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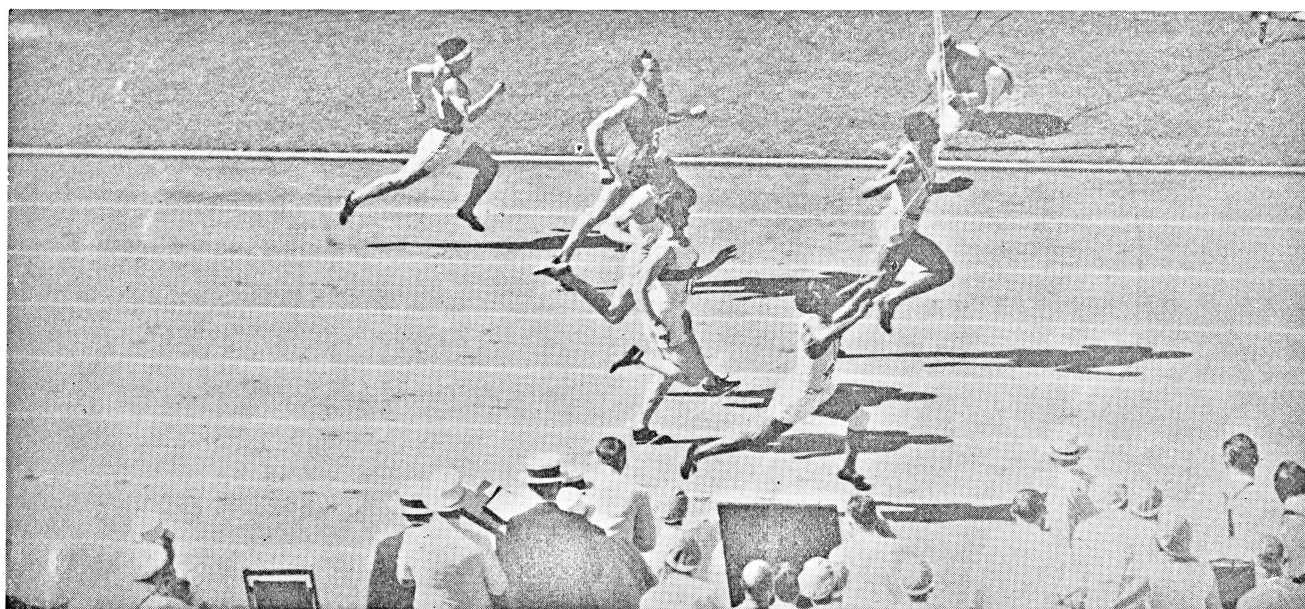


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Famous finish of the 100-meter race in the 1932 Olympics at Los Angeles with Ralph Metcalfe and Eddie Tolan breasting the tape together.

Race and Runners

By

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Introduction

AS THE physical anthropologist scans the fascinating panorama of contests in simultaneous progress at a great track meet like the Penn Relay Carnival, he becomes aware of an association between certain types of bodily build and special events. Conspicuous contrasts are the large, heavily muscled, occasionally paunchy athletes who put the shot and throw the hammer farthest, and the tall, lean young men who jump highest. The leading high hurdlers are tall and the stellar distance men of medium to slender build. In the other running and field events distinctive types of bodily build are less apparent. Almost every variety of human form and style of performance competes successfully in the relay races which endlessly circle the track.

Since athletic accomplishment is jointly dependent upon physical constitution, technique, and the will to achieve, it is obvious that in a few specialized events a particular bodily build may confer advantages which cannot be overbalanced by any amount of training and determination on the part of the less gifted. In the shot put, great bodily weight is an advantage, increasing the impetus imparted to the shot; in the high jump it is a handicap, adding to the load which the muscles must lift from the ground. Similarly, it can be shown that tallness is of advantage to both weight man and high jumper.

Among the sprinters and broad jumpers a diversity of physical types is seen. It is apparent that here determination of the influence of bodily build on performance will be more difficult.

