

ABSTRACT

JEFFERSON, James B. Changing styles in the discus throw between 1896 and the present. M.S. in Physical Education, 1980. 64 p. (Dr. N.K. Butts).

This study was a review of literature and film observation concerning the discus. It consists of four basic parts: (1) a section on early times which provides background information on how the ancients threw the discus; (2) an area concerned with the creation of the modern Olympic Games; (3) information concerning the discus itself; and (4) the changing throwing styles. Through this review the author found much controversy concerning almost every aspect of the discus. What was a discus? What was the construction of a discus, its weight and measurements? How was it thrown and where was it thrown from? Who was the motivating force behind the Olympics and who decided the discus throw would be an event? The study concentrated on the Olympic years and their resulting discus winners. There was progression from standing throws to throws utilizing turn techniques. The turns, for the most part, followed in order beginning with 1 turn to 1 1/4, 1 1/2, 1 3/4 and then 2 complete turns. This scan of literature also found that for every throwing style there were many personal variations from it.

Changing Styles in the Discus Throw
between 1896 and the Present

A Seminar Presented
to
The Graduate Faculty
University of Wisconsin - La Crosse

In Partial Fulfillment
of the Requirements for the
Master of Science Degree

by
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CHAPTER I

INTRODUCTION

Background

According to Bloch (1968), competitive sports in Greece had their roots in religion, mythology and military training and were nurtured by the Greek's passion for excellence. Contests of physical strength and skill were believed to invigorate and renew the youth of participants, activate powers of the Gods and by inspiration, restore to the dead some of their lost powers. As philosophers and warriors the Greeks came to cultivate physical exercise for its health giving value and its preparation for combat - or the peaceful alternative to combat.

The discus was not thrown just at the Olympics or other athletic contests but it was also utilized at funeral games. As Homer wrote in the Iliad, concerning the funeral games of Patroclus:

...then the son of Peleus set forth a mass of rough-cast iron, which of old the mighty strength of Eteoneus was wont to hurl; but him had swift-footed goodly Achilles slain, and bare this away on his ships with his other possessions. And he stood up, and spake among the Argives, saying: Up now ye that will make essay likewise in this contest. Though his rich fields be very far remote, the winner hereof will have it five revolving years to serve his need; for not through lack of iron will his shepherd or ploughman fare to the city; nay, this will supply them.

So spake he, and thereat arose Polypoetes, staunch in fight, and the mighty strength of godlike Leonteus, and Alias, son of Telamon, and godly Epeius. Then they took their places in order, and goodly Epeius grasped the mass, and whirled and flung it; and all the Achaeans laughed aloud thereat. Then in turn Leonteus, scion of Ares, made a cast; and thirdly great Telamonian Ares, hurled it from his strong hand, and sent it past the marks of all. But when Polypoetas, staunch in fight, grasped the mass, far as a herdsman flings his crook, and it

flieth whirling over the heads of kine, even so far cast
 he it beyond all the gathering: and the folks shouted
 aloud. (Homer, 1925/1934, p. 557)

From the preceding quote we see some support for the statement made by Bloch that athletic contests were used to restore some of their lost powers to the dead.

Gardiner (1910/1970) stated that the discus played an important part in the life at the gymnasium and palaestra. It won favor with the Romans and Horace mentioned it as a manly exercise. According to Lucian it was a valuable exercise to strengthen shoulders and gave tone to all extremities. Doctors approved its' use and Aertaeus recommended it as a cure for chronic headache and dizziness. Harris (1972) mentioned the Greek youth found it ideal to develop handsome muscles of the shoulders and arms. Today the diskos is thought of as a symbol of the ancient games (Bloch, 1968).

Purpose

The purpose of this study was to trace development of the styles, technique, improvement of throwing the discus with emphasis in the period of 1896 to 1980. This was done by examining related literature on the subject of the discus. Some of the areas examined were: the Modern Olympic Games from beginning to present; the sport of track and field; weight throwing; physical education; and athletic games of the Ancient Greeks.

Need for the Study

Tracing discus styles from 1896 to 1980 is important for a number of reasons. This sport is one of the few carry-overs from the ancient

Olympics to the modern Olympics. It's history should be preserved because of it's antiquity. The knowledge which can be obtained from looking at the past is also important and may lead to improvements in the future.

Assumption

The author assumed that with time the throwing style would change drastically from 1896 to present. These changes would result in the lead to an increased distance that the discus can be thrown today compared to early times.

Delimitation

Although the study was delimited to the years 1896, the beginning of the modern Olympics, to 1980 the author felt it was necessary to have short chapters in two areas which would lead up to 1896. The first area that was necessary was a chapter on Early Times. This area discussed ancient styles and equipment. The second chapter was to discuss the roles of Pierre de Coubertin and other early proponents, who were responsible for the establishment of the Modern Olympic Games.

Limitation

Limitations to the study were: finding adequate numbers of primary sources that were available to the author; sources that adequately described a thrower's form; books and periodicals that were in the English language or translated; and, finally time!

CHAPTER II

EARLY TIMES

The Olympics

The year 776 B.C. is generally recognized as the time of the first Olympic Games (Durant, 1969). At least it was the first Games where records were kept. A 200 yard race was the sole event on the program which was conducted on the most beautiful spot in Greece, the sacred valley of Olympia. During the month long Olympic festival wars never interfered with the games. During the Battle of Thermopylae in 480 B.C., against foreign invaders, the Games went on. If two Greek states were at war, a truce was called until the end of the festival. Mandell (1976) felt a typical calendar of events for the early games would have been as follows: Day one was dominated by religious ceremony; Day two was the chariot races, horse racing and the field events; Day three was for honoring the patron gods and the holding of foot races; The fourth day the heavy events or "combative sports" were held; and, on the final day there were rituals, processions and banquets.

Durant (1969) suggested that the work in preparing for the Olympic Games was done by the athletes who removed weeds, layered new sand and many other things. He also felt the zenith for the ancient games were in the late 4th and early 5th centuries.

Pedestal or Ground

This particular aspect of the discus has proved to be very

controversial and very hard for anyone to reach a conclusion. Wilt (1974) mentioned that they threw from packed sand and Bloch (1968) said they threw from behind a line. Kieran (1936) showed a picture, from a piece of pottery, of a discobolus marking his takeoff with a peg. While Kieran's picture was good Gardiner (1910/1970) also had an example that was better (see figure 1). Cretzmeyer (1969) suggested the ancients threw from a pedestal.

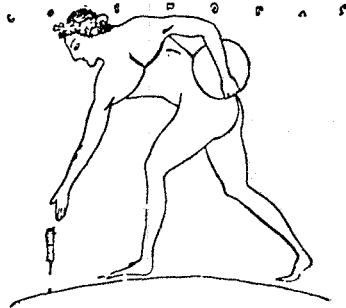


Figure 1. The takeoff. (Gardiner, 1910/1970, p. 320)

Probably the most troubling area for historians is the $\beta\alpha\lambda\beta\acute{\iota}\varsigma\kappa$ which is the pedestal mentioned by Cretzmeyer (1969). The knowledge of the $\beta\alpha\lambda\beta\acute{\iota}\varsigma\kappa$ or balbis comes from an obscure and much misunderstood passage in Phitostrates according to Gardiner (1910/1970). This passage stated:

...the balbis is small and sufficient for one man, marked off except behind, and it supports the right leg, the front part of the body leaning forward while it takes the weight off the other leg which is to be swung forward and follow through with the right hand. (p. 318)

From that passage Gardiner (1910/1970) indicated that the balbis was marked off by a line in front and sides but not in back. This would enable the thrower to take as many preliminary steps as necessary prior to the throw. There does not appear to be a raised or sloping

platform as used by Modern Greeks in the Hellenic style.

Gardiner (1910/1970) also mentioned that it was natural to suppose that in the stadium the diskos and spear were thrown from the line of stone slabs which marked the start and was also called $\beta\alpha\lambda\beta\epsilon\varsigma$. He felt the throws would have been measured from the front of the balbis to where it fell. To overstep this area was a foul. The throw was then marked by drawing lines in the ground or by using a spear, peg or arrow as a marker.

How was it thrown?

Since the discus was not used in war, Harris (1972) felt it was a curious and illogical activity for the Greeks to engage in. He also mentioned that our knowledge of the discus throwing style of the ancients relies upon works of art. One of the only clues in literature described as "whirling around" which would indicate a method similar to our own.

Since the balbis was mentioned, a method of throwing from it is also provided by Gardiner (1910/1970):

The thrower is to bend his head to the right and stoop as to catch a glimpse of his (right) side, and to throw with a rope-like pull, and putting all the force of the right side into the throw. (p. 319)

For this throw to have been made correctly the right foot should remain in front for a right handed thrower as demonstrated in Myron's Diskobolus (see figure 2).

According to the style described by "Lucian", the diskobolus seems as if he would straighten himself up at the throw. "Philostratus" said the left foot must be swung forward and follow through with the right hand. Gardiner (1910/1970) used the preceding descriptions and artistic efforts



Figure 2. Myron's Diskobolos. (Gardiner, N.E. 1910/1970, p. 96)

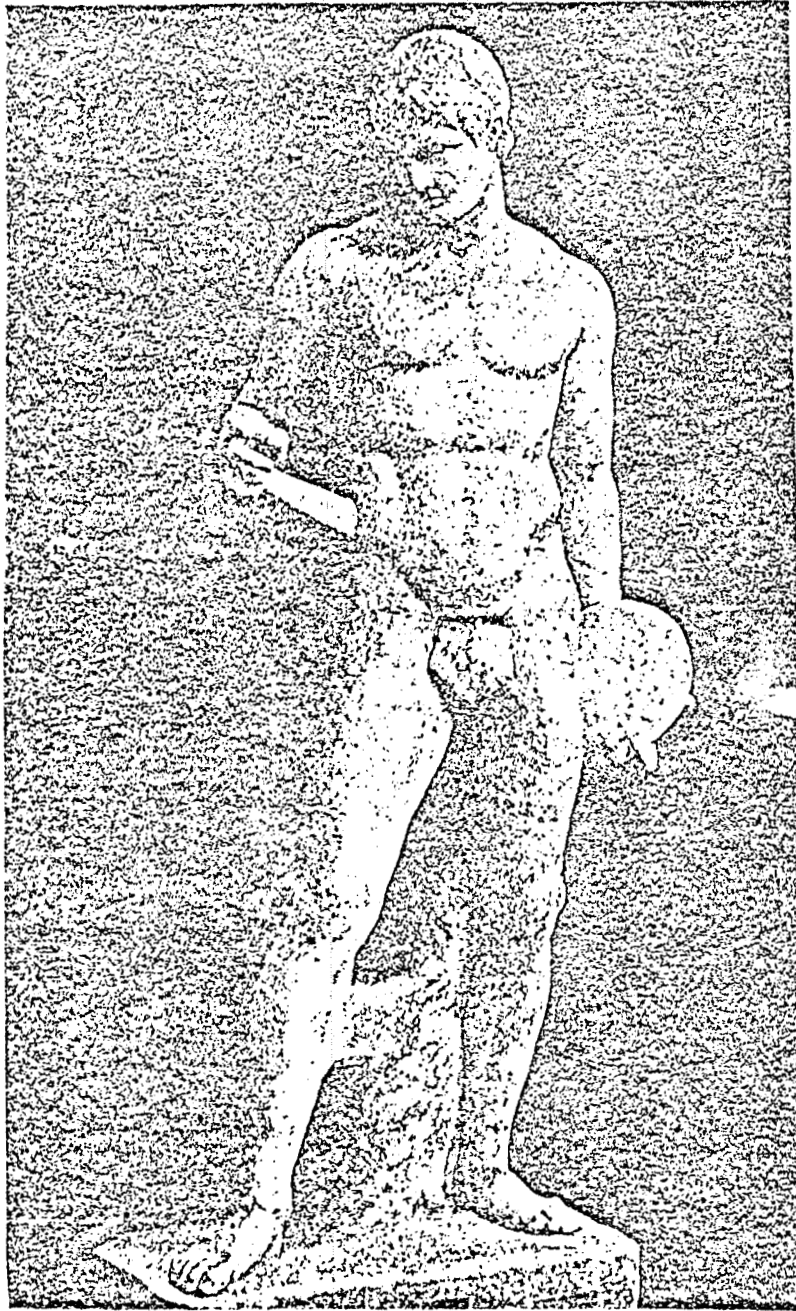


Figure 3. The Standing Diskobolus. (Gardiner, N.E. 1910/1970, p. 321)

on vases, coins, bronzes, gems and statues as a basis for a more detailed description of the ancient Greek throw.

The preliminary stance could be a variety of poses represented by the standing discobolus as seen in Figure 3. The diskos was held in both hands, level with the waist (see figure 4), or the diskos was raised in the left hand level with the head (see figure 5).

From any of these positions, with or without a foot change, the diskos was usually raised to position with the left foot forward and the diskos in both hands. At this point the discus could be extended horizontally to the front, as depicted in Figure 6, or raised above the head.

