

ling and exaggerated politeness, and questioning is necessary to secure any information about him. His expression is sweet and ingenuous, and he is definitely impulsive, sensitive and unguarded, unfriendly and antagonistic. His frequently voiced phrases are "It's not my fault and I can't do it," and "I didn't have anything to do with it, my getting to be like this." His social attitude has embarrassed him very much, and he is embarrassed and nervous through the newspaper stories, usually quoting his school teachers, say that he is very nice and intelligent. His defective attention and slow responses hold for all company at all, both familiar and unexpected, but he does manifest a rapid interest in seeing any manuscript made by a "good doctor." All functions that are attributed to the highest centers in the cerebral cortex are languid and delayed. He says that he never has any feelings of vertigo or lightheadedness.

His appetite is voracious, and he eats heterodoxically. His daily food consumption averages about 5,000 calories and after morning is 8,000. He eats very early and sleeps much.

He was born in Alton of native American stock. His maternal grandfather was obese and had epilepsy. Most of his known forebears were of unusual height, and all his immediate relatives are of very ordinary stature. He is the eldest of a family of five children; he has two brothers, aged 14 and 3 1/2 years, and two sisters, aged 12 and 12 years. He was disturbed by Drs. Louis H. Behrens and David P. Warr of St. Louis on July 1933, when he was 13 1/2 years old, as 221.5 cm. tall and endowed with a superabundance of brain strength, and there is little that can be added to their account of his early history. At birth he weighed 8 1/2 pounds (3.82 Gm.), and his birth was the ordinary uncomplained delivery of a primipara. At 5 months he weighed 30 pounds (13.6 Kg.), and at 18 months his weight was 60 pounds (27.2 Kg.). At 3 years he was 5 feet 4 inches (163 cm.) tall, and at 9 1/2 years his height equaled his father's. He had a bilateral inguinal hernia when he was 7 years old. He had warts and chickenpox in early childhood and whooping cough when he was 11. He has not had scarlet fever and has never experienced any "growing-pains." The history of injuries includes only other wounds in his feet.

He has been a patient in Barnes Hospital, St. Louis, on four occasions, and his medical records there have been used to supplement my own observations, particularly when his lack of cooperative medical laboratory work has made it impossible to obtain details of his measurements inaccuracy.

Oct. 15-21, 1931: Cellulitis of the left foot with incision and drainage by through-and-through incision in the web of the first and second toes; double amputation.

June 21-July 2, 1932: Cellulitis of the entire left lower limb.

Oct. 16-21, 1933: Abscess of the left great toe with incision, drainage and wet dressings.

March 25-May 4, 1934: Ulcer of the right great toe; epithelial; hyperplastic; ulcerative from persistent abscess and wounding.

The record of his growth given in table 1 is believed to be reasonably accurate. It has been compiled from several independent sources; the hospital notes (a measurement of his height being corrected for each metabolism determination), the record of measurements kept by his father, the published accounts of newspaper correspondents (with no source indication of the inches [25.4 cm.] for the heels of his shoes, since he was never called to remove his shoes when he was backed up against a study table to have calipers leveled off above his crown), a tailor's specifications and a shoe manufacturer's probability material, and a long series of photographs the backgrounds of which could be measured and noted.

It will be noted that this growth curve has been steady and continuous, without noticeable spurts or arrests. Our usual practice when the curve will level off; I think that the lad's height is still actively increasing.

The giant appears to be quite anemic and more than a little emaciated. His musculature is inadequately developed. His general posture is good for his size and weight. The sitting posture is "average." His center of position, for his arms, hands, legs and feet, is very poor. His water consumption is not good or else he is actively thirsty by nature. He is revealed in his dress. His handwriting is neatly and poorly done.