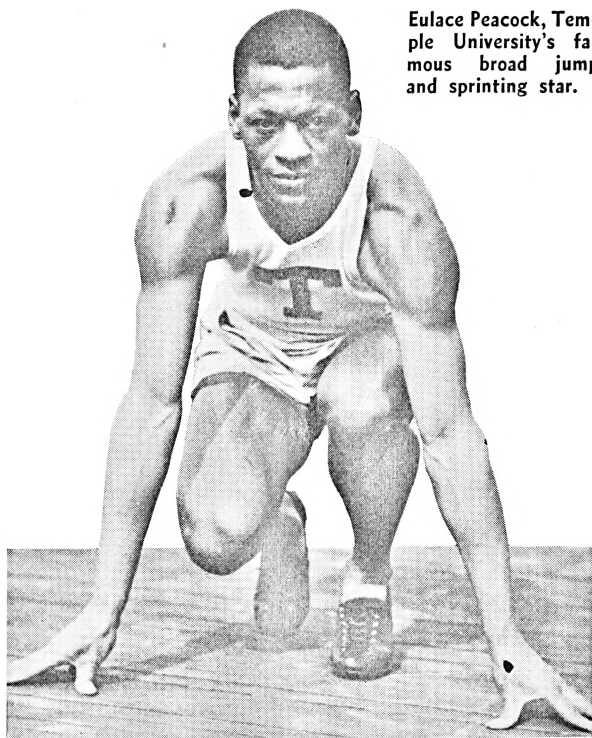
As the anthropologist surveys the striving field in the stadium, he sees nothing to suggest an association between race and competition in any particular event. He notices Negro youths in nearly every phase of competition. Their bodily build varies like that of other athletes. The weight men are big fellows, while those topping the bar are more sparsely built. However, a number of recent comments in the press upon the current success of American Negro sprinters and broad jumpers have either directly ascribed this success to a longer heel bone or stronger tendon of Achilles than those of their white competitors, or implied that in some way it has been due to racial characteristics. The wide circulation which these suggestions have received warrants a careful appraisal of the facts.

Sprinters and Broad Jumpers

In the 1932 Olympics two American Negroes, Eddie Tolan and Ralph Metcalfe, carried off top places in both the 100- and 200-meter dashes, Tolan setting new Olympic records in each event; and another Negro, Ed Gordon, won the broad jump. Since the tenth Olympiad,

Negroes have continued to dominate the national field in the sprints and broad jump in the persons of Metcalfe, Jesse Owens, Eulace Peacock, and Ben Johnson.

In 1932, 1933, and 1934, Metcalfe won national A.A.U. championships in both the 100- and 200-meter sprints. In 1935 he won the 200-meter event. With Tolan and Percy Williams of Canada, he is co-holder of the world's record of 10.3 seconds for the 100 meters, and co-holder with Roland Locke of Nebraska of the world's record for the 200 meters, 20.6 seconds. He also holds numerous records at intermediate distances. Jesse Owens, like Metcalfe a consistent performer, won the national A.A.U. broad-jump championship in 1933 and 1934. He has made and equalled various intermediate sprint records. In one afternoon at Ann Arbor, Michigan, in May, 1935, he performed the greatest track feats ever wrought by a single man, breaking three world's records and equalling a fourth. He leaped 26 feet 8 $\frac{1}{4}$ inches in the broad jump, ran the 220-yard dash in 20.3 seconds, and won the 220-yard low hurdles in 22.6 seconds for new records, besides equalling the world mark of Frank Wykoff of 9.4 seconds for the 100-yard dash. Eulace Peacock was national A.A.U. pentathlon champion in 1933 and 1934. In the 1935 A.A.U. championships he defeated Metcalfe and Owens in the 100 meters to equal the world's record (disallowed because of slight wind), and in the same meet surpassed Owen's remarkable jump of 26 feet 2 $\frac{1}{2}$ inches with a leap of 26 feet 3 inches to win the broad jump crown. Ben Johnson has had the misfortune to race Metcalfe at peak and twice to suffer injuries when his own condition was very promising. He has beaten Owens, however, to tie the latter's world record for 60 meters and has done the hundred in 9.6 seconds. In the 1935 I.C.A.A.A. championships at



Eulace Peacock, Temple University's famous broad jump and sprinting star.

Cambridge, Massachusetts, he was two and a half yards from the finish of the 100-yard final and leading the field when he pulled a tendon. Only a sophomore at Columbia, his day still may come.

Wide attention has thus come to be focussed on the fact that in the past champion sprinters and broad jumpers have often been Negroes. The first was Howard P. Drew who became national A.A.U. champion at 100 yards in 1912 and 1913 while at Springfield (Mass.) High School. In 1913 he also won the 220-yard title. In 1914 Drew went to the University of Southern California where he became co-holder with Arthur Duffey of Georgetown of the world's record of 9.6 seconds for the 100-yard dash, a mark which stood for many years. Drew also equalled the world's record for the 220-yard sprint when that was 21.2 seconds. His action photographs are displayed today as models of perfect form.

After Drew the A.A.U. list of national track champions shows no Negroes' names among the sprinters until that of Tolan in 1929. For six of the last seven years, however, three Negroes, Tolan, Metcalfe, and Peacock, between them have won both sprints.