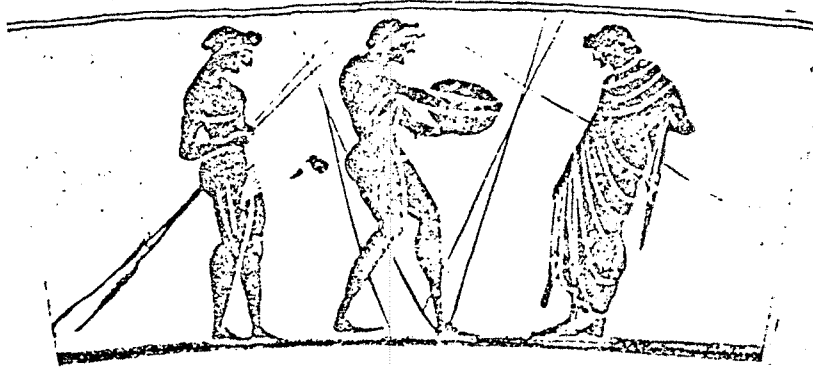


Figure 4. Preliminary stance. (Gardiner, 1910/1970, p. 328)

The diskos was then swung downward, resting on the right forearm. If the left foot was forward, either before or during the swing, the left foot was drawn back (figure 7) or the right foot was advanced (see figure 8) to reach the position of Myron's discobolus as demonstrated in Figure 3. As can be seen from Figures 9 and 10 at the beginning of the forward swing the body was straightened and as the discus swung down the left foot was vigorously advanced as indicated in



Figure 5. Bronze statuette. (Gardiner, N.E. 1910/1970, p. 329)

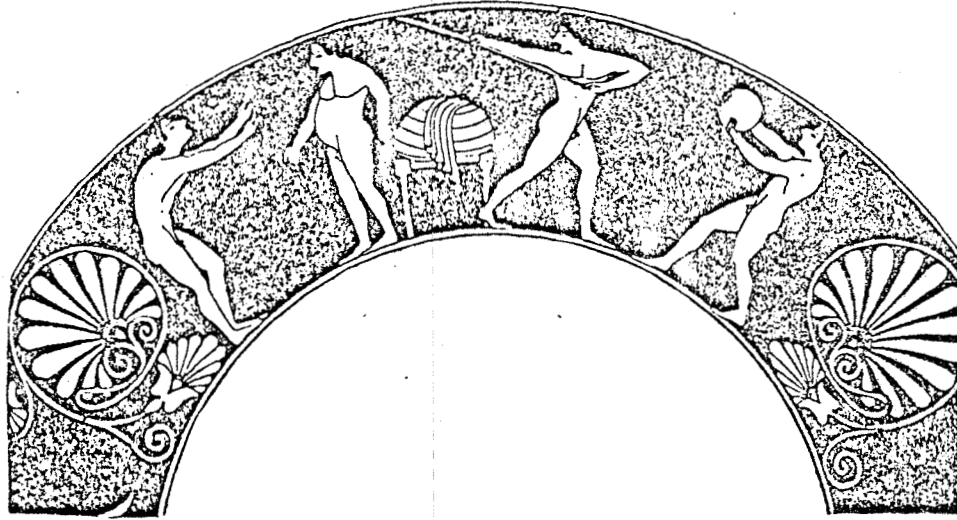


Figure 6. Readying the diskos. (Gardiner, N.E. 1910/1970, p. 323)

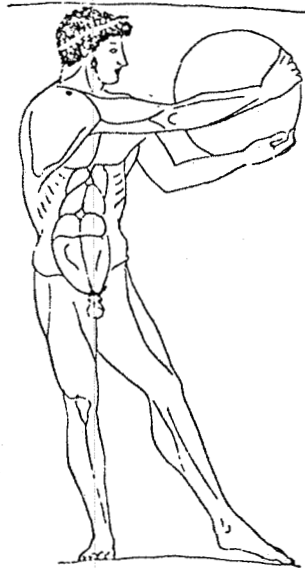


Figure 7. Stepping back. (Gardiner, N.E. 1910/1970, p. 324)

Figures 11 and 12. Finally, after the diskos has left the right hand, the right foot was again advanced. This style could be used for both areas of throwing, the balbis or the ground in a marked area. Gardiner (1910/1970) seemed to support Bloch's (1968) description of throwing in his article. Please refer to Figure 13.

When used on the small balbis the change of feet could have been completed in two ways:

1. with left foot forward raise the diskos in both hands, swing back and step with right foot and the left to throw. There would have to be room for three steps.
2. there would be a pendulum swing of the left leg, first forward, the back and forward again to throw. Only one step would be needed. (Gardiner, 1910/1970, p. 324)

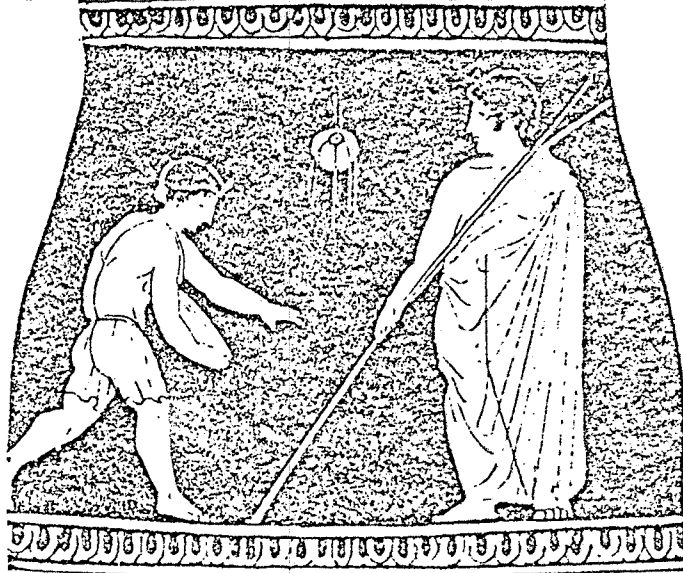


Figure 8. Advancing to throw. (Gardiner, 1910/1970, p. 325)

Gardiner (1910/1970) also stated that most schemes of throwing were unsatisfactory because the authors (of the art items) failed to recognize two important factors:

1. divergence of type caused by artistic differences in material, space and the age or style of the artist.
2. though the principle of the throw remained the same-styles of individuals had to vary which shows up in art work. (p. 322)

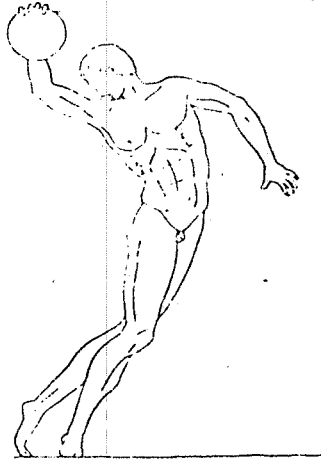


Figure 9. Beginning swing. (Gardiner, N.E. 1910/1970, p. 333)

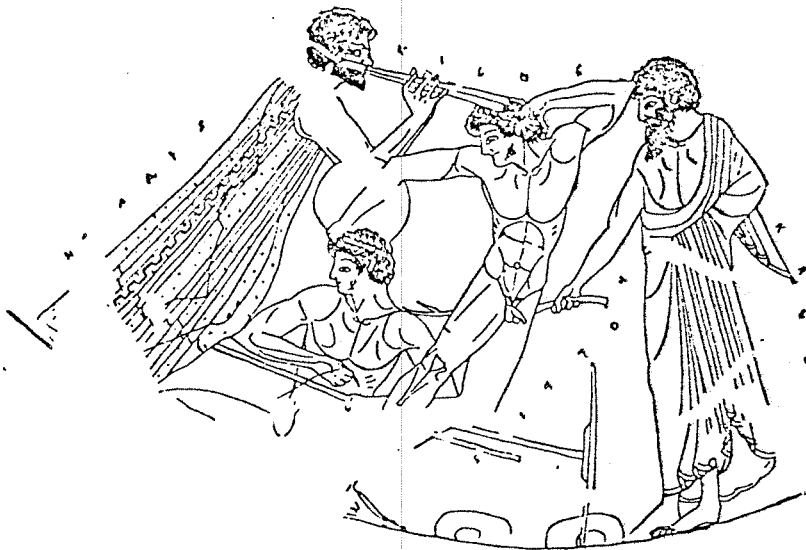


Figure 10. The swing. (Gardiner, N.E. 1910/1970, p. 334)

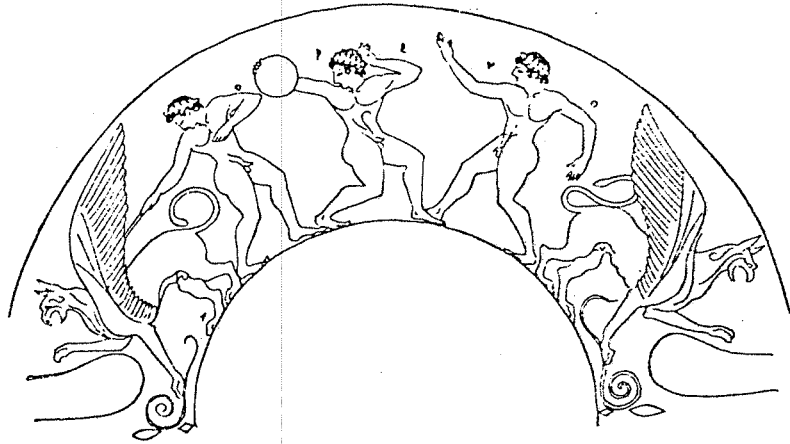


Figure 11. The plant. (Gardiner, N.E. 1910/1970, p. 335)

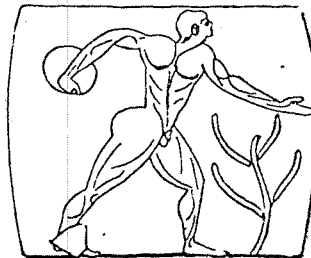


Figure 12. A strong left foot. (Gardiner, N.E. 1910/1970, p. 336)

Since Gardiner (1910/1970) recognized these two factors, was his description of the throwing style correct of just another scheme? This author felt it was an excellent attempt since he incorporated a variety of art work and poses into his description.

To differ from Gardiner, Doherty (1976) mentioned a statement from Homer that "Epeius whirled and threw it". He further stated that:

the Greeks threw the discus not for a mere 70 years as have we moderns, but for centuries, and we can be sure their inventive minds would have created much sounder techniques than the stilted throw from a raised platform, without a turn, that was required in Modern Olympics until 1908. (p.227)

This was known as the "Greek Style".

Doherty (1976) indicated that the style probably varied with the diameter and weight of the diskos. One could assume a vertically held discus with an up-and-down hop in the "whirl". Not even Al Oerter could maintain a high held, flat turn with a 25 pound ingot with a 15 inch diameter.

The literature does not contain a good description of a whirl technique. But if you read Doherty's preceding statement carefully he does have a good point. It would seem that in all the years the discus was thrown, the Greeks would have found a more efficient way to throw, than from the balbis.

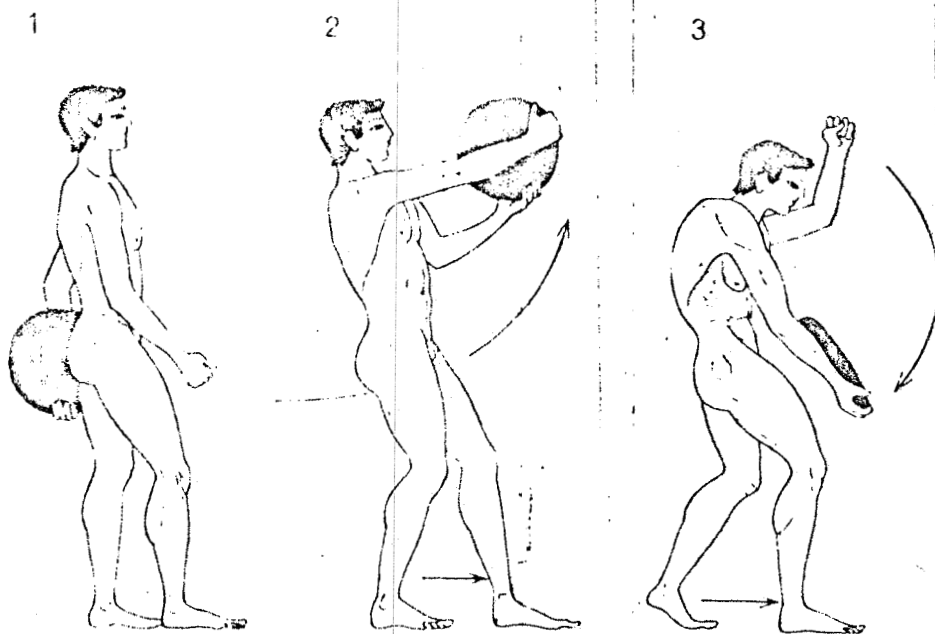


Figure 13. proposed style of ancient discus thrower. (Bloch, R. 1968, p. 82) 1. preliminary stance, right foot forward, 2. diskos raised and left foot brought forward, 3. the diskos starts its downward swing and the right foot advances.

