Report of the Anthropometric Committee, consisting of Mr. F. Galton, Dr. Beddoe, Mr. Brabrook (*Secretary and Reporter*), Sir G. Campbell, Dr. Farr, Mr. F. P. Fellows, Major-General Pitt-Rivers, Mr. J. Park Harrison, Mr. James Heywood, Mr. P. Hallett, Professor Leone Levi, Dr. F. A. Mahomed, Dr. Muirhead, Sir Rawson Rawson, Mr. Charles Roberts, *and the late* Professor Rolleston.

[Plates III. and IV.]

1.—The Committee were first appointed in 1875, and instructed to continue the collection of observations on the systematic examination of heights, weights, &c., of human beings in the British Empire, and the publication of photographs of the typical races of the empire. It may be convenient to recapitulate briefly what the Committee have done in previous years.

2.—In the first year they prepared schedules and instructions and had them printed, and purchased a small outfit of instruments to send to places where measurements were to be made. The co-operation of inspectors of the army, of the navy, of factories, and of pauper schools was secured.

3.—In the second year the Committee obtained a series of measurements of the 2nd Royal Surrey Militia from Colonel Lane Fox (now General Pitt-Rivers) and circulated copies of his report as a model for other observers. They further revised the instructions, prepared a book of lithographed patterns of hair colours, added to the collections of instruments for lending, and initiated the work of collecting typical photographs.

4.—In the third year the collection of statistics was actively proceeded with, and returns were obtained of a few well-defined classes, as boys in Westminster school, letter-sorters in the Post Office, criminals, &c. Tables were prepared from these, and a Report by Mr. Galton on the returns of criminals was printed and circulated. Progress was made in the collection of photographs.

5.—In the fourth year the Committee continued the collection and tabulation of observations. They had by that time obtained statistics of about 12,000 individuals, which were sufficiently complete to justify the publication of tables of average height and weight, and of the ratio of weight to height. They had been furnished by the Warden of Christ's Hospital with the records in his possession which enabled Sir Rawson Rawson, one of the members, to construct a series of tables, serving as a model for similar observations. Mr. Roberts prepared for the Committee a series of tables and charts, showing the relation of height and weight in the several classes of the English population, as compared with the observations of Americans and Belgians published by Drs. Bowditch, Baxter, and Quetelet respectively.

6.—In the fifth year the Committee were able to double the number of observations, and to reduce them to order by adopting a scheme of classification. They selected from the returns those which related to a standard class living under the most favourable conditions with respect to fresh air, exercise, and wholesome and sufficient food, and prepared a series of tables relating to that class. They also digested the returns relating to the colour of hair and eyes in the standard class, and summarised the statistics of height and weight from persons of country

origin and town origin respectively. They availed themselves of the observations made during several years at Marlborough College to show the usefulness of such systematic records.

7.—In the present year, the sixth of their existence, the Committee have not carried on operations under favourable circumstances. The returns obtained in relation to the several classes are now of sufficient number to make it desirable to subject them to scientific arrangement by skilled computers, but the small fund at the disposal of the Committee (30*l.*) has not been sufficient to enable this to be done completely.

8.—The same cause has prevented the incurring any expense in grants towards actual observations, which, as they involve skill and care and time, ought, in many cases, to be paid for. The whole of the returns collected during the year have been due to obliging voluntary assistance.

9.—The Committee think it an important part of their duties to show how observations should be made, and how they should be used when obtained. From this point of view, they are inclined to hope that their labours have been very successful.

10.—It is confidently anticipated that many of the persons who have been furnished with the forms and instructions adopted by the Committee, and to whom these reports are accessible, will proceed with the collection and recording of observations on the definite system laid down, and that, by this means, valuable results will be obtained and made available even after the Committee have ceased operations.

11.—This remark applies particularly to the case of the public and other schools and institutions which have furnished information to the Committee, as recorded in the present and previous reports. In each of these it is hoped that the practice of keeping an anthropometric record will be continued.

12.—On page 3 is a statement of the additional returns which have been furnished to the Committee during the present year.

13.—The special thanks of the Committee are due to the contributors, mentioned in the list, whose zealous assistance in a matter necessarily involving a great expenditure of time and trouble deserves most hearty acknowledgment.

14.—Adding these returns to those referred to in the previous reports, the aggregate number of original observations furnished to the Committee is as follows :—

Year	Sex	Number of observations					
		Of birth-place and origin	Of age, height, and weight	Of colour of hair and eyes	Of girth of chest	Of strength of arm	Of eyesight
1879	Male	5,254	11,745	4,011	6,321	2,131	1,368
1880	Male	3,206	11,956	3,511	5,766	1,686	1,260
1881	Male	796	5,877	867	789	1,521	315
	Female	368	403	403	403	338	13
Total . .		9,624	29,981	8,792	13,279	5,676	2,956

15.—Upon the main branch of the inquiry, therefore, that of the relation of height and weight to age, the Committee have collected, in round numbers, 30,000 original observations. To these have to be added the 50,000 or more observations independently collected by Mr. Charles Roberts, one of the most active members of the Committee.

List of Observations collected during the Year 1881.

Sources of Information	By whom furnished	Number of Observations						
		Sex	Birth-place and Origin	Age, Height and Weight	Colour of Hair and Eyes	Girth of Chest	Strength of Arm	Eyesight
1. Medical Students (Leeds) . .	Mr. F. Greenwood . . .	Males	57	57	57	—	—	—
2. St. Stanislaus College (Ireland) .	Rev. W. Delany . . .	„	100	100	100	100	100	100
3. York Quaker School . . .	Mr. E. Clarke	„	—	5000	—	—	—	—
4. Yarlet Hall School	The Head Master and Gymnastic Master.	„	73	73	73	73	73	—
Ladies' Schools.								
5. North London College . .	Mrs. Bovell Sturge, M.D. . .	Females	73	73	73	73	73	—
6. Orme Girls' School, Newcastle, Stafford	Miss Martin	„	—	35	35	35	—	—
7. Ladies' College, Guernsey .	Miss Eaton	„	30	30	30	30	—	13
8. Roan School, Greenwich . .	Miss Blackmore . . .	„	265	265	265	265	265	—
9. Letter-sorters, &c.	Dr. Waller Lewis . . .	Males	—	—	—	—	1159	—
Rifle Volunteers:								
10. Cumberland	Dr. Knight	Males	55	55	55	55	—	55
11. Lancashire	Major Greenall	„	28	28	28	28	28	28
12. Lancashire	Dr. Barrow	„	245	245	245	245	—	—
13. Glamorgan (further instalment)	Dr. Evan Jones. . . .	„	6	6	6	6	6	6
14. Militia (West Norfolk) . . .	Major Massy	„	—	81	81	81	—	—
15. Industrial Classes (Cardiff) . .	Dr. Taylor	„	80	80	70	75	55	—
Industrial Schools.								
16. Anerley (North London Pauper Schl.	Mr. J. Marsland . . .	„	100	100	100	100	100	100
17. Bristol	Dr. Beddoe	„	26	26	26	26	—	26
„	„	„	13	13	13	—	—	—
„	„	Females	13	13	13	—	—	—
			1164	6280	1270	1192	1859	328

TABLE A.—Showing the number of observations of HEIGHT and WEIGHT collected by the Committee at each age in the several classes, including some of the returns placed at its disposal by Dr. Beddoe and Mr. Chas. Roberts.

Age in years	Number of Observations of Height						Number of Observations of Weight					
	Classes						Classes					
	1	2	3	4	5	6	1	2	3	4	5	6
10–	101	313	783	336	419	959	92	211	—	—	—	108
11–	242	687	597	240	341	951	185	393	—	—	—	96
12–	490	902	395	193	325	645	369	410	—	—	—	115
13–	869	857	403	614	—	531	621	353	—	640	—	106
14–	966	800	9	1653	1	1414	748	304	—	1396	—	75
15–	974	544	515	1464	3	230	652	244	676	1446	3	44
16–	1102	110	177	1391	6	164	834	55	169	1177	6	24
17–	1852	107	75	711	20	92	1705	38	80	673	21	52
18–	1724	62	148	371	31	579	1638	39	135	338	29	359
19–	951	63	143	277	29	579	940	69	140	289	31	379
20–	461	61	183	175	35	461	451	52	175	173	33	285
21–	364	51	177	165	35	381	365	51	164	157	31	281
22–	227	53	127	109	33	345	215	51	167	109	33	243
23–	114	59	274	145	61	326	112	57	279	103	54	260
24–	57	62	258	140	42	317	56	57	250	120	37	281
25–		47	218	92	31			45	224	61	32	
26–		47	194	74	44			46	192	58	32	
27–	107	27	162	66	44	981	115	26	171	56	45	958
28–		33	208	59	42			33	213	50	30	
29–		26	163	53	33			26	161	46	30	
30–	52	85	745	180	156	587	48	87	700	153	144	1901
35–		82	631	111	110	419		80	631	105	92	
40–	46	43	551	64	82	261	44	39	541	66	75	
45–		36	392	16	64	162		33	371	47	60	
50–	—	16	147	22	22	222	18	16	129	21	20	
60–70	—	—	34	—	2	98		—	24	—	2	
	10,699	5,173	7,709	8,721	2,011	10,704	9,208	2,815	5,592	7,284	840	5,567

16.—Mr. Roberts has rendered his colleagues very essential help by the preparation of the diagrams and a great number of the elaborate tables in the former Reports of the Committee, and has contributed to the present Report the paper on the general result of the observations, which is given in the Appendix.

17.—Mr. Roberts's Tables (I.–IV.) show the general result of the observations collected by the Committee as to (1) height, (2) weight, (3) chest-girth, (4) strength.

18.—The height of 38,953 persons is recorded in Table I., the horizontal black lines in which indicate the curve of growth formed by the 'mean' height at each age, which is 3 feet 5 inches at the age of 5, and becomes 5 feet 8 inches at the age of 50.

19.—The weight (with clothes, for which about 7 lbs. may be allowed) of 26,560 persons is recorded in Table II. The horizontal black lines in this Table indicate the curve of increase in weight formed by the 'mean' weight at each age, which is 4 st. 9 lbs. at the age of 10, and becomes 11 st. $8\frac{1}{2}$ lbs. at the age of 70.

20.—The chest-girth of 17,883 persons is recorded in Table III., the horizontal black lines in which indicate the curve of increase formed by the 'mean' chest-girth at each age, which is 26 inches at the age of 10, and becomes $36\frac{1}{2}$ inches at the age of 40.

21.—The strength, as indicated by the drawing power of the arm, in 5,039 persons is recorded in Table IV., the horizontal black lines in which indicate the curve formed by the variations of the 'mean' drawing power at the successive ages, rising from 35 lbs. at age 11 to 80 lbs. at ages 25–30, and falling again to 70 lbs. at the age of 50.

22.—In using Mr. Roberts's tables, however, it is important to bear in mind that he employs the term 'mean' not in the ordinary sense of an arithmetical mean or average, but as representing 'the value at which the largest number of observations occur,' or that of 'greatest frequency.' The arithmetical average is found by him in adults to exceed the 'mean' in general by about half an inch.

23.—In Tables V. and VI. Mr. Roberts is able to show the results of a comparison as to the 'average' height and weight of the several classes of the population, distinguished as (1), the professional classes, including town and country; (2), the commercial classes in towns; (3), the labouring classes in the country; (4), the artisans in towns.

24.—Table V. relates to height, which is taken without shoes. The relative position of the four classes stands in the order stated; classes 1 and 2 being taller, and classes 3 and 4 shorter, than the general population. This relation is maintained throughout, and the table affords material for study as to the comparative effects of occupation and town and country life on growth.

25.—Table VI. relates to weight, which is taken with clothes. The relative position of the four classes still stands nearly in the same order, class 1 being heavier and class 4 lighter than the general population, but class 3 very nearly coincides with the general average, and is in general superior in weight to class 2. In other words, the rural occupation of the country labourer gives him the advantage in weight over the town tradesman, though the latter has the advantage in height.

26.—Class V. of the classification adopted by the Committee in the Report for 1880—the industrial workers or sedentary trades in towns; and Class VI., the specially-selected occupations, have not furnished returns in sufficient number to be available for comparison.

27.—The chairman of the Committee, Mr. Francis Galton, contributes to the Appendix to this Report a paper on the range in height, weight, and strength of the different classes at every age. He measures the range, not between the maximum and minimum values recorded, which afford no safe basis for comparison, but through an extension of the principle by which the so-called 'probable error' is ascertained. Thus, he first arranges the cases in the order of their magnitude, then he cuts off a certain fractional portion of them from either end of the series, and measures the difference between the maximum and minimum of the intermediate group. The ranges given are between the upper and the lower tenths and between the upper and the lower fourths, the value of the latter range being identical with twice the 'probable error.'

28.—Inspector-General Lawson contributes to the Appendix to this Report a valuable paper giving the results of the earlier portion of the observations furnished to the Committee on eyesight.

29.—The total number of observations of eyesight collected by the Committee has been 2,956; many of which, as will be seen by Dr. Lawson's paper, are not considered trustworthy. Sufficient, however, have now been derived from various independent sources to form a fair average.

30.—This inquiry as to eyesight has led the Committee to consider the very important question of colour-blindness, which has been ascertained in Germany and America to affect 1 in 25 of the male population, and which probably exists in this country to a greater extent than is suspected by most people.

31.—To facilitate the collection of statistics relating to colour-blindness, the Committee accepted an offer which a member, Mr. Roberts, was enabled by the kindness of the Norwegian professor, Daae, to make, that he should prepare for publication an English edition of that professor's tests for colour-blindness, as published in Berlin; also a description of Professor Holmgren's method, with a revised series of the eyesight tests and popular instructions of his own.

32.—This work has been published in a compact form,[1] and its application might even be made a parlour pastime, since it requires no special qualification in the observer, who may indeed be a colour-blind person himself. The Committee hope that this little book may be widely circulated and freely used. This book of tests is in use at Marlborough College, and Mr. Roberts contributes to the Appendix of this report an analysis of the observations made on the whole of the boys and masters, 600 in number, at present in the College, by the Rev. T. A. Preston, a gentleman to whom the Committee are indebted for many valuable contributions to their store of anthropometric observations.

33.—Mr. Roberts has remarked on this important subject that 'some unnecessary alarm will be felt by travellers if they are led to believe that colour-blindness is as prevalent among engine-drivers as other men of their own class, and that one person in every twenty-five is subject to this defect. As a matter of fact, the severer forms of colour-blindness are quickly eliminated from the railway services, either by the conscious inability of the men to distinguish the signals to which they are daily and almost hourly subjected, or by the minor accidents they fall into, which leads their employers to dismiss them as careless, incompetent, or intemperate servants. It is, however, most desirable that this clumsy and

[1] *The Detection of Colour-blindness and Imperfect Eyesight.* By Mr. Charles oberts, F.R.C.S. Published, at 5*s*., by Mr. Bogue, 3 St. Martin's Place, W.C.

dangerous process of elimination should be superseded by a searching, trustworthy method of testing the colour-sense, especially in fresh candidates for employment on railways and steam-vessels, and it is a disgrace to our country—which was the first to discover and investigate the subject of colour-blindness and to point out its dangers—that it should be the last to recognise its practical importance. But the subject has a much wider bearing than the regulation of traffic by sea and land. As many arts and occupations can only be carried on successfully by persons who possess a normal colour-sense, the testing of the eyesight, whether for colours or objects, should take place in childhood, and before a youth has wasted much time in acquiring technical knowledge which his faulty sight precludes him from using to the same advantage as his more fortunate competitors. Every parent should be cognisant of the condition of the colour-sense of his children, in order that he may provide the colour-blind ones with suitable occupations. Fortunately the art of testing the colour-sense is a very simple one, and is quite within the capacity of a schoolmaster or parent of ordinary intelligence, as it requires neither a knowledge of the theory of colour-blindness (which, indeed, is not yet agreed on by specialists) nor of medicine or surgery.'

34.—Upon the portion of the reference to them which relates to the 'publication of photographs of the typical races of the Empire,' the Committee have not at present anything to add to previous reports. It was intended that a portion of the grant made to the Committee should be applied towards this branch of their work, but the more urgent needs of the general anthropometric work have absorbed the whole of it. Dr. Beddoe, however, has presented a set of photographs of pure Highlanders, and a collection of Irish types has been made by Mr. Park Harrison.

35.—The total expenditure of the Committee during their six years' operations has been only 243*l.* 15*s.*, or about 40*l.* a year. This has included the preparing, printing, and circulating of many thousands of papers of instructions, forms of returns, cards and other publications, and of a costly series of colour-types; besides the judicious payment of small sums, in a few cases, as remuneration to the observers, where their position in life (as regimental sergeants &c.) rendered it desirable; the purchase of photographs and negatives of photographs and of several sets of instruments for making measurements, and the cost of clerical labour in abstracting the returns. The Committee venture to think that they have not improvidently administered the fund at its disposal.

36.—The Committee could, indeed, not have accomplished the work at so small a cost but for the obliging exertions of some of the members, notably Sir Rawson W. Rawson and Mr. Roberts. They have also to acknowledge the services of several gentlemen, not members of the Association, who have kindly consented to act as advisers to the Committee, viz.:—Dr. Bain, Dr. Balfour, Inspector-General Lawson, Dr. Waller Lewis, and Dr. Ogle.

37.—It remains to note briefly the work still to be done by the Committee in the event of their reappointment.

38.—First, it is exceedingly desirable that more complete details should be obtained with regard to the earlier ages from birth to 10 years, a period in which the rate of growth and development is probably more affected by external circumstances than in after-life, and which therefore lends itself more readily to classification.

39.—Secondly, it is of great importance to proceed with the inquiry into anthropometric facts relating to females, which has been commenced with much zeal by the mistresses of some of the high schools for girls, and which by their example may be extended among the various classes of girls' schools throughout the kingdom.

40.—Thirdly, a larger number of statistics are required of individuals belonging to class V.—town industrial workers—to form an average for comparison with the other classes.

41.—Fourthly, further observations should be obtained on the colour sense and on eyesight.

42.—Fifthly, the materials already existing should be more completely worked out, especially those referring to the colour of hair and eyes, as well as the physical proportions of the population in different geographical districts, or districts inhabited by persons of different racial origin.

43.—Lastly, the encouragement in public and private schools and establishments of systematic weighing and measuring on fixed principles should be continued.

44.—The Committee have, in conclusion, to state that the assistant-secretary, Mr. J. Henry Young, has performed his duties with marked intelligence and zeal.

APPENDIX.