The story of the list of broad jump champions is startling. Only three times in the last sixteen years have white men been able to win the national broad jump title. No white man has leaped as far as 26 feet but six white men, Ed Hamm, Bob LeGendre, J. Hill, Lemoine Boyle, Dick Barber, and Al Olson, have officially bettered 25 feet.

In 1920 a parade of six Negro champions began with Sol Butler, Dubuque sprinter and member of the United States Olympic team. He won the national event in that year with a jump of 24 feet 8 inches. Ned Gourdin won the next year. He was then the world-record holder by virtue of a leap of 25 feet 3 inches, which was Harvard's greeting to English invaders the previous spring. Gourdin was the first man known to have jumped 25 feet. He was also national pentathlon champion in 1921 and 1922. Continuing after Gourdin, DeHart Hubbard of Michigan held the national broad-jump title for six consecutive years. In turn the world-record holder, Hubbard set a mark of 25 feet 10 $\frac{7}{8}$ inches with his last jump in collegiate competition. In 1928 white Eddie Hamm's 25 feet 11 $\frac{1}{8}$ inches set a new world's record. Then came the fourth Negro, Ed Gordon of Iowa, who took first place in 1929 and 1932. Al Bates won in both the intervening years with leaps of less than twenty-five feet. He has been the only white man except Hamm to win this event in the last sixteen years. In 1933 and 1934 the winner was Owens, and in 1935, Peacock.

Two months after Hamm broke Hubbard's world mark, Silvio Cator, a Haitian Negro, restored Negro supremacy by jumping 26 feet $\frac{1}{8}$ inches. This was the first accredited entry in the 26-foot bracket. In 1928 Hubbard had jumped 26 feet 2 inches, but the take-off was one inch above the level of the landing pit and the record could not be accepted. Chuhei Nambu, the Japanese, jumped 26 feet 2 $\frac{1}{8}$ inches at Tokyo in 1931 and this record stood until Owens' wonder feat last May.

There have been numerous other stellar Negro per-

formers in the sprints and broad jump like Willis Ward of Michigan and Everett Utterbach of Pittsburgh who never won national or Olympic titles. Particularly noteworthy in this group is James Johnson of Illinois State Normal, who earned a place on the American sprint team for the 1932 Olympics, but for some reason, never clear, was not allowed to run. In 1933 James Johnson set new records in the 100- and 200-meter races of 10.4 and 21.6 seconds respectively, in the junior outdoor A.A.U. championships.

Other Performers

Negro champions have been less frequent among middle-distance runners and field performers, yet in these events the Negro has not failed to produce exceptional men. R. Earle Johnson of the Edgar Thompson Steel Works was national five-mile champion in 1921, 1922, and 1923 and represented this country on the 1920 and 1924 Olympic teams. Gus Moore of St. Bonaventure won fame as a miler. Though never a champion, he several times bettered 4:20. Phil Edwards won the intercollegiate half-mile championship while at New York University and was national champion in 1929. He represented Canada in the 1928 and 1932 Olympics. At the gruelling quarter-mile distance Binga Dismond of Chicago equalled Meredith's world record of 47.4 seconds which withstood all assaults until erased by the great Ben Eastman. Cecil Cooke of Syracuse was intercollegiate champion in this event in 1923 and national champion in 1925. For the past two years the intercollegiate crown has been worn by Jimmy LuValle of the University of California at Los Angeles.

In the high jump Charley Major of St. Bonaventure used to clear 6 feet 4 inches frequently in the early twenties. Owens' present team-mate at Ohio State, Melvin Walker, has cleared the bar at 6 feet 5 inches, and leaps of Temple's Al Threadgill have taken him 6 feet 7 inches into the air. For four consecutive years Cornelius Johnson of Compton Junior College has won or tied for first in the national high-jump competition. In 1932 he tied with Bob Van Osdel and George Spitz at 6 feet 6 $\frac{5}{8}$ inches; in 1933 he won with 6 feet 7 inches; in 1934 he tied with Walter Marty, the world's record holder, at 6 feet 8 $\frac{5}{8}$ inches; and in 1935 he won easily with 6 feet 6 inches. Last May, Leo Williams, a colored Muncie High boy, broke the Indiana interscholastic record with a jump of 6 feet 4 $\frac{1}{2}$ inches, while in the same meet another Negro lad, Walter Farmer, set a new prep mark in the pole vault of 12 feet 10 inches.