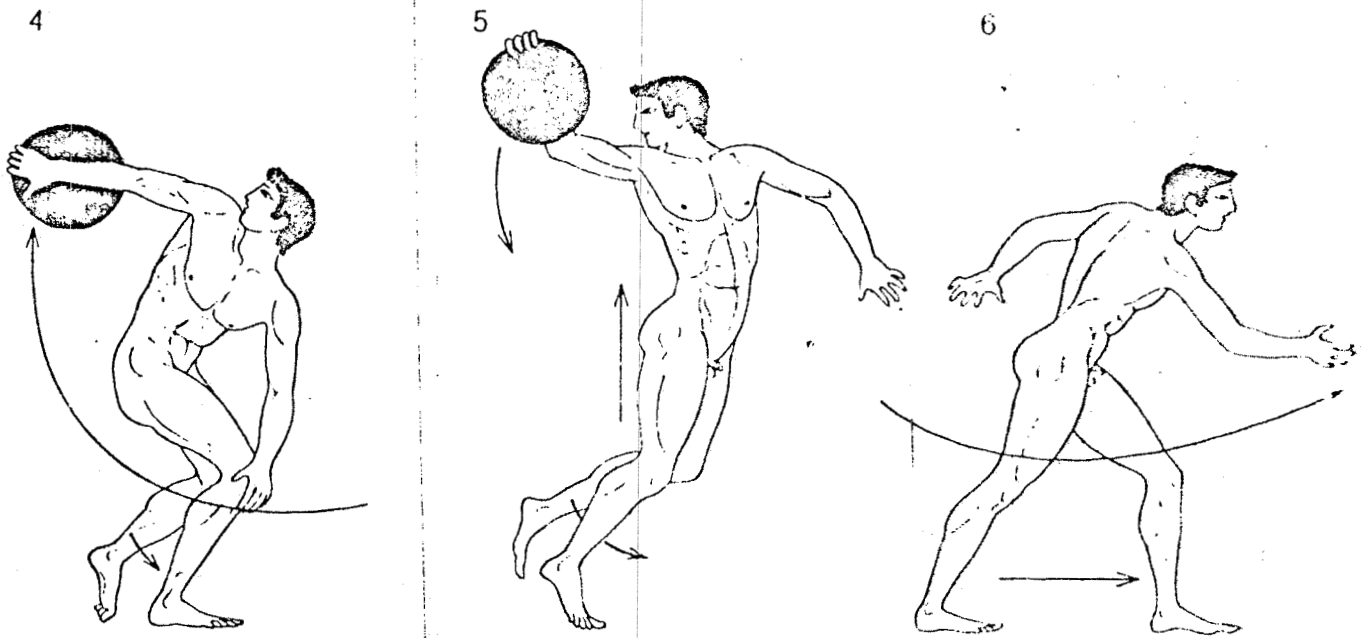


Figure 13 continued.

4. the position of Myron's Diskobolus, 5. body rises with discus and left foot begins its advance, 6. underarm swing which could become more of a side delivery with a lighter implement.

CHAPTER III

PIERRE DE COUBERTIN'S INFLUENCE

Numerous authors (Kieran, 1936; Durant, 1969; Mandell, 1976) have indicated that Baron Pierre de Coubertin was the major force behind the establishment of the Modern Olympic Games.

Mandell (1976) mentioned that the Baron was an advocate of physical exercise. He was an educational reformer of distinguished French ancestry and a prolific writer.

According to Durant (1969), de Coubertin fought a one man campaign for years. He felt the French people lacked vigor and noted no sporting events were supported by them. de Coubertin wanted to change all that since he was convinced that the attitude against sport was all wrong. In his mind, education and athletic's went hand in hand toward better understanding (Kieran, 1936).

In the 1880's Coubertin visited and saw the ancient Olympic site (Durant, 1969). At that time he felt that the Olympic Games could do a great good to the world. On August 30, 1887, according to Mandell (1976), he began his campaign seeking to revive the Olympic Games.

According to Bloch (1968) Baron de Coubertin expressed the original Greek ideal of amateurism in 1894:

Before all things it is necessary that we should preserve in sport those characteristics of nobility and chivalry that have distinguished it in the past, so that it may continue to play the same part in the education of the peoples of today as it played so admirably in the days of Ancient Greece. (p. 85)

Some other early proponents of an Olympic revival were Johann C.F. Gust Maths, a German, from 1759 to 1839; Evangelios Zappas, 1800-1865, a Greek; J. Astley Cooper from England in the 1890's; and, a Dominican priest, Henri-Martin Didon, from 1840 to 1900, who used the Latin Motto: Citius, Altius, Fortius which means Faster, Higher, Stronger (Mandell, 1976).

Sports Illustrated (November, 1964) also mentioned Dr. William Penny Brookes as an early proponent. Brookes began his Games in Wenlock, Shropshire, England in 1850 and they included tilting and footraces. To the placewinners he gave crosses of gold, silver and bronze. In 1860 King Otto I of Greece sent a gold cup to be competed for in the Wenlock Games. The Wenlock Olympian Society also sent a resolution to the British and Greek governments to renew the International Olympic Festival.

In 1892, the Athletic Sports Union in Paris became the first group to publicly announce their support for the idea of an Olympic Games (Durant, 1969). Mandell (1976) stated the Congress of Sorbonne formed the first Olympic Committee and voted on the Olympic Games in Athens. In 1894 those games were approved. Approval meant nothing, however, since money was needed to begin. According to Kieran (1936) the Committee was in serious financial straits until George Averoff, a wealthy merchant prince, offered 1,000,000 drachmas to the Committee's credit. On April 6, 1896, King George I formally opened the first modern Olympic Games.

It should be noted that the Greeks insisted the discus be included as an event in the Olympics because it was a part of their Olympic

history (Mandell, 1976). There were three throws allowed with the longest throw winning. The first outstanding Olympic performer, Bob Garrett, came from these games and one of the events he won was the discus. He also won the shot put and placed second in the broad jump and high jump (Durant, 1969).

As the reader can see, many years went into the formation of the Olympic Games. Many people were involved and, finally, it all culminated in a very fine program. It was so successful it has carried over to this very day. The only exceptions to this regular meeting of athletes has been the two world wars and the current Russian invasion of Afganistan. The Greeks saw fit to call a truce when the Olympics were to be held. It is too bad the world can not do the same. This author would like to express his admiration of those men whose foresight and ideals have brought the nations of the world together in peaceful competition.

CHAPTER IV

THE DISCUS

According to Bresnahan (1956) and Cretzmeier (1969) the diameter, size and composition of the discus has changed dramatically from the time of the ancients until present. The diameter and weight were greater in the ancient discus. The first ancients threw stone plates (Lambros, 1896). Those stone plates were eventually replaced by metal quoits in the shape of lentils. Gardiner (1910/1970) stated discol of the 5th century were generally thought to be metal while those used during the time of Homer were of stone. Harris (1972) contradicted this, however, when he stated that the Games of Homer used ingots of copper. To add to the confusion, Gardiner (1910/1970) also mentioned that the weight thrown in the Games of Patroclus was a lump of unwrought iron described as solos.

The terms used in the discussion of the discus are also contradictive. Definitions of the word "diskos" are "a thing for throwing", flat, of stone, hole in it, and thrown with a cord. "Solos" is described as round (ball shape), metal and by the word solid. Solos was a result of the Greek smelting process. Shallow circular depressions were dug in the sand to cool liquid metal and, hence, the diskos shape. As you can see from the preceding there is much conflicting information of the discus, even in its definition (Gardiner, 1910/1970).

In addition, there is disagreement as to the weight and measurement of the discol found by historians. Lambros (1896) said they were 4 to 5

pounds. Wilt (1974) said 6.24 to 13.26 inches in diameter and 2.98 to 10.58 pounds. Quercentani (1964) mentioned 4 to 9 pounds for competitions. Doherty (1976) talked of the largest, however. He felt they could have been as heavy as 25 pounds and 15 inches in diameter.

The size difference can be attributed to the number and variety of discoi found. At Mt. Olympus alone, eight discoi have been found and all of them were different (Gardiner, 1910/1970). Table 1 provides a summary of the size and weight range of fifteen discoi that have been reported. This author felt there could be several possible reasons for the variation in all the discoi found. One could be the difference between a man's and a boy's discus. Another could be the material the discoi were made from. Some could have been simply trophies which were very ornamental. Finally, the age from which the individual discoi came. Quercentani (1964) mentioned that some discoi fragments date from 500 B.C.

Doherty (1976) mentioned the style of ancients probably varied greatly with the diameter and weight of the discus. Bresnahan (1956) suggested that the ancients were limited to throws under 100 feet. It is easy to see that if these heavy discus were thrown from the balbis why their styles of throwing would vary drastically. In addition, it would explain why the throws were less than 100 feet.

The first Modern Olympic Games did something that was not possible previously. Definite rules were laid down concerning size, weight and shape of the discus and little has changed since.

According to Mandell (1976) the discus used at Athens in 1896 was 2 kilograms or 4 1/2 pounds, was of hard tough wood, had a brass center

and a protecting ring of wrought iron. The only conflict with this was Quercentani (1964) who said they had a lead nucleus.

Table 1. Ancient diskoi, size and weights

Finding-place	Museum	Weight in kilos.	Diameter in cms.	Thickness in mms.
1. Olympia	Olympia, Inv. 7567	5.707	34	5-13
2. Corfu	B.M. 2691	3.992	23	6-13
3. Gela	Vienna	3.800	28	7
4. Amyclae	Athens, De Ridder, Cat. 530	3.349	19	
5. Olympia	Olympia, Inv. 4257	2.945 (?)	22	6-12
6. Olympia	Olympia, Inv. 12,892	2.775	18	11-12
7.	Rome, Museo Kircheriano	2.378	21, 21.5	
8. Olympia	Olympia, Inv. 2859	2.083	19, 22.5	3 at edge
9. Sicily	B.M. 248	2.075	21	5
10. Olympia	Berlin	2.023	17.5	9-10
11. Aegina	Berlin	1.984	21	
12. Olympia	Berlin	1.721	20	7
13. Olympia	Berlin, Inv. 2286	1.353 (?)	20.5	4
14. Olympia	Olympia, Inv. 12,891	1.268	17	4-12
15. Cephallenia	B.M. 3207	1.245	16.5	5

(from: Gardiner, 1910/1970, p. 316.)

The discus was officially recognized as an event in the United States in 1897 and the Athletic Union rules stated it should weigh 3 pounds, 9 ounces (Cretzmeyer, 1969). According to Bresnahan (1956) this weight is still official but it is the listed weight for high school boys. The high school discus can also be composed of rubber and use interior weights. The author felt this composition is for safety reasons.

In 1928, the Olympics officially included women's discus. Its weight was 2 pounds, 3 1/4 ounces (Foreman, 1966).

The current men's discus is regulated by the National Collegiate Athletic Association and the Amateur Athletic Union of the United States. It weighs 4 pounds, 6.4 ounces and has a smooth metal rim with flush brass plates at the center (2-2 1/4 inches in diameter). The sides

taper until 1 inch from the rim. The largest dimension comprises a circle of not less than $8 \frac{5}{8}$ inches in diameter. The thickness at the center should not be less than $1 \frac{3}{4}$ inches. At $\frac{1}{4}$ inch from the edge it should be at least $\frac{1}{2}$ inch thick (Cretzmeyer, 1969).

CHAPTER V

THROWING STYLES

1896

The United States athletes at the 1896 Olympics were not sent over as a team. Robert Garrett was a field event specialist from Princeton and James Connolly was a jumper from Harvard. Both of these men paid their own way to Greece. The other nine athletes representing the United States were sent over by the Boston A.A.. It was not until 1906 that the United States had its first official Olympic team (Kieran, 1936).

In 1976, Mandell stated that Garrett originally had planned on throwing the discus at the Olympic Games and even had a discus made so he could practice. He gave this idea up though because it was too heavy. When Garrett arrived in Greece and was practicing for another event, he found a small round object and was told through "pantomime" it was a competition discus. The discus was much lighter than what he had practiced with so he entered the event. Garrett utilized a turning technique that was very awkward. In this first Olympics the athletes either threw from a 7 foot circle (Bresnahan, 1956 & Cretzmeyer, 1969) or an 8 feet 2 1/2 inches square (Quercentani, 1964). Either way, there was more room in this than the very restrictive balbis of ancient Greece. This, in turn, allowed for more movement and individuality on the part of the athlete.

Mandell (1976) went further and said Garrett began his spin from

a deep crouch, began angling upward and finished his throw by releasing with an abrupt centrifugal motion. Figure 14 shows Garrett in what possibly could have been his deep crouch. If this was his starting position there is a resemblance to Myron's Discobolus of ancient history.

Another thrower in the 1896 Olympics was Paraskevopoulos, from Greece. There is no style given for him but it may have been the old "Greek Style" of throwing. Many of the 11 international throwers were still using this method and it survived many years after the turn techniques came into being.

The third finalist was Versis, a Greek as was Paraskevopoulos, who was described by Mandall (1976) as using a hop and throw style.

From the scant descriptions given, all of the throwers could have had the same starting position; that of Myron's Discobolus, and then adapted their own style to it. If Garrett utilized a turn technique, it probably began facing the direction of the throw. The author felt this would have been the most basic style. Footwork for this type of turn could have been worked out in the short time span Garrett had to prepare for this event.

In 1974, however, Wilt disputed the idea of a circle or a square and said the discus was thrown from the balbis (an elevated platform previously mentioned). He also stated: "The action was new to athletes attending the first modern Games and they complained bitterly" (p. 49). Because of the unpopularity of the balbis several countries introduced a "free throwing technique". It began from a 8 feet 2 1/2 inch square and later was changed to a 2.50 meter diameter circle.



Figure 14. Robert Garrett. (Durant, J. 1969, p. 20)

If Wilt was correct, then the idea of a spin for Garrett does not hold up. He would then have had to use a variation of the Greek style. The descriptions furnished by the preceding authors could have been interpreted either way. The author felt that angling upward and finishing with an abrupt centrifugal motion would not have to come from a spin technique. This style could have come from the Greek method.

It should be mentioned here that Garrett beat Paraskevopoulos on his last of three tries: Paraskevopoulos, 28 meters 95 1/2 centimeters and Garrett with 29 meters 15 centimeters (Lambros, 1896).