L. Behrens, L. H., and Barr, D. P., Neurological Hospital, St. Louis, Mo., Alton, Ill., 1933, 1934, 1935, 1936, 1937.

The head has a large and very high forehead, is very thick, oval, slightly flattened and very hairy. The eyebrows are pale, and they are set together at an angle. The eyes are convex, bright and have a peculiar degree of innervation and a divergent squint which is characteristic. The eyelids are thin and translucent. There is no ptosis. The eyelids are closed with glasses. There is no conjunctivitis. The cornea is normal, oval and convex, normally in both and slightly in prominent position. The sclera is normal. The iris is a light blue-gray, a fine structure of the iris and shows the iris. There is a very slight depression of the nasal bridge. The nose is a healthy shaped and rather narrow and the nostrils are very large. The nasal septum shows a marked deviation to the right, but the nostrils are wide. The alar cartilages are small in extent. The lips show a marked growth, but the angles are heavy and being. The external auditory canal project laterally, upward at an unusual angle with the chin, rather than in the usual convex slightly downward and forward. His lips are thick and heavy and pale. The teeth are very large, regular and evenly spaced and in good condition; the occlusion is even. The palate is unusually high. The tongue is big but not disproportionately so. The uvula are enlarged and 2 mm. thick, without granular coating. Laryngeal tissue is very loose and waxy. The voice is a weak low, hoarse, hoarse and grunting and comparable to the pronunciation of a patient with no voice quality. His spine shows only the usual anteroposterior curves with no lateral deviation. His chest is barrel shaped. The scapular borders are straight and the curves of the clavicles are straightened out a little from the normal. His heart shows

Table 1.—Growth of Charles D. Humbert.

GIANTISM

REPORT OF A CASE

CHARLES D. HUMBERD, M.D.

BARNARD, MO.

Of 124 letters and cards requesting reprints of and/or making comments about a recent paper¹ on giantism, seventy-one informed me of a remarkable schoolboy giant at Alton, Ill. This giant has received much newspaper and magazine publicity; my clippings about and photographs of him, over a period of eight years, fill two large scrapbooks. But the popular accounts of his height vary so much in stating his dimensions that their accuracy was questionable. I recorded the following history and measurements at his home, June 2, 1936:

R. W., a white youth, single, aged 18 years 3 1/2 months, is just completing the first semester of his freshman year in college. He is a precromegalic giant, 8 feet 3 1/4 inches (252 cm.) tall, of phenomenal size, molded on a vast scale, colossal and stupendous in bulk, truly Gargantuan in all his proportions, and symmetrically built. His family home is a small and modest house with ceilings 8 1/2 feet high; he stoops through its doorways and picks his way about among the light fixtures. His oversized armchair and bed have been especially made, but they seem too small for him. He has been bothered much by the curious, who want to see such a freak. His parents have come to resent these intrusions of the inquisitive; they would like to have the lad regarded as an ordinary 18-year-old boy, and physicians and laymen alike find it impossible to do this. Both the giant and his mother are unduly resentful of the fate which has fashioned him on so preposterous a scale. He makes his pocket money by posing for photographs, for which his charges are variable and modest, but certain.

He objects to being measured or to talking about himself and says there is "nothing in it" for him; a lavish and continued expenditure of much cajolery, flattery, servility, wheed-

I am indebted to Drs. David P. Barr and Louis H. Behrens of St. Louis and to Dr. J. E. Walton of Alton for their discussions and suggestions and for their kindness in furnishing me with their data on the Alton giant, whose height exceeds that of every other documented case of giantism on record in medical literature.
1. Humbert, C. D.: A Twenty-Five-Year-Old Error in Measuring a Giant, J. A. M. A. 106: 1713 (May 16) 1936.

ling and exaggerated politeness, and persistence is necessary to secure any information about him. His expression is surly and indifferent, and he is definitely inattentive, apathetic and disinterested, unfriendly and antagonistic. His frequently voiced complaints are "It's not my fault that I am this way," and "I didn't have anything to do with my getting to be like this." His soured attitude has embittered him very much, and he is introverted and morose, though the newspaper stories, usually quoting his school teachers, say that he is very alert and intelligent. His defective attention and slow responses hold for all sensory stimuli, both familiar and unexpected, but he does manifest a vapid interest in seeing any memoranda made by a questioner. All functions that we attribute to the highest centers in the frontal lobes are languid and blurred. He says that he never has any feelings of vertigo or faintness.

His appetite is enormous, and he eats immoderately, his daily food consumption averaging some 6,000 calories and often running to 8,000. He tires very easily and sleeps much.