Willis Ward, Charles Drew, and George Beatty have been hurdlers of note. A misfortune snatched from Beatty a place on the 1932 Olympic team. Owens' world's record in the 220-yard low hurdles must be held a tribute to his speed as he is not a finished hurdler and does not intend to specialize in the event.

There is thus no running event and few field events to which Negroes have not contributed some outstanding performer and there is no indication of ineptitude in any event in which no champion has yet appeared. It is to be noted, however, that the sprint and broad jump champions have appeared in a rapid succession, culminating

in the present group of contemporaneous performers. For this reason they have been especially conspicuous in the public eye. It is this prominence which has probably stimulated the notion that these stars might owe their success to some physical attributes peculiar to their race.

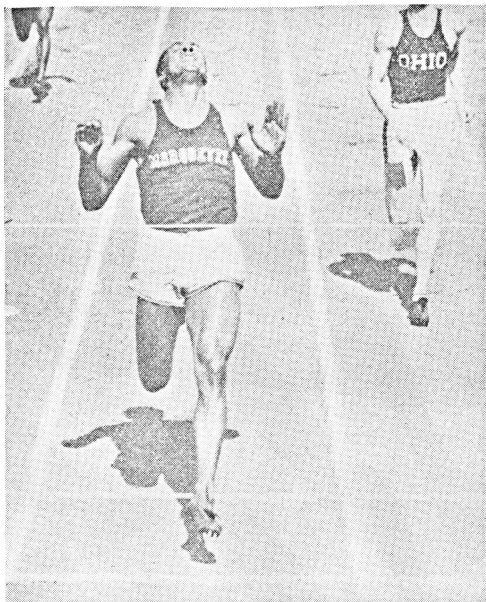
The Old, Old Story

This sort of suggestion is by no means new. In the days when peerless Paavo Nurmi daily fired every youngster's imagination with new world's records broken in Olympic competition, in the months afterward when more records fell during the memorable duels of Nurmi and his doughty Finnish team-mate, Willie Ritola, while the two toured America, there were reams written on why the Finns seemed to have a permanent corner on supremacy in the distance runs. The historians extolled the conquests of the mighty Hans Kolehmainen in 1913. Geographers showed how Finland's rugged climate bred endurance such that the rest of the world might as well turn in its spikes. Moralizing editors completely effervesced on the subject. But still the ancient records (1904) of England's immortal Al Shrubbs for the 6-, 7-, 8-, and 9-mile runs are the world's best. Along have come Kansas' Cunningham, Princeton's Bonthron, and New Zealand's Lovelock to run the mile with "impossible" speed. Who can say whence the next athletic "trust busters" will come, or what records they will attack?

But let us look in other fields. There have been those who felt that continued European victories over Americans in the weight-lifting contests, despite the intensive advertising campaigns of American vendors of bar-bells and other muscle-building and allegedly masculinizing agents, indicated superior inherent European capacity in this line of endeavor. There are people who ask if the

Howard P. Drew, University of Southern California, one of the first of the famous Negro sprinters to achieve championship records.





Ralph Metcalfe, an outstanding sprinter from Marquette University.

fact that professional boxing, once the Irishman's pride, now affords prominence to so many Hebrews, Italians, and Negroes, might not be due to changes in racial physique. Recently the authorities who elucidate the reasons for the meanderings of the Davis Cup have been quite busy.

But to pursue seriously our original inquiry about the relation of the Negro's anatomy to his feats on cinders and pit, track coach and anthropologist must pool their knowledge.

Coach and Anthropologist

To detect and develop athletic talent is the prime function of our track coaches. The track coach is professionally interested only in those qualities of an athlete which make for excellence in performance. He has no concern with the measure in which those qualities may also be characteristic of men of particular occupations or races. These matters are the business of the physical anthropologist.

Let the track coach set down the factors that make a great sprinter and the anthropologist the distinguishing features of the American Negro. If on comparison the two lists have much in common, race may be important; if little, race is of no significance.

Almost at once, however, we are beset with vagaries. The track coach cannot categorically describe the physique and character of the sprint champion, nor can the anthropologist define with useful accuracy the physique and character of the American Negro.

Characteristics of a Sprinter

Most sprinters can broad jump well. If they learn to leave the ground properly after a good run, their inertia will carry them a respectable distance. It used to be thought that participation in one event detracted from ability in the other, but Hubbard, Owens, and Peacock have helped usher this idea into discard. For convenience here, sprinters and broad jumpers are considered together.

It is obvious that superior sprinting and broad-jumping performances require a certain combination of physical proportions, physiological efficiency, and personality which are recognized by the track coach as natural capacity. By methods ably explained in a few manuals on the subject, the coach is able to impart training and technique which convert this potential capacity into the actual ability to perform.