MR. C. ROBERTS, *who has prepared the Tables from I. to VII. for the Committee, has contributed the following explanations and remarks :—*

Tables I. (height), II. (weight), III. (chest-girth), and IV. (strength), are intended to show the chief physical characters of the British *race*: hence the whole number of observations are given to show the range or variation of the stature, weight, &c., at each age, and the relative number of individuals at each height, weight, &c.; the *mean* height, chest-girth, weight, and strength being indicated by the horizontal lines crossing the columns of figures where the largest number of observations occur.

Tables V. and VI. show the *average* stature and weight of different classes of the nation,—classes which have been differentiated by social or sanitary surroundings and peculiar occupations.

It is necessary to call attention to the difference between the average and the mean as employed in these tables. An *average* is obtained by dividing the sum of the values observed by the number of observations, while the *mean* is the value at which the largest number of observations occur ('the value of greatest frequency.') An average is influenced by exceptional cases, but a mean disregards exceptional cases and is entirely dependent on the predominating numbers; hence I have employed the *mean* to distinguish the racial type, and the *average* the variations to which the race is subject by the modifying influences of local and exceptional causes. To determine the racial type of a nation by means of an *average* it would be necessary to have all classes of the community represented in their due proportions; but the unequal distribution of occupations renders this impossible, unless a general census were taken. Even within narrow limits it is almost impossible to obtain observations of all the individuals of a class, as the taller and better-developed members readily submit to measurement, while the shorter and imperfectly-developed evade examination, and the sick and deformed are passed over altogether. On the other hand, the determination of the racial type by the *mean* is free from these sources of error, as we disregard both the ill-developed and the over-developed individuals, and depend entirely on those which represent the medium development of the class or nation. Table VII., giving the stature of adult men of different classes of the British population shows the difference between the *average* and the *mean*. In those classes, where all the individuals have been accessible and no selection has been attempted, the average and the mean stature are almost identical; but in the case of the recruits for the army, where all the men below a certain standard are excluded, the *average* is an inch higher than the *mean* stature. The *average* in this case implies that recruits are of the same type as the agricultural classes (Class III.), but the *mean* shows that they are really of the type of the town artisan class (Class IV.) from which we know they are chiefly drawn. This also explains why the *average* stature of the general population (Table V.) is half an inch higher than the *mean* stature (Table I.)

The tables show some new and interesting facts in connection with the physical development of the body at different periods of life. Below the age of ten years the observations are very imperfect, but from that age up to sixty years they are very numerous, and fairly representative of all classes of the population.

The accompanying chart (Pl. III.) shows graphically the variations in the *mean* height, chest-girth, weight, and strength of the general population with advancing age, and the relation of these qualities to each other; and the following figures show their actual value:—

Relative Increase in the Size, Weight, and Strength of the Body from 5 to 70 years of age.

Age	Height	Girth	Weight	Strength (drawing power)
	inches	inches	lbs.	lbs.
5	—	No observations at these ages	ditto	ditto
6	2·0			
7	2·0			
8	2·0			
9	2·0			
10	2·0	—	—	—
11	2·0	·5	5·0	—
12	2·0	·5	7·5	2·5
13	2·5	·5	7·5	2·5
14	2·5	1·0	7·5	2·5
15	2·0	1·0	10·0	5·0
16	2·0	2·0	15·0	7·5
17	1·5	2·0	17·5	7·5
18	1·0	·5	7·5	5·0
19	·5	·5	—	2·5
20	—	—	2·5	2·5
21	·5	·5	—	2·5
22	—	—	2·5	2·5
23	—	·5	—	—
24	—	—	2·5	—
25–30	—	·5	—	2·5
30–40	—	—	2·5	−2·5 decrease
40–50	—	·5	2·5	−2·5 decrease
50–60	·5	No observations at these ages.	2·5	−5·0 decrease
60–70	—		2·5	—
70–	—		2·5	—

1. After the age of 10 years the greatest increase in stature takes place at 13 and 14; in chest-girth at 16 and 17; in weight at 15, 16, and 17; and in strength at 15, 16, 17, and 18 years. The chest-girth and the strength have a more direct relation to the weight than to the stature.

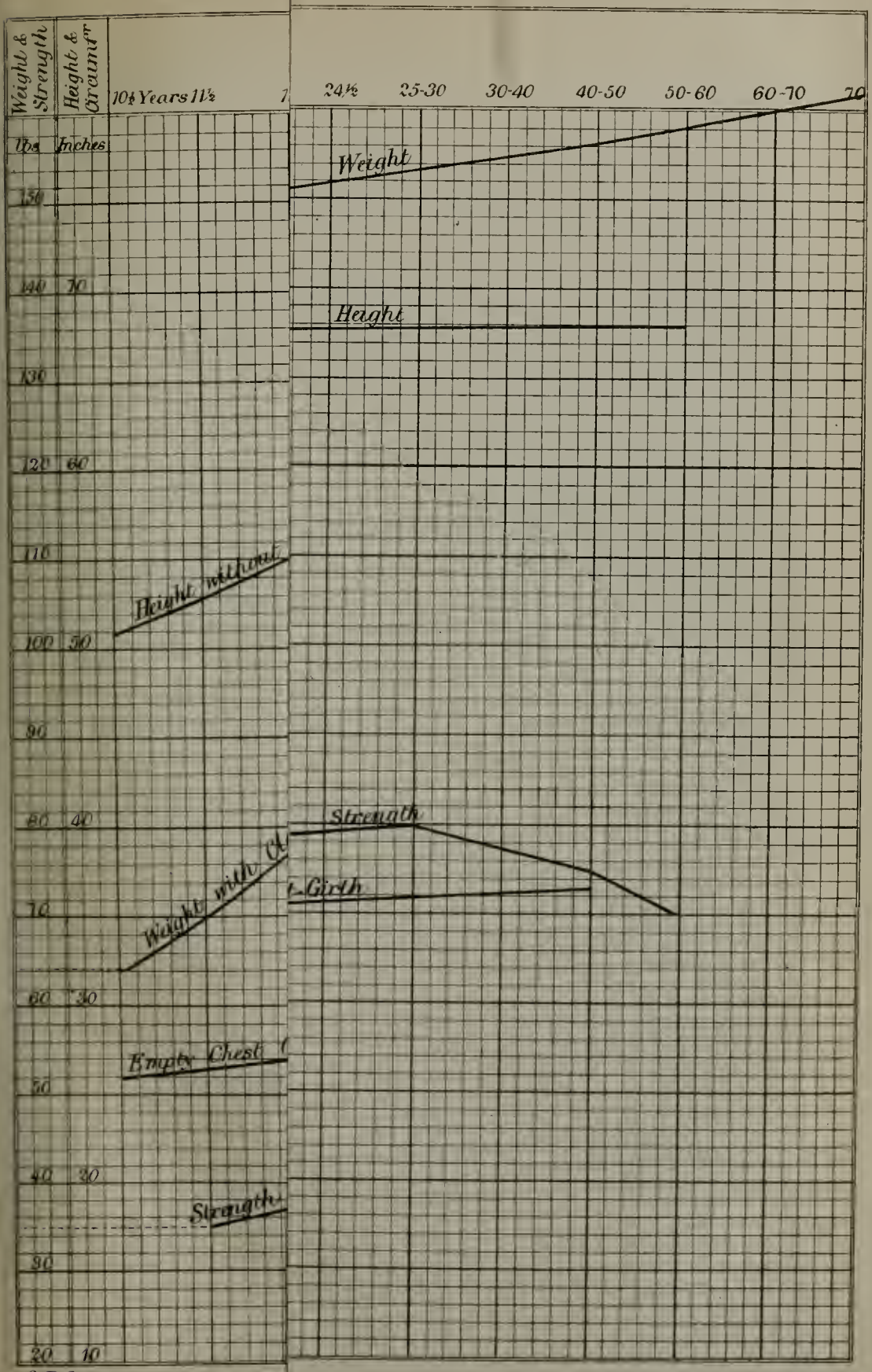
2. The stature increases rapidly to the age of 21, after which there is a very slow, but decided increase, in all classes (see Table V.), up to the age of 70 years.

3. The weight increases rapidly up to the age of 19, after which it continues to increase slowly but uniformly up to the age of 70 years.

4. The chest-girth increases at a rate similar to that of the weight up to the age of 50 years (the limit of the Committee's observations).

5. The strength increases rapidly and at a rate similar to that of the weight up to the age of 19, more slowly and regularly up to 30, after which it declines at an increasing rate to the age of 60 years.

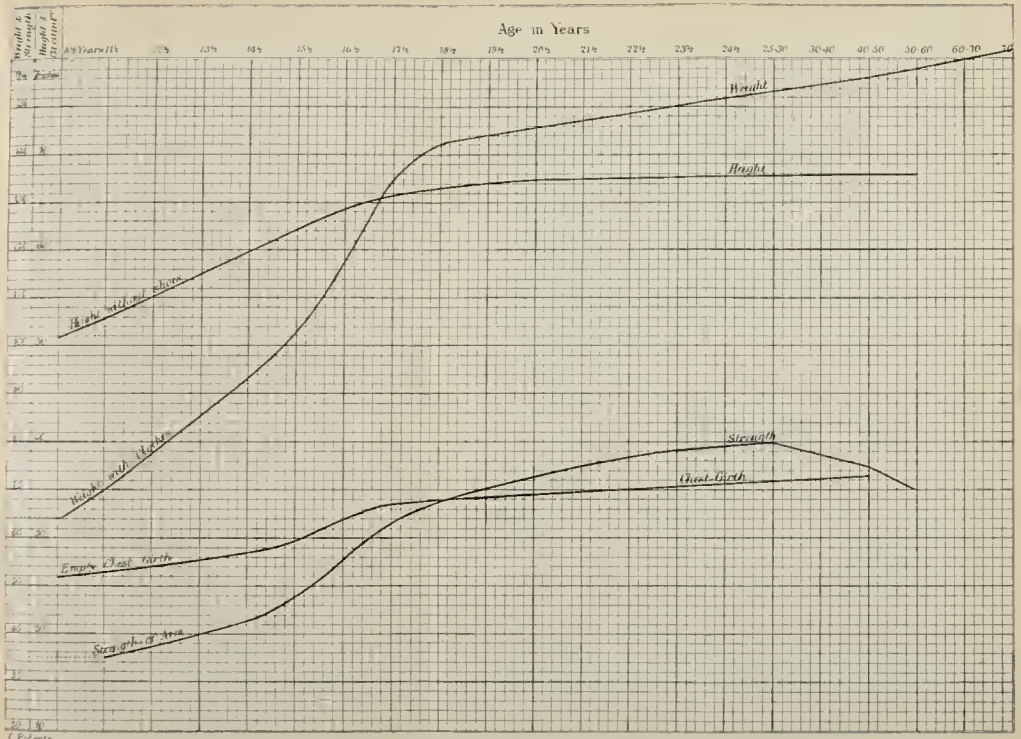
Chart showing at Britian given in Tables I,II,III and IV.



C. Roberts

Spottiswoode & C° Lith London.

Chart shewing the mean Heights, Chest-Girths, Weights, and Strength of the general population of Great Britain given in Tables I, II, III and IV



Illustrating the Report of the Anthropometric Committee

Spottiswoode & Co. Lith. London

The increase of stature throughout life as shown by Tables I. and V. is a new and unexpected fact, but it is obviously due to the survival of the taller and better developed members of the population, and the elimination by disease or death of the smaller and feebler ones. Quetelet has stated that man attains his maximum height at the age of 30 years and maintains it up to 50 years, after which it begins to recede, and at 90 it has lost three inches. This may be true of individuals if measured from year to year, but it does not appear to be true of the population in the aggregate. The loss of stature resulting from the degeneration and loss of tissues, and the stooping position assumed by old people, is more than counterbalanced by the survival of a greater number of individuals who are above the average in height. The uniform increase in the weight and chest-girth throughout adult life also confirms this view.

The Tables do not show distinctly at what period man attains his full stature, and much difference of opinion exists on this subject. Some French writers (Barnard, Allaire, &c.) maintain that growth in height goes on until the 32nd or 35th year, and Dr. Baxter arrives at the same conclusion from the statistics of the United States Army; while most English writers (Danson, Aitken, Roberts, &c.) regard the 25th as the year of mature growth, and Dr. Beddoe places it as early at the 23rd year, admitting, however, that a slight increase may take place after this age. The difference of opinion on this subject arises, no doubt, from the faulty method of relying on the measurements of many different individuals, instead of measuring the same individuals from year to year until growth ceases. The elimination of the weak and ill-developed by death, the difficulty of following the same class, and all the members of the class, through successive years, and the selection of special classes (*i.e.* recruits, whose ages are never certain), invalidate all conclusions as to the period of maturity, drawn from statistics of measurements of many different persons; but, allowing for these sources of error and judging by the run of the curves formed by the means and averages in Tables I. and V., it is probable that little actual growth takes place after the age of 21, and that it entirely ceases by the 25th year. It is evident, moreover, from Table V., that the full stature is attained earlier in the well-fed and most favoured class (Class I.) than in the ill-fed and least favoured classes of the community.

TABLE I.—Showing the STATURE (without shoes)

Whole number of Observations. The horizontal

Height		Age last											
		5–	6–	7–	8–	9–	10–	11–	12–	13–	14–	15–	16–
ft. in.	in.												
6 5	77 to 78	—	—	—	—	—	—	—	—	—	—	—	—
6 4	76–	—	—	—	—	—	—	—	—	—	—	—	—
6 3	75–	—	—	—	—	—	—	—	—	—	—	1	—
6 2	74–	—	—	—	—	—	—	—	—	—	—	—	2
6 1	73–	—	—	—	—	—	—	—	—	—	—	1	—
6 0	72–	—	—	—	—	—	—	—	—	—	1	2	19
5 11	71–	—	—	—	—	—	—	—	—	1	2	5	19
5 10	70–	—	—	—	—	—	—	—	—	—	4	17	57
5 9	69–	—	—	—	—	—	—	—	1	—	13	33	102
5 8	68–	—	—	—	—	—	—	—	—	2	16	48	160
5 7	67–	—	—	—	—	—	—	1	—	6	32	120	235
5 6	66–	—	—	—	—	—	—	—	—	7	60	168	240
5 5	65–	—	—	—	—	—	—	—	—	13	112	223	293
5 4	64–	—	—	—	—	—	—	—	2	28	136	332	389
5 3	63–	—	—	—	—	—	—	—	6	47	192	353	336
5 2	62–	—	—	—	—	—	—	1	12	85	256	495	278
5 1	61–	—	—	—	—	—	—	1	28	131	378	461	229
5 0	60–	—	—	—	—	—	—	10	55	205	399	405	168
4 11	59–	—	—	—	—	1	—	13	86	279	465	317	109
4 10	58–	—	—	—	—	—	5	38	150	305	514	242	72
4 9	57–	—	—	—	—	2	15	80	206	402	351	127	48
4 8	56–	—	—	—	—	3	31	104	276	373	239	72	20
4 7	55–	—	—	—	—	8	73	210	314	371	138	38	4
4 6	54–	—	—	—	1	23	111	296	295	246	58	20	3
4 5	53–	—	—	—	4	43	203	294	279	116	33	10	1
4 4	52–	—	—	—	5	107	296	321	278	66	16	2	2
4 3	51–	—	—	—	31	167	316	267	138	37	9	2	—
4 2	50–	—	—	2	60	245	300	228	107	11	3	—	—
4 1	49–	—	1	11	133	270	254	136	34	8	2	1	—
4 0	48–	—	2	36	189	299	177	56	26	3	—	—	—
3 11	47–	—	6	67	242	221	94	35	9	—	—	—	—
3 10	46–	—	19	128	247	160	45	15	2	—	—	—	—
3 9	45–	2	25	142	186	67	24	1	1	—	—	—	—
3 8	44–	7	50	173	129	24	4	—	—	—	—	—	—
3 7	43–	17	68	105	56	13	3	—	1	—	—	—	—
3 6	42–	24	69	76	25	1	1	—	—	—	—	—	—
3 5	41–	48	56	32	8	2	—	—	—	—	—	—	—
3 4	40–	32	18	10	5	—	—	—	—	—	—	—	—
3 3	39–	29	10	—	1	—	—	—	—	—	—	—	—
3 2	38–	10	2	1	—	—	—	—	—	—	—	—	—
From 3 –1	37–38	5	2	1	—	—	—	—	—		—	—	—
Total		174	328	784	1322	1656	1952	2107	2306	2742	3429	3495	2786
Mean Height . . .		41·0	43·0	45·0	47·0	49·0	51·0	53·0	55·0	57·5	60·0	62·0	64·0
Increase		—	2·00	2·00	2·00	2·00	2·00	2·00	2·00	2·50	2.50	2·00	2·00

of the General Population of Great Britain.

black lines show the *mean* stature for each age.

Birthday														Centimètres
17–	18–	19–	20–	21–	22–	23–	24–	25–30	30–40	40–50	50–60	60–70	70–	
—	—	—	—	—	—	—	—	—	—	2	—	—	—	195·5–
—	1	1	—	1	1	1	—	1	1	1	—	—	—	193·0–
2	2	—	2	3	1	3	—	1	4	5	—	—	1	190·5–
4	3	1	3	3	2	2	1	9	8	3	4	—	—	187·9–
2	7	10	6	16	11	12	5	26	14	19	4	2	—	185·4–
11	32	24	14	26	15	10	18	55	46	28	4	1	2	182·8–
51	60	52	42	42	43	25	24	88	84	44	22	2	1	180·3–
131	134	83	53	97	57	49	37	152	127	100	15	1	2	177·8–
200	235	128	85	93	82	63	55	213	249	155	26	5	2	175·2–
254	282	186	112	107	90	95	78	245	297	158	33	5	1	172·7–
347	329	232	129	109	96	105	101	321	332	196	33	6	1	170·1–
355	312	203	130	140	96	98	81	288	360	203	28	9	1	167·6–
372	319	183	121	95	73	81	68	243	241	157	19	5	—	165·1–
320	221	161	99	54	46	78	61	153	180	103	12	1	1	162·5–
283	195	104	63	23	29	18	42	74	105	54	11	2	—	160·0–
203	132	61	34	11	9	13	24	39	60	35	8	1	—	157·4–
118	47	23	19	3	1	4	2	15	22	17	4	1	—	154·9–
62	15	9	—	1	—	—	5	4	13	9	2	—	—	152·4–
19	5	1	1	—	—	1	—	6	5	4	—	—	—	149·8–
17	3	—	—	—	—	—	—	1	4	—	—	—	—	147·3–
7	—	1	2	—	—	—	—	1	—	—	—	—	—	144·7–
3	—	—	—	—	—	—	—	—	—	—	—	—	—	142·2–
3	—	—	—	—	—	—	—	—	—	—	—	—	—	139·7–
—	2	—	—	—	—	—	—	—	—	—	—	—	—	137·1–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	134·6–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	132·0–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	129·5–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	127·0–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	124·4–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	121·9–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	119·4–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	116·9–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	114·3–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	111·7–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	109·2–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	106·6–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	104·1–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	101·6–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	99·0–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	96·5–
—	—	—	—	—	—	—	—	—	—	—	—	—	—	93·9–
2764	2336	1463	915	824	652	658	602	1935	2152	1293	225	41	12	38953
65·5	66·5	67·0	67·25	67·5	67·5	67·5	67·5	67·5	67·5	67·5	68·0	68·0	—	—
1·50	1·00	·50	·25	·25	—	—	—	—	—	—	·50	—	—	—

TABLE II.—Showing the WEIGHT (with clothes) of the general population of Great Britain.
Whole number of observations. The horizontal black lines show the *mean* weight at each age.