He was born in Alton of native American stock. His maternal grandmother was obese and had nephritis. None of his known forebears were of unusual height, and all his immediate relatives are of very ordinary stature. He is the oldest of a family of five children; he has two brothers, aged 14 and 3½ years, and two sisters, aged 16 and 12 years. He was described by Drs. Louis H. Behrens and David P. Barr² of St. Louis as of July 1931, when he was 13½ years old, as 221.5 cm. tall and endowed with a superabundance of brute strength, and there is little that can be added to their account of his early history. At birth he weighed 8½ pounds (3,856 Gm.), and his birth was the ordinary uncomplicated delivery of a primipara. At 6 months he weighed 30 pounds (13.6 Kg.), and at 18 months his weight was 67 pounds (30.4 Kg.). At 5 years he was 5 feet 4 inches (163 cm.) tall, and at 8½ years his height equaled his father's. He had a bilateral inguinal herniotomy when he was 2 years old. He had measles and chickenpox in early childhood and whooping cough when he was 11. He has not had scarlet fever and has never experienced any "growing-pains." The history of injuries includes only minor wounds to his feet.

He has been a patient in Barnes Hospital, St. Louis, on four occasions, and his routine records there have been used to supplement my own observations, particularly when his lack of cooperation made laboratory work impossible and some details of his measurements inaccessible:

Oct. 13-23, 1931: Cellulitis of the left foot with incision and drainage by through-and-through drains in the web of the first and second toes: simple anemia.

June 21-July 2, 1932: Old fracture of the second left metatarsal.

Oct. 18-23, 1932: Abscess of the left great toe, with incision, drainage and wet dressings.

March 29-May 4, 1935: Ulcer of the right great toe; epistaxis; sacro-iliac arthritis; cachexia from persistent anorexia and vomiting.

The record of his growth given in table 1 is believed to be reasonably accurate. It has been compiled from several independent sources: the hospital notes (a measurement of his height being necessary for each metabolism determination), the record of measurements kept by his father, the published accounts of newspaper correspondents (with an average deduction of 1¼ inches [32 mm.] for the heels of his shoes, since he was never asked to remove his shoes when he was backed up against sundry walls to have rulers leveled off above his crown), a tailor's specifications and a shoe manufacturer's publicity material, and a long series of photographs the backgrounds of which could be measured and scaled.

It will be noted that this growth curve has been steady and continuous, without noticeable spurts or upsets. One cannot predict when the curve will level off; I think that the lad's height is still actively increasing.

The giant appears to be quite asthenic and more than a little anemic. His musculature is inadequately developed. His general posture is good for his size and weight. His sitting posture is "droopy." His sense of position, for his arms, hands, legs and feet, is very poor. His motor coordination is not good, or else he is unduly sloppy by nature. He is careless in his dress. His handwriting is untidy and poorly legible.

His blond hair is fine and very thick; his skin is fair, cold, moist, elastic and stretched, and very pallid. His eyebrows are thin, and they are not rugged as in acromegaly. He is severely myopic and has a moderate degree of astigmatism, and a divergent squint, which is alternative. He suffered much from headaches before these refractive errors were corrected with glasses. There is no nystagmus. The pupils are round, equal and contract normally to light and slowly to accommodation. The sclerae are clear. There seems to be a slight photophobia, a little drooping of the lids and some lid lag; there is very little contraction of the visual fields. The nose is roughly shaped and rather bulbous, and the nostrils are very large. The nasal septum shows a marked deviation to the right, but the airways are clear. He thinks his sense of smell is normal. His ears share in his gigantic makeup; the pinnae are heavy and flaring. The external auditory canals project themselves upward to an unusual angle into the skull, rather than in the usual course slightly downward and forward. His lips are thick and heavy, and pale. His teeth are very large, regular and evenly spaced and in good condition; the occlusion is good. The palate is unusually high. The tongue is big but not disproportionately so. The tonsils are enlarged and a little injected, without purulent masses. Deglutition seems to be very "violent" and "awkward." His voice is a weak bass, thick, husky and numbling and comparable to the enunciation of a patient with an acute quinsy. His spine shows only the normal anteroposterior curves, with no lateral deviations. His chest is barrel shaped. The scapular borders are straight, and the curves of the clavicles are straightened out a little from the normal. His heart shares

TABLE 1.—A Record by Years of Giant's Height

Birth-day Years	Height, cm.
9	186
10	193
11	201
12	209
13	218
14	225
15	232
16	239
17	245
18	251

in his proportions; the apex beat is somewhat diffuse under the left nipple. There is a reduplication of the pulmonic second sound.