The personal histories and constitutions of our sprinters have not yet been sufficiently analyzed for the formula for the perfect sprinter or jumper to be given. We are not able to say what measure of natural capacity is due to physical proportions, or to physiological efficiency or to forceful personality. Nor can we weight capacity and training scientifically. This does not mean that strongly biased opinions on the subject are non-existent. For instance, it has been said that superior sprinting and jumping ability must be a matter of nine-tenths capacity and one-tenth training because the Negro is not disposed to subject himself to rigorous training.

Despite the fact that adequate data are not available for scientific analysis of sprinting and jumping ability, many useful conclusions may be drawn from a common-sense approach to the problem. We know first of all that the physique, style of performance, and character of our champions have been highly variable.

Physique, Style of Performance, and Character

When the track coach arrays before his mind's eye the galaxy of stars who have done the hundred in 9.6 seconds or better, he notes no uniformity of physique, style of running, or temperament. This group includes the Negro constellation just discussed and Arthur Duffey, Jackson Sholz, Loren Murchison, Charles Paddock, Chester Bowman, Frank Hussey, Charles Borah, Claude Bracey, Emmett Toppino, George Simpson, James Owen, Robert Grieves, Frank Wykoff, Foy Draper, and George Anderson.

Some were tall (Anderson, Metcalfe, Peacock); more were short (Paddock, Tolan, Hubbard, Draper, Grieves, Toppino). Some were slender (Simpson, Anderson); others stocky (Drew, Metcalfe, Paddock, Bracey). Some were well proportioned like Owens, Grieves, and Anderson, but there were a few who could hardly have served as models for the Greeks.

For finer distinctions, data of desirable precision are not available but we can say from general inspection that there have been long-legged champions and short-legged ones; some with large calves and some with small. Record-breaking legs have had long Caucasoid calves like those of Paddock and short Negroid ones such as Tolan has.

In the matter of style, there have been fast starters like Hubbard and Simpson and slow ones like Paddock and Metcalfe. We have had "powerhouse" sprinters such as Metcalfe and smooth graceful flashes like Owens whose performances seem without effort. Most of the runners have been mouth breathers; Metcalfe is a nose breather. Owens follows no rule in breathing. The first fifty yards is the faster for some men, the last half the

better for others. Paddock started fast, "died" in the middle, and swept to the finish with a final burst, using the orthodox "jump" finish very effectively. Some men use a long stride, others a short one, and so on.

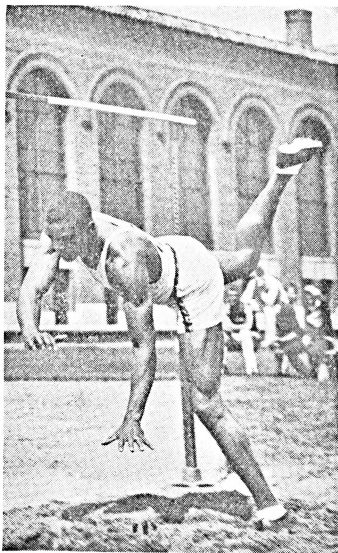
In respect to temperament, again we find no homogeneity. Some maintained calm well before a big meet, others tended to become extremely nervous and required careful handling to be sent off their marks in peak form. Some could ignore efforts by competitors or their sympathizers to gain psychologic advantage; others have been licked before starting a race. Some of rugged constitution could partake of a wide range of edibles and stand a long season, others had to diet carefully and could not long remain at peak. There have been champions of great courage who were undaunted by defeat or misfortune and others who reacted very severely to "bad breaks."

Training and Incentive

We know that general habits, training, and incentive are very important factors in the make-up of the champion. As one studies the records in the *Athletic Almanac* from 1876 to the present, it becomes evident that in every field of athletic endeavor the quality of human achievement has been improving, times are faster, distances farther. To date no calculator of the absolute limits of human capacity seems to have had the correct data for his conclusions. Many have been embarrassed to see men do what had been proved impossible.

The anthropogenist tells us that compensatory improvement in human constitution in a mere sixty years is inconceivable. The fact of our improving performances can mean only that society is learning more and more how to conserve and develop the physical resources which it has had all along. Improved standards of living and two generations of experience have benefited our athletes.

The value of training and incentive is strikingly apparent even in the Negro stars under discussion. If it were true that Negroes had special physical endowments fitting them for sprinting and jumping, it would be expected



Willis Ward, the University of Michigan's versatile Negro athlete, who was an outstanding football player as well as track athlete.