Weight	Age last Birthday																					Kilo-grammes
lbs.	10-	11-	12-	13-	14-	15-	16-	17-	18-	19-	20-	21-	22-	23-	24-	25-30	30-40	40-50	50-60	60-70	70-	
259-	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	3	2	—	—	117·6-
245-	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4	5	—	—	—	111·2-
231-	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	5	2	2	2	104·9-
217-	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	2	16	15	7	—	—	98·5-
203-	—	—	—	—	—	—	—	—	4	2	—	2	—	2	1	10	30	32	15	4	—	92·2-
189-	—	—	—	—	—	—	—	8	16	8	3	9	6	7	10	41	89	75	14	2	3	85·8-
175-	—	—	—	—	—	1	4	23	53	37	34	41	18	32	20	122	318	180	26	3	—	79·4-
170-	—	—	—	—	—	1	5	48	72	60	32	67	28	22	21	86	121	91	14	4	1	76·3-
165-	—	—	—	—	—	1	5	31	46	32	29	36	52	29	17	118	159	90	17	1	1	74·9-
160-	—	—	—	—	1	4	15	96	130	83	75	87	35	46	45	152	206	115	21	3	1	72·6-
155-	—	—	—	—	1	2	20	132	159	99	85	102	67	49	54	148	191	123	12	5	—	70·4-
150-	—	—	—	—	1	6	34	168	217	159	95	169	80	73	71	197	208	110	12	2	—	68·1-
145-	—	—	—	—	2	17	76	243	256	168	109	177	95	72	73	176	210	118	13	1	1	65·8-
140-	—	—	—	1	4	27	110	255	287	197	125	188	88	90	53	219	205	109	14	4	2	63·6-
135-	—	—	—	—	11	53	129	277	260	186	98	165	72	48	44	128	110	60	8	—	—	61·3-
130-	—	—	—	1	22	71	190	264	197	164	63	135	72	47	38	117	96	58	7	3	—	59·0-
125-	—	—	—	7	42	112	222	278	184	95	66	78	55	40	33	71	58	34	4	1	1	56·7-
120-	—	—	—	7	58	153	234	235	128	73	33	42	31	19	15	34	51	22	2	2	—	54·5-
115-	—	—	2	12	74	240	279	168	75	43	18	24	16	10	17	35	25	15	4	—	—	52·2-
110-	—	—	1	24	136	299	203	112	57	34	13	11	8	5	6	13	24	9	4	—	—	49·9-
105-	—	—	9	42	149	330	250	87	17	19	2	9	1	2	2	5	6	4	1	—	—	47·7-
100-	—	3	17	82	226	340	173	45	12	7	2	—	1	1	—	5	3	1	—	—	—	45·4-
95-	—	8	29	146	340	404	124	26	4	2	—	1	—	—	—	—	—	—	—	—	—	43·1-
90-	1	11	58	195	352	363	90	9	1	1	1	—	—	—	—	—	—	—	—	—	—	40·9-
85-	2	22	81	278	423	287	48	10	2	—	—	—	—	—	—	—	—	—	—	—	—	38·6-
80-	17	62	126	299	307	178	21	1	3	—	—	—	—	—	—	—	—	—	—	—	—	36·3-
75-	39	86	133	269	210	81	7	1	—	—	—	—	—	—	—	—	—	—	—	—	—	34·0-
70-	64	120	129	134	66	33	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31·8-
65-	60	104	97	76	20	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	29·5-
60-	50	104	81	27	12	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	27·2-
55-	59	45	13	14	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25·0-
50-	11	11	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22·8-
45-	—	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20·5-
From 40–45	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18·2-
Total . .	303	578	779	1614	2459	3012	2240	2517	2180	1469	883	1343	725	595	520	1679	2142	1274	199	37	12	26560
Mean . .	65·0	70·0	77·5	85·0	92·5	102·5	117·5	135·0	142·5	143·7	145·0	146·2	147·5	148·7	150·0	151·2	152·5	155·0	157·5	160·0	162·5	—
Increase .	—	5·0	7·5	7·5	7·5	10·0	15·0	17·5	7·5	1·2	1·3	1·2	1·3	1·2	1·3	1·2	1·3	2·5	2·5	2·5	2·5	—

TABLE III.—Showing the *empty* CHEST-GIRTH of the General Population of Great Britain.

Whole Number of Observations. The horizontal black lines show the *mean* Chest-girth at each age.

Chest-girth in Inches	Age last Birthday																	Centimètres
	10–	11–	12–	13–	14–	15–	16–	17–	18–	19–	20–	21–	22–	23–	24–	25–30	30–40	40–50	
45 to 46	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	1	1	114·3–
44–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	4	2	111·7–
43–	—	—	—	—	—	—	—	—	—	—	—	1	—	1	1	4	7	7	109·2–
42–	—	—	—	—	—	—	—	—	1	—	—	1	1	4	2	2	25	24	106·6–
41–	—	—	—	—	—	—	—	—	2	2	1	3	1	3	4	27	33	10	104·1–
40–	—	—	—	—	—	—	—	3	2	7	10	5	5		9	29	60	27	101·6–
39–	—	—	—	—	—	—	—	11	20	15	16	15	13	16	15	63	97	25	99·0–
38–	—	—	—	—	—	—	8	31	50	41	38	40	36	35	34	102	119	40	96·5–
37–	—	—	—	—	2	—	12	71	123	78	78	82	70	52	50	139	144	57	93·9–
36–	—	—	—	—	—	2	29	164	204	191	161	158	100	73	86	190	177	62	91·4–
35–	—	—	—	—	3	15	39	234	354	332	202	176	136	105	89	160	154	44	88·9–
34–	—	—	—	1	5	29	103	363	552	446	270	207	135	103	97	179	116	46	86·3–
33–	—	—	—	1	10	59	181	424	528	353	173	102	87	37	43	103	57	9	83·8–
32–	—	—	—	2	16	152	199	357	324	180	73	52	43	30	18	38	24	7	81·2–
31–	—	1	1	21	62	210	184	212	157	89	32	24	17	8	5	19	7	1	78·7–
30–	—	2	7	48	94	334	162	104	73	39	15	8	3	9	7	15	2	—	76·2–
29–	1	17	45	86	162	269	103	58	31	15	8	4	4	—	—	4	1	—	73·6–
28–	23	50	76	137	160	277	179	21	12	4	1	4	—	1	—	—	—	—	71·1–
27–	31	65	134	152	158	202	45	14	4	1	—	1	—	—	—	—	1	—	68·5–
26–	62	101	106	86	135	122	24	4	2	—	1	2	—	—	—	—	—	—	66·0–
25–	57	92	62	39	64	41	7	1	—	—	—	—	—	—	—	—	—	—	63·5–
24–	39	34	19	16	18	11	2	1	—	—	—	—	—	—	—	—	—	—	60·9–
23–	5	12	4	6	4	2	—	—	1	1	—	—	—	—	—	—	—	—	58·4–
22–	3	4	2	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	55·8–
From 21–22	1	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	53·3–
Total . .	222	379	458	596	894	1725	1280	2073	2440	1794	1079	885	651	479	460	1077	1029	362	17883
Mean . .	26·00	26·50	27·00	27·50	28·50	29·50	31·50	33·50	34·00	34·50	34·75	35·00	35·25	35·50	35·75	36·00	36·25	36·50	—
Increase .	—	·50	·50	·50	1·00	1·00	2·00	2·00	·50	·50	·25	·25	·25	·25	·25	·25	·25	·25	—

TABLE IV.—Showing the STRENGTH (drawing power) of the General Population of Great Britain.

Whole number of Observations. The horizontal black lines show the *mean* Strength at each age.

Drawing Strength. lbs.	Age last Birthday																		Kilogrammes
	1–	12–	13–	14–	15–	16–	17–	18–	19–	20–	21–	22–	23–	24–	25–30	30–40	40–50	50–60	
155–160	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—	—	70·4–
150–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—	68·1–
145–	—	—	—	—	—	—	—	—	1	—	—	—	—	—	1	—	1	—	65·8–
140–	—	—	—	—	—	—	1	—	1	—	—	—	1	—	1	—	—	—	63·6–
135–	—	—	—	—	—	—	1	2	1	—	—	1	—	—	—	—	—	—	61·3–
130–	—	—	—	—	—	—	—	1	1	—	1	1	—	—	2	—	—	—	59·0–
125–	—	—	—	—	1	—	1	1	—	—	—	—	—	—	2	3	1	—	56·7–
120–	—	—	—	—	1	—	3	1	6	4	1	1	1	2	5	1	—	—	54·5–
115–	—	—	—	—	—	1	1	4	2	2	1	2	—	—	—	6	—	—	52·2–
110–	—	—	—	—	—	—	3	3	5	4	4	3	1	2	6	3	—	1	49·9–
105–	—	—	—	1	—	—	4	7	13	6	1	3	3	2	14	6	3	1	47·7–
100–	—	—	—	1	2	4	—	14	7	3	10	6	6	5	26	5	3	—	45·4–
95–	—	—	—	1	1	3	8	19	15	15	15	17	11	6	41	21	2	2	43·1–
90–	—	—	—	1	3	1	12	20	16	22	18	19	23	13	61	39	9	2	40·9–
85–	—	—	—	1	1	7	10	19	27	18	20	20	14	18	74	57	14	1	38·6–
80–	—	—	1	1	6	16	17	36	43	30	30	26	29	23	89	56	22	2	36·3–
75–	—	—	1	3	13	14	26	42	30	34	27	26	35	23	96	97	22	4	34·0–
70–	—	—	—	7	18	35	51	52	48	32	30	38	33	30	89	68	29	6	31·8–
65–	—	1	2	9	20	35	49	54	61	32	24	21	17	19	32	93	8	5	29·5–
60–	—	—	3	24	48	60	53	60	54	32	21	15	9	13	28	29	12	6	27·2–
55–	—	—	5	19	57	62	51	45	34	18	9	1	6	1	7	28	8	3	25·0–
50–	1	3	15	51	102	70	59	25	11	4	1	2	—	2	3	9	5	1	22·8–
45–	3	5	16	63	89	62	25	8	5	3	—	—	1	—	—	7	2	—	20·5–
40–	5	14	36	74	104	39	10	2	1	—	—	—	1	—	—	2	2	—	18·2–
35–	8	9	25	68	50	21	2	—	—	—	—	—	—	—	—	2	1	—	15·9–
30–	6	15	12	47	14	8	1	—	—	—	—	—	—	—	—	—	—	—	13·7–
25–	4	3	3	3	1	—	—	—	—	—	—	—	—	—	—	—	—	—	11·4–
From 20 to 25	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9·1–
Total . .	27	49	119	375	531	438	388	415	382	259	213	202	192	159	578	534	144	34	5,039
Mean Strength	35·0	37·5	40·0	42·5	47·5	55·0	62·5	67·5	70·0	72·5	75·0	77·5	77·5	77·5	80·0	77·5	75·0	70·0	—
Increase .	—	2·5	2·5	2·5	5·0	7·5	7·5	5·0	2·5	2·5	2·5	2·5	—	—	2·5	—	—	—	—

NOTE.—See Diagram on next page showing the manner in which observations relating to strength are taken.

The following is a copy of the drawing and instructions issued by the Committee to observers in collecting statistics of strength :—

The above figure represents the position in which the strength of arm should be tested. The right or left arm, whichever is the stronger, should be used to draw, and the other to resist. The resisting arm must be free, and extended straight from the side, as nearly as possible in the line of the shoulders, and the hand of the other arm brought back towards the ear, as an archer uses a bow.

TABLE V.—Showing the average STATURE (*without shoes*) of different classes of the Population of Great Britain.

Age last Birth-day	General Population. All Classes. Town and Country			Class I. Professional Classes. Town and Country			Class II. Commercial Classes. Towns			Class III. Labouring Classes. Country			Class IV. Artisans Towns		
	No. Obs.	Average Height. Inches	Increase. Inches	No. Obs.	Average Height. Inches	Increase. Inches	No. Obs.	Average Height. Inches	Increase. Inches	No. Obs.	Average Height. Inches	Increase. Inches	No. Obs.	Average Height. Inches	Increase. Inches
Birth	—	—	—	—	—	—	—	—	—	—	—	—	100	19·34	—
1–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4–	—	—	—	—	—	—	—	—	—	—	—	—	21	38·45	—
5–	—	—	—	—	—	—	—	—	—	—	—	—	37	41·09	2·64
6–	—	—	—	—	—	—	—	—	—	—	—	—	40	43·28	2·19
7–	—	—	—	—	—	—	3	46·16	—	—	—	—	53	45·71	2·43
8–	—	—	—	—	—	—	16	47·31	1·15	268	47·03	—	176	47·06	1·35
9–	—	—	—	—	—	—	81	50·18	2·87	418	49·06	2·03	358	48·94	1·88
10–	1551	51·84	—	101	53·69	—	331	52·04	1·86	783	50·93	1·87	336	50·72	1·78
11–	1766	53·50	1·66	242	55·23	1·54	687	53·76	1·72	597	52·32	1·39	240	52·68	1·96
12–	1981	54·99	1·49	490	57·29	2·06	902	55·29	1·53	395	53·67	1·35	194	53·72	1·04
13–	2743	56·91	1·92	869	59·08	1·79	857	57·43	2·14	403	55·31	1·64	614	55·81	2·09
14–	3428	59·33	2·42	966	61·29	2·21	800	59·47	2·04	9	57·94	2·63	1653	58·61	2·80
15–	3507	62·24	2·91	974	63·61	2·32	544	62·19	2·72	515	61·82	3·88	1465	61·36	2·75
16–	2780	64·31	2·07	1102	66·23	2·62	110	64·55	2·36	177	63·62	1 80	1391	62·85	1·49
17–	2745	66·24	1·93	1852	67·81	1·58	107	66·59	2·04	75	65·87	2·25	711	64·70	1·85
18–	2305	66·96	·73	1724	68·26	·45	62	67·44	·85	148	66·53	·66	371	65·60	·90
19–	1435	67·29	·33	951	68·58	·32	63	67·55	·11	143	66·87	·34	277	66·17	·57
20–	880	67·52	·23	461	69·08	—	61	67·58	·03	183	66·93	·06	175	66·50	·33
21–	757	67·63	·11	364	68·70	·12	51	67·79	·21	177	67·15	·22	165	66·55	·05
22–	558	67·68	·05	227	68·94	—	53	67·82	·03	169	67·35	·20	109	66·60	·05
23–	592	67·48	—	114	68·73	·03	59	67·42	—	274	67·38	·03	145	66·40	—
24–	517	67·73	·05	57	68·82	·09	62	68·09	·27	258	67·47	·09	140	66·55	—
25–							47	67·93	—	218	67·52	·05	92	66·40	—
26–							47	68·07	—	194	67·46	—	74	66·46	—
27–	1794	67·80	·07	107	69·14	·32	27	68·13	·04	162	67·76	·21	66	66·67	·07
28–							33	67·65	—	208	67·31	—	59	66·65	—
29–							26	67·96	—	163	67·54	—	53	66·82	·15
30–35	1886	68·00	·20	52	69·61	·37	85	67·70	—	745	67·59	—	180	66·65	—
35–40							82	68·07	—	631	67·62	—	111	67·08	·26
40–50	1148	67·96	—	46	69·38	—	79	68·09	—	943	67·56	—	80	66·80	—
50–60	198	67·92	—	13	69·50	—	16	67·69	—	147	68·06	·30	22	66·45	—
60–70	44	67·41	—	5	69·10	—	3	66·16	—	34	67·88	—	2	66·50	—
70–	12	69·22	—	—	—	—	1	68·50	—	11	69·95	—	—	—	—
Total Obs.	31627	—	—	10717	—	—	5195	—	—	8448	—	—	9410	—	—

TABLE VI.—Showing the average WEIGHT (*including clothes*) of different classes of the Population of Great Britain.

Age last Birth-day	General Population. All Classes. Town and Country			Class I. Professional Classes. Town and Country			Class II. Commercial Classes. Towns			Class III. Labouring Classes. Country			Class IV. Artisans. Towns		
	No. Obs.	Average Weight. Lbs.	Increase. Lbs.	No. Obs.	Average Weight. Lbs.	Increase. Lbs.	No. Obs.	Average Weight. Lbs.	Increase. Lbs.	No. Obs.	Average Weight. Lbs.	Increase. Lbs.	No. Obs.	Average Weight. Lbs.	Increase. Lbs.
Birth	—	—	—	—	—	—	—	—	—	—	—	—	100	7·5	—
1–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8–	—	—	—	—	—	—	—	—	—	238	55·3	—	115	53·7	—
9–	—	—	—	—	—	—	81	60·3	—	345	61·2	5·9	296	58·3	4·6
10–	1464	67·5	—	92	74·0	—	370	65·2	4·9	721	67·0	5·8	281	64·0	5·7
11–	1599	72·0	4·5	185	78·7	4·7	686	68·0	2·8	553	72·2	5·2	175	69·0	5·0
12–	1786	76·7	4·7	369	84·9	6·2	905	73·2	5·2	366	75·9	3·7	146	73·0	4·0
13–	2443	82·6	5·9	621	91·6	6·7	854	80·1	6·9	328	79·7	3·8	640	79·0	6·0
14–	2952	92·0	9·4	748	102·2	10·6	799	89·5	9·4	9	89·2	9·5	1396	87·3	8·3
15–	3118	102·7	10·7	652	114·3	12·1	344	99·4	9·9	676	100·6	11·4	1446	96·4	9·1
16–	2235	119·0	16·3	834	129·5	15·2	55	117·2	17·8	169	117·2	16·6	1177	112·2	15·8
17–	2496	130·9	11·9	1705	141·7	12·2	38	128·8	11·6	80	131·5	14·3	673	121·5	9·3
18–	2150	137·4	6·5	1638	146·4	4·7	39	135·1	6·3	135	138·7	7·2	338	129·3	7·8
19–	1438	139·6	2·2	940	148·5	2·1	69	138·6	3·5	140	140·2	1·5	289	131·1	1·8
20–	851	143·3	3·7	451	152·4	3·9	52	140·1	1·5	175	144·3	4·1	173	136·4	5·3
21–	738	145·2	1·9	365	152·7	·3	52	143·9	3·8	164	147·8	3·5	157	136·2	—
22–	542	146·9	1·7	215	152·8	·1	51	145·5	1·6	167	150·6	2·8	109	138·6	2·2
23–	551	147·8	·9	112	151·5	—	57	146·8	1·3	279	152·8	2·2	103	140·2	1·6
24–	483	148·0	·2	56	149·6	—	57	147·1	·3	250	151·9	—	120	143·4	3·2
25–							45	148·5	1·4	224	154·1	1·3	61	139·9	—
26–							46	154·1	5·6	192	154·1	—	58	142·2	—
27–	1559	152·3	4·3	115	156·3	3·5	26	149·2	—	171	156·7	2·6	56	146·9	6·5
28–							33	156·1	2·0	213	155·1	—	50	148·0	1·1
29–							26	154·3	—	161	158·0	1·3	46	148·1	·1
30–35	964	159·8	7·5	24	171·5	15·2	87	158·5	2·4	700	159·2	1·2	153	150·1	2·0
35–40	840	164·3	4·5	24	173·5	—	80	166·6	8·1	631	160·5	1·3	105	156·5	6·4
40–50	1040	163·3	—	44	172·5	1·0	72	168·6	2·0	911	162·0	1·5	113	151·7	—
50–60	179	166·1	1·8	13	174·5	2·0	16	173·4	4·8	129	170·9	8·9	21	145·6	—
60–70	35	158·1	2·0	5	164·5	—	3	165·7	—	24	170·9	—	3	130·8	—
70–	12	182·1	—	—	—	—	1	189·0	—	11	175·3	4·4	—	—	—
Total Obs.	29475	—	—	9208	—	—	4944	—	—	8162	—	—	8300	—	—

TABLE VII.—Showing the RELATIVE STATURE OF ADULTS of the ages from 25 to 30 years under different physical and social conditions.

