast( ) Pen 4823 (1)
(580w 25.2 1423 11.2 161)
0509 Brussels 80mH 11.2 (1)
0609 Enschede SP 1464 (1) GB v Neths
1109 London(WC) 80mH 11.2 (3) GB v France inv
1209 London(WC) SP 1379 (1) GB v France inv
2609 Portsmouth 80mH 11.2 (2)
1610/1710 Tōkyō Pen 4797 (4) OG
(11.0 1448 160 560w 25.4)
2010 Tōkyō SP 1446(14)qOG
(1344, F, 1446)
■1965 2603 Cosford 60yH i( )h nda
8.0i(2)
SP 1411i(1)
0204 Wembley SP 1494i(2) GB v USA
0304 Wembley 60yH 8.3i(2) GB v USA
1905 Belfast( ) SP 1337 (1)
2905 Chiswick Pen 4413w(1) WAAA champ
(520 26.1w 11.3w/+6.8 1337 150)
0206 Belfast( ) SP 1351 (1)
2606 Belfast( ) SP 1411 (1) sloping ground
0307 London(WC) SP 1406 (2) WAAA champs
80mH 12.0 (4)h
0907/1007 Praha Pen 4400 (1) Rosický mem
(12.0 1374 153 545 26.4)
2307/2407 Welwyn GC Pen 4373w(2) GB v Neths, Belgium
(12.1/-2.9, 1296, 155, 541/-1.8, 26.1w/+4.1)
3107 London(WC) SP 1398 (2) GB v Poland
(1305, F, 1398, 1222, 1340, 1371)
0808 Bolton Pen 4349 (1) Northern champ
(529 25.7 12.3 1295 155)
1408 London(WC) SP 1387 (3) GB v Hungary
1808 Belfast( ) SP 1402 (1)
2208 FontainebleauSP 1297 (5) European cup(sf)
0409/0509 E Berlin Pen 4512 (4) England v GDR
(11.5w 1348 155 556 26.3)
0509 E Berlin SP 1394 (4) England v GDR
■1966 1202 Cosford SP 1530i(1) WAAA champs
LJ 547i(8)
2703 Dortmund SP 1456i(7) European Games
0505 SP 1430 (1)
2805 BirminghamU Pen 4625 (1) WAAA champ
(570w 26.6 11.4 1507 154)
0106 Belfast( ) SP 1631 (1)
(1627, 1486, 1576, 1575, 1586, 1631)
LJ 557 (2)
1106 Belfast( ) SP 1662 (1) RUC sports sloping gd
1607 Dublin SP 1623 (1)
3007 Annotto Bay SP 1711 (1) no stop board
0608 Kingston, J.SP 1629 (2) BECG
(1629, 1586, 1611, 1629, 1597, 1540)
3008 Budapest SP 1481(11) European champs
(1381, 1350, 1481)
■1967 1103 Benoni SP 1421 (1)
1403 Benoni SP 1537 (1)
2503 Capetown SP 1451 (1) SA champs
4x110y 49.0 (3) 3rd leg
2703 Capetown 80mH 11.7 (3)hSA champs
12.0 (3)
1006 Belfast(SB) 80mH 11.5 (1) NI champs
HJ 164 (1)
LJ 534 (1)
100y 11.1 (2)
SP 1530 (1)
1706 Belfast( ) 100y 11.2 (1) RUC sports
SP 1369 (1)
3006 London(WC) SP 1328 (3)qWAAA champs
0107 London(WC) SP 1366 (3) WAAA champs
0907 Los Angeles SP 1477 (3) BE v USA
■1968 2505 Solihull Pen 4683 (1)
(561 26.1 11.2 1465 157)
2206 Harlow Pen 4350 (2)
(557w 26.2 11.5w/+3.1 1326 141)
2007 London(CP) SP 1394 (4)qWAAA champs
1467 (4)
2107 Twickenham SP 1575 (1)
0208/0308 London(CP/WC)Pen 4740 (4) GB v GFR
(11.2/+1.4 1499 157 573/+1.8 26.0)
0308 London(WC) SP 1392 (4) GB v GFR
0608 Belfast(P) 100y 11.2 (2)
HJ (2) nda
0708 Belfast(P) 80mH 11.4 (2)
SP 1554 (1)
0908/1008 London(CP) Pen 4723 (1) WAAA champ
(11.3/+1.2 1451 160 564/0 25.8/-0.8)
0209 London(WC) SP 1404 (3) GB v Poland
1409 Portsmouth 80mH 11.6 (4)
HJ 160 (3)
0510 Mexico City SP 1499 (1)
1510/1610 Mexico City Pen 4803 (9) OG
(11.0/+0.8 1509 153 560/+0.8 24.9/0)
■1969 2510 Paris( ) SP 1620 (1) light shot
2211 Cosford SP 1552i(1)
■1970 3001/3101 Cosford 60mH 8.7i(1)hWAAA champs
8.5i(1)
SP 1586i(1)
2102 Cosford 60mH 8.5i(2) GB v GDR
SP 1584i(3)
2802 București SP 1640i(1)
0103 București 50mH 7.0i(1)h
7.0i(1)
1403 Wien 60mH 8.5i(2)hEuropean champs
1503 Wien 60mH 8.7i(4)sfEuropean champs
SP 1570i(8)
1804 Belfast( ) SP 1537 (1)
0205 Edinburgh(M)SP 1552 (1)
0905 Belfast( ) 100mH 14.3 (1) NI v Scotland
SP 1526 (1)
1705 's-Gravenhage SP 1533 (2) GB v Neths
2605 Bangor, Down SP 1493 (1)
100y 11.2 (2)
2605 Belfast( ) 100mH 14.3 (1) NI champs
SP 1475 (1)
0306 Belfast( ) Pen 4416 (1)
(13.7w 1560 167 24.5 547)
0606 EdinburghM 100mH 14.3 (1) Scottish champs -1.5
SP 1487 (1)
0706 Belfast( ) 200m 24.5 (1)
1306/1406 Ghent Pen 4373 (1) GB v Neths, Belgium
(13.6/+1.9 1600 160 560 24.9)
2006 London(CP) 100mH 14.3 (1)hWAAA champs -1.0
13.9 (1)sf -1.0
14.0 (1) -1.3
SP 1485 (1)
2606/2706 London(CP) Pen 4233 (1) WAAA champ
(14.0/-0.9 1487 156 571/+0.3 25.0/+0.1)
1107 London(WC) 100mH 13.6w(3) GB v GDR +4.9
SP 1586 (3)
2107/2207 EdinburghM Pen 4515w(1) BCG
(13.61w/+4.5 1558, 1613, 1507 166 573/+1.0 24.38w/+2.5)
2307 EdinburghM SP 1593 (1) BCG
(1593, F, F, 1423, 1499, 1468)
100mH 14.14(2)h -1.2
13.88(5) -0.3
0208 E Berlin SP 1578 (3) European cup (sf)
2208 Budapest SP 1502 (6) European cup
■1971 1009 London(CP) 100mH 14.7 (4) IAC meet
2011 Cosford SP 1502i(1)
HJ 167i(2)