United States coaches questioned Garrett many times after his return from the Olympics. Mandell (1976) said that because Bob Garrett had won the Olympics he was considered an expert. Garrett advised coaches to train with a 9 pound discus instead of the current 7 pound discus used in the United States at that time. The author assumed Garrett felt that by practicing with a heavy implement a smaller one would go further in competition.

The Grip

From the research the author has done there appears to be very little change in the way a discus is held. Figure 15 illustrates different handholds used during the 1896 Olympics and also by today's competitors (Bresnahan, 1956).

Figure 15A indicates a possible grip for a large hand. The hand is flat to the discus with the first joint of the fingers over the edge. Fingers should be slightly and evenly spread and grasp the edge firmly. The thumb is flat and extends in a line toward the forearm with

the hand either over or slightly behind the center of weight of the discus. This allows for balance and helps in the spin of the discus upon release.

In figure 15B we again see a large hand grip with the only change being the first two fingers. This allows the pressure to be applied by the first two fingers and, according to this author, would be good to use with a thrower who does not force the discus to roll off his index finger. The emphasis has now been placed on these fingers and the thrower will concentrate on this aspect of the throw.

The third diagram 15C, shows a possible grip for shorter fingers. In this case the palm of the hand is over the center of the discus.

In figure 15 D and E the talon grasp is demonstrated. It should be thought of as the talon of an eagle or hawk. The hand is arched or cupped so the base of fingers and palm do not touch. The discus rests on the wrist and lobe of the thumb with the thumb carried close to the index finger for proper balance. The two reasons for this grip are: a little more wrist snap; and, the weight of the discus is placed in front of the fingers. Also this grip allows for greater hand flexion, more force and less friction on the discus. This author would not recommend this grip for beginners since there may be some problems with control.

Footwear

Another area that should also be mentioned at this time is the type of shoes worn by the discus throwers. From the beginning of the Modern Olympics until the late 1950's and early 1960's the discus was thrown from packed earth. This allowed the use of spiked shoes. In 1969 Gretzmeyer mentioned that throwers wore a soft material field

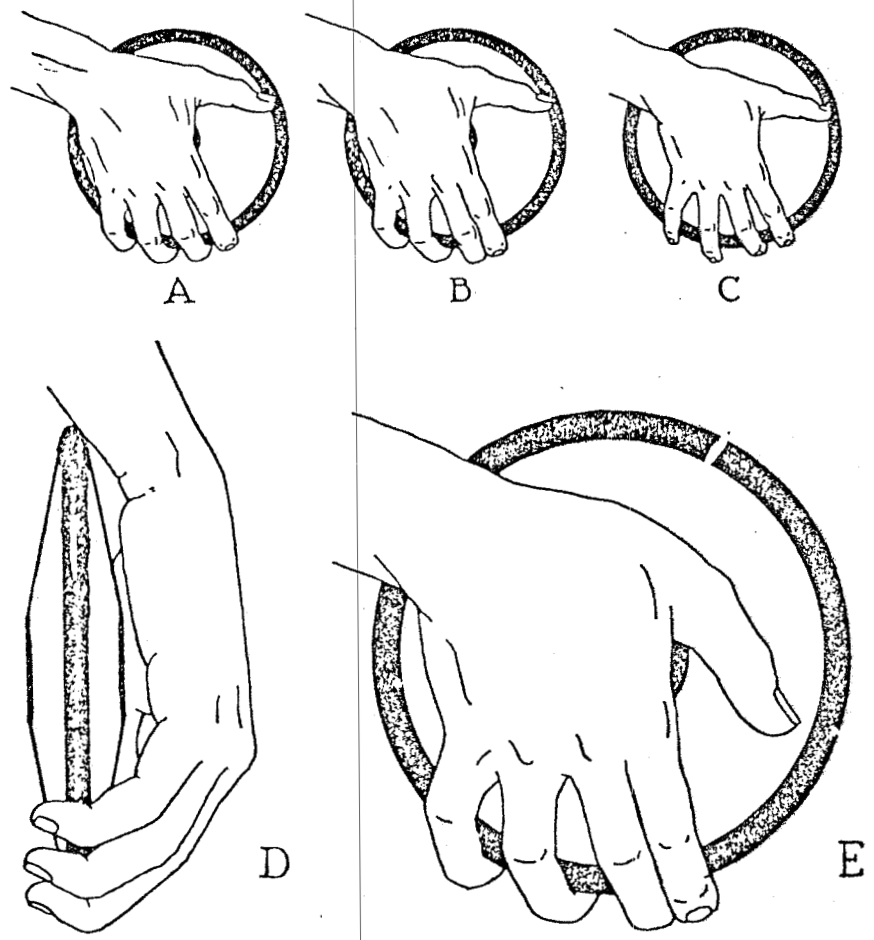


Figure 15. The grips. (Bresnahan, 1956, p. 384)

shoe with spikes in each sole. There were also spikes in the heel. With the advent of the turn techniques Bresnahan (1956) said some athletes took out all but one spike from the sole. With the introduction of the hard surface this author has seen the development of a new weight shoe. Basically these shoes are very light. They are composed of a firm rubber sole with a very flat surface for balance. The heel and toe have been reinforced to lengthen the shoe's life and have either leather or nylon top and sides.

With the different grips and shoes discussed we can now progress to other years and styles of throwing. The grips were mentioned because they have not changed noticeably where as the throwing shoes have. It was necessary for the shoes to change to keep with the advancing styles and hard surfaces.

1900

No mention is made of the balbis in the study of the 1900 Olympics. The elimination of this platform was the reason for an immediate development of turn techniques (Wilt, 1974). In 1974, Wilt mentioned that Soderstrom was the first to use the 1 1/2 turn. Frantisek Janda of Germany disputed the idea that Soderstrom created the style. Janda claimed he was the first to use a turn which was called the "Janda Spiral".

The exact date of this new technique's unveiling is not known exactly but it was before the 1900 Olympics at Paris. It was performed either from a 8 feet 2 1/2 inch square (Wilt, 1974) or a 7 feet circle if you read Cretzmeyer (1969). Bresnahan (1956) stated that the hand hold was the same and that the initial stance was flat footed. From here the

body weight shifted to the left leg with a 1/2 turn to the left. This was followed with a pivot on the right foot when it touched close to the center of the circle. The impetus from the front 1/2 turn itself, gave impetus and the turn continued until the left foot reached for the toe board. A diagram of this footwork is presented in figure 16.

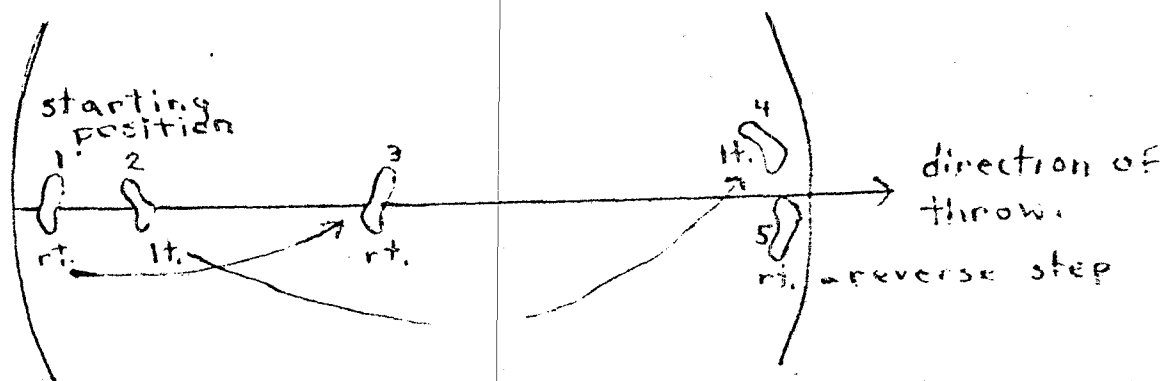


Figure 16. 1 1/2 steps. (Doherty, M.J. 1953, p. 12)

Wilt (1974) described the throw in more detail. The left side, for a right handed thrower, faced the direction of the throw. Upon the last preliminary swing the knees bent to nearly 90° and a fast turn was begun with one foot always in contact with the ground. Delivery took place when the legs stretch for the toe board. The throw itself was followed by a jumping reverse to avoid fouling. It was also mentioned that this was a sound basis for the styles of today and it did indeed produce quick results. Please refer to Table 2 for results in the Olympics to see the increase in distance this style produced.

Wilt (1971) made the statement that "prior to 1930 evolution of modern discus throwing was very slow. The most common was side-to-direction-of-throw start with stepping action" (p. 255). This new style

Table 2. Discus improvement

		80 ft.	115	150	185	220	
Robert Garrett	1896						95' 7 3/4"
USA							
Rudolf Bauer	1900						118' 3"
HUNGARY							
Martin Sheridan	1904						128' 10 1/2"
USA							
Martin Sheridan	1906						136' 2/3"
USA							
Martin Sheridan	1908						134' 2"
USA							
Armas Taipale	1912						148' 4"
FINLAND							
Elmer Niklander	1920						146' 7 1/2"
FINLAND							
Clarence Houser	1924						151' 5"
USA							
Clarence Houser	1928						155' 3"
USA							
John Anderson	1932						162' 4 1/2"
USA							
Kenneth Carpenter	1936						165' 7 1/2"
USA							
Adolfo Consolini	1948						173' 2"
ITALY							
Sim Iness	1952						180' 6 1/2"
USA							
Al Oerter	1956						184' 11"
USA							
Al Oerter	1960						194' 2"
USA							
Al Oerter	1964						200' 1 1/2"
USA							
Al Oerter	1968						212' 6 1/2"
USA							
L. Danek	1972						211' 3"
HUNGARY							
M. Wilkins	1976						221' 5"
USA							

(Osborne, 1967, p. 91.)

was definitely the beginning of a new generation of discus styles. The method involved momentum, angular velocity and ended with a summation of all possible forces (Cretzmeyer, 1969). Bresnahan (1956) mentioned that continuity of movement was vital to this style. There was no style mentioned in the researched literature for the three place winners in the Paris Olympics. Rudolf Bauer of Hungary won and was followed by Janda-Suk and Sheldon, the lone United States contestant. Kieran (1936) made light of the fact that the United States team refused to participate in the finals on Sunday. They would not desecrate the Sabbath. The methods used by the Olympic performers may not be known but it could be assumed some must have used the style created by Soderstrom and Janda.

1904

The 1904 Olympics in St. Louis brought only one new idea into the discus throw. In these games Martin Sheridan and Nikolas Georgantos paired off in a duel. The Greek Georgantos lost. According to Kieran (1936) Georgantos could not solve the advanced American style of tossing the discus. The Greek's low trajectory throws were surpassed by the higher trajectory throws of Sheridan. Since trajectory has entered the picture at this time could it indicate an understanding of how wind aides the flight of the discus? Bresnahan (1956) mentioned that the ideal angle of release was between 28° - 32° from the ground. The style was probably the standard side-to-direction-of-throw since this was the accepted for at that time (Wilt, 1971).

1906

The Greeks had their minds set on a double discus victory at the

Athens Games. Martin Sheridan ruined that idea when he won the free style method used in previous years. Georgantos, the Greek hero, was then favored to take the "Greek style". This method was introduced to bring a discus champion back to Greece. The style was performed from a pedestal in the classic discobolus form. Poise, pose and distance thrown were all part of the scoring. The pedestal measured 80 centimeters long, 70 centimeters wide and not more than 15 centimeters high in the rear nor less than 5 centimeters in the front. The throw by Sheridan was 136' 1/3" and was probably made with the side-to-direction-of-throw method. Werner Jaervinen won the Greek style when he struck the right pose and threw further than Georgantos (Kieran, 1936). It must also be said that the 1906 Games were not recognized as official.

1908

The London Games proved to be very good. The facilities were the best ever. Kieran (1936) mentioned that despite the wet weather the United States "whales" did well. Sheridan again won and was followed by Griffin and Horr, also of the United States. The throw was still being made from a 7 feet circle and there was no mention of style but the author felt the style would have been the side-to-the-direction-of-the-throw method.

1910 - 1911

Although not an Olympic year the time between 1910 and 1911 saw a significant change in throwing styles. According to numerous authors (Wilt, 1971; Canham, 1952; Cretzmeier, 1969) this was when the 7 feet

circle increased to 8 feet 2 1/2 inches. Bresnahan (1956) stated that the increase in the circle's size allowed for greater freedom in executing preliminary swings, the turn and delivery. These facts provided a much greater possibility for better distances. Wilt (1971) suggested that the increased circle size had a great bearing on the technical evolution of throwing styles. Canham (1952) gave a possible example when he mentioned Sheridan's best throw from a 7 foot circle was 141' 4 3/4" but in an 8 feet 2 1/2 inch circle Duncan was able to throw 156' 1 3/8". According to Bresnahan (1956) the International Amateur Athletic Federation was responsible for this change.

1912

A.R. Taipale of Finland and James H. Duncan of the United States were evidently the premier throwers at this time. With the modification of the discus circle, Duncan set a new world record. His style began with the discus high above and behind his head. From there it followed a down, up, down, up and out motion. He used a single turn of 360 degrees or a so-called spin in which at least one foot was on the ground at all times (Doherty, 1976). With that type of description this author felt Duncan could have started two different ways. He could have begun at the back of the circle facing the throw or with his side-to-the-direction-of-the-throw. It all depends on a person's interpretation of what is meant by a 360 degree turn.