The horizontal black lines show the *mean* Height of each class. The averages are given at the bottom of the Table.

Height in inches	General Population all Classes	Metropolitan Police and Fire Brigade	Class I. Professional Classes	Class II. Commercial Classes, Clerks and Shopkeepers	Class III. Labouring Classes, Agricultural. Miners, Sailors	Class IV. Artisan Classes living in Towns	Class V. Sedentary Occupations: Factories, Shoemakers, Tailors	Class VI.—Special Classes			
								Recruits for the Army, 1879	Prisoners all Classes	Lunatics, all Classes	Surrey Militia
76 to 77	1	1	—	—	—	—	—	—	—	—	—
75–76	1	—	—	—	1	—	—	—	—	—	—
74–75	9	2	1	—	6	—	—	—	1	—	—
73–74	26	7	3	2	11	2	1	1	2	1	—
72–73	55	16	7	6	24	2	—	—	3	2	—
71–72	88	22	9	8	42	3	4	—	6	6	—
70–71	152	38	21	14	56	14	9	3	20	7	2
69–70	213	37	20	30	103	15	8	8	29	18	8
68–69	245	23	13	25	130	41	13	12	41	20	11
67–68	321	12	16	35	179	57	22	12	73	40	11
66–67	288	6	8	24	144	78	28	14	78	62	13
65–66	243	2	4	19	111	64	43	9	76	51	14
64–65	153	2	2	11	69	38	31	5	78	52	19
63–64	74	—	2	5	38	17	12	—	41	29	16
62–63	39	—	—	1	20	4	14	—	21	29	5
61–62	15	—	1	—	6	5	3	—	17	12	—
60–61	4	—	—	—	1	2	1	—	2	5	—
59–60	6	—	—	—	2	—	4	—	1	4	—
58–59	1	—	—	—	1	—	—	—	1	1	—
57–58	1	—	—	—	1	—	—	—	—	2	—
From 56 to 57	—	—	—	—	—	—	—	—	1	—	—
Total . . .	1935	168	107	180	945	342	193	64	491	341	99
Mean Height.	67·5	70·0	69·0	68·0	67·5	66·5	65·5	66·5	66·0	65·5	64·5
Average . .	67·54	70·04	69·14	67·95	67·51	66·61	65·92	67·44	66·16	65·65	65·94

NOTE—A Table similar to this, but relating to boys of the age of 11-12 years, is published in the Committee's Report for 1880. It will be seen that the same differences exist in both Tables, and that the differentiation of the classes takes place before the age of 11 years, and probably is in a great measure hereditary.

Mr. Francis Galton *who has prepared the Tables VIII. to X. on the Range in Height, Weight, and Strength, has contributed the following remarks upon them.*

In determining the range I have employed and extended the method by which the so-called 'probable error' is found. That is to say, the observations in each series were arranged in the order of their respective magnitudes, beginning with the lowest and ending with the highest. A definite fraction was then cut off from either end of the series; the values at the exact points where the divisions took place were ascertained by interpolation, and the difference between these gave the range of the intermediate portion.

The fractions so cut off were—(1) a half; this gave simply the median value: (2) a quarter; this gave the upper and lower 'quartile' values, and consequently the 'interquartile' range (which is equal to twice the 'probable error'): (3) a tenth; this gave the upper and lower 'decile' values, and consequently the 'interdecile' range. The following are the definitions of these terms, Median, Quartile, and Decile:—

The *Median*, in height, weight, or any other attribute, is the value which is exceeded by one-half of an infinitely large group, and which the other half falls short of.

The *Upper Quartile* is that which is exceeded by one-fourth part of an infinitely large group, and which the remaining three-fourths fall short of. Conversely for the *Lower Quartile*.

The *Upper Decile* is that which is exceeded by one-tenth of an infinitely large group, and which the remaining nine-tenths fall short of. The *Lower Decile* is the converse of this; one-tenth falls short of it, and nine-tenths exceed it.

Each line of the annexed tables is to be read as in the following instance, taken from the fourth line of Table VIII*a*.

Example:—869 observations were made of boys of the professional classes, of 13 years of age, whence it appears that—

(1) There are as many boys above the height of 59·0 inches as below it. This Median value differs from the Average value by 0·1 inch, which shows a trifling want of symmetry in the distribution of the heights.

(2) One-fourth of the boys exceeds the height of 60·9 inches, and another fourth falls short of 57·1 inches; in consequence, the difference of 3·8 inches defines the range in height of the intermediate two-fourths, or middle half, of the boys.

(3) One-tenth of them exceeds 62·8 inches, while another tenth falls short of 55·4 inches. The difference between these numbers is 7·4, which defines the range in height of the intermediate eight-tenths, or three-quarters of the boys.

(4) The highest measurement actually taken in these 869 observations was 71·5 inches (reckoning to the nearest inch), and the lowest was similarly 49·5 inches, showing a difference of 22 inches.

The information as to the extreme values that happen to have been observed in these 869 cases, is avowedly of little solid value. Their magnitude depends to a great degree upon the accident of this particular series happening to include, or not to include, one very exceptional instance of great stature and another of small stature. It is beyond the power of statistical science to determine the extreme values that might possibly be observed.

On the other hand, the Median, Decile, and Quartile values possess a trustworthiness of the same order as that of the Average or Arithmetic Mean values. They are not sensibly affected by a solitary accident, and a moderately large series of observations is sufficient to determine them with as much precision as is needful for ordinary statistical purposes.

A small error in the position of the medians, quartiles, &c., causes an error in their values proportional to the tangent of the circumscribing curve at the corresponding points. On protracting the curves for height, weight, and strength from their tabular values, it appears that the tangents at the quartiles are but little greater than those at the medians, but that the tangents at the deciles are about twice as great. Again, the tangents at corresponding points in two of these curves, drawn from different numbers of observations (the ordinates relating to the successive values being supposed in all cases to stand at the same distances apart), must vary inversely as the number of observations. Consequently, in order to ascertain decile values in the series with which we are now dealing, with the same accuracy as medians and quartiles, we require to have about twice the number of observations.

It appears to be well worth while to print, not only summary tables of results, as Table VIII. for the height, and Table IX. for the weight, but to supplement these by other tables going more into detail and referring to the classes separately. So much has been written on the applicability of the Exponential Law of Error to statistical results, that it is important to publish material for the more complete discussion of the subject. Into the discussion itself, this is hardly the place to enter, further than by saying that the median values will be found to conform very closely indeed with the arithmetical means, that the distribution of variations on either side of the median value is so symmetrical that the difference between either quartile or decile and the median is almost exactly one-half of the difference between the two quartiles or the two deciles, and, lastly, that the range between the two deciles is very commonly a trifle short of double the range between the two quartiles. According to the Exponential Law of Error, the results in every case would have been nearly the same as these.

I would refer those who desire to pursue the subject on a theoretical basis to a paper of my own on the 'Geometric Mean in Vital and Social Statistics,' in the Proceedings of the Royal Society, October, 1879, and more especially to the subsequent one by Dr. Donald McAlister on the 'Law of the Geometric Mean,' in which the equation is given to the circumscribing curve, both on the assumption of the arithmetical mean of two fallible observations of the same fact being the most probable inference from them, and on that of the Geometric Mean being accepted, as I have argued that it ought to be, as the more probable inference in all physiological phenomena.

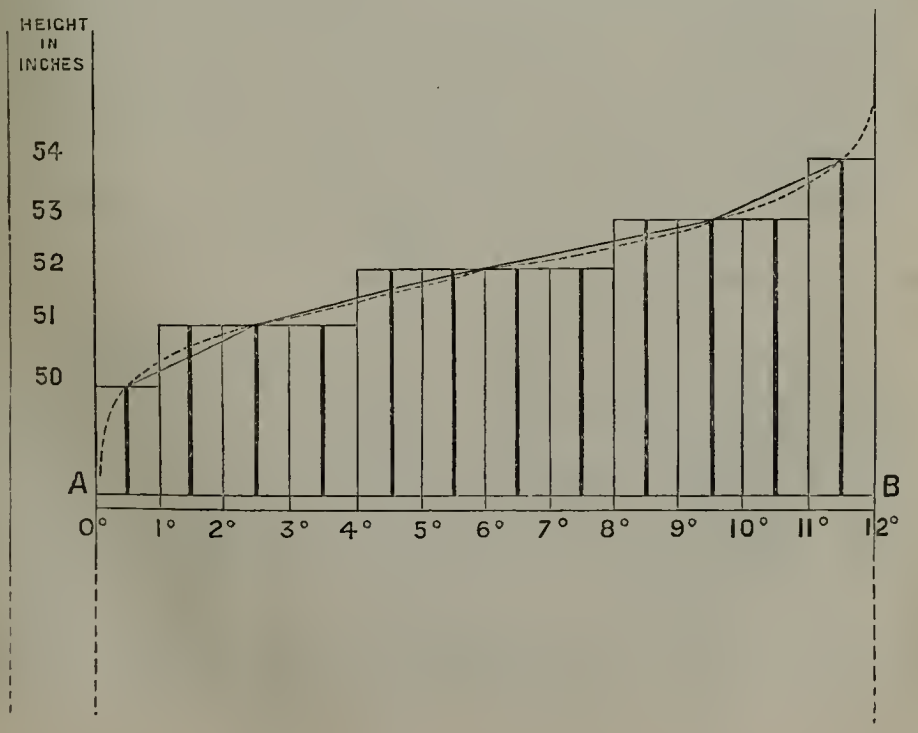
On the Calculation of Deciles, Quartiles, and Medians.

The deciles, quartiles, and medians are ordinates to an ideal curve, supposed to be constructed as follows:—An infinite number of measurements, belonging to the same statistical group, are arranged in the order of their magnitudes, and ordinates of lengths corresponding respectively to each of them are erected side by side, at equal, but infinitesimally small, distances apart, along a given line AB; then the curve passing through their tops is the curve in question. The median is the ordinate corresponding to the abscissa of $\frac{1}{2}$·AB; the lower and upper quartiles

correspond respectively to $\frac{1}{4}$·AB and to $\frac{3}{4}$·AB; the lower and upper deciles correspond to $\frac{1}{10}$ AB and to $\frac{9}{10}$ AB. It may be remarked that the general shape of the curve will always resemble that shown in the diagram, owing to the recognised statistical fact that medium values are much more frequent than extreme ones, deviations from the mean value becoming increasingly rare in a rapidly increasing ratio.

In order to deduce approximately the above-mentioned curve from a finite series of n observations, we divide AB into n equal spaces, and erect an ordinate in the middle of each of a length proportionate to the corresponding datum. The spaces will be defined by divisions that run from 0° at A, to n° at B, and therefore there will be $n + 1$ of them. The first ordinate will stand at 0°·5 of the graduated scale, the second at 1°·5, and so on, while the abscissæ of the deciles, quartiles, and medians will be at the following positions: $\frac{n}{10}, \frac{n}{4}, \frac{n}{2}, \frac{3n}{4}, \frac{9n}{10}$. The data are grouped and tabulated as in columns A and B of the following example, which, for the sake of simplicity in illustration, consists of only twelve observations.

Height in inches	Number of observations	Total number of previous records	Halves of the entries in column B	Abscissæ. — Sums of the columns C and D
A	B	C	D	E
—	—	12	—	12·0
54	1	11	0·5	11·5
53	3	8	1·5	9·5
52	4	4	2·0	6·0
51	3	1	1·5	2·5
50	1	—	0·5	0·5



To work out this case, take a base line AB, divide it into twelve equal parts, and erect an ordinate (see the dark lines in the diagram) in the middle of each of them. The first ordinate will reach to 50 inches (the lower part of the ordinate is suppressed to save space); the next three will reach to 51 inches; the next four to 52 inches, and so on according to the tabular data. Erect ordinates of suitable heights (see the light lines in the diagram) at each of the graduations, and draw horizontal lines through the top of each group of dark lines until it meets the light lines on either side of them. A figure is thus produced which consists of a series of rectangles rising in equal steps. A curved line (see the dotted line) which smooths off the corners of the rectangles, is the curve upon which the deciles, &c., are to be measured, and the broken line formed by joining the central points of the upper boundary of each rectangle may be adopted as an equivalent to the curve without material error. The ordinates at these central points are those that correspond to the successive integral heights of 50, 51, 52, &c. inches. The value of their corresponding abscissæ is equal to half the number of the dark lines in the rectangle in question *plus* the number of dark lines in all the previous rectangles. An inspection of the figure will show this more readily than a verbal explanation.

The calculation is very easily made by appending to the tabular data in A and B three other columns, C, D, and E. Column C contains in each line the sum of all the heights inferior to the number of inches found in A upon the same line. D contains the halves of the entries in B, and E contains the sum of the entries in C and D, and consequently gives the abscissæ corresponding to the several integral inches.

Example: to find the lower decile in the above instance. As we know the abscissa of the decile, we proceed to find from column E the two entries between which it lies, and we take the corresponding ordinates from A, whence we find the decile itself by simple interpolation. As there are twelve observations in the example, the abscissa of the decile is 1·2, which lies between the tabular entries in E of 0·5 and 2·5, and these are the abscissæ of 50 and 51 inches respectively. Therefore the decile is equal to 50 inches *plus* a certain fraction of an inch, x, whose value may be ascertained by a simple rule of three. Thus:—

difference between 2·5 and 0·5 : 1 inch :: difference between 1·2 and 0·5 : x inches

x=0·35, and the required decile=50·35 inches.

On a first glance at the tables, a very remarkable fact is manifest. It is the uniformity of range at all the ages given in it. Let us begin with height, as shown in Table VIII.; the range between the upper and lower fourths is as great at 11, or even at 8, years of age as it is at 22 or 40 years, and at the intermediate ages it is much the same, viz., about 3·3 inches. It might have been expected that the range would vary with the average height, so that the fact of boys of 11 years of age having a median or average height of 53·5 inches, and an interquartile range of 3·2 inches, would imply that men of 22 years, having a median height of 67·6 inches, would have an interquartile range of 4·4 inches, because 53·5 : 3·2 :: 67·6 : 4·4. The interdecile range is equally constant. It seems so difficult to conceive of variation otherwise than as a fraction of the

average height, that we are justified in expressing the steadiness of the range at different ages by the phrase that the variation in height at all ages between boyhood and manhood is inversely proportional to the average height at those ages. The results of 100 measurements of newly-born male infants at their full term, furnished to me by Mr. Roberts, show a large range; the median value is 19·2, the interquartile range is 1·8, and the interdecile range is 3·5; but it must be recollected that it is difficult to measure infants with accuracy.

It would be of much interest to examine this question further, and to find out at what age the range begins to be steady, but my data are at present insufficient to enable me to do this.

As regards weight, much the same holds good at and after the age of 14, but the range decreases steadily as we go further back. Among the newly-born infants the median value is 7·6 lbs., the interquartile range is 1·7 lbs., and the interdecile range is 3·3 lbs.

As regards strength the range is small in early life, large in early manhood, but in after-life other conditions appear which materially and steadily reduce it. The upper quartile values begin to decrease and the lower quartiles to increase; in other words, the stronger quarter of Englishmen do not keep up their full vigour, and the weaker quarter become steadily stronger. This latter event is certainly due in large part to the previous removal of many of the weakest by early death. As regards the deciles we see that the athletes preserve their vigour very fairly, while the weakly tenth considerably improve, so that the interdecile range also decreases in advancing life.

Another very curious fact is a marked increase of range of height from about 14 to 16 years of age in Classes I. and II., and in a less degree in Class IV., which disappears afterwards. Probably the increase of range takes place in different boys at slightly different ages, and therefore becomes smoothed down in the mean result. If so, it would be still more striking if the classes had been further subdivided. I gather from this temporary increase of range that precocity is, on the whole, of no advantage in later life, and that it may be a disadvantage. It is certain that the precocious portion do not maintain their lead to the full extent; it is possible that they may actually fall back, and that many of those who occupied a low place in the statistical series between the ages of 14 and 16 occupy a high place after those years. The full discussion of this requires the collation of many *individual histories*; it cannot be effected through mean results. Perhaps the class of statistical researches in anthropometry that most deserves encouragement at the present time is the preservation of these records of the same individual throughout life. He might with little trouble be measured and weighed annually or more often, in the nursery, at school, at college, and in after-life, and all the records might be kept *seriatim* in a book, with remarks at the side accounting, as far as may be, for abnormalities of growth. A large collection of well-kept records of this kind would be of the highest value, not only from an anthropometric but from a sanitary point of view, using that term in its widest sense.

TABLE VIII.—Range in the HEIGHT of Males at each Age and in the several Classes.

(For further details see Tables VIII*a*, VIII*b*, VIII*c*, and VIII*d*.)