MARY PETERS

■1972 0801	Cosford	60m	i( )h	nda
			7.6i(1)sf	
			7.7i(5)	
		60mH	8.6i(1)	
2901	Cosford	HJ	171i(1)	
		60m	7.7i(2)h	
			7.7i(5)	
1802/1902	Cosford	60mH	8.7i(1)hWAAA champs	
			8.6i(2)	
		SP	1626i(1)	
1103/1203	Grenoble	50mH	7.2i(4)hEuropean champs	
		SP	1490i(13)	
1803	Cosford	LJ	565i(2)	
		SP	1514i(1)	
2604	London(Nh)	LJ	588 (4)	+1.7
		100mH	14.1w(3)	
		HJ	175 (1)	
0605/0705	London(CP)	Pen	4630 (1)	
		(13.7w/+3.4 1540 177 604/+1.8 24.5/+1.3)		
0306	Irvine, Ca	100mH	14.0 (1)	
		HJ	173 (1)	
0507	Belfast(M)	Pen	4475 (1)	
		(588 24.9 14.0 1528 173)		
0707	London(CP)	100mH	13.6w(2)hWAAA champs	+2.5
		LJ	581 (6)q	+0.8
		200m	25.3 (6)h	-0.7
0807	London(CP)	HJ	174 (2) WAAA champs	
1507	Celje	HJ	170 (7)	
2907/3007	Papendal	Pen	4558 (1) GB v Neths, Belgium	
		(13.5 1520 169 587 24.2)		
1908	EdinburghM	100mH	13.1w(1)	+4.1
		HJ	178 (1)	
		SP	1569 (1)	
0209/0309	München	Pen	4801 (1) OG	
		13.29/+0.5 1503, 1620, 1441 182 598/+0.5 24.08/-0.6)		