Of added interest was the concentration of the arm movement and the lack of concern given the legs. The stress was on the arm action in this era (Quercentani, 1964). Little attention was paid to the movement of the trunk and legs. He also mentioned Taipale was the

first to correct this and develop more torque than his peers.

Taipale invented a technique that was novel but very short-lived. The discus was very high in the first part of his turn, low in the center and again high on the delivery. Delivery of the discus was similar to a standing throw. There was very good use made of the leg drive and a finishing jump reverse (Wilt, 1974). From the sound of this description Taipale was aware that getting the body weight up into the throw was important. At the Stockholm Games Taipale won both the standard free style throw and the new event, the right and left hand throw. The winning throw was 148' 3 9/10" (Kieran, 1936).

Both Taipale and Duncan were of the side-to-direction-of-throw group and the footwork was again relatively cautious as far as speed was concerned. The arm motion was similar, therefore, the author felt that Duncan must have adapted Taipale's style to his own use.

World War I

Due to the war there were no Olympic Games held in 1916. The next games were then rescheduled to be held 4 years later in 1920. Between these years several things of note occurred. In 1918 Austria became the first nation to recognize women's track when it held the first national track and field meet. The winning throw in the discus was 55' 5" with a discus weighing the same as a man's. Babe Wolbert was the first United States discus champion with a throw of 71' 9 1/2" (Miller, 1964). There was nothing mentioned in the literature of her form.

The year 1919 was a very important year for discus styles. A Hungarian, Gorok, introduced two important steps in discus styles.

The running rotation style and the $1 \frac{3}{4}$ turn were demonstrated by Gorok. Both of these techniques are still being used today. This style began with the back-to-the-direction-of-the-throw. Increased turning speed came when the turn was performed by using a jumping manner which landed him in a powerful throwing position. Fifteen years later the Americans would realize its importance and put it to use (Wilt, 1974).

The conservative footwork used by the "side-to-direction" throwers can be seen in Figure 17 and a quicker variation in Figure 18. Footwork, similar to Gorok's, can be seen in Figure 19 and a more conservative style in Figure 20.

1920

Niklander, from Finland, continued the astonishing improvement of the Nordic countries in the discus. His winning throw measured $146' 7 \frac{1}{4}"$. Taipale followed in second and Pope from the United States was third. It was during this time span, after World War I, that Glenn Hartranft introduced a novelty by putting the discus behind his back with a bent throwing arm. The arm was straightened just before delivery and the discus swung around and out. Glenn was the first man to better the 50 meter (164 feet) mark. Whether or not his innovation had anything to do with the distance remained to be seen (Wilt, 1974). In the early 1960's this author also used the behind the back hold on the discus. The reasons for this were that it felt more comfortable and was more secure. Also, when the arm came around for the throw, it seemed to really come faster than the normal arm. It was interesting to see that technique, once learned, does not die easily.

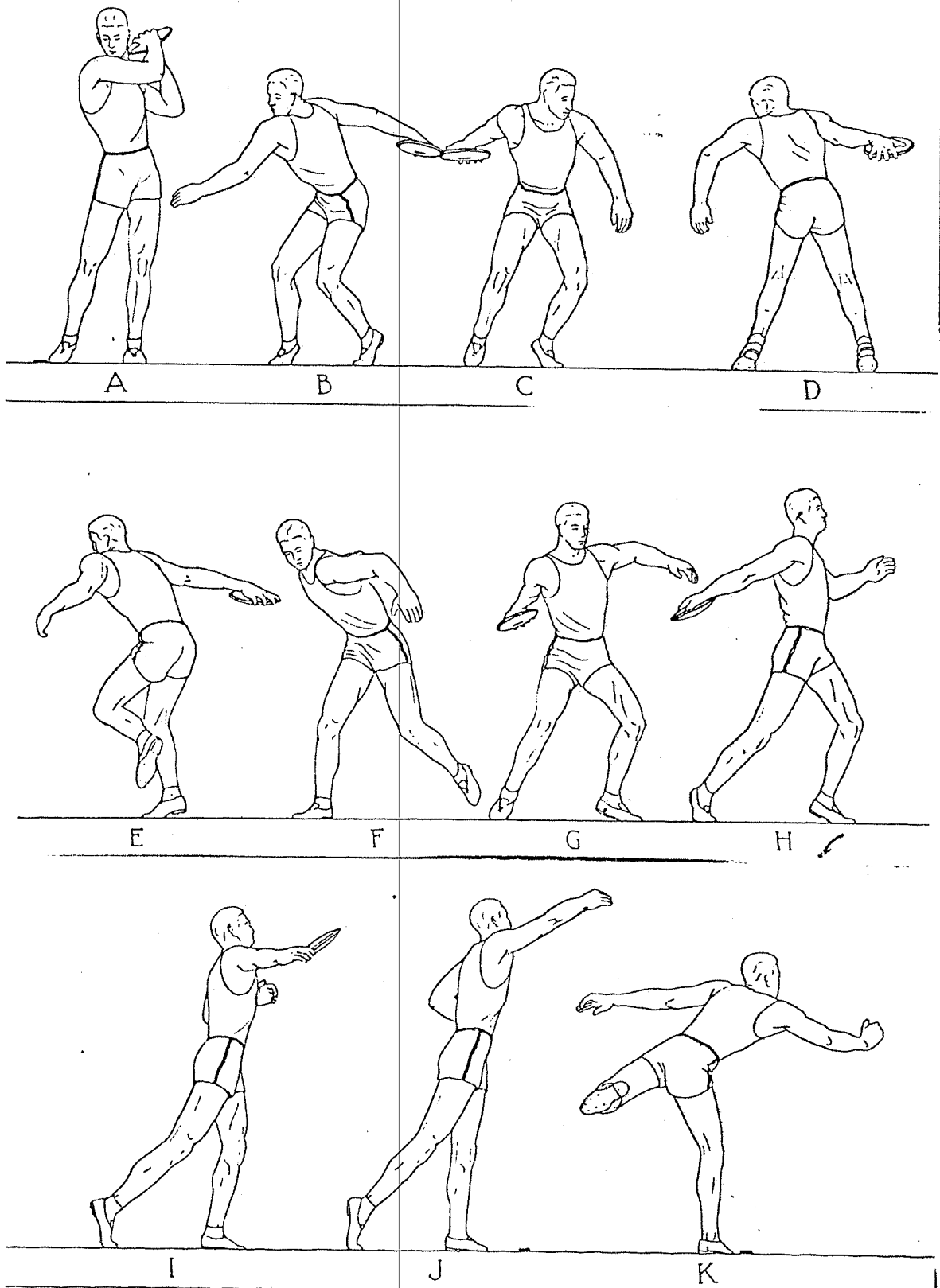


Figure 17. Pivot rotation. (Bresnahan, 1956, p. 365-367)

Hartranft's technique was used for more than 40 years.

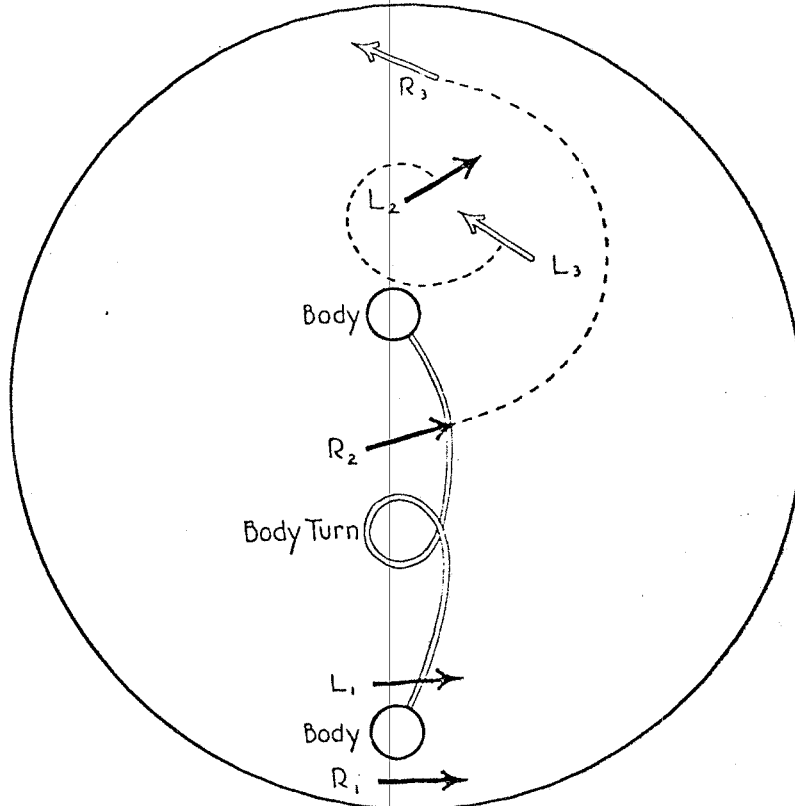


Figure 18. Jump rotation. (Bresnahan, 1956, p. 364)

1924

The United States finally recaptured the discus title at the 1924 Olympics in Paris. Clarence Houser won on a throw of 151' 5 1/8". Quercentani (1964) mentioned that "Bud" Houser was the greatest discus thrower of the 20's. Houser was fast, of medium proportions and was well coordinated. Wilt (1974) and Doherty (1976) both agreed as to Houser's contribution to the discus. He used a flat turn technique that began slowly but then accelerated rapidly after landing on the right foot. The author felt his major emphasis, therefore, was placed on balance and then a continued and steady acceleration.

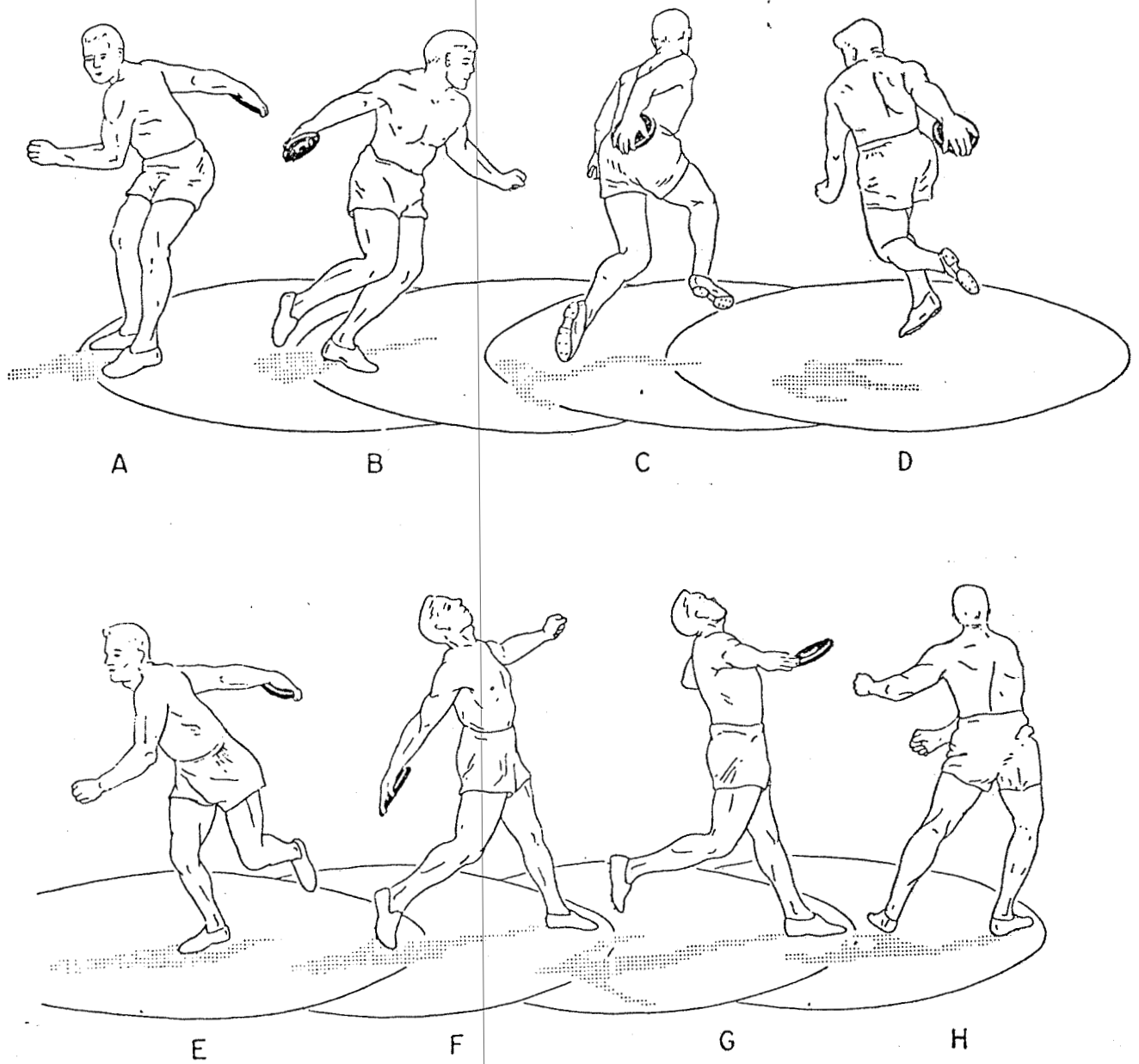


Figure 19. 1 3/4 jump. (Bresnahan, 1956, p. 386-387)