Age in Years	Total number of Observations.	Median Value					Range in Height at each Age									
							Between Upper and Lower Fourths					Between Upper and Lower Tenths				
		Classes				Average of all Classes	Classes				Average of all Classes	Classes				Average of all Classes
		1	2	3	4		1	2	3	4		1	2	3	4	
		inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
8–	309	—	—	46·9	47·0	47·0	—	—	3·2	3·4	3·3	—	—	·1	6·1	6·1
9–	514	—	—	49·4	49·1	49·3	—	—	3·0	3·0	3·0	—	—	5·6	6·0	5·8
10–	1533	53·9	52·7	50·9	51·0	52·1	2·7	2·7	3·0	2·9	2·8	5·2	5·3	5·8	6·0	5·6
11–	1766	55·2	53·8	52·3	52·7	53·5	3·1	3·2	3·2	3·1	3·2	6·4	6·3	5·9	5·8	6·1
12–	1980	57·1	55·3	53·6	53·5	54·9	3·4	3·7	3·2	3·7	3·5	6·4	6·6	6·3	7·0	6·6
13–	2743	59·0	57·5	55·3	56·7	57·1	3·8	3·7	2·9	2·7	3·3	7·4	7·2	6·1	5·3	6·5
14–	3419	61·2	59·5	—	59·3	60·0	4·5	4·5	—	3·4	4·1	8·6	8·5	—	6·6	7·9
15–	3497	63·7	62·2	61·9	61·3	62·3	4·5	4·6	2·5	4·0	3·9	8·5	8·6	5·1	7·4	7·4
16–	2780	66·4	65·0	63·6	63·0	64·5	3·7	4·4	2·5	3·7	3·6	7·3	8·5	4·7	7·2	6·9
17–	2745	67·9	66·8	65·8	64·7	66·3	3·5	4·0	2·5	3·2	3·3	6·6	7·1	5·1	6·2	6·3
18–	2305	68·3	67·4	66·4	65·4	66·9	3·4	4·2	3·3	2·9	3·5	6·6	7·1	6·4	5·8	6·5
19–	1434	68·6	67·4	66·5	66·1	67·2	3·3	2·9	3·3	3·1	3·2	6·6	5·7	6·5	5·8	6·2
20–	880	69·1	67·8	67·0	66·5	67·6	3·4	3·5	3·1	2·8	3·2	6·7	6·4	6·5	5·5	6·3
21–	757	68·9	66·9	67·0	66·5	67·3	3·4	3·6	3·3	2·8	3·3	6·3	6·1	6·0	5·7	6·0
22–	516	69·0	67·7	67·2	66·5	67·6	3·2	2·9	3·4	3·3	3·2	6·5	5·7	6·3	6·4	6·2
23–	592	68·5	67·5	67·3	66·2	67·4	3·7	3·7	3·3	2·9	3·4	7·0	7·2	6·7	5·3	6·6
24–	517	68·8	67·2	67·0	66·4	67·4	2 8	3·2	3·1	3·3	3·1	5·2	6·9	6·5	6·0	6·2
25–	357	—	67·7	67·4	66·3	67·1	—	2·4	3·4	2·9	2·9	—	5·3	6·8	5·5	5·9
26–	315	—	68·0	67·3	66·4	67·2	—	3·0	3·6	2·2	2·9	—	5·2	7·1	5·2	5·8
27–	255	(69·4)	68·6	67·6	66·8	67·7	(3·1)	3·8	3·2	2·3	3·1	(6·0)	6·8	6·5	4·7	6·0
28–	300	—	68·1	67·4	66·6	67·4	—	3·6	3·2	3·0	3·3	—	6·1	6·5	4·7	5·8
29–	242	—	68·2	67·4	66·9	67·5	—	3·6	2·8	3·1	3·2	—	6·2	5·6	6·6	6·1
30–	1010	(69·7)	67·9	67·5	66·7	67·4	(3·1)	3·2	3·4	3·1	3·2	(5·8)	5·2	6·2	5·7	5·7
35–	824	—	68·0	67·6	67·0	67·5	—	2·7	3·4	2·8	3·0	—	5·5	6·5	5·8	5·9
40–	658	(69·0)	68·2	67·5	66·8	67·5	(3·2)	3·3	3·5	3·0	3·3	(6·8)	7·0	6·6	6·0	6·5
45–	441	—	68·1	67·5	66·3	67·3	—	2·7	3·6	3·4	3·2	—	5·2	6·7	6·2	6·0
50–	185	—	—	68·2	66·5	67·4	—	—	4·0	3·7	2·6	—	—	7·7	8·0	5·2

NOTE.—The ages under Class I., to which the entries within brackets ( ) apply, were grouped differently to those in the other classes (*see* Table VIII*a*). It has therefore been necessary to exclude those entries from the 'Average of all Classes."

TABLE VIII*a*.—Range in the HEIGHT of Males at each Age.

CLASS I.—Professional (Upper and Upper Middle Classes).

Age in years	Number of Observations	Median	Average	Difference	Upper Quartile	Lower Quartile	Range between upper and lower fourths	Upper Decile	Lower Decile	Range between upper and lower tenths	Maximum — between	Minimum — between	Difference between maximum and minimum
		inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
10–	101	53·9	53·7	+·2	55·1	52·4	2·7	56·3	51·1	5·2	57–58	48–49	9·0
11–	242	55·2	55·2	—	56·8	53·7	3·1	58·3	51·9	6·4	67–68	48–49	19·0
12–	490	57·1	57·3	−·2	59·0	55·6	3·4	60·6	54·2	6·4	70–71	48–49	22·0
13–	869	59·0	59 1	−·1	60·9	57·1	3·8	62·8	55·4	7·4	71–72	49–50	22·0
14–	966	61·2	61·3	−·1	63·5	59·0	4·5	65·8	57·2	8·6	72–73	50–51	22·0
15–	974	63·7	63·6	+·1	65·9	61·4	4·5	67·8	59·3	8·5	75–76	49–50	26·0
16–	1102	66·4	66·2	+·2	68·2	64·5	3·7	69·8	62·5	7·3	74–75	53–54	21·0
17–	1852	67·9	67·8	+·1	69·6	66·1	3·5	71·1	64·5	6·6	76–77	56–57	20·0
18–	1724	68·3	68·3	—	70·0	66·6	3·4	71·4	64·8	6·6	77–78	59–60	18·0
19–	951	68·6	68·6	—	70·2	66·9	3·3	71·9	65·3	6·6	77–78	60–61	17·0
20–	461	69·1	69·1	—	70·8	67·4	3·4	72·4	65·7	6·7	76–77	58–59	19·0
21–	364	68·9	68·7	+·2	70·6	67·2	3·4	72·2	65·9	6·3	76–77	62–63	15·0
22–	227	69·0	68·9	+·1	70·6	67·4	3·2	72·1	65·6	6·5	76–77	62–63	14·0
23–	114	68·5	68·6	−·1	70·4	66·7	3·7	72·2	65·2	7·0	75–76	62–63	13·0
24–	57	68·8	68·8	—	70·3	67·5	2·8	71·4	66·2	5·2	73–74	64–65	9·0
25–	107	69·4	69·1	+·3	70·7	67·6	3·1	72·1	66·1	6·0	74–75	61–62	13·0
30–	52	69·7	69·6	+·1	71·2	68·1	3·1	72·4	66·6	5·8	75–76	63–64	12·0
40–50	46	69·0	69·4	−·4	70·6	67·4	3·2	72·6	65·8	6·8	77–78	64–65	13·0

Table VIIIb.—Range in the Height of Males at each Age.

Class II.—Commercial (Lower Middle Classes), Clerks, Shopkeepers, Shopmen, &c.

Age in years	Number of Observations	Median	Average	Difference	Upper Quartile	Lower Quartile	Range between upper and lower fourths	Upper Decile	Lower Decile	Range between upper and lower tenths	Maximum — between	Minimum — between	Difference between maximum and minimum
		inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
10–	313	52·7	53·0	−·3	54·4	51·7	2·7	55·9	50·6	5·3	58–59	47–48	11·0
11–	687	53·8	53·8	—	55·3	52·1	3·2	56 9	50·6	6·3	60–61	47–48	13·0
12–	902	55·3	55·3	—	57·1	53·4	3·7	58·6	52·0	6·6	64–65	47–48	17·0
13–	857	57·5	57·4	+·1	59·4	55·7	3·7	61·3	54·1	7·2	67–68	49–50	18·0
14–	800	59·5	59·5	—	61·6	57·1	4·5	63·7	55·2	8·5	70–71	49–50	21·0
15–	544	62·2	62·2	—	61·5	59·9	4·6	66·5	57·9	8·6	71–72	53–54	18·0
16–	110	65·0	64·6	+·4	67·0	62·6	4·4	68·3	59·8	8·5	71–72	54–55	17·0
17–	107	66·8	66·6	+·2	68·6	64·6	4·0	70·1	63·0	7·1	72–73	58–59	14·0
18–	62	67·4	67·4	—	69·6	65·4	4·2	70·9	63·8	7·1	73–74	62–63	11·0
19–	63	67·4	67·6	−·2	68·9	67·0	2·9	70·6	64·9	5·7	72–73	63–64	9·0
20–	61	67·8	67·6	+·2	69·3	65·8	3·5	70·5	64·1	6·4	72–73	63–64	9·0
21–	51	66·9	66·8	+·1	68·1	64·8	3·6	69·8	63·7	6·1	72–73	62–63	10·0
22–	53	67·7	67·8	−·1	69·2	66·3	2·9	70·9	65·2	5·7	73–74	63–64	10·0
23–	59	67·5	67·4	+·1	69·3	65·6	3·7	71·0	63·8	7·2	72–73	61–62	11·0
24–	62	67·2	67·1	+·1	68·8	65·6	3·2	70·4	63·5	6·9	71–72	61–62	10·0
25–	47	67·7	67·9	−·2	69·0	66·6	2·4	70·9	65·6	5·3	73–74	64–65	9·0
26–	47	68·0	68·1	−·1	69·6	66·6	3·0	70·7	65·5	5·2	73–74	64–65	9·0
27–	27	68·6	68·1	+·5	70·1	66·3	3·8	71·3	64·5	6·8	72–73	63–64	9·0
28–	33	68·1	67·7	+·4	69·3	65·7	3·6	70·4	64·3	6·1	72–73	62–63	10·0
29–	26	68·2	68·0	+·2	69·8	66·2	3·6	71·0	64·8	6·2	72–73	63–64	9·0
30–	85	67·9	67·7	+·2	69·3	66·1	3·2	70·4	65·2	5·2	72–73	63–64	9·0
35–	82	68·0	68·1	−·1	69·3	66·6	2·7	70·9	65·4	5·5	74–75	62–63	12·0
40–	43	68·2	68·2	—	69·7	66·4	3·3	71·8	64·8	7·0	75–76	63–64	12·0
45–	36	68·4	68·0	+·4	69·5	66·8	2·7	70·7	65·5	5·2	71–72	60–61	11·0
50–	16	—	—	—	—	—	—	—	—	—	—	—	—

TABLE VIIIc.—Range in the HEIGHT of Males at each Age.

CLASS III.—Agricultural Labourers, Gardeners, Miners, Sailors, Fishermen, &c.

Age in years	Number of Observations	Median	Average	Difference	Upper Quartile	Lower Quartile	Range between upper and lower fourths	Upper Decile	Lower Decile	Range between upper and lower tenths	Maximum — between	Minimum — between	Difference between maximum and minimum
		inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
8–	133	46·9	47·0	−·1	48·5	45·3	3·2	49·9	43·8	6·1	54–55	40–41	14·0
9–	156	49·4	49·1	+·3	51·0	48·0	3·0	52·2	46·6	5·6	55–56	42–43	13·0
10–	783	50·9	50 9	—	52·4	49·4	3·0	53·8	48·0	5·8	58–59	44–45	14·0
11–	597	52·3	52·3	—	53·9	50·7	3·2	55·3	49·4	5·9	58–59	46–47	12·0
12–	395	53·6	53·7	−·1	55·3	52·1	3·2	56·9	50·6	6·3	60–61	45–46	15·0
13–	403	55·3	55·3	—	56·7	53·8	2·9	58·4	52·3	6·1	62–63	48–49	14·0
14–	9	—	—	—	—	—	—	—	—	—	—	—	—
15–	515	61·9	61·8	+·1	63·1	60·6	2·5	64·4	59·3	5·1	70–71	55–56	15·0
16–	177	63·6	63·6	—	64·8	62·3	2·5	66·0	61·3	4·7	71–72	59–60	12·0
17–	75	65·8	65·9	−·1	67·1	64·6	2·5	68·4	63·3	5·1	71–72	61–62	10·0
18–	148	66·4	66·5	−·1	68·2	64·9	3·3	69·6	63·2	6·4	73–74	62–63	11·0
19–	143	66·5	66·9	−·4	68·4	65·1	3·3	70·3	63·8	6·5	74–75	62–63	12·0
20–	183	67·0	66·9	+·1	68·5	65·4	3·1	70·1	63·6	6·5	74–75	58–59	16·0
21–	177	67·0	67·2	−·2	68·8	65·5	3·3	70·3	64·3	6·0	72–73	60–61	12·0
22–	127	67·2	67·3	−·1	69·0	65·6	3·4	70·5	64·2	6·3	73–74	62–63	11·0
23–	274	67·3	67·4	−·1	68·9	65·6	3·3	70·8	64·1	6·7	76–77	59–60	17·0
24–	258	67·0	67·1	−·1	68·5	65·4	3·1	70·3	63·8	6·5	74–75	61–62	13·0
25–	218	67·4	67·5	−·1	69·2	65·8	3·4	71·0	64·2	6·8	74–75	60–61	14·0
26–	194	67·3	67·4	−·1	69·2	65·6	3·6	71·3	64·2	7·1	74–75	57–58	17·0
27–	162	67·6	67·8	−·2	69·4	66·2	3·2	71·2	64·7	6·5	74–75	58–59	16·0
28–	208	67·4	67·3	+·1	68·9	65·7	3·2	70·4	63·9	6·5	75–76	59–60	16·0
29–	163	67·4	67·5	−·1	68·9	66·1	2·8	70·4	64·8	5·6	74–75	62–63	12·0
30–	745	67·5	67·6	−·1	69·3	65·9	3·4	70·7	64·5	6·2	75–76	60–61	15·0
35–	631	67·6	67·6	—	69·3	65·9	3·4	70·9	64·4	6·5	76–77	59–60	17·0
40–	551	67·5	67·7	−·2	69·4	65·9	3·5	71·0	64·4	6·6	76–77	59–60	17·0
45–	392	67·5	67·5	—	69·3	65·7	3·6	70·7	64·0	6·7	77–78	59–60	18·0
50–	147	68·2	68·1	+·1	70·1	66·1	4·0	71·8	64·1	7·7	74–75	60–61	14·0
60–	34	67·6	67·9	−·3	69·5	66·1	3·4	72·2	64·2	8·0	73–74	62–63	11·0

TABLE VIII*d*.—Range in the HEIGHT of Males at each Age.

CLASS IV.—Artisans, Workers in Wood, Metals, Stone, Engravers, Printers, &c.

Age in years	Number of Observations	Median	Average	Difference	Upper Quartile	Lower Quartile	Range between upper and lower fourths	Upper Decile	Lower Decile	Range between upper and lower tenths	Maximum — between	Minimum — between	Difference between maximum and minimum
		inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches	inches
4–	21	38·8	38·5	+·3	39·6	37·3	2·3	40·1	36·2	3·9	40–41	35–36	5·0
5–	37	40·1	40·1	—	41·2	39·0	2·2	42·4	38·0	4·4	43–44	35–36	8·0
6–	40	42·9	43·3	−·4	44·6	41·7	2·9	46·5	40·7	5·8	48–49	39–40	9·0
7–	53	45·9	45·7	+·2	47·0	44·4	2·6	48·2	42·9	5·3	50–51	41–42	9·0
8–	176	47·0	47·1	−·1	48·8	45·4	3·4	50·1	44·0	6·1	51–52	41–42	10·0
9–	358	49·1	48·9	+·2	50·6	47·6	3·0	52·1	46·1	6·0	56–57	42–43	14·0
10–	336	51·0	50·7	+·3	52·4	49·5	2·9	53·8	47·8	6·0	58–59	42–43	16·0
11–	240	52·7	52·7	—	54·2	51·1	3·1	55·5	49·7	5·8	60–61	47–48	13·0
12–	193	53·5	53·7	−·2	55·6	51·9	3·7	57·6	50·6	7·0	60–61	43–44	17·0
13–	614	56·7	56·8	−·1	58·1	55·4	2·7	59·7	54·4	5·3	64–65	49–50	15·0
14–	1653	59·3	59·6	−·3	61·2	57·8	3·4	63·2	56·6	6·6	71–72	50–51	21·0
15–	1464	61·3	61·4	−·1	63·3	59·3	4·0	65·2	57·8	7·4	73–74	51–52	22·0
16–	1391	63·0	62·8	+·2	64·7	61·0	3·7	66·3	59·1	7·2	·71–72	52–53	19·0
17–	711	64·7	64·7	—	66·3	63·1	3·2	67·9	61·7	6·2	73–74	56–57	17·0
18–	371	65·4	65·6	−·2	67·0	64·1	2·9	68·8	63·0	5·8	71–72	55–56	16·0
19–	277	66·1	66·2	−·1	67·7	64·6	3·1	69·2	63·4	5·8	72–73	58–59	14·0
20–	175	66·5	66·5	—	67·8	65·0	2·8	69·3	63·8	5·5	73–74	62–63	11·0
21–	165	66·5	66·8	−·3	68·1	65·3	2·8	69·8	64·1	5·7	74–75	61–62	13·0
22–	109	66·5	66·6	−·1	68·2	64·9	3·3	70·0	63·6	6·4	72–73	61–62	11·0
23–	145	66·2	66·4	−·2	67·8	64·9	2·9	69·2	63·9	5·3	71–72	62–63	9·0
24–	140	66·4	66·5	−·1	68·2	64·9	3·3	69·7	63·7	6·0	72–73	61–62	11·0
25–	92	66·3	66·5	−·2	67·9	65·0	2·9	69·4	63·9	5·5	71–72	61–62	10·0
26–	74	66·4	66·4	—	67·4	65·2	2·2	69·0	63·8	5·2	72–73	60–61	12·0
27–	66	66·8	66·7	+·1	67·9	65·6	2·3	69·0	64·3	4·7	70–71	60–61	10·0
28–	59	66·6	66·7	−·1	67·9	64·9	3·0	69·0	64·3	4·7	73–74	62–63	11·0
29–	53	66·9	66·8	+·1	68·4	65·3	3·1	70·2	63·6	6·6	73–74	60–61	13·0
30–	180	66·7	66·7	—	68·2	65·1	3·1	69·4	63·7	5·7	73–74	60–61	13·0
35–	111	67·0	67·1	−·1	68·5	65·7	2·8	70·2	64·4	5·8	72–73	61–62	11·0
40–	64	66·8	66·7	+·1	68·2	65·2	3·0	69·8	63·8	6·0	72–73	60–61	12·0
45–	16	66·3	66·9	−·6	68·5	65·1	3·4	70·5	64·3	6·2	73–74	63–64	10·0
50–	22	66·5	66·5	—	68·5	64·8	3·7	70·2	62·2	8·0	73–74	60–61	13·0

Table IX.—Range in the Weight of Males at each Age and in the several Classes.