■1973 0302	Cosford	HJ	174i(2)	
		60mH	8.8i(1)h	
1702	Cosford	HJ	175i(3) GB v GDR	
1103	Rotterdam	HJ	170i(17)European champs	
0205	London(Nh)	100mH	14.2 (2)	+2.0
1305	London(CP)	LJ	607w(1)	
		100mH	13.9w(1)	
		HJ	162 (2)	
		100m	12.4 (1)	
2705	Warley	Pen	4429 (1)	
		(13.8/-0.7 1500 168 577 24.7)		
0506	Belfast(AP)	HJ	175 (1)	
		100mH	13.8 (1)	
1606	EdinburghM	HJ	170 (6=)BG	
		100mH	13.82(3)	+1.6
2406	Drachten	SP	1405 (5) GB v Neths, CSR	
		100mH	14.5 (3)	
3006	Leipzig	SP	1495 (5) GB v GDR, Bulgaria	
0107	Leipzig	100mH	13.5 (4) GB v GDR, Bulgaria	
2107	London(CP)	SP	1449 (2) WAAA champs	
		100mH	14.33(2)h	
			14.40(2)	-3.3
1108/1208	Reykjavik	Pen	4086 (3) European cup (sf)	
		(14.70 1571 152 574 25.85)		
2508	London(CP)	100mH	13.86w(3)GB v Hungary	+2.6
2708	London(CP)	SP	1588 (3) GB v Hungary	
2109	London(CP)	SP	1496 (2) GB v Sweden	
2209	London(CP)	100mH	14.65(2) GB v Sweden	0
2909	London(CP)	Pen	4090 (1)	
		(14.0/+1.4 1421 157 539 25.5)		
0610	London(CP)	SP	1519 (1) BCG trials	
		100mH	14.07(3)	
■1974 2501	Christchurch	Pen	4455 (1) BCG	
		(13.94 1505 174 581 25.00)		
2701	Christchurch	SP	1488 (4) BCG	
2901	Christchurch	100mH	14.35(3)hBCG	+1.3
			14.75(8)sf	-0.2
0202	Christchurch	HJ	170 (8) BCG	

HIGH JUMP DIFFERENTIALS
Richard Hymans

This is the deepest list of high jump differentials yet published. An efficiency rating has been calculated for each athlete; the idea is to give almost equal rating to the size of the athlete and the differential achieved. The formula is: Height (in metres) x Differential (in centimetres) + Height (in metres) x Height achieved (in metres) x 20.