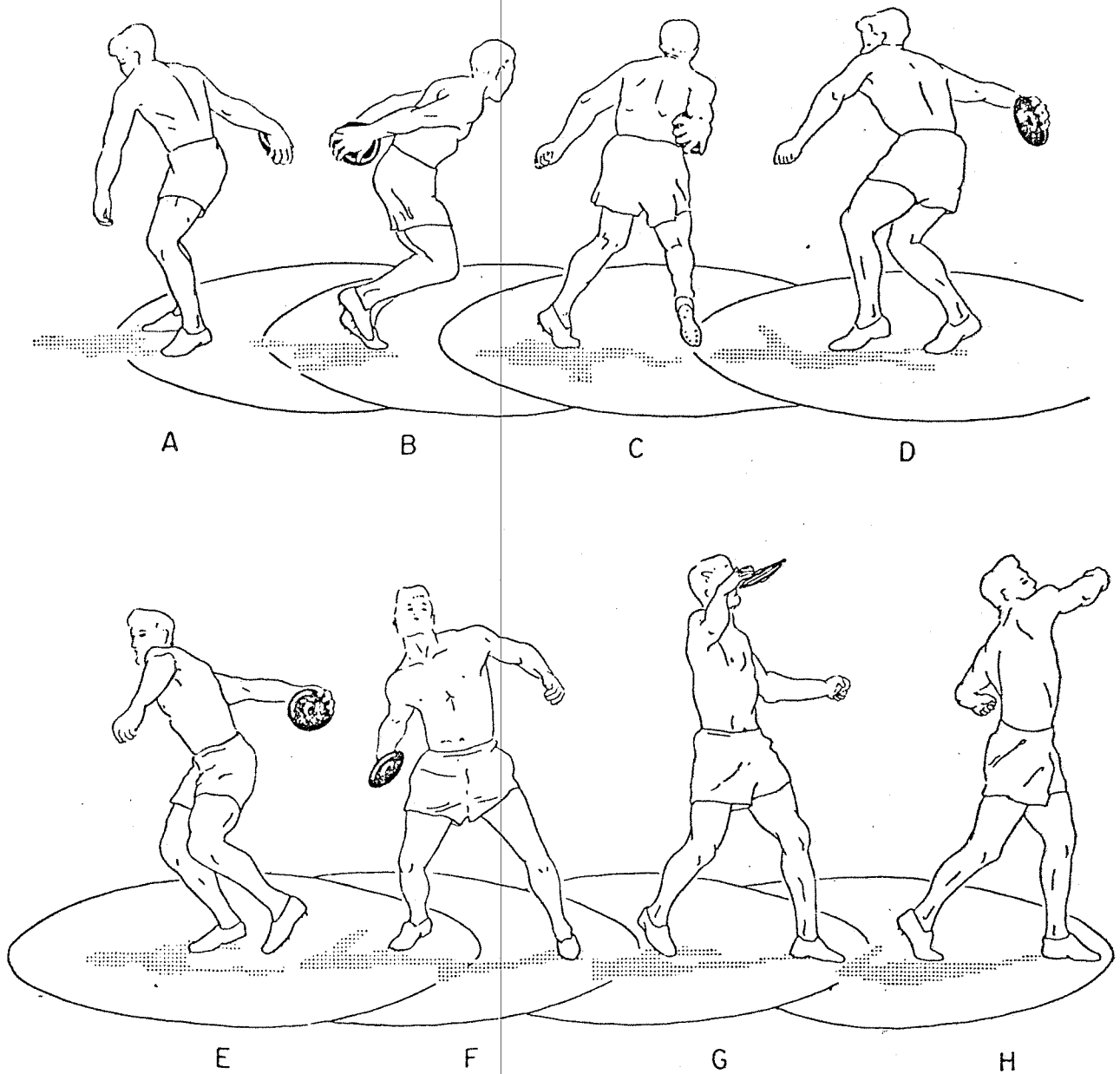


Figure 20. 1 3/4 pivot. (Bresnahan, 1956, p. 388-389)

Cromwell, Houser's coach, stated that Houser made two separate steps, left then right, in completing 1 1/2 turns and that he was extremely quick (Doherty, 1976). According to Wilt (1974) Cromwell also experimented with Houser in the jump turn but he evidently did not use it in 1924. Houser was also using the side-to-direction-of-throw method as can be seen in Figure 21B. Also notice his style as compared to Gorok's 1 3/4 turn (figure 21A).

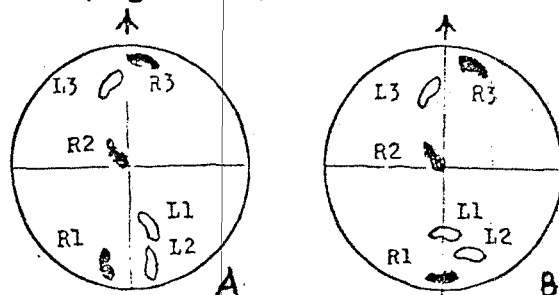


Figure 21. Gorok and Houser. (Wilt, F. 1974, p. 50)

1928

Amsterdam saw Houser repeat his 1924 performance although not quite as easily. It took Houser three throws to qualify because he fouled on his first and had poor control on his second. The third and final throw was good and was far enough to get him into the finals. He went on to throw the discus 155' 3" (Kieran, 1936). Houser made other discus throwers aware of the help wind could give them at these games. At one point in the competition he shifted his starting position 90° so he could throw into a headwind. Doherty (1976) reported a wind tunnel study was completed in 1932. It was found that a 7 to 8 miles per hour headwind was indeed helpful but after that point it was a detriment. That study supported Bud Houser's feelings (Doherty, 1976).

Los Angeles

The Los Angeles Olympic Games saw John Anderson win the discus. According to Quercentani (1964) Anderson may have gotten some help from the discus officials who were watching the pole vault when Noel threw. Noel's throw was in the area of Anderson's best when it hit but no one saw the mark. Noel had to throw again but did not live up to his previous throw. Finishing in second was H.J. Laborde of the United States (Quercentani, 1964).

Previous to these Olympic Games a discus was thrown by Eric Krenz in 1930 that whipped out to 167' 5 3/8". His style was very similar to Gorok's although the left foot movement was different (see figures 21A and 22). Krenz also had a higher and more pronounced jump than Gorok (Wilt, 1974). Krenz's style was immediately borrowed by others and Wilt (1974) refers to them as jump turners in reference to their style of throwing. Krenz record was very short-lived when Paul Jessup whirled the platter 169' 8 7/8" at the Amateur Athletic Union Championships on August 23, 1930. Unfortunately Krenz died in 1931 and never got a chance to fight back and get the title (Quercentani, 1964).

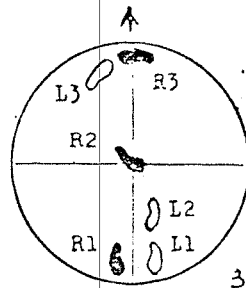


Figure 22. Eric Krenz. (Wilt, F. 1974, p. 50)

John Anderson, however, in winning the event in 1932 showed observers and competitors another important aspect of the discus. Anderson was a very consistent thrower (Quercentani, 1964).

Berlin - 1936

Ken Carpenter won the Games in Germany by being consistent. He was in the 164 to 174 feet mark all the time. The expected winner, Willi Schroeder, could not control his speed or discus thus finishing fifth. Harold Anderson, also a great thrower at that time, hurt his hand before the Olympics and was out of the competition. Gordon Dunn of the United States finished second.

Cromwell (1939) described Carpenter's style as turning with one foot on the ground at all times. It was from a sideway facing direction and the body was in an easy crouch. There was a sideward step of about 12 inches and then the pivot over that left foot. The weight was always kept over the pivot foot and the discus arm trailed. The throw was made with both feet on the ground.

In 1937 Bresnahan mentioned that he saw two distinct types of throwers developing. The first was a speed type which relied on acceleration developing from angular velocity. The second was the power type which relied on brute force and good positioning. The speed type found it was necessary to maintain speed and to develop more force in the final effort. The power type, on the other hand, wanted to maintain or increase available energy at the time of release.

Qualifications of a good discus thrower were also discussed by Bresnahan (1937). He felt that a discus thrower had to: be 6 feet or more; weigh over 200 pounds; have a strong hand and a wide finger spread;

long arm; strong legs and thighs; and, finally, have good coordination and rhythm. To the author it sounded like the ideal athlete.

Bresnahan (1956) also mentioned the different methods used to get into the turn. He felt that the direction favored by most athletes at the beginning of their throw was sideways-to-the-throw. It required less footwork.

The 40's, 50's and 60's

This time span of 30 years saw the development of six major throwers. Most of them remained active longer and accomplished more than other throwers during this period. The influence of Eric Krenz, mentioned previously, on these throwers was tremendous. All used a variation of Krenz's style.

According to Wilt (1974) Phil Fox was the first athlete to give the 1 3/4 turn polish. Fox used three preliminary swings and gradually moved his left foot closer to the circle on every swing after starting with his left shoulder facing the direction of the throw. As a result, his back faced the throwing direction. The turn began after the third preliminary swing and was completed very fast forcing Fox to use several turns in the follow through. Fox was copied, with some alterations, by Bob Fitch, Fortune Gordien and Adolfo Consolini.

The style began by taking the left foot off the ground before the right foot had touched. The right foot should hit a little to the left of a straight line. This delivery used the legs, hip and trunk drive very well. The discus was still released at shoulder height. The discus, arm, and body followed a slightly up and down motion but nothing like Taipale. The delivery was mainly from one

foot but a two foot delivery could be made. In 1976 Doherty reviewed Fox's style. Fox changed Krenz's high hop to a low horizontal hop. This was made in an attempt to gain greater momentum in the whirl. He led with the back and gained momentum with an off-balance drive. By gaining momentum, Fox felt he added 2 feet on the distance traveled by the discus. That was two more feet that force could be applied to it. Momentum causes both the discus and the body to travel in a arc rather than a straight line hence the added distance. Doherty (1976) indicated the movement was caused by letting the back lead. The throwing position was important, however, so the thrower might have had to sacrifice some power from the drive. The left leg brace was still important in Phil Fox's style.

Bob Fitch followed Fox and had more luck in competition than did Fox. Quercentani (1964) mentioned that Fitch was one of the leading United States specialists in 1941 with distances in the 160 foot plus range. The one major change he made in the Fox method was that he emphasized momentum and centrifugal force through an extreme leading of the turn with the left shoulder and entire upper body (Doherty, 1976). Fitch permitted the weight of the upper body to fall around the circle and never caught up with his feet until after the reverse. He did not use a left leg brace to the extent Fox did. Wilt (1971) stated that Bob began his movement through the circle by turning his left foot until it pointed in the direction of the throw and then drove across the circle. This motion resembled that of a sprinter and became known as the "Running Rotation Style" (see figure 23). The style created by Fitch is still used today, however, the release appears to

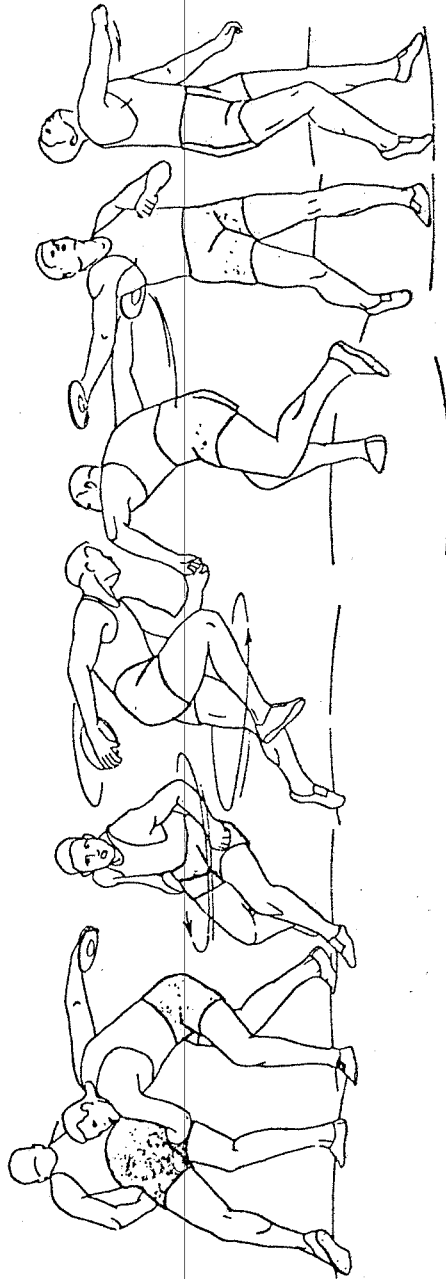


Figure 23. Bob Fitch. (Doherty, 1976, p. 229)

be different (Wilt, 1971). There are two types of releases.

The first is one where the thrower releases the discus while still in contact with the ground. These throwers stress the drive of the hips and upper body up and over the bracing left leg. This type of thrower also has a wide throwing base.

The second type is the thrower who releases in the air after an upward springing motion at the end of the turn. They rely on an upward drive of both legs, a narrower throwing base and a short bracing of the left leg. The reverse is an essential part of this technique.

Adolfo Consolini also adopted the Fox technique probably through the work of his American coach Boyd Comstock (Quercentani, 1964). Consolini's career lasted from 1937 to 1952. His furthest throws were well over 170 feet. In the 1948 Olympics he dominated and employed the Fox technique. The only changes made by Consolini was that he dropped his left foot off the circle just before the turn was executed. He had reverted back to Krenz's original footwork (see figure 22). According to Doherty (1953) Adolfo also emphasized less momentum so he could get into a strong throwing position at the end. Consolinis' record must leave him ranked as the number one European discus thrower. He won so many championships it is unpractical to list them.