(For further details see Tables IX*a*., IX*b*., IX*c*., and IX*d*.)

Age in Years	Total number of Observations	Median Value					Range in Weight at each Age									
							Between Upper and Lower Fourths					Between Upper and Lower Tenths				
		Classes				Average of all Classes	Classes				Average of all Classes	Classes				Average of all Classes
		1	2	3	4		1	2	3	4		1	2	3	4	
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
10–	303	74·2	64·4	—	—	69·3	11·7	11·5	—	—	11·6	29·6	20·3	—	—	25·0
11–	578	77·6	67·4	—	—	72·5	11·5	11·4	—	—	11·5	22·6	21·6	—	—	22·1
12–	779	84·7	73·6	—	—	79·2	13·8	12 2	—	—	13·0	26·3	22·8	—	—	24·6
13–	1614	90·7	78·0	—	83·7	84·1	16·9	14·5	—	11·8	14·4	30·8	27·4	—	23·2	27·1
14–	2448	100·0	85·5	—	90·7	92·1	20·8	24·1	—	15·3	20·1	40·1	33·5	—	30·2	34·6
15–	3018	113·8	97·1	99·7	100 3	102·7	25·3	22·7	22·8	21·9	23·2	45·7	42·9	34·0	36·0	39·7
16–	2235	129·9	122·0	122·6	111·8	121·6	25·3	29·0	16·2	19·7	22·6	43·1	51·1	29·3	37·3	40·2
17–	2496	141·2	128·0	132·3	121·5	130·8	21·0	19·1	22·6	19·8	20·6	39·3	41·5	38·0	35·7	38·6
18–	2150	145·8	136·6	138·8	129·2	137·6	20·4	19·4	24·3	19·4	20·9	39·6	35·6	47·6	37·0	40·0
19–	1438	147·2	139·2	138·9	130·8	139·0	19·3	18·6	18·9	21·3	19·5	38·1	34·9	38·8	40·0	38·0
20–	851	151·7	141·8	144·0	136·4	143·5	18·6	25·9	21·3	17·6	20·9	37·2	38·1	37·6	38·1	37·8
21–	737	152·4	140·6	147·9	134·8	143·9	20·4	14·7	18·0	17·5	17·7	38·5	29·4	37·5	37·2	35·7
22–	542	153·5	142·2	149·7	137·3	145·7	19·9	20·8	24·4	21·2	21·6	37·5	44·3	41·7	38·2	40·4
23–	551	150·7	145·0	151·0	140·1	146·7	20·8	15·3	22·7	18·4	19·3	43·8	31·9	53·4	34·1	40·8
24–	483	149·7	147·8	151·3	142·5	147·8	18·9	21·1	19·8	23·0	20·7	34·9	41·3	40·1	44·1	40·1
25–	330	—	146·7	153·4	141·7	147·3	—	23·3	23·3	22·9	23·2	—	39·3	45·2	42·5	42·3
26–	296	—	149·2	151·7	138·3	146·4	—	19·0	25·0	20·5	21·5	—	42 2	48·0	35·6	41·9
27–	253	(155·9)	150·5	155·3	145·4	150·4	(23·3)	25·1	20·7	20·6	22·1	(40·1)	41·6	43·9	41·3	42·3
28–	296	—	151·9	154·4	146·7	151·0	—	24·1	23·3	18·1	21·8	—	64·7	46·5	40·6	50·6
29–	233	—	152·5	157·3	146·0	151·9	—	21·1	20·0	13·4	18·2	—	46·3	41·2	41·9	43·1
30–	940	(170·0)	158·2	157·4	146·6	154·1	(32·0)	26·0	23·6	29·2	26·3	(59·7)	47·0	51·6	59·0	52·5
35–	816	—	161·5	158·4	154·8	158·2	—	32·7	24·4	23·1	26·7	—	60·9	55·1	51·8	55·9
40–	646	(174·0)	165·5	160·4	147·8	157·9	(44·9)	33·8	27·1	25·7	28·9	(74·5)	67·5	55·7	56·9	60·0
45–	451	—	171·3	159·7	146·5	159·2	—	40·0	27·9	28·2	32·0	—	71·5	55·8	67·8	65·0
50–60	166	—	172·5	166·9	148·8	162·7	—	41·0	37·3	34·2	37·5	—	65·9	69·4	68·9	68·1

Note.—The ages under Class I., to which the entries within brackets ( ) apply, were grouped differently to those in the other classes (*see* Table IX*a*.) It has therefore been necessary to exclude those entries from the 'Average of all Classes.'

TABLE IX*a*.—Range in the WEIGHT of Males at each Age.

CLASS I.—Professional (Upper and Upper Middle Classes).

Age in years	Number of Observations	Median	Average	Difference	Upper Quartile	Lower Quartile	Range between upper and lower fourths	Upper Decile	Lower Decile	Range between upper and lower tenths	Maximum — between	Minimum — between	Difference between maximum and minimum
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs	lbs	lbs.
10–	92	74·2	74·0	+ ·2	78·9	67·2	11·7	82·9	63·3	29·6	90– 95	55– 60	35·0
11–	185	77·6	78·7	−1·1	84·3	72·8	11·5	90·7	68·1	22·6	100–105	55– 60	45·0
12–	369	84·7	84·9	– ·2	91·7	77·9	13·8	98·8	72·5	26·3	115–120	55– 60	60·0
13–	621	90·7	91·6	– ·9	99·6	82·7	16·9	107·3	76·5	30·8	140–145	55– 60	85·0
14–	748	100·0	102·2	−2·2	112·1	91·3	20·8	124·0	83·9	40·1	160–165	60– 65	100·0
15–	652	113·8	114·3	– ·5	126·8	101·5	25·3	137·3	91·6	45·7	175–189	70– 75	109·5
16–	834	129·9	129·5	+ ·4	141·1	118·8	25·3	150·1	107·0	43·1	175–189	75– 80	109·5
17–	1705	141·2	141·7	– ·5	151·8	130·8	21·0	161·7	122·4	39·3	189–203	90– 95	103·5
18–	1638	145·8	146·4	– ·6	156·2	135·8	20·4	166·0	126·4	39·6	203–217	100–105	107·5
19–	940	147·2	148·5	−1·3	157·4	138·1	19·3	168·5	130·4	38·1	203–217	105–110	102·5
20–	451	151·7	152·4	– ·7	161·4	142·8	18·6	171·3	134·1	37·2	189–203	90– 95	103·5
21–	365	152·4	152·7	– ·3	162·1	141·7	20·4	171·5	133·0	38·5	203–217	115–120	92·5
22–	215	153·5	152·8	+ ·7	162·2	142·3	19·9	171·6	134·1	37·5	189–203	115–120	78·5
23–	112	150·7	151·5	– ·8	161·9	141·1	20·8	172·5	128·7	43·8	175–189	115–120	64·5
24–	56	149·7	149·6	+ ·1	159·3	140·4	18·9	166·4	131·5	34·9	189–203	110–115	83·5
25–	115	155·9	156·3	– ·4	167·3	144·0	23·3	180·3	140·2	40·1	203–217	110–115	97·5
30–	48	170·0	172·5	−2·5	187·8	155·8	32·0	207·2	147·5	59·7	217–231	120–125	101·5
40–	44	174·0	174·6	– ·6	193·8	148·9	44·9	216·0	141·5	74·5	245–259	135–140	114·5
50–70	18	171·5	171·5	—	—	—	—	—	—	—	—	—	—

Table IX*b*.—Range in the Weight of Males at each Age.

Class II.—Commercial (Lower Middle Classes): Clerks, Shopkeepers, Shopmen, &c.

Age in years	Number of Observations	Median	Average	Difference	Upper Quartile	Lower Quartile	Range between upper and lower fourths	Upper Decile	Lower Decile	Range between upper and lower tenths	Maximum — between	Minimum — between	Difference between maximum and minimum
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
10–	211	64·4	65·2	− ·8	70·4	58·9	11·5	75·5	55·2	20·3	80– 85	50– 55	30·0
11–	393	67·4	68·0	− ·6	73·5	62·1	11·4	79·5	57·9	21·6	95–100	45– 50	50·0
12–	410	73·6	73·2	+ ·4	77·9	65·7	12·2	83·9	61·1	22·8	90– 95	45– 50	45·0
13–	353	78·0	80·1	−2·1	85·7	71·2	14·5	93·5	66·1	27·4	120–125	55– 60	65 0
14–	304	85·5	89·5	−4·0	101·2	77·1	24·1	104·3	70·8	33·5	130–135	55– 60	75·0
15–	244	97·1	99·4	−2·3	110 9	88·2	22·7	121·4	78·5	42·9	145–150	65– 70	80 0
16–	55	122·0	122·2	− ·2	137·5	108·5	29·0	146·9	95·8	51·1	160–165	70– 75	90·0
17–	38	128·0	128·8	− ·8	138·3	119·2	19·1	150·0	108·5	41·5	160–165	95–100	65·0
18–	39	136·6	135·1	+1·5	145·2	125·8	19·4	151·9	116·3	35·6	160–165	100–105	60·0
19–	69	139·2	138·6	+ ·6	147·8	129·2	18·6	157·7	122·8	34·9	170–175	100–105	70·0
20–	52	141·8	143·1	−1·3	153·8	127·9	25·9	161·9	123·8	38·1	189–203	110–115	84·5
21–	51	140·6	140·9	− ·3	147·2	132·5	14·7	155·5	126·1	29·4	189–203	95–100	98·5
22–	51	142·2	145·5	−3·3	155·0	134·2	20·8	170·8	126·5	44·3	189–203	100–105	93·5
23–	57	145·0	146·8	−1·8	154·5	139·2	15·3	165·0	133·1	31·9	175–189	115–120	64·5
24–	57	147·8	147·1	+ ·7	156·8	135·7	21·1	168·8	127·5	41·3	175–189	110–115	69·5
25–	45	146·7	148·5	−1·8	160·8	137·5	23·3	168·9	129·6	39·3	175–189	115–120	64·5
26–	46	149·2	154·2	−5·0	161·5	142·5	19·0	177·2	135·0	42·2	217–231	120–125	101·5
27–	26	150·5	149·2	+1·3	160·5	135·4	25·1	170·8	129·2	41·6	175–189	110–115	69·5
28–	33	151·9	156·1	−4·2	165·8	141·7	24·1	196·0	131·3	64·7	203–217	125–130	82·5
29–	26	152·5	154·3	−1·8	165·0	143·9	21·1	178·8	132·5	46·3	189–203	105–110	88·5
30–	87	158·2	158·5	− ·3	169·3	143·3	26·0	183·3	136·5	47·0	217–231	105–110	116·5
35–	80	161·5	166·6	−5·1	180·5	147·8	32·7	201·3	140·4	60·9	245–259	125–130	125·0
40–	39	165·5	169·0	−3·5	183·4	149·6	33·8	208·0	140·5	67·5	245–259	120–125	129·5
45–	33	171·3	168·2	+3·1	185·8	145·8	40·0	205·3	133·8	71·5	217–231	120–125	101·5
50–	16	172·5	173·4	− ·9	191·3	150·3	41·0	210·0	144·1	65·9	217–231	130–135	91·5

TABLE IXc.—Range in the WEIGHT of Males at each Age.

CLASS III.—Agricultural Labourers, Gardeners, Miners, Sailors, Fishermen, &c.

Age in years	Number of Observations	Median	Average	Difference	Upper Quartile	Lower Quartile	Range between upper and lower fourths	Upper Decile	Lower Decile	Range between upper and lower Tenths	Maximum — between	Minimum — between	Difference between maximum and minimum
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
15–	676	99·7	100·6	– ·9	111·8	89·0	22·8	117·8	83·8	34·0	140–145	60– 65	80·0
16–	169	122·6	122·2	+ ·4	130·1	113·9	16·2	136·9	107·6	29·3	155–160	90– 95	65·0
17–	80	132·3	131·5	+ ·8	143·1	120·5	22·6	151·1	113·1	38·0	160–165	80– 85	80·0
18–	135	138·8	138·7	+ ·1	150·3	126·0	24·3	161·7	114·1	47·6	189–203	80– 85	113·5
19–	140	138·9	140·2	–1·3	149·0	130·1	18·9	161·3	122·5	38·8	189–203	95–100	98·5
20–	175	144·0	144·3	– ·3	154·7	133·4	21·3	163·2	125·6	37·6	175–189	110–115	69·5
21–	164	147·9	147·8	+ ·1	156·1	138·1	18·0	166·1	128·6	37·5	189–203	105–110	88·5
22–	167	149·7	150·6	– ·9	163·0	138·6	24·4	171·1	129·4	41·7	189–203	110–115	83·5
23–	279	151·0	152·8	–1·8	163·2	140·5	22·7	184·4	131·0	53·4	217–231	105–110	116·5
24–	250	151·3	151·9	– ·6	161·2	141·4	19·8	171·3	131·2	40·1	189–203	115–120	78·5
25–	224	153·4	154·1	– ·7	164·9	141·6	23·3	178·2	133·0	45·2	203–217	110–115	97·5
26–	192	151·7	154·1	–2·4	165·5	140·5	25·0	180·7	132·7	48·0	203–217	115–120	92·5
27–	171	155·3	156·7	–1·4	165·3	144·6	20·7	181·1	137·2	43·9	203–217	115–120	92·5
28–	213	154·4	155·1	– ·7	165·9	142·6	23·3	179·4	132·9	46·5	203–217	110–115	97·5
29–	161	157·3	158·0	– ·7	167·2	147·2	20·0	179·8	138·6	41·2	189–203	125–130	68·5
30–	700	157·4	159·2	–1·8	169·3	145·7	23·6	188·5	136·9	51·6	259–273	110–115	153·5
35–	631	158·4	160·5	–2·1	170·6	146·2	24·4	191·7	136·6	55·1	259–273	110–115	153·5
40–	541	160·4	162·8	–2·4	174·6	147·5	27·1	192·8	137·1	55·7	259–273	105–110	158·5
45–	371	159·7	161·2	–1·5	174·1	146·2	27·9	191·0	135·2	55·8	245–259	110–115	139·5
50–	129	166·9	170·9	–4·0	188·3	151·0	37·3	208·8	139·4	69·4	259–273	115–120	148·5
60–	24	162·5	170·9	–8·4	183·4	152·5	30·9	229·4	132·5	96·9	231–245	120–125	115·5

Table IX*d*.—Range in the Weight of Males at each Age.

Class IV.—Artisans, Workers in Wood, Metal, Stone, Engravers, Printers, &c.

Age in years	Number of Observations	Median	Average	Difference	Upper Quartile	Lower Quartile	Range between upper and lower fourths	Upper Decile	Lower Decile	Range between upper and lower tenths	Maximum — between	Minimum — between	Difference between maximum and minimum
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
13–	640	83·7	84·0	− ·3	90·0	78·2	11·8	96·2	73·0	23·2	110–115	55– 60	55·0
14–	1396	90·7	92·3	−1·6	99·2	83·9	15·3	108·9	78·7	30·2	135–140	55– 60	80·0
15–	1446	100·3	101·4	−1·1	113·0	91·1	21·9	119·9	83·9	36·0	150–155	60– 65	90·0
16–	1177	111·8	112·2	− ·4	122·1	102·4	19·7	131·0	93·7	37·3	160–165	70– 75	90·0
17–	673	121·5	121·5	—	130·1	110·3	19·8	139·3	103·6	35·7	165–168	75– 80	89·0
18–	338	129·2	129·3	− ·1	138·9	119·5	19·4	148·1	111·1	37·0	168–175	80– 85	89·0
19–	289	130·8	131·1	− ·3	140·9	119·6	21·3	151·5	111·5	40·0	189–203	90– 95	103·5
20–	173	136·4	136·4	—	144·8	127·2	17·6	155·4	117·3	38·1	175–189	100–105	79·5
21–	157	134·8	136·2	−1·4	144·2	126·7	17·5	155·7	118·5	37·2	175–189	105–110	74·5
22–	109	137·3	138·6	−1·3	148·3	127·1	21·2	158·5	120·3	38·2	189–203	105–110	88·5
23–	103	140·1	140·2	− ·1	148·9	130·5	18·4	156·9	122·8	34·1	175–189	110–115	69·5
24–	120	142·5	143·4	− ·9	153·2	130·2	23·0	165·4	121·3	44·1	203–217	105–110	102·5
25–	61	141·7	139·9	+1·8	151·4	128·5	22·9	160·0	117·5	42·5	168–175	105–110	64·0
26–	58	138·3	142·2	−3·9	152·5	132·0	20·5	162·5	126·9	35·6	168–175	110–115	59·0
27–	56	145·4	146·9	−1·5	157·0	136·4	20·6	164·8	123·5	41·3	217–231	105–110	116·5
28–	50	146·7	148·0	−1·3	155·0	136·9	18·1	169·0	128·4	40·6	203–217	115–120	92·5
29–	46	146·0	148·1	−2·1	154·0	140·6	13·4	166·9	125·0	41·9	189–203	110–115	83·5
30–	153	146·6	150·1	−3·5	162·7	133·5	29·2	181·5	122·5	59·0	231–245	110–115	97·5
35–	105	154·8	156·5	−1·7	166·1	143·0	23·1	183·8	132·0	51·8	217–231	115–120	106·5
40–	66	147·8	150·7	−2·9	161·4	135·7	25·7	183·2	126·3	56·9	189–203	110–115	83·5
45–	47	146·5	152·8	−6·3	164·5	136·3	28·2	192·0	124·2	67·8	217–231	110–115	111·5
50–	21	148·8	145·6	+3·2	160·0	125·8	34·2	176·8	107·9	68·9	203–217	105–110	102·5

TABLE X.—Range in the STRENGTH OF ARM of Males at each Age.

General Population.