His blood pressure has been about 110 systolic and 80 diastolic for five years. The respiratory rate is 18 and the pulse 70. The abdomen is slightly paunchy, rounded and soft, and its wall is rather fat and "loose." It moves freely, and immensely, with respiration. The scars of the early bilateral inguinal herniotomy are in good condition. There is a nocturia of two or three times. The external genitalia are quite small; both testes are descended. The pubic hair is scanty, and there is no body hair. He has no lymphadenitis. His hands, whose measurements will be given later, are startlingly enormous; the metacarpals are so extremely long that the thumb, to appearances, sits noticeably nearer the wrist than it should. At the knuckles the fingers tend to an ulnar deviation laterally, away from the thumb's side of the hand, to a marked degree. His nails are thin. Roentgenograms of the hands show, despite much tapering of the fingers, an abnormal amount of tufting of the terminal phalanges of all his digits. His fingers are "double jointed," and they curl themselves up in bizarre positions and assume ungainly and gruesome postures. His wrists, knuckles, knees and ankles, without being greatly misshapen, still show that they do not function with complete normality as joints; they are enlarged and awkwardly formed. But in the hasty and riotous overgrowth at the epiphyses it is not strange that nature's architecture goes somewhat awry and that the nearby joint surfaces acquire planes with angulations, in relation to the bony shafts, that deviate a little from the normal. This would explain the vagaries of unexpected and odd "twists" in his wrists, fingers, knees and ankles. These joints appear to be swollen, but they do not pit with pressure. There are pigmented scars on his shins. His feet are disproportionately large and he is very flat footed; his toes are misshapen.

2. Behrens, L. H., and Barr, D. P.: Hyperpituitarism Beginning in Infancy: The Alton Giant, *Endocrinology* 16: 120 (March-April) 1932.

His walk is a slow, laborious, shoulder-hunching shuffle. Like most other giants, he is especially prone to trophic ulcers and indolent infections of the feet, which have caused him much grief. All sensations (touch, pain, temperature) are void and blank below the ankles, and the loss of pain and temperature senses affects also the middle third of the lower legs. There is a loss of temperature sense, too, up to the level of his knees. His own explanation is that his "legs have grown too fast for the nerves to keep up." It is possible to conceive of his diminished sensibility arising from a "standard" number of ordinary pain areas being distributed over a skin with the surface area more than twice the normal in size. He is unaware of a wrinkle in his sock or a foreign body inside his shoe until a blister, followed by an ulcer, is formed, and only then do the general symptoms of a systemic reaction arouse him.

Roentgenograms of the skull show the air spaces of the paranasal sinuses and mastoid cells developed to an unusual size. The sella turcica is very large, and its floor is pierced by a tubular structure (persistent Rathke's pouch) which extends downward and forward through the sphenoid to the posterior wall of the nasopharynx, where an indefinite soft tissue shadow bulges into the lumen. He must have a most extraordinary amount of functioning pituitary tissue. The mental reactions

TABLE 2.—Anthropometric Picture of Giant

	Cm.
Stature (total height, or crown-heel length).....	232
Acromial height.....	217
Height at sternal notch.....	215
Height at xiphoid.....	183
Height at iliac crests.....	157
Height at symphysis.....	133
Height at patella.....	76
Occlusofrontal circumference.....	76
Length of nose.....	8
Breadth of nose.....	6
Neck.....	39
Length of clavicle.....	20
Biacromial width of shoulders.....	51
Height of scapula.....	21
Breadth of scapula.....	18
Upper arm length.....	45
Biceps.....	30
Elbow.....	28
Forearm length.....	39
Wrist.....	26
Hand length.....	30
Hand breadth.....	14
Circumference of chest.....	112
Circumference of waist.....	110
Bi-iliac width.....	39
Thigh.....	60
Length from trochanter to knee.....	74
Calf.....	41
Ankle.....	37
Foot length.....	41
Foot breadth.....	16

suggest involvement of the frontal lobes, and pressure on the pons posteriorly could well account for his loss of sensory perceptions.

The hospital records, 1931-1935, of his blood studies show an average of about 4 million red blood cells, 7,000 white blood cells and 75 per cent hemoglobin; the Kahn and Wassermann tests were negative. Urinalyses have all been negative except for a rather high specific gravity and the presence of acetone during a starvation period in April 1935 (Simmonds' disease?). The blood sugar was 134 mg. June 30, 1932, 89 mg. March 25, 1935, and 112 mg. April 8, 1935. The basal metabolic rate was minus 18 per cent in 1932 and in 1935.