Fortune Gordien was also an exponent of the "Minnesota Style", which is another name for the running rotation style, developed by Fitch. However, he carried everything to an extreme. His centrifugal impetus was so great (Quercentani, 1964) that he sometimes had trouble keeping everything under control. Gordien proved to be a very durable performer with a career from 1940 to 1956. He appeared in three Olympics

and placed in two.

Sim Iness was also a classic exponent of Fitch's "running rotation style". Iness attended the University of Southern California and became a very good thrower. In 1948 at the age of 18 he emerged and tried out for the Olympic team. Although he did not make the 1948 team, in 1952 he set the world record at Helsinki with a throw of 180' 6 1/2" (Quercentani, 1964). As a big man, 6 feet 3 inches tall and weighing 240 pounds, the author felt he would have to strive for a good throwing position rather than speed. Although his physique was similar to that suggested by Bresnahan (1956) for a good thrower this body type may have been hard to control during a fast, quick turn.

Al Oerter is the last of the six throwers possibly affected by the Krenz style. He is considered by everyone to be the most successful discus thrower of all time. Al was a four time Olympic champion and the first to go over the 200 feet mark. In 1956 Al Oerter must have destroyed Fortune Gordien mentally during the Melbourne Olympics. His first throw went 184' 11" and all Gordien could do was to finish second 5 feet back (Kieran, 1957). The Christian Science Monitor (1968) talked of Oerter's "theory of total involvement". This, in turn, backed up what Doherty said in 1967 that Oerter prepared for everything, the expected and the unexpected. Some examples of his preparation would be to throw in all types of weather. He prepared for unexpected delays and he was always afraid he would go too fast in extreme competition so he planned to go slower. Oerter was a follower of Fox and Fitch whether he realized it or not. Some of his movements should be mentioned at any rate. His motion started with the left heel turning

inward until the foot pointed towards the throw and he took a relatively close step with his right leg. The first circle was big and controlled. His second circle was tight and very quick (Doherty, 1976). Delivery came from a one leg support. Also important here was a relatively low center of gravity with a limited knee lift (Wilt, 1974). According to national news coverage observed by the author, the year 1979 saw Al Oerter preparing for the 1980 Olympic Games in Moscow. That is a time span of 24 years from his first Olympic win to the 1980 try outs in the United States and his throws are still well over 200'. It will be a long time before another discus thrower can measure up to Oerter's records or longevity. Al Oerter's style can be seen very well by observing someone who has been affected by Oerter's methods (see figures 24 and 24A).

1961-1962

In less than two years, 1961 & 1963, 60 meters or 196 feet 10 inches was beaten by eight men. Could this mean we are entering a new era of discus throwing with the results of intense laboratory experimentation starting to show; or, is it the end result of previous experimentation on an individual basis by the men previously mentioned? It is a question that is not readily answered. Most throwers are still using $1 \frac{1}{2}$ or $1 \frac{3}{4}$ turns which are excellent techniques. Some men are still experimenting, knowing there just has to be another way. Some who have worked on new methods are Bob Humphreys, Edmund Piatkowski and Hein-Direck Neu (Wilt, 1974; Doherty, 1976). They have concentrated their efforts on $2 \frac{1}{2}$ turns with some success. The author felt that there must be a limit to how much centrifigal force can be generated



Figure 24. Clyde Miles - the Oerter Style. (Kring, 1968, p. 210)

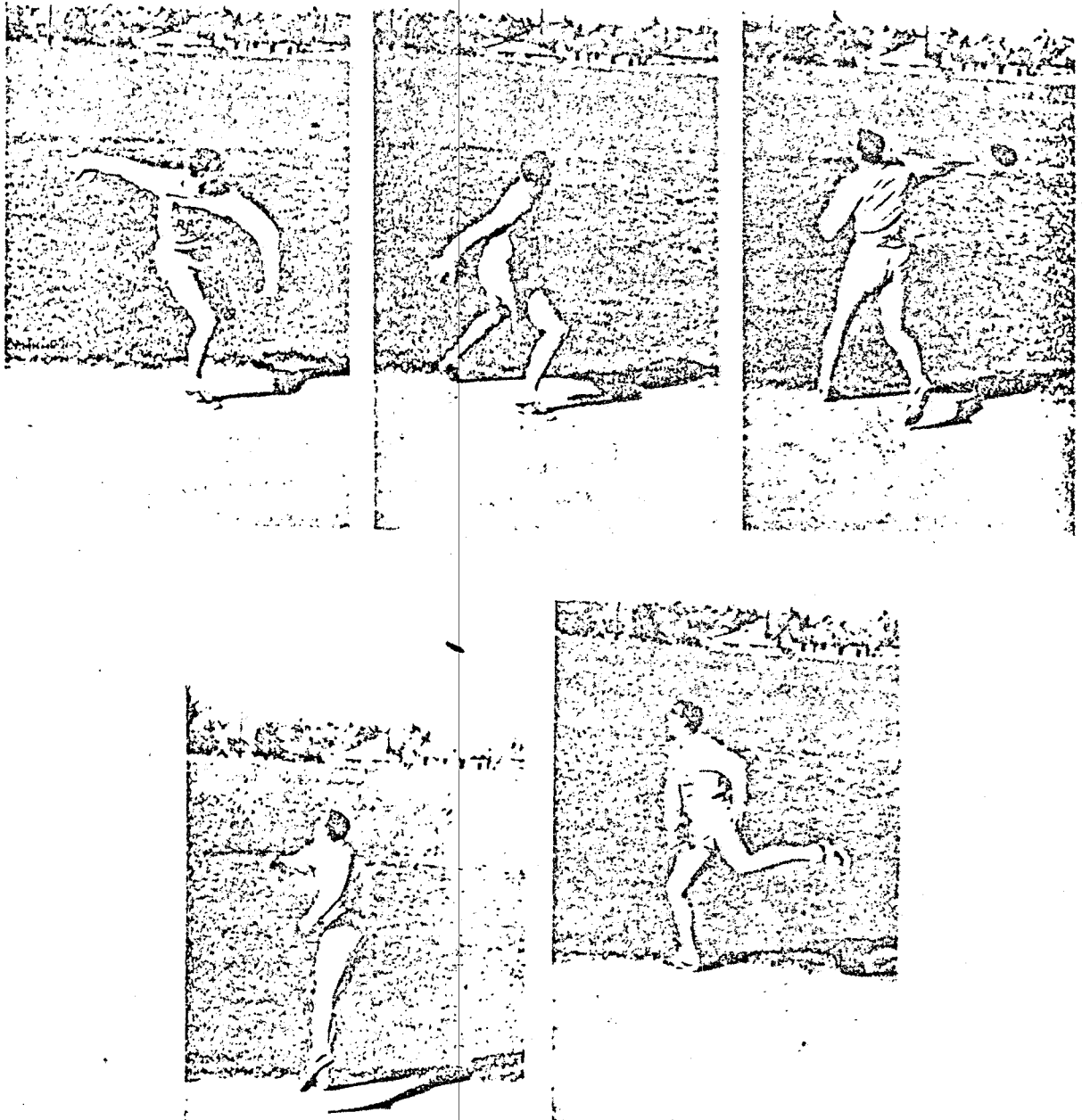


Figure 24A. Clyde Miles - the Oerter Style. (Kring, 1968, p. 210)

and controlled in an 8 feet 2 1/2 inch circle. Where that limit is no one can tell.

Jay Silvester

The "Silvester" style beginning in the 60's was another adaptation of the "back-to-the-direction-of-throw" method. According to Gemer (1973) the most obvious difference is the foot placement as seen in Figure 25, Diagram 1. With this start, the distance covered by the implement is greater and the length of the turn extended. Force can be applied for a longer period of time. A drawback is that it is harder for big, quick men to stay in the ring.

In the delivery (see figure 25, diagrams 3 & 4) Jay's foot and knee pivot less than the orthodox start which results in a more curved path. There is greater momentum but the thrower's feet arrive at a more narrow throwing position and are not lined up with the throw. "This reduces the thrower's final movements considerably, disturbs dynamic balance and reduces the distance through which force can be applied" (Gemer, 1973, p. 71).

Figure 25, Diagram 2 is of a normal start. In Jay's initial movement his ankle and knee turn to the throw. This allows the access to a running motion.

Gemer (1973) went further and stated the reason Silvester used a wide leg swing was so he could establish very early tension of the shoulders (two sided) which enabled him to come to a prepared active landing.

Cantello (1972) reported Silvester said these thing about his style. He started on the line, drove down the line and threw down the line. Doing that allowed him to maximize the directional movement.

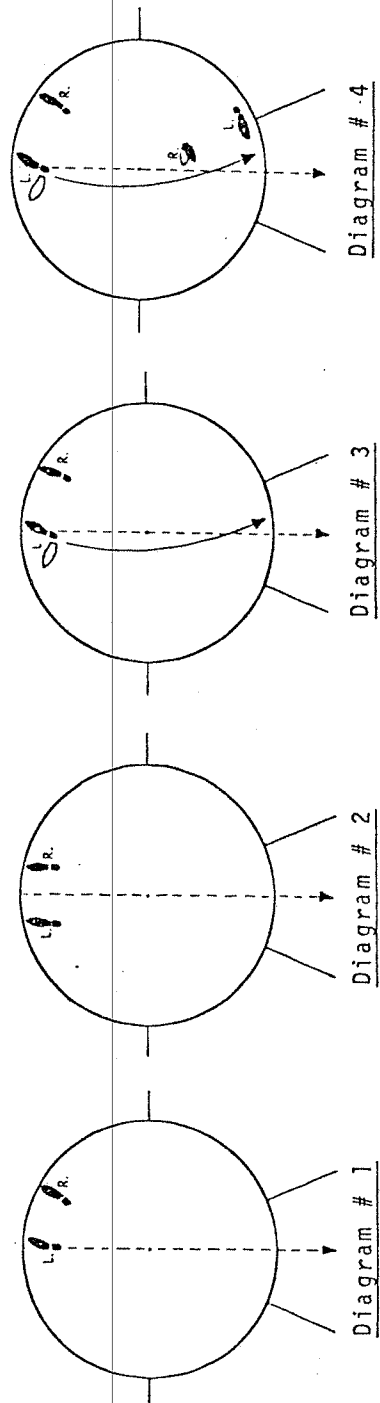


Figure 25. Footwork. (Wilt, F. 1974, p. 71)

It is also important to get the body weight over the left foot before beginning the spin. This aided in balance and timing. Another item was to have the body tip towards the throw to get body weight behind the discus. Silvester also felt the first turn was vital. If the thrower got that done all right then the other parts of the throw would be more nearly correct. Jay also believed in a wide leg swing on the first turn. This kept his shoulders back where he was cocked and ready to throw.

In watching a film from Track and Field News (1972) the author saw the following areas in Silvester's throw: a weight change from one foot to the other in his preliminary swings; and, a left ankle and knee lead into the first circle. Both of the preceding aid in balance and relaxation. The right leg should swing wide and slow in the first turn which leads to an increase in build up of torque. There should be a short time where both feet are off the ground in his jump leading to a quick sharp turn. The torso should incline toward the direction of the throw, which gets the body weight up into the throw and, last, it looked as though Jay used a one foot or an in-the-air release when he threw.

Gordien (1977) mentioned that Silvester was definitely a technique thrower. Brown (1973) mentioned that in a quartering wind of 40 to 50 miles per hour Silvester threw 242' 5" in practice. An astonishing 29 feet over the world record. The wind certainly does help.

Multiple Turns

In 1949 Sam Felton began working with the two turn throw while

others have tried three. These early throwers discarded these styles because the discus was not sufficient to steady the thrower's movement through the circle (Doherty, 1976). According to Doherty (1976) Bob Humphreys was probably the most serious at achieving the two turn style. He worked from 1958 to 1965 and reached a maximum of 202' 4 1/2". Parry O'Brien also worked with Humphreys for awhile and they both improved their distances by 5'. They both felt, however, that the skill was more complicated. Another discus thrower commented while watching Humphreys that "it would be good for a slower man like Bob to gradually build up speed". Humphrey's comment was: "I fear it may fall apart under highly competitive conditions. It is best for the slow thrower. My series improved with the double turn" (Track Technique, 1969, p. 6). In 1974 Wilt commented that the main problem for Bob, after four years of work was getting into a good throwing position.