MEN

Franklin Jacobs	USA	1.73	2.32	59	182.3
Ron Livers	USA	1.75	2.24	49	164.2
Kazunori Koshikawa	JAP	1.72	2.21	49	160.3
Juan Carrasco	SPA	1.70	2.18	48	155.7
Mike Lattany	USA	1.71	2.19	48	154.9
Ni Chih-chin	CPR	1.84	2.29	45	167.1
Mike Cawthorn	USA	1.59	2.03	44	134.6
Rory Kotinek	USA	1.85	2.29	44	166.1
Valeriy Brumel	SU	1.84	2.28	44	164.9
Rolf Beilschmidt	GDR	1.88	2.31	43	167.7
Rodolfo Bergamo	ITA	1.79	2.22	43	156.7
Henri Elliott	FRA	1.75	2.18	43	151.6
Aleksandr Grigoryev	SU	1.87	2.30	43	166.4
Volodymyr Yashchenko	SU	1.93	2.35	42	171.8
Giordano Ferrari	ITA	1.78	2.20	42	153.1
Michal Grotowski	POL	1.78	2.20	42	153.1
Jan Ohlson	SWE	1.72	2.14	42	145.9
Paul Poaniewa	FRA	1.85	2.26	41	159.5
Mike Winsor	USA	1.86	2.27	41	160.7
Asko Pesonen	FIN	1.78	2.19	41	151.0
John Beers	CAN	1.83	2.24	41	158.2
Kazuyoshi Fukura	JAP	1.77	2.18	41	149.7
Henri Elende	CON	1.73	2.14	41	145.0
Dwayne Joseph	USA	1.78	2.18	40	148.8
Bill Jankunis	USA	1.88	2.28	40	160.9
Gene White	USA	1.80	2.20	40	151.2
Pat Matzdorf	USA	1.89	2.29	40	162.2
Bernard Gauthier	FRA	1.80	2.20	40	151.2
Danial Temin	YUG	1.80	2.20	40	151.2
Bruno Bruni	ITA	1.82	2.22	40	154.5
Terje Totland	NOR	1.82	2.22	40	154.5
Vladimir Abramov	SU	1.84	2.24	40	157.8
Jacek Wszoła	POL	1.90	2.30	40	163.4
Oscar Raise	ITA	1.84	2.24	40	157.8
Edgar Kirst	GDR	1.87	2.26	39	157.5
Jesper Tørring	DEN	1.86	2.25	39	156.2
Sergey Budalov	SU	1.86	2.25	39	156.2
Gordon Windeyer	AUS	1.82	2.21	39	151.5
Edward Czernik	POL	1.81	2.20	39	150.2
Isamu Uzawa	JAP	1.76	2.15	39	144.3
John Radetich	USA	1.90	2.28	38	158.8
Claude Ferragne	CAN	1.87	2.25	38	155.2
Richard Spencer	CUB	1.83	2.21	38	151.7
Rustam Akhmyetov	SU	1.85	2.23	38	153.4
Vladimir Zhuravlyev	SU	1.83	2.21	38	151.7
Viktor Bolshov	SU	1.83	2.21	38	151.7
Lothar Doster	GFR	1.83	2.21	38	151.7
Sergey Senyukov	SU	1.90	2.28	38	158.8
Cookie Thornton	USA	1.78	2.16	38	144.5

WOMEN

Rosemarie Ackermann	GDR	1.76	2.00	24	112.6
Michiyo Inaoka	JAP	1.62	1.85	23	97.2
Maggie Woods	CAN	1.58	1.80	22	91.6
Ann-Marie Pira	BEL	1.71	1.92	21	101.6
Yordanka Blagoyeva	BUL	1.74	1.94	20	102.3
Joni Huntley	USA	1.73	1.93	20	101.4
Maria Mracnova	CSR	1.72	1.92	20	100.4
Hiroe Ishida	JAP	1.59	1.79	20	88.7
Sara Simeoni	ITA	1.78	1.97	19	104.0
Heidi de Kock	RSA	1.66	1.85	19	92.9
Val Harrison	GBR	1.64	1.83	19	91.2
Erika Rudolf	HUN	1.72	1.90	18	96.3
Alla Fedorchuk	SU	1.70	1.88	18	94.5
Debbie Brill	CAN	1.75	1.92	17	96.5
Jutte Kirst	GDR	1.77	1.94	17	98.8
Rita Schmidt	GDR	1.75	1.92	17	97.0
Virginia Ioan	RUM	1.75	1.92	17	97.0
Tatyana Boiko	SU	1.73	1.90	17	95.2
Larisa Kuzelenkova	SU	1.72	1.89	17	94.3
Renate Boschert	GFR	1.69	1.86	17	91.6
Kiyomi Kogure	JAP	1.58	1.75	17	82.2
Andre Matay	HUN	1.73	1.89	16	93.1
Edith Samuel	HUN	1.72	1.88	16	92.2
Marlies Wilken	GFR	1.70	1.86	16	90.4
Cornelia Popu	RUM	1.78	1.93	15	94.3
Magdolna Csabi	HUN	1.70	1.85	15	88.4
Audrey Reid	CAN	1.70	1.85	15	88.4
Susanne Erd	SWI	1.69	1.84	15	87.5
Hybre Myburgh	RSA	1.68	1.83	15	86.6
Svetlana Kovaleva	SU	1.66	1.81	15	84.8
Sabine Fenske	GFR	1.65	1.80	15	83.9
Nadezhda Tkachenko	SU	1.65	1.80	15	83.9
Nadezhda Murtazayeva	SU	1.63	1.78	15	82.5
Fukuko Miyauchi	JAP	1.60	1.75	15	80.0