His anthropometric picture is given in table 2. His present weight, he says, is 395 pounds (179 Kg.) in ordinary clothes.

The thick lips, coarse nose, increasing depth of the chin and general enlargement of the soft parts of the face, as noted when earlier photographs are compared, suggest that an acromegalizing process is already beginning and can be expected to become prominent in the near future.

Anthropologists have yet to set up a definite height above which a man can with certainty be labeled a giant. A scant 10 inches (25 cm.) added to the crown-heel length of an ordinary 6 footer sets him far apart from the crowd and gets him the attention always bestowed on giants by the public. A 10 gallon hat and a pair of high heeled boots equipped with "lifts," with some 82 or 83 inches (208 or 211 cm.) of height

furnishes the picture of more than half of the giants seen in today's sideshows. It is of interest to read that Phineas T. Barnum, doyen of American showmen, after expressing a doubt that there were any men of 8 foot (244 cm.) stature, carefully instructed a friend who was acting as his agent in hiring a French giant³ to give the tall man a job only if his height, as measured when the bootless giant lay flat on the floor, exceeded 7 feet 2 inches (218 cm.). Just why the impresario chose that figure is not known; probably a giant of this height had been in his employ previously. This boy at Alton could indulge himself in the luxury of a 13 inch slouch and still get on the payroll of a latter-day Barnum.

The height limit of the U. S. Army in World War days was 6 feet 6 inches (198 cm.). Among 3¼ million men between the ages of 18 and 30 (a relatively larger proportion of them between 21 and 30) only seven cases of giantism⁴ were found. I have been unable to identify these seven cases, for only a little information about them is to be had from the tedious tables of the work cited. But four of these giants were accepted for full army service, in spite of their disability, so it must be presumed that their heights were not greatly in excess of the army's standard. One of the four was a Negro from the Mississippi River bottoms of rural Arkansas⁵ and the other three were white. One of the three came from a rural section in the northern half of Minnesota,⁶ where the population was 10 per cent Scandinavian, another came from a rural section in the southern half of Minnesota,⁷ where the population was more than 20 per cent German and Austrian, and the last, a native white Southerner, came from eastern Oklahoma⁸ where, in a rural district, there was a sparsely settled Indian territory. Perhaps these men became drum majors for army bands. Their roster does not seem to include Homer Parks of Memphis, Tenn., who is still regularly exhibiting as a circus giant under a banner which extols him as being the tallest soldier overseas. He makes an imposing spectacle in American Legion parades.

Of the three men whose giantism was sufficient reason to reject them from army service, one was a white mountaineer in a rural district of eastern Kentucky,⁹ a second came from an urban district in section 2 of Louisiana,¹⁰ and the third came from Washington¹¹; the exact locale is in doubt, since the earlier references assign him to an urban district, while the later ones place him in a rural section. Tracing these giants must be left to some one who knows the ins and outs of War Department officialdom and the whereabouts of record cards there. I have been told that the statistical cards used in compiling the data were destroyed. The material of the text cited must be incomplete, for I have competent evidence that Bernard Coyne (1897-1921), an undescribed 7 feet 8 inches (234 cm.) giant of the infantilism type who lived on a farm near Oto, Iowa, appeared before the examining board at Des Moines in the draft routine of 1918 and was rejected because of his giantism.

3. The Life of Barnum, Written by Himself, Philadelphia, International Publishing Company, 1891, p. 250.

4. Love, A. G., and Davenport, C. B.: Defects Found in Drafted Men: Statistical Information Compiled from the Draft Records Showing the Physical Condition of the Men Registered and Examined in Pursuance of the Requirements of the Selective-Service Act, Washington, D. C., Government Printing Office, 1920, pp. 81 and 439.

5. Love and Davenport, pp. 444, 1102, 1325 and 1468.

6. Love and Davenport, pp. 448, 1102, 1330 and 1475.

7. Love and Davenport, pp. 448, 1102, 1330 and 1477.

8. Love and Davenport, pp. 451, 1107, 1333, 1472 and 1547.

9. Love and Davenport, pp. 612, 1160, 1328, 1472 and 1552.

10. Love and Davenport, pp. 612, 1035, 1247 and 1328.

11. Love and Davenport, pp. 624, 1043, 1165 and 1251.