One of the last to attempt multiple turns was Neu. Neu's technique was probably originated by K.O. Bosen from Indiana who had been the West German national coach in 1963. They wanted to increase rotary momentum and thus felt this style was a means to do this. Webb (1978) provided some good illustrations of Neu's style (figures 26, 26A & 26B). His method started with the right foot at the center of the circle, his back to the bisecting line and the left foot at the circle, heel to the line. The initial turn began with a head lead followed by the left arm and right knee. There was a pivot over the left heel similar to the hammer throw. The body leaned toward the center of the circle but once the right foot hit in the center

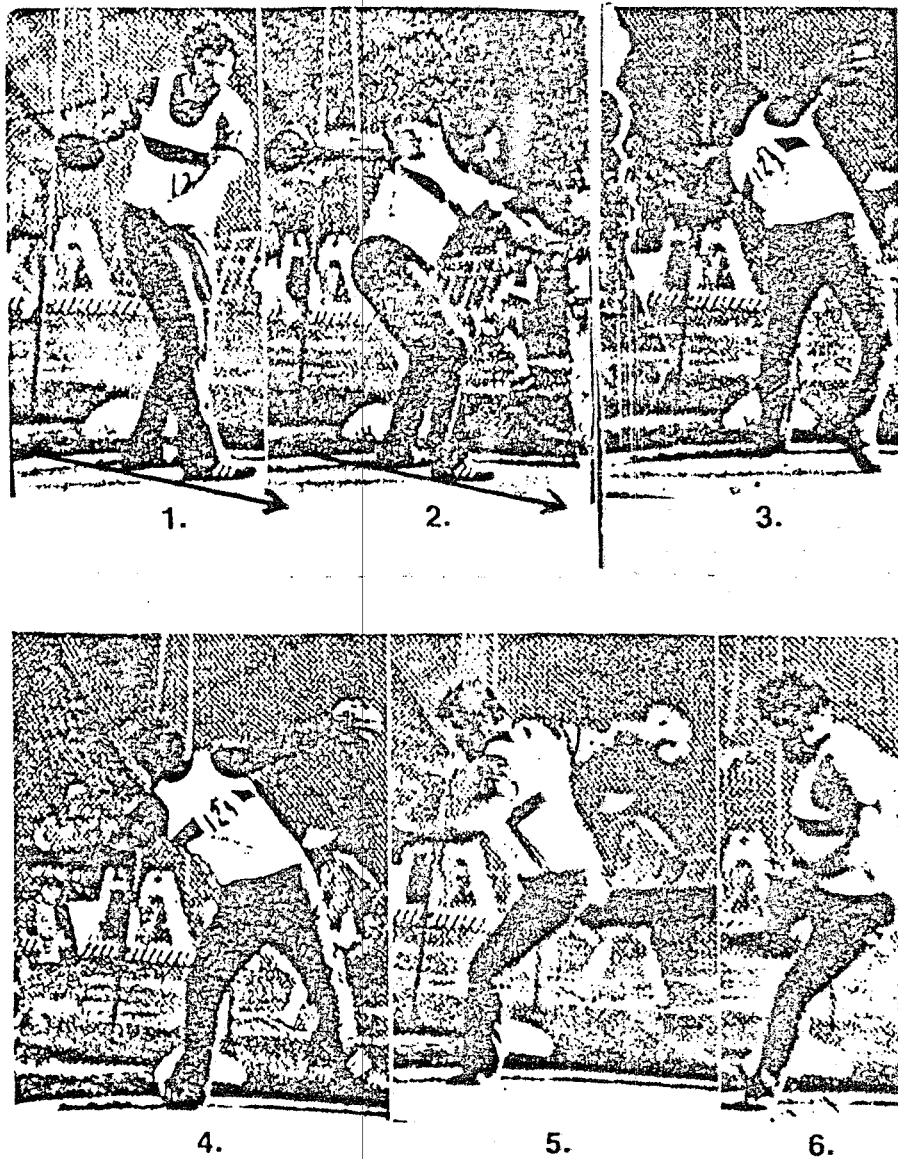


Figure 26. Neu. (Webb, 1976, p. 68)

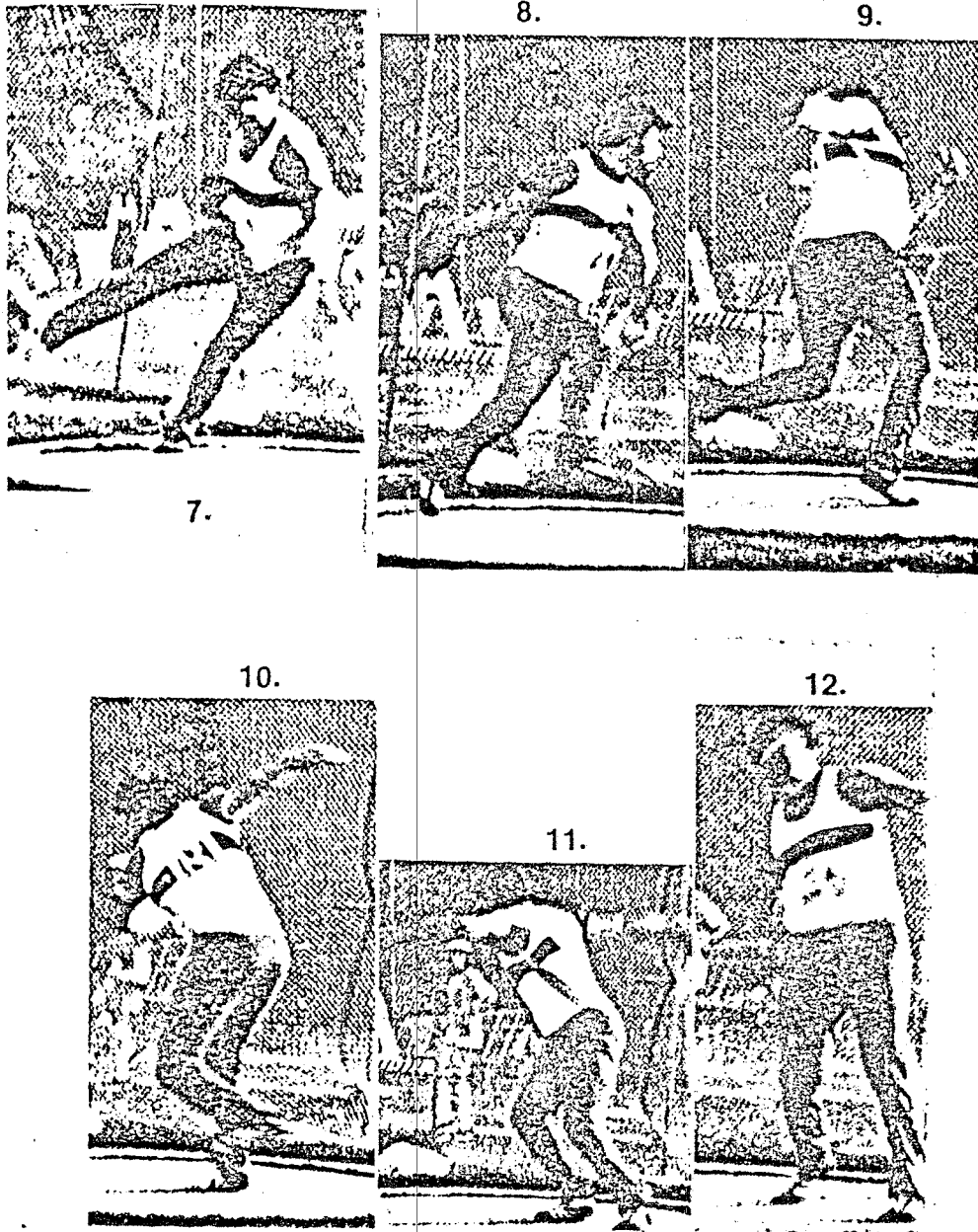


Figure 26A. Neu. (Webb, 1976, p. 68)

13.

14.

15.



16.

17.

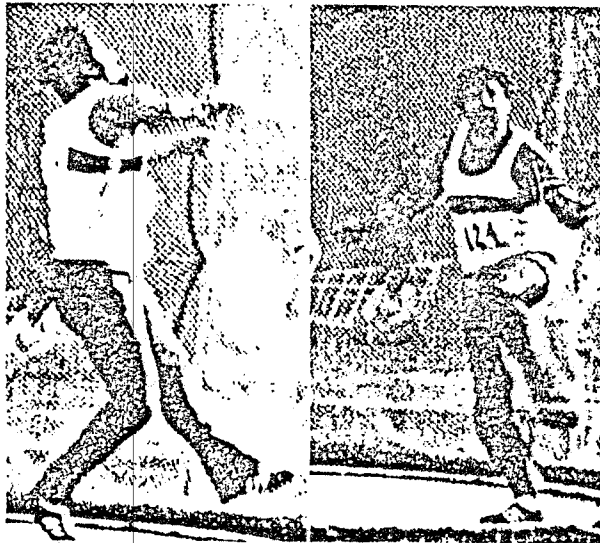


Figure 26B. Neu. (Webb, 1976, p. 68)

the throw was again traditional. There is much emphasis on the hips, legs and torque in this style (Webb, 1976). Webb (1976) also pointed out some key spots in Neu's style. Illustration two shows that the turn was initiated by leading the left elbow and that the center of gravity drops drastically. Illustration three (figure 26) indicates Neu's hammer thrower's heel turn while number seven shows the straight legs with the right leg swinging wide. The author felt that illustration eight showed a weakness of overleading with the head. This would result in less pull (or force) at the final snap.

1976

Mac Wilkins was the last Olympic champion and from a film loop by Audio Graphic Films (1970), the author made these observations. Mac differs from Silvester's style because his stance is over the dividing line instead of beside it. From here the two styles are similar. Both have upright bodies; the right foot is swung wide although it is slower than Silvester's; and the heel and knee lead around first, as does Silvester's. Differing again from the Silvester method, Mac had a definite higher hop and used both legs on the throw. There was good drive from his right leg and good extension from the left. Another similarity to Silvester would be the narrow throwing base they both had. Wilkin's front foot work resembles Oerter in his use of the legs as the throw is being made. Wilkins would be a good example of how a discus thrower keeps what works for him and gets rid of what does not. Some parts of his form resemble Silvester but other parts resemble Oerter and others. According to national news services, Mac Wilkins has thrown over 230' in the week just previous to the presentation of

this report and now holds the world record. Unfortunately, he will not get to try his hand in the 1980 Olympics.

Discussion

What the writer intended to do in this paper was to provide the reader with clear and orderly progression of discus throwing styles from 1896 to the present. Much research has taken place but is clear to the author more could have been done. There is a great deal of literature being published in this field although the early styles are not mentioned very often. Primary sources are impossible to find. The author tried to deal with styles individually and in some cases show how they mesh together in their development.

While style is primary in moving the discus the author also felt it was necessary to include things such as past history, equipment, rules, trajectory and others so the reader would have a better understanding of the discus throw.

Many areas which affect throwing were not mentioned. Preparatory activities, weight training, what are the qualifications of a good discus thrower, training and similar things also affect throwing.

It is my hope that this study will help other discus coaches in their research and understanding of the sport. The ultimate goal of this paper would be to have an excellent thrower develop because of something the author said in this research.

Included in the abstract is a listing of all placewinners from 1896 to 1976, the Modern Olympics. This was added as an aid to the reader. Knowing exactly when a man threw helps fill in the complete picture. (Killanin, 1976, p. 234)

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APPENDIX A

Discus

Weight 4 lb. 6.547 oz. from a circle of 8 ft. 2 1/2 in.

1896	R. Garrett USA 95 ft. 7 3/4 in.	P. Paraskevopoulos GRE 95 ft. 0 in.	S. Versis GRE 94 ft. 5 in.
1900	R. Bauer HUN 118 ft. 3 in.	F. Janda-Suk BOH 115 ft. 7 3/4 in.	R. Sheldon USA 113 ft. 6 in.
1904	M. Sheridan USA 128 ft. 10 1/2 in.	R. Rose USA 128 ft. 10 1/2 in.	N. Georgantos GRE 123 ft. 7 1/2 in.
1908	M. Sheridan USA 134 ft. 2 in.	M.H. Griffin USA 133 ft. 6 1/2 in.	M. Horr USA 129 ft. 5 1/4 in.
1912	A. Taipale FIN 148 ft. 4 in.	R. Byrd USA 138 ft. 10 in.	J. Duncan USA 138 ft. 8 1/2 in.
1920	E. Niklander FIN 146 ft. 7 1/2 in.	A. Taipale FIN 144 ft. 11 1/2 in.	A. Pope USA 138 ft. 2 1/2 in.
1924	G. Houser USA 151 ft. 5 in.	V. Niittymaa FIN 147 ft. 5 1/2 in.	T. Lieb USA 147 ft. 1 in.
1928	G. Houser USA 155 ft. 3 in.	A. Kivi FIN 154 ft. 11 1/2 in.	J. Corson USA 154 ft. 6 1/2 in.
1932	J. Anderson USA 162 ft. 4 1/2 in.	H.J. Laborde FRA 159 ft. 0 1/2 in.	P. Winter FRA 157 ft. 0 in.
1936	K. Carpenter USA 165 ft. 7 1/2 in.	G. Dunn USA 161 ft. 11 in.	G. Oberweger ITA 161 ft. 6 in.
1948	A. Consolini ITA 172 ft. 2 in.	G. Tosi ITA 169 ft. 10 1/2 in.	F. Gordien USA 166 ft. 7 in.
1952	S. Iness USA 180 ft. 6 1/2 in.	A. Consolini ITA 176 ft. 5 in.	J. Dillion USA 174 ft. 9 1/2 in.
1956	S. Iness USA 184 ft. 11 in.	F. Gordien USA 179 ft. 9 in.	D. Koch USA 178 ft. 5 1/2 in.
1960	A. Oerter USA 194 ft. 1 3/4 in.	R. Babka USA 190 ft. 4 1/4 in.	R. Cochran USA 187 ft. 6 1/4 in.
1964	A. Oerter USA 200 ft. 1 1/2 in.	L. Danek TCH 198 ft. 6 1/2 in.	D. Weill USA 195 ft. 2 in.
1968	A. Oerter USA 212 ft. 6 1/2 in.	L. Milde GDR 206 ft. 11 1/2 in.	L. Danek TCH 206 ft. 5 in.
1972	L. Danek TCH 211 ft. 3 in.	L.J. Silvester USA 208 ft. 4 in.	R. Bruch SWE 208 ft. 0 in.
1976	M. Wilkins USA 221 ft. 5 in.	Schmidt E.G. 217 ft.	Powell USA 215 ft. 6 in.