Jesse Owens, of Ohio State University, accomplished the remarkable feat of breaking three world's records and equalling a fourth in one afternoon's performance at the 1935 Western Conference Track and Field Meet.

that from the Negro colleges, which are mostly in the South, there would be a constant crop of good athletes from whom the few champions would emerge. Yet not one of the Negro stars in question came from a Negro college. Both incentive and training facilities are known to be capable of marked improvement in these schools.

Some of the Negro stars themselves have declared that the desire to emulate their predecessors and to excel in a white environment have been powerful stimuli to their efforts. Jesse Owens acknowledges the inspiration derived from his high school coach and discoverer, Charles Riley. DeHart Hubbard hitched his wagon to the shining star of Ned Gourdin.

Anthropological Characteristics

We have seen that the variability of the physical, physiological, and personality traits of great sprinters and jumpers, and inadequate scientific data prevent a satisfactory statement as to just what traits are responsible for their success. We have seen also, the importance of training and incentive. Let us now go to the anthropologist. He has to deal with men categorically designated as American Negroes, but they do not look alike. Genetically we know they are not constituted alike. There is not one single physical feature, including skin color, which all of our Negro champions have in common which would identify them as Negroes.

From his photographs Howard Drew is usually taken for a white man by those not in the "know." Gourdin had dark straight hair, no distinctly Negroid features, and a light brown complexion. In a great metropolis he would undoubtedly be often considered a foreigner. Owens and Metcalfe are of rather intermediate physiognomy. Owens is light brown, lighter than Metcalfe. But Owens has somewhat frizzled hair while Metcalfe's is dark, smooth, and wavy. Hubbard, Tolan, Johnson, and Peacock are darker and more definitely Negroid than the others, but

not one of them even could be considered a pure Negro according to Herskovits' recent definition.

Extending his view, the anthropologist fails to find racial homogeneity even among the white sprinters. We find blond Nordic and swarthy Mediterranean types and various mixtures. In fact if all our Negro and white champions were lined up indiscriminately for inspection, no one except those conditioned to American attitudes would suspect that race had anything whatever to do with the athletes' ability.

Our situation thus appears hopelessly complicated. Variability is so great in the pertinent characters of both sprinters and Negroes as special groups, that to ferret out and evaluate what the two have in common will be difficult if not impossible.

Test Characters

Another approach to the determination of the influence of race in the making of our Negro sprint champions is the comparison of selected Negro characteristics which conceivably may affect running capacity, with the conditions found in our Negro stars.

The Negro is long of limb, that is, he has long legs and arms relative to the length of his trunk as compared with the white. In addition, the leg of the Negro is said to be long in proportion to his thigh. Possibly this might be of significance in broad jumping, as leaping animals such as the kangaroo have extremely long shins and very short thighs. The belly of the calf muscle of the Negro is short and the tendon long, whereas in the white, the belly, which produces the prominence of the calf, is long and the tendon short. The size of the pelvis, which is small in the Negro, would also appear of little importance to the runner or jumper.

In one study it was found that the nerve fibers of the Negro are larger in cross section than those of the white. As with electric conductors, the larger the nerve the easier and quicker the passage of the impulse, so this finding would imply better muscular coordination in the Negro.

It would be desirable, of course, to have for comparison the dimensions of all our stellar athletes, Negro and white, but as such data are not available it will be of value to compare the results of an examination of one of the Negro stars with recognized standards. Accordingly, the following data on Jesse Owens are presented and discussed.

Physique of Jesse Owens

Jesse Owens is a tall, slender, well-knit youth of twenty-one years. He stands 5 feet 10 inches and scales 160 pounds. He is muscular, of erect carriage, with broad sloping shoulders, narrow hips, and long legs. The close observer would notice that the legs are better developed than the arms, but there is by no means a disharmony.

Skeletal Proportion.—Owens' dimensions will be compared with standard dimensions of whites and Negroes. The standards used are those published by Todd and Lindala based on cadavera at Western Reserve University. As the measurements compared are between sub-

cutaneous bony points, the comparison will be satisfactorily accurate.

The average male white lower limb forms 50.9 per cent of the total height, the limb being measured from the pubic symphysis (mid-point on the front of the pelvic brim). The average male Negro limb forms 52.5 per cent of the standing height. Jesse Owens' lower limb forms 52.7 per cent of his height. Owens thus has a long lower limb relative to his height and in this characteristic he is Negroid.