Age in years	Number of Observations	Median	Average	Difference	Upper Quartile	Lower Quartile	Range between upper and lower fourths	Upper Decile	Lower Decile	Range between upper and lower tenths	Maximum — between	Minimum — between	Difference between maximum and minimum
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
11–	27	37·5	37·5	—	42·1	32·5	9·6	46·9	29·6	17·3	50– 55	25–30	25·0
12–	49	38·6	38·7	– ·1	44·1	33·1	11·0	53·8	34·9	18·9	50– 55	25–30	25·0
13–	119	42·9	44·2	–1·3	49·1	37·9	11·2	56·3	33·3	23·0	80– 85	25–30	55·0
14–	375	45·1	47·0	–1·9	52·5	38·1	14·4	67·3	33·4	33·9	105–110	20–25	85·0
15–	531	52·6	52·2	+ ·4	58·4	43·3	15·1	68·3	38·3	30·0	125–130	25–30	100·0
16–	438	56·6	58·2	–1·6	66·3	48·3	18·0	76·5	41·8	34·7	115–120	30–35	85·0
17–	388	64·4	67·8	–3·4	74·5	55·2	19·3	87·5	49·0	38·5	140–145	30–35	110·0
18–	415	73·9	74·2	– ·3	88·4	61·9	26·5	97·7	57·4	40·3	135–140	40–45	95·0
19–	382	73·0	76·4	–3·4	86·1	64·1	22·0	100·5	62·0	38·5	145–150	40–45	105·0
20–	259	76·1	77·9	–1·8	87·5	65·9	21·6	93·3	59·5	33·8	120–125	45–50	75·0
21–	213	78·9	80·2	–1·3	90·5	69·4	21·1	98·3	62·7	35·6	130–135	50–55	80·0
22–	202	79·6	81·7	–2·1	90·6	71·3	19·3	99·5	65·2	34·3	135–140	50–55	85·0
23–	192	79·4	80·9	–1·5	89·1	69·9	19·2	97·3	65·0	32·3	155–160	40–45	115·0
24–	159	78·3	79·7	–1·4	87·3	70·4	16·9	96·4	64·5	31·9	120–125	50–55	70·0
25–	578	81·9	83·5	–1·6	91·4	74·1	17·3	100·5	70·5	30·0	150–155	50–55	100·0
30–	534	75·3	77·5	–2·2	85·8	68·1	17·7	94·7	60·9	33·8	155–160	35–40	120·0
40–	144	76·3	76·5	– ·2	84·7	68·1	16·6	93·0	57·5	35·5	145–150	35–40	110·0
50–60	34	71·6	74·6	–7·0	80·8	64·3	16·5	97·5	58·1	39·4	110–115	50–55	60·0

Inspector-General Lawson, *who has prepared the Tables XI. to XIV. on* Eyesight, *has contributed the following remarks upon them.*

The acuteness of vision has been tested by finding the distance at which the individual under trial could distinguish the dots on the cards issued by the Committee, so as to count them readily. These cards contain eighteen square dots of one-fifth of an inch wide placed irregularly in two groups, the distances from centre to centre of the contiguous dots varying from 2 diameters to 3·16; their intervals may accordingly be taken at one diameter less, or from 1 to 2·16. Of these intervals five are of 1 diameter, six of 1·24, two of 1·83, and three of 2·16, and, if the acuteness of vision were fairly tested, it must have been equal to separating the dots with the intervals of one diameter sufficiently, at the distance noted for each individual, to enable him to count them.

On approaching such a card, from a distance, the dots with the larger interspaces become distinct, while those with the smaller still seem continuous; but after a few trials many of those under test will become aware that the elongated-looking dots are made up of two, though they be too far off for the eye to separate them.

The individuals examined have been distributed in five classes according to the scheme detailed in Table III. of the Committee's Report for 1880; the details for each class are given in the Tables XI. to XIV.[1] On looking over these the fluctuations in the distance for consecutive years of age are far too great to admit of any satisfactory conclusions; to obviate this the ages have been grouped in five-yearly periods up to thirty, after which ten-yearly periods have been employed; these reduce the fluctuations materially and afford much more harmonious results, as will be seen in the following abstract.

Distance at which the test-dots were distinguished at different ages in each of the five classes, with a general mean for the II. III. IV. and V. Classes, and a separate one for the IV. and V. Classes.

Ages	Class I.		Class II.		Class III.		Class IV.		Class V.		General Mean of Classes II. to V.		Mean of Classes IV. and V.	
	Obs.	Distance in Feet	Obs.	Distance in Feet	Obs.	Distance in Feet	Obs.	Distance in Feet	Obs.	Distance in Feet	Obs.	Distance in Feet	Obs.	Distance in Feet
10–14	52	29·2	—	—	—	—	—	—	—	—	—	—	—	—
15–19	63	27·7	14	54·3	57	54·6	97	51·5	18	62·7	186	53·7	115	53·2
20–24	15	26·8	27	54·5	145	52·0	97	48·1	53	56·1	322	51·7	150	50·9
25–29	2	47·5	15	48·5	80	50·9	48	47·1	39	52·8	182	50·1	87	49·7
30–39	7	42·5	22	52·3	77	51·3	41	45·6	25	50·9	165	50·0	66	47·6
40–49	2	47·5	8	38·8	33	51·9	24	45·7	13	48·3	78	48·0	37	46·6
50–59	1	7·5	4	48·5	13	51·6	6	40·0	5	36·4	28	46·0	11	40·2
60 and upwds.	2	55·0	1	27·5	7	43·9	—	—	5	35·5	13	39·5	5	35·5
Total . .	144	—	91	—	412	—	313	—	158	—	974	—	471	—

[1] For the reasons stated below, it has not been considered necessary to give the Tables for Class I. in a separate form.

The details in this table show that the distance at which the dots could be counted by those under 25 years of age in Class I. was about half that found for each of the other four classes, while above 25 this difference was greatly reduced. This discrepancy has arisen from the persons in Class I. having been examined in a hall where the space was limited and the light not very good; but it is so great as to prevent the numbers for the first class being combined with those for the other four in a general mean; consequently the latter only, which are sufficiently regular among themselves to justify the proceeding, have been employed for this purpose, and the results are given in the 6th column of the table. From this it appears that, in a mixed town and country population of 974, those from 15 to 19 could distinguish the test-dots at a mean distance of 53·7 feet; this diminished through 51·7 feet between 20 and 24, to 50·0 feet from 30 to 39; a decrease of 2 feet in ten years went on from 40 to 59; and after 60 this was nearly doubled. There is here an approximate measure of the reduction of the range of vision with advancing age, which, taking the distance the dots were visible from 15 to 19 as the unit, may be represented for the subsequent ages as follow:—

Ages . .	15–	20–	25–	30–	40–	50–	60–
Range of vision	1	·96	·93	·93	·89	·86	·74

The influence of town or country occupations and surroundings may now be examined. Class III. may be taken to represent the latter, but it is advisable to combine Classes IV. and V., to increase the number as well as to embrace a greater variety of occupations, to illustrate the former. The results are given in the last column in the above table. Class II. includes persons in a different sphere of life from III., IV., and V., and their numbers are too few at present to afford a sufficient basis to work on; while Class I., as has been already mentioned, is not available. Taking the mean distance at which the dots were distinguished at 15 to 19 as the unit as above, the ranges at subsequent ages were as follow:—

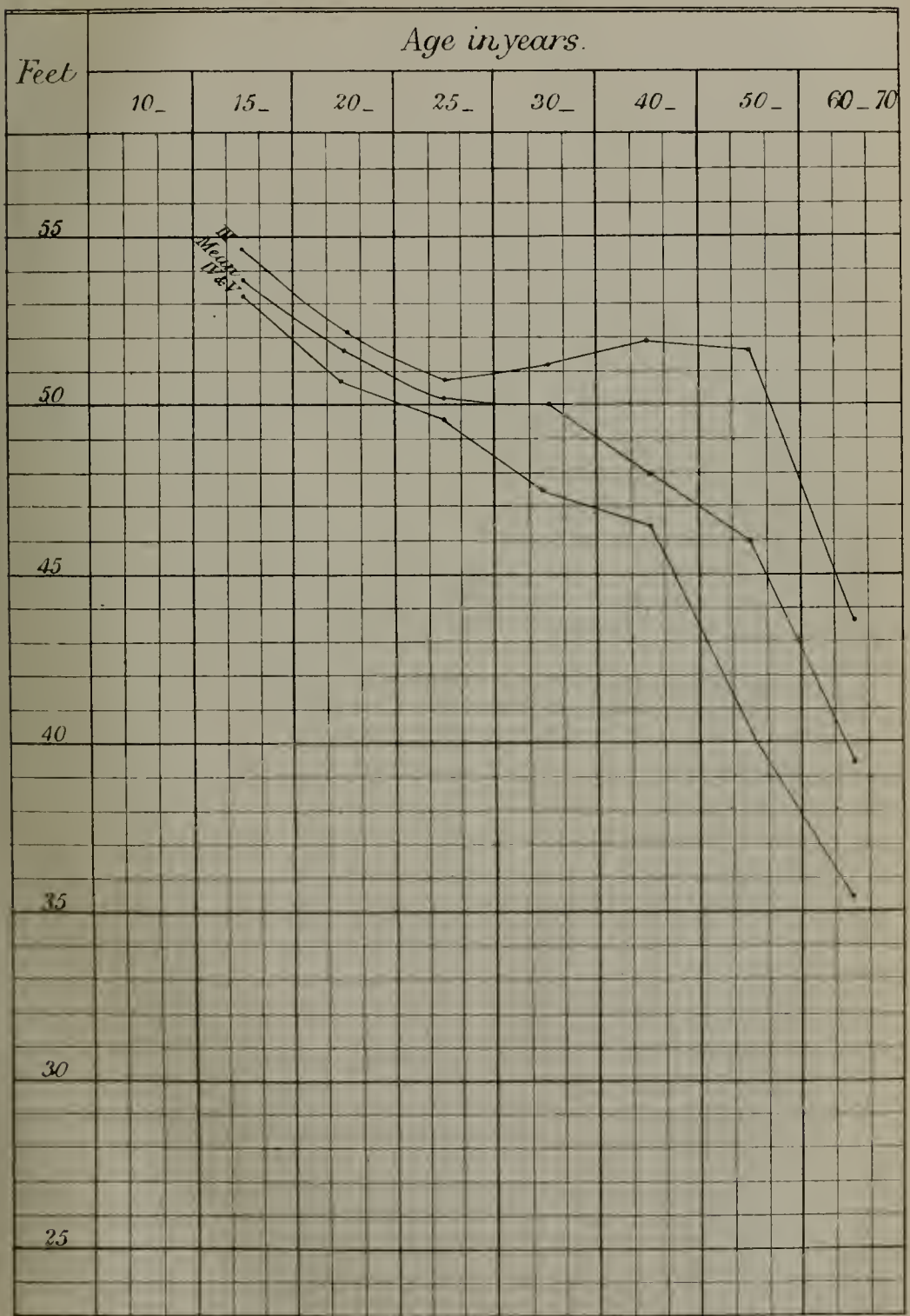
Ages	15–	20–	25–	30–	40–	50–	60–
Class III., country . .	1	·95	·93	·94	·95	·95	·80
Class IV. and V., town .	1	·96	·93	·89	·88	·76	·67

Though Class III. embraces 412 individuals, it is evident from the course of the ratios from the ages of 30 to 59 that they are not sufficiently numerous to neutralise irregular fluctuations; nevertheless, when compared with those for Classes IV. and V. in the next line, there can be no doubt that country life and occupations are far less injurious to vision as age advances than residence in towns with its concomitant circumstances. As the smaller distance at which the dots were distinguished by persons under 19 in the towns than in the country may be due in a great measure to the difference in the brightness of illumination in these positions, it is prudent to postpone the consideration of how far people at that age have their vision affected by town life until sufficient material be accumulated. These facts will be readily appreciated by examining the diagram on Plate IV.

These remarks will afford a fair idea of the scope of the present inquiry; but many more observations, especially at the higher ages, are required to place the results on a firmer basis. With a sufficient number of observations the influence of any single occupation, or of a series of

SIGHT

Diagram showing the average distance at which dots ⅕ inch square were distinguished by different classes at different ages.



III.=Class III. Mean = Classes II to V. IV&V=Classes IV&V.

Illustrating the Report of the Anthropometric Committee.

Spottiswoode & Co. Lith. London.

occupations, involving the employment of the sight in a similar manner might be tested, and could afford materials for very important conclusions.

NOTE.—The conditions under which the acuteness of vision is tested have a marked influence on the results. The most favourable circumstances for bringing out the acuteness of vision in persons whose eyes are healthy, and their refracting power normal, are to view a dark body against a well-illuminated bright-coloured background some way behind it. For short distances the upright or wire of an iron fence; for greater distances a pole or flagstaff projected against the clear sky beyond, are suitable objects, from either of which the distance of the observer can be measured. The writer, for instance, though his vision is no longer so acute as formerly, can perceive distinctly at 200 yards' distance, in good daylight, the upright of an iron hurdle presenting a breadth of 0·36 inch from his point of observation, and projected against a newly gravelled walk; and, some years ago, he had frequent opportunities of observing a flagstaff, on a hill, the smallest part of which was not more than six inches in diameter, yet in favourable weather that was distinctly visible three miles off. The angle the object subtended at the eye in the former instance is 10″·3, and in the latter 6″·7, and in each case it was considerably within the extreme limit of vision. It will be observed, however, that though these objects were narrow, they were of considerable length, and this extension in a direction perpendicular to their smallest diameter enabled the eye to seize and retain the latter, while, had its length not exceeded its breadth there would have been far more difficulty in finding it in the first instance, and in keeping the eye fixed steadily on it afterwards. In practice objects which appear square or circular, as presented to the eye, cannot be distinguished under such small angles, and only become distinctly visible at distances proportionately much shorter. When they are dark, on a light ground in the same plane, the range of vision is reduced still more.

In arranging his test-types Snellen proceeded on the assumption that the normal eye could perceive an object subtending an angle of 1′, and consequently he gave the lines forming his letters such a breadth that they should reach the eye under an angle of 1′, when held at the distance indicated in the accompanying instructions; but to admit of the various parts of the letters being perceptible their height was fixed at 5′, or five times the breadth of their limbs. These letters afford a very convenient practical test of the various alterations the sight may have undergone; but, as will appear immediately, owing to their forms and the small distance between their different parts, they are not adapted for determining quantitatively its greatest range under normal conditions. The test-dots which were introduced originally to ascertain the fitness of recruits for military service seem better suited for this purpose, though, as they were employed to ensure the minimum range of vision required for military service, which is far within that of the ordinary healthy eye, their capabilities were never fully considered or developed.

A single test-dot, say a square of $\frac{1}{5}$ of an inch of a side, will be visible as far as any combination of them in which the single dots are distinguishable; their arrangement in groups is merely to provide a check on the person under trial, by varying the number exposed and requiring him to count them; but when investigating the extreme limit of vision a difficulty arises here, which did not present itself when

TABLE XI. CLASS II.—AGE and STRENGTH OF SIGHT (distance at which dots $\frac{1}{5}$-inch square have been distinguished).

Feet	15 yrs	16–	17–	18–	19–	20–	21–	22–	23–	24–	25–	30–	35–	40–	45–	50–	55–	60–	Total
0–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10–	—	—	—	—	—	—	—	—	1	—	—	—	—	1	—	—	—	—	2
15–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20–	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
25–	—	—	1	—	—	—	1	—	—	—	1	1	1	—	—	—	—	1	6
30–	—	—	1	—	—	—	—	1	1	2	3	3	—	—	1	—	—	—	12
35–	—	—	—	—	1	—	1	—	—	—	1	1	—	1	2	—	—	—	7
40–	—	—	—	—	—	—	2	—	—	—	3	2	—	1	—	—	1	—	9
45–	—	—	—	3	1	2	1	—	1	—	1	1	1	—	—	—	2	—	13
50–	—	—	—	—	1	—	—	—	—	1	—	2	2	1	—	—	—	—	7
55–	1	—	—	—	1	—	2	1	1	—	2	1	1	1	—	1	—	—	12
60–	—	—	1	1	—	1	—	—	—	—	3	—	—	—	—	—	—	—	6
65–	—	—	—	—	—	1	—	1	1	1	—	2	—	—	—	—	—	—	6
70–	—	—	—	—	—	1	—	—	—	—	—	—	1	—	—	—	—	—	2
75–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
80–	—	—	—	—	1	—	—	—	—	—	—	3	—	—	—	—	—	—	4
85–	—	—	—	—	—	1	—	—	—	—	1	—	—	—	—	—	—	—	2
90–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
95–	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
100 and upwards	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
	1	—	4	4	5	6	7	3	5	6	15	16	6	5	3	1	3	1	91
Average for each year	57·5	—	55·0	51·3	55·5	64·2	44·6	52·5	43·5	66·7	48·5	52·5	51·7	40·5	35·8	57·5	45·5	27·5	—
And for five and ten yearly periods	54·3					54·5					48·5	52·3		38·8		48·5		27·5	—

TABLE XII. CLASS III.—AGE and STRENGTH OF SIGHT (distance at which dots $\frac{1}{5}$-inch square have been distinguished).

Feet	16 yrs.	17–	18–	19–	20–	21–	22–	23–	24–	25–	30–	35–	40–	45–	50–	55–	60	Total
0–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5–	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	1
10–	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	2
15–	—	—	—	—	—	1	—	—	1	2	—	—	—	—	—	—	—	4
20–	—	1	—	—	—	1	2	1	—	1	—	1	1	—	—	1	—	9
25–	—	—	—	2	3	1	—	—	2	4	2	1	—	—	1	—	—	16
30–	—	—	1	4	1	2	3	4	2	5	1	4	2	—	—	1	—	30
35–	—	1	1	—	2	3	1	2	3	11	8	2	—	1	—	—	1	36
40–	—	1	2	1	2	3	3	1	2	3	4	3	2	—	1	1	5	34
45–	—	—	2	4	3	8	—	1	1	8	4	6	3	1	—	—	—	41
50–	—	1	5	2	6	11	4	4	3	8	5	1	5	1	—	—	—	56
55–	—	4	6	3	2	8	1	1	4	14	—	3	6	2	2	1	1	58
60–	—	—	1	4	3	4	1	3	1	10	6	5	2	1	3	—	—	44
65–	1	—	1	—	3	2	3	2	3	10	8	2	5	—	1	—	—	41
70–	1	—	—	—	1	2	2	1	2	3	3	5	—	—	—	—	—	20
75–	—	2	1	2	—	1	2	1	—	—	—	—	—	—	1	—	—	10
80–	—	—	—	1	—	1	—	—	—	1	—	—	—	—	—	—	—	3
85–	—	—	—	—	1	—	—	—	—	—	1	—	—	—	—	—	—	2
90–	—	—	—	2	—	1	1	1	—	—	—	—	—	—	—	—	—	5
95–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
100 and upwards	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals . . .	2	10	20	25	27	49	23	22	24	80	43	34	26–	7	9	4	7	412
Averages for each year	70·0	54·0	53·3	54·7	51·8	52·5	53·6	52·3	49·2	50·9	52·0	50·4	53·3	46·8	57·5	38·8	43·9	51·9
And for five and ten yearly periods	54·6				52·0					50·9	51·3		51·9		51·6		43·9	—

TABLE XIII. CLASS IV.—AGE and STRENGTH OF SIGHT (distance at which dots $\frac{1}{5}$-inch square have been distinguished).

Feet	15 yrs	16–	17–	18–	19–	20–	21–	22–	23–	24–	25–	30–	35–	40–	45–	50–	55–	60–	Total
0–	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
5–	—	—	—	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	2
10–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1
15–	—	—	—	—	—	—	—	—	—	—	1	2	—	—	—	—	—	—	3
20–	—	—	—	2	—	1	2	2	—	2	3	2	2	3	2	—	1	—	22
25–	—	—	1	2	—	2	4	—	2	—	4	1	2	1	—	1	—	—	20
30–	—	—	2	5	2	3	3	2	2	3	6	5	—	3	—	—	—	—	36
35–	—	—	3	1	2	1	1	3	—	1	4	2	2	1	2	—	—	—	23
40–	1	—	2	3	6	—	3	2	1	3	2	2	1	2	1	—	—	—	29
45–	—	—	9	9	6	6	—	1	1	1	5	3	2	1	—	—	—	—	44
50–	—	1	3	4	—	3	2	1	1	1	7	3	—	1	1	—	1	—	29
55–	—	—	1	5	2	5	2	2	2	2	6	3	—	1	1	—	—	—	32
60–	—	—	2	4	2	3	2	2	2	2	7	3	1	1	—	2	—	—	33
65–	—	—	—	—	1	2	—	2	—	1	—	—	—	—	—	—	—	—	6
70–	—	—	1	4	1	2	1	—	—	—	1	—	—	1	—	—	—	—	11
75–	—	—	—	2	—	—	—	—	—	—	1	2	1	—	—	—	—	—	6
80–	—	—	—	—	—	1	—	—	—	—	—	—	1	—	—	—	—	—	2
85–	—	—	—	1	—	—	—	1	—	—	—	—	1	—	—	—	—	—	3
90–	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1
95–	—	—	—	—	1	—	—	—	—	—	1	—	—	—	—	—	—	—	2
100–	—	—	—	1	1	—	1	—	—	—	—	—	—	—	—	—	—	—	3
105–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
110–	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
115–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
120–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
125–	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1
130–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
135 and upwards	—		1	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	2
Totals . . .	1	1	25	46	24	29	22	18	12	16	48	28	13	17	7	3	3	—	313
Averages for each year	42·5	52·5	50·8	51·2	52·5	51·5	43·0	48·3	53·9	44·7	47·1	44·5	47·9	48·5	38·9	50·8	29·2	—	47·2
And for five and ten yearly periods			51·5				48·1				47·1	45·6		45·7		40·0		—	—

TABLE XIV. CLASS V.—AGE and STRENGTH OF SIGHT (distance at which dots $\frac{1}{5}$-inch square have been distinguished).

Feet	17 yrs	18–	19–	20–	21–	22–	23–	24–	25–	30–	35–	40–	45–	50–	55–	60–	Total
0–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10–	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	—	2
15–	—	—	—	—	—	—	—	—	1	—	1	—	—	1	—	—	3
20–	—	—	—	—	—	—	—	—	—	1	1	—	—	—	1	—	3
25–	—	—	—	—	—	—	1	—	—	—	—	—	3	—	—	2	6
30–	—	—	—	—	—	—	—	—	1	—	1	1	—	—	—	1	4
35–	—	—	—	—	—	—	1	1	1	—	1	—	—	—	1	—	5
40–	1	1	—	—	1	1	—	—	4	1	—	—	—	—	—	1	10
45–	2	—	—	1	—	1	1	—	3	1	—	1	—	1	—	1	12
50–	1	—	—	1	4	1	1	1	2	1	1	—	2	—	—	—	15
55–	—	1	1	6	4	11	3	3	13	2	3	1	2	1	—	—	51
60–	—	4	1	3	1	—	—	1	8	3	4	2	1	—	—	—	28
65–	—	—	2	1	—	—	—	1	4	2	—	—	—	—	—	—	10
70–	—	—	2	—	—	1	1	—	1	1	—	—	—	—	—	—	6
75–	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1
80–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
85–	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
90–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
95–	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
100 and upwards	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Totals	4	8	6	12	11	15	8	7	39	12	13	5	8	3	2	5	158
Averages for each year .	47·5	67·5	66·3	58·3	56·6	56·5	51·3	56·1	52·8	56·3	46·0	52·5	45·6	40·8	30·0	35·5	—
And for five and ten yearly periods	62·7			56·1					52·8	50·9		48·3		36·4		35·5	—

recruits only were concerned, viz., the distance at which dots of the same size appear separate to the eye, and can be counted, varies with the space between them. Four rows of dots of $\frac{1}{5}$-inch square were placed on a card; those of the first row were separated from each other by spaces of the same size left blank; in the second row each dot was separated from those in its vicinity by $\frac{2}{5}$ of an inch; in the third row the distance of each dot from any other was $\frac{3}{5}$ of an inch, and in the fourth row $\frac{4}{5}$ of an inch; and a single dot was placed on one side 1·5 inch from the nearest one in the rows. These were exposed in the open air, on a bright day, in a situation affording a clear range of about 90 feet; at that distance from the card the single dot was quite perceptible, and those in the first, second, and third rows had the appearance of continued lines. On approaching the card the dots in the fourth row could be counted at 82 feet, those in the third at 74, in the second at 58, and in the first only at 36 feet. The ordinary cards of dots, therefore, on which these are separated by spaces varying from one to a little over two diameters can only give a comparative test of the acuteness of vision among those examined, and not an absolute one such as a card with intervals of not less than five times the diameter of the dots between every two of them would afford. Dots so arranged could not be grouped readily, but they could be shown in varying numbers to the person under trial, and his replies would indicate whether he were able to distinguish them.

Mr. Roberts's *Report on the Observations on Eyesight and Colour-blindness made at Marlborough College by the* Rev. T. A. Preston.

The difficulty experienced by many observers of obtaining sufficient space and light for testing the eyesight by the test-dots (which are distinguishable to the normal eye in good daylight at a distance of 19 yards) has induced the Committee to use Snellen's test-types, No. 1 and No. 10, as more convenient and trustworthy. No. 1 is a small type visible to the normal eye at the ordinary reading distance of from 12 to 20 inches, and No. 10 is a large thick type $\frac{1}{5}$th of an inch square, distinguishable by the normal eye at a distance of 10 feet.

The Rev. T. A. Preston, one of the masters at Marlborough College, has examined the eyesight and colour-sense of the whole of the boys and some of the masters at present in the College, and the following is an analysis of his returns. The observations include the age, the colour of the iris, the eyesight as tested by No. 1 and No. 10, and the letters composed of horizontal and vertical lines for astigmatism; and the colour-sense as tested by the methods of Dr. Daae and Professor Holmgren (and in a few instances by the solar spectrum), according to the book of tests which I have prepared for the use of the Committee ('The Detection of Colour-blindness and Imperfect Eyesight': Bogue).

Age.—The ages of the boys range from 11 to 19 years, and those of the masters from 20 to 50 years, five of the latter being over 40 years.

Colour of Eyes.—The following Table shows the colour of the eyes

of the boys and masters under 40 years of age, divided into two groups—those who are under and those who are above the age of 15 years.

Colour of Eyes	Under 15			Over 15			Total		
	No.	Per cent.		No.	Per cent.		No.	Per cent.	
Dark blue	2	·9	65·2	7	1·9	64·5	9	1·5	64·7
Blue	62	28·1		98	27·9		160	27·8	
Light blue	32	14·5		51	14·4		83	14·4	
Grey	48	21·7		72	20·3		120	21·0	
Brown grey (green)	23	10·4	34·8	36	10·1	35·5	59	10·3	35·3
Light brown (hazel)	52	23·5		83	23·4		135	23·5	
Dark brown	2	·9		7	2·0		9	1·5	

From the similarity of the percentages of the two periods it would appear that little change takes place in the colour of the iris after the age of 15 years, as the dark eyes are barely one per cent. greater in the later than the earlier period. The proportion of fair to dark eyes is 64·7 to 35·3, or about two fair to one of dark complexion.

Colour-blindness.—Of the 600 boys and masters, 15, or 2·5 per cent. were found to be colour-blind, a proportion which has been found to exist elsewhere in the same class of boys, and about half that which exists in the uneducated classes. The following table shows the nature of the chromatic defect, and the condition of the eyesight and the colour of the hair and iris.

No.	Age	Colour of Hair	Colour of Eyes	Colour-blindness	Test-type No. 1	Test-type No. 10	Astigmatism.
					in.	ft.	
1	12–8	Golden (fair red)	Dark grey	Red-blind	16	11	Horizontal
2	12–4	Dark brown	Light blue	Red-blind	13	7	Vertical
3	14–1	Dark brown	Blue	Red-blind	18	4	
4	15–4	Red	Grey	Red-blind	18	8	Horizontal
5	16	Black	Dark brown	Red-blind	16	3½	Horizontal
6	17	Dark golden (red)	Dark blue	Red-blind	17	10	Horizontal
7	17–3	Dark brown	Blue	Red-blind	21	13	Vertical
8	14–2	Dark brown	Light brown	Green-blind	15	7	Horizontal
9	14–3	Red	Blue	Green-blind	29	15	
10	14–11	Red	Grey	Green-blind	20	9	Vertical
11	16–2	Dark brown	Light blue	Green-blind	19	12	
12	17–0	Black	Light brown	Violet-blind	22	12	
13	13	Light brown	Blue	Imperfect	16	6	
14	17–4	Brown	Grey	Imperfect	18	7	
15	28	Dark brown	Light brown	Imperfect	28	13	Horizontal

Having observed in my private examinations that colour-blindness was very frequent in persons with red hair, Mr. Preston has furnished me with the colour of the hair in his cases. The Table of the relative prevalence of different coloured hair published in the Anthropometric Committee's Report for 1880 shows that red hair prevails in the professional classes (in which are included the Marlborough boys) to the extent of 9·06 per cent., while in conjunction with complete colour-blindness in the above Table it exists to the extent of 41·7 per cent. Light-coloured eyes are slightly in excess, and imperfect eyesight is more prevalent among the

colour-blind, but the number of observations are too few to form any safe conclusion on these heads.

EYESIGHT.—The following Tables show the quality of the eyesight as tested by Snellen's test-types.

NEAR VISION.—The Distance at which Test-type No. 1 can be read.[1]

Distance in inches	Marlborough Boys — Age last Birthday									Masters — Age		Total	Per cent.	
	11	12	13	14	15	16	17	18	19	20–40	40–50			
0	—	—	—	—	—	—	—	—	—	—	1	1	·2	
4	—	—	—	—	1	1	—	—	—	—	—	2	·3	
6	—	—	—	1	1	2	—	1	1	—	1	7	1·1	8·9
8	—	—	—	1	1	2	2	—	—	—	—	6	1·0	
10	—	2	1	4	2	1	3	—	—	—	—	13	2·2	
12	1	1	3	4	5	6	2	—	—	2	1	25	4·1	
14	1	6	5	6	9	5	1	1	—	—	—	34	5·7	
16	3	4	13	14	17	11	6	2	—	1	—	71	11·8	51·7
18	2	4	14	17	24	12	7	1	—	3	—	84	14·0	
20	2	6	15	27	30	21	14	2	1	2	1	121	20·2	
22	1	2	12	19	21	16	9	4	2	—	1	87	14·5	
24	1	—	3	13	14	22	11	5	—	1	—	70	11·7	
26	—	—	1	6	11	8	3	4	1	4	—	38	6·3	
28	—	—	2	3	3	8	4	1	—	3	—	24	4·0	39·4
30	—	—	—	1	2	4	1	2	—	2	—	12	2·0	
32	—	—	—	—	1	2	—	—	—	—	—	3	·5	
34	—	—	—	1	—	—	—	—	—	—	—	1	·2	
36	—	—	—	—	—	—	1	—	—	—	—	1	·2	
Total	11	25	69	117	142	121	64	23	5	18	5	600	10 0·	
Average	18·4	16·4	18·3	19·0	19·1	20·1	20·0	21·8	19·0	—	—	—	—	
	17·7			19·4			20·2			22·1	11·4	—	—	

[1] Specimen of Test-type No. 1.—(12 inches.)

437, 35, 66, 680, 956, 8634, 473, 533, 3536, 4303. During the minority of Queen Mary, the Palace of Holyrood was burnt, as well as the city, by the English forces under the Earl of Hertford; soon after, it was repaired and enlarged beyond its present size. At that time it is said to have consisted of no fewer than five courts, the most westerly of which was the largest. Great part of the Palace of Holyrood House was burnt by the soldiers of Cromwell; but, at the Restoration, it was

DISTANT VISION.—The Distance at which Test-type No. 10 can be read.[1]

Distance in feet	Marlborough Boys — Age last Birthday									Masters — Age		Total	Per cent.	
	11	12	13	14	15	16	17	18	19	20–40	40–50			
½	—	—	—	—	—	2	—	1	1	—	1	5	·8	
1	—	—	—	4	6	6	5	—	—	2	—	23	3·8	
2	—	—	2	3	5	8	1	2	—	1	—	22	3·7	
3	—	—	—	—	2	5	3	—	1	1	1	13	2·0	
4	—	—	—	1	3	4	1	—	—	—	—	9	1·5	30·5
5	—	—	2	4	4	2	3	2	—	—	—	17	3·0	
6	1	1	3	4	3	2	—	—	—	1	—	15	2·5	
7	1	5	6	5	5	6	3	—	—	—	1	32	5·2	
8	—	3	9	9	10	10	3	3	—	—	—	47	8·0	
9	2	4	9	15	17	8	5	—	—	1	1	62	10·3	
10	2	2	14	17	28	16	14	2	—	—	—	95	15·8	39·4
11	2	7	10	17	17	12	9	4	—	2	—	80	13·3	
12	3	3	6	15	16	13	3	1	3	4	1	68	11·3	
13	—	—	5	8	14	9	4	2	—	2	—	44	7·3	
14	—	—	2	10	4	8	4	—	—	—	—	28	4·7	
15	—	—	1	2	4	6	4	4	—	—	—	21	3·5	
16	—	—	—	1	3	2	1	1	—	1	—	9	1·5	30·1
17	—	—	—	1	—	1	1	—	—	1	—	4	·7	
18	—	—	—	—	1	1	—	1	—	1	—	4	·7	
20	—	—	—	—	—	—	—	—	—	1	—	1	·2	
22	—	—	—	1	—	—	—	—	—	—	—	1	·2	
Total	11	25	69	117	142	121	64	23	5	18	5	600	100·	
Average	10·0	9·4	9·5	10·0	9·6	9·1	9·4	10·2	8·0	—	—	—	—	
	9·6			9·6			9·2			10·5	6·5	—	—	

[1] Specimen of Test-type No. 10.—(10 feet.)

V Z B D F H K

Judging by the averages it would seem that the near sight (as tested by No. 1) improves from year to year up to 40, but this apparent improvement is probably due to the greater ease with which the type is read by the elder pupils and masters. From the great distances at which the No. 1 type has been read, it is probable that considerable efforts have been made to distinguish it at the greatest possible distance rather than at the distance at which it could be read with ease and fluency. The curve formed by the whole number of observations at all ages is remarkably uniform, the 'mean' being at 20 inches, and the corresponding groups above and below the mean being nearly identical in value. Normal near vision exists in 51·7 per cent., while 39·4 are above, and 8·9 per cent. below the average.

The averages do not show any change in the distant vision (as tested by No. 10) up to the age of 40 years, a result which contrasts favourably with similar observations made in German schools and universities, where short-sight has been found to increase rapidly with the extended period of education. The curve formed by the total number of observations is, however, irregular, and consists of two curves having a chief mean at

10–11 feet, and a minor one at 2–3 feet. This latter curve is due to the accession after the age of 13 years of an abnormal amount of imperfect eyesight (short-sight and over-sight) which is too slight relatively to the total number of observations to influence the averages. 39·4 per cent. possess normal distant vision, while 30·1 per cent. are above, and 30·5 per cent. below the average.

Astigmatism.—Tested by means of the letters composed of horizontal and vertical lines, 68·2 per cent. of the Marlborough boys and masters are returned as more or less astigmatic, or in the proportion of nearly two to one; the ratio of the horizontal to the vertical defect being 1 to 1·2. Mr. Preston is not quite satisfied with the result of his observations on this subject, as he had no means of checking the statements of the boys.

Ignorance of the Names of Colours.—In a recent report on the examination of 27,927 school-children for colour-blindness by Dr. Joy Jeffries, in America, the following remark on this subject occurs: 'Experience has abundantly shown me that but very few *boys* of the grammar or higher schools are familiar with colour-names of even the primary colours, and that still less can they correctly apply those names they do remember when shown coloured objects. Although prepared for this ignorance on the part of the boys to a certain extent, I confess I was astonished to find it so frequent and great. It seems almost impossible that a bright boy of fourteen, not colour-blind, should not know the word *green* or be able to apply it. Yet this does not give an extreme idea of the truth in reference to the ignorance of colour-names and their application among school-boys.' Being desirous to know if our English public school-boys are as ignorant of colour-names and their application as the boys of the same class in America, I submitted the above sentence to Mr. Preston, and the following is his reply: 'I cannot agree with Dr. Jeffries as to ignorance of colour-names. By this I mean reds, greens, &c. Of course *mauve*, *magenta*, &c., and what are called drapers' colours are not often known, but I have certainly had no difficulty in getting the names of the common colours. In fact it was quite the exception to meet with a boy who could not tell the names fairly well. The whole of the boys who proved to be colour-blind, except one, knew of their defect, and another boy was under the impression that he was colour-blind, but turned out on examination not to be so.'

Report of the Committee, consisting of Professor Leone Levi, Mr. Stephen Bourne, Mr. Brittain, Dr. Hancock, Professor Jevons, *and* Mr. F. P. Fellows, *appointed for the purpose of inquiring into and reporting on the present Appropriation of Wages, and other sources of income, and considering how far it is consonant with the economic progress of the people of the United Kingdom. Drawn up by* Professor Leone Levi.

If it were possible to ascertain, with any approach to accuracy, the present appropriation of wages and other sources of income of the people of the United Kingdom, it would certainly be of the greatest utility, as it would afford a valuable aid in the consideration of some of those great problems which meet us on every side in our social economy. There are, in truth,