Now to the proportions of the limb itself, namely, thigh, leg, and foot. As previously mentioned, when nature makes a leaping animal, she shortens the thigh, lengthens the leg, and lengthens the foot, as in the kangaroo. Todd and Lindala found no differences between Negroes and whites in the relative proportions of limb length formed by thigh, leg, and foot. Other investigators, however, have reported that the shin of the Negro is longer in proportion to his thigh than that of the white. Davenport quotes a crural index (length of the tibia expressed as percentage of the length of the femur) of 80.4 for the Japanese, of 84.0 for whites, and 86.0 for Negroes, though certain details of his data are somewhat conflicting. The crural index of Jesse Owens is 84.0. Hence this relationship may be interpreted as being near the white norm, or else supporting the contention of Todd and Lindala that there is no racial difference in this index. It is interesting to note that a member of the group having the lowest crural index, the Japanese, from 1931 until last May held the world's record for the broad jump and still holds the record for the hop, step, and jump. So whatever the significance of the crural index for saltatorial ability in the animal kingdom, it is of no importance to man.

Foot length is proportionate to limb length in both Negroes and whites, the length of the foot being 26 per cent of the length of the limb in both races. Owens' foot, however, is but 24.9 per cent as long as his entire leg. He thus has a short foot, a fact apparent to even the casual observer.

Foot breadth is proportionate to foot length and Owens' foot is on the broad side of the normal in this respect, the breadth being 36.25 per cent of the length. In Todd and Lindala's male whites the ratio was 36.1 and in the male Negroes 35.5.

The proper interpretation of the proportions of the foot itself involves an understanding of certain mechanics of the foot. In walking there is heel and toe contact with the ground. In sprinting the movement is simpler, only the ball of the foot striking the ground. For the present, assuming the foot to be a rigid bar, in sprinting it functions as a lever of the second class, in which the heads of the metatarsals (ball of the foot) are the *fulcrum*, the *force* is the upward pull of the triceps surae (calf muscle) on the hinder end of the calcaneus (heel bone), and the *load* is the weight of the body concentrated on the tibia (shin bone).

Obviously in such an arrangement, the efficiency of the foot as a lever would be increased if the heel bone were prolonged backward. Then the saving in lifting

force would give the calf muscle greater driving power, a distinct athletic advantage.

This is the concept which prompted the hypothesis that the calcaneus of the Negro sprinters was exceptionally long. The background for the assumption probably was the widely prevalent impression that the Negro has a projecting heel. Dr. Adolph Schultz has shown that the protuberance when present is a subcutaneous fat pad and not bone.

But there are other faults with the assumption. Why should not all the white champions be long heeled too? If the explanation be that their calf muscles with long bellies and short tendons are more powerful than those of Negroes, it must follow that the short belly and long tendon of the Negro calf gives less muscular power than the muscle of the white and the longer Negro calcaneus would be only compensatory.

For explanatory convenience it was assumed above that the foot as a lever behaves as a rigid bar. This is not true. The foot is arched and the arch bends elastically under pressure. In running and leaping the arch is subjected to severe strains. If on these occasions the supports of the arch are inadequate it will sag and force applied at the heel will be imperfectly transmitted to the heads of the metatarsals. Thus a powerful calf muscle to be effective in giving a runner good drive must act on a foot with a strong or well supported arch.

This emphasizes the importance of the natural supports of the arch. These consist properly of the ligaments which hold the bones of the foot together. But these alone cannot resist the thrust of the body weight. A group of muscles which by their attachments hold the foot bones pressed against each other forms the second line of defense of the arch. Of these the most important are three muscles which arise in the leg beneath the calf muscle. One is a leash for the arch from the inside of the foot (tibialis posterior), another is a sling for the arch from the outside of the foot (peroneus longus), and the third stretches under the inner side of the foot from a pulley on the heel to the great toe (flexor hallucis longus).

It is clear then, that for the calf muscle to be effective in action, the arch of the foot must be strong; and we see that important muscular supports of the arch are not affixed to the heel bone. The proponents of the long heel theory must, therefore, also assume a strong arch for the Negro. The racial anatomy of the arch of the foot and its supports has not been thoroughly investigated but we should like to point out that much has been written about the prevalence of low arches and flat feet in the Negro.

We are now ready to return to Owens. It has been previously noted that he has a relatively short and somewhat broad foot. We cite now that his heel does not conspicuously protrude. On the X-ray picture it may be observed that there is no thick fat pad beneath the skin to produce an effect of protrusion, and that his heel bone is not as long behind the ankle bone as are several bones of approximately the same size belonging to white men. When Owens' roentgenogram was shuffled with those of

several male whites of comparable age and size, a fellow anatomist could not pick out Owens' picture, emphasizing that there is nothing unusual about Owens' calcaneus.

His footprints standing and sitting and the conformation of the bones as seen on the roentgenogram reveal an excellent arch. This arch is distinctly a high one.

Our findings thus demonstrate that Owens' foot presents none of the characteristics commonly but often erroneously designated as Negroid. He has a relatively short broad foot with an excellent high arch and a well-formed non-protruding heel. To have what has been described as a typical Negroid foot, the member should be long and narrow with a low arch and projecting heel, the latter being due both to a large fat pad and a long heel bone.

The reader may ask what the average length of the calcaneus relative to the tibia is in Negroes and whites. To our knowledge no such information has been published. But we have tried to show that the calcaneus is only one element in the mechanics of the foot which is far overshadowed in importance for running by the strength of the arch. To single out the calcaneus is like emphasizing the moderate elongation of the kangaroo's heel while completely ignoring the tremendous extension of the foot in front of the shin. This type of lever arm extension can be adapted to give great drive too, and apparently works well in the marsupial.

Calf Muscles.—The layman is familiar with the small short calf prominence frequently seen in Negroes as contrasted with the large long calf prominence commonly seen in whites. Dr. George D. Williams found in the dissecting room at Washington University that the tendon of the lateral belly of the gastrocnemius or calf muscle formed 51.0 per cent of the total length of the muscle in whites, but in Negroes this tendon formed 55.3 per cent of the length of the muscle. This gives metrical form to the general observation.

Although it is difficult to measure the proportions of the muscle on the living, the gastrocnemius was measured on Owens. Great care was used and as anatomist we are sure our measurements are useful though as anthropometrist we freely admit the possibility of large error. In Jesse Owens the tendon of the lateral belly of the gastrocnemius formed only 49.2 per cent of the total length of the muscle on the right and 49.9 per cent on the left.

Owens thus has a longer calf than the average white, a feature apparent to the naked eye. In fact, the fine calf development is the most conspicuous feature of Owens' legs. The muscle bellies are long and large. His calf girth standing is 399 mm. or nearly 16 inches. In respect to calf structure then, Owens is of the Caucasoid type rather than the Negroid.

Neuromuscular Coordination.—Since the cross-section areas of nerves cannot be measured in the living, Owens was given a tapping test to determine whether in his untrained arms there was any inherent ability to move unusually rapidly. In this test a metal pencil is simply struck alternately on two metal squares about two inches apart as rapidly as the subject is able. Electrical connections make a graph from which is read the number of

taps in a given time. In this test Owens was exceptionally fast with his right arm and above the average with his left. He is right handed.

There are other tests of speed of nervous reaction such as the time of the patellar tendon reflex (knee jerk) and the rapidity with which one can run in place which have been studied on athletes. These were not applied to Owens.

Summary and Conclusions

Since man has begun to measure the quality of his athletic performances with stop-watch and tape he has constantly improved. This has been due not to a betterment of human stock but to experience and better nurture.

No particular racial or national group has ever exercised a monopoly or supremacy in a particular kind of event. The popularity of different events with different groups of people has, and probably always will vary, though not necessarily in the same direction.

Negroes have been co-holders but until Owens not single holders of the world's records for the standard sprints. The split-second differences in the performances of the great Negro and white sprinters of past and present are insignificant from an anthropological standpoint. So are the differences in the achievements of the two races in the broad jump.

The physiques of champion Negro and white sprinters in general and of Jesse Owens in particular reveal nothing to indicate that Negroid physical characters are anatomi-

cally concerned with the present dominance of Negro athletes in national competition in the short dashes and the broad jump.

There is not a single physical characteristic which all the Negro stars in question have in common which would definitely identify them as Negroes.

Jesse Owens who has run faster and leaped farther than a human being has ever done before does not have what is considered the Negroid type of calf, foot, and heel bone.

Although the world mark for the broad jump has remained the property of Negro athletes for a surprisingly long period, it would seem that the technique of the jump is the only feature involved in the matter of supremacy, for Negro and white sprinters have demonstrated equal speed for the preliminary run.

Chuhei Nambu, the retiring world's champion broad jumper, belongs to a people with an anatomical build the opposite of the Negroid in pertinent features. The Japanese are short of stature, short of limb, long thighed, and short legged. If the view that racial anatomy was important in the Negroes' success were correct, these are just the specifications a jumper should not have. Hence we see no reason why the first man to jump twenty-seven feet should not be a white athlete or the first man to run the mile in four minutes a Negro.

N.B. A review of pertinent literature will be found in W. M. Cobb, "The Physical Constitution of the American Negro, *Journal of Negro Educ.*, III (1934), 340-88.