

## THE PHYSIQUE OF GLASGOW SCHOOL CHILDREN (1921–22).

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IN a study of the influence of environmental and other conditions on the growth and nutrition of the children of the poorer classes in the city of Glasgow, it seemed desirable to determine how far a homogeneous stock was being dealt with since there was some danger that racial variations might modify the results of the investigation.

For this purpose three typical schools attended by the class of children included in the above-mentioned investigation were selected and observations made upon colour of hair and eyes, weight, height and stem height.

The opportunity was taken of studying (1) the physique of these children as determined by weight, height and stem height, (2) how far recent illness tends to modify weight and height, and (3) how far the estimate of the condition of a child from its general appearance corresponds with the evidence afforded by weight and height.

Our purpose was not to re-investigate the relationship between social class and growth and nutrition, a matter which has already been very fully studied in this country and especially in Glasgow in the Public Schools, 1905–6, data from which have been analysed by Miss Elderton.

### *Method of Investigation.*

The method adopted was as follows:

Three investigators were employed and the work was allotted thus:

No. 1 weighed and measured the children.

No. 2 examined the colour of hair and eyes. It may be stated that the same individual carried out this part of the work in all the schools.

No. 3 obtained information relating to illness and classified the children according to their general appearance. This also was done by the same person in all the schools.

The information obtained was recorded on special cards drawn up as shown.

Further details as to method of weighing and classification are given later on in this report. Similar information in regard to the classification for colour of hair and eyes is given by Dr McKinlay in his paper on this subject (p. 176).

Our special thanks are due to Mr Clark of the Glasgow Education Authority who gave the most valuable help in selecting schools and in arranging for the

prosecution of the investigation, and to the Headmasters and Staffs of the Schools who gave every possible assistance in the carrying out of the work.

No compulsion was used in inducing the children to submit themselves to the examinations.

Name .....No.....  
 Age.....Sex.....  
 Weight.....lbs. Height.....ins. Stem length.....ins.  
 .....  
 Colour—Hair.....Eyes.....  
 Head Form—Length.....Breadth.....  
 General Appearance.....  
 Recent Illness.....  
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M.R.C. CHILD LIFE (University of Glasgow).

The investigation was done under the Child Life Committee of the Medical Research Council at the instigation of Prof. Noël Paton. My grateful thanks are due to him for his assistance in preparing this paper.

The investigation was carried out during the closing month of 1921 and the opening months of 1922.

The schools, here designated A, B, C, are situated in three separate areas of the city, and although not originally selected for this reason are attended to some extent by the children of three different grades of workers.

School A is situated in an area in which there are few big factories or works, the district being mainly composed of tenement houses and this school is attended chiefly by children of boarding-house keepers, tradesmen and theatrical artistes, etc., with a sprinkling of a much poorer element coming from sunk basements in the neighbourhood. Both in clothes and in general health these children are superior to those in schools B and C.

School B is situated in a good working-class area, near shipyards and is attended by children of skilled engineers and other ship-yard workers and also of dockers and other unskilled workers of a distinctly poorer class.

School C is situated in a very poor locality. The housing in this district is extremely bad and the whole area is so built up that there are very few open spaces. The school is attended mainly by children of dockers and unskilled labourers—a large proportion being of Irish extraction.

The children were weighed and measured; their stem height was taken in the usual manner; a note was made of the general appearance of each child, whether healthy, fairly healthy, or not healthy, as also a record made of any illness during the past year.

The usual method of weighing and measuring in ordinary indoor garments

188 *Physique of Glasgow School Children (1921-22)*

and without boots was adopted. In working out, the weights were taken to the nearest half pound and the heights to the nearest quarter inch.

Over 4000 children were examined, ranging in age from 4 to 14 years.

The ages are taken to the age last birthday so that the average age of each group is half a year more than the group figure, *i.e.* group 7 includes everything from 7-8 years and the mean age of the group is 7.5 years.

In the case of the children of 4 and 14 years the numbers were too small to be of value in this investigation and they were accordingly rejected.

*Number of children. 5-13 years.*

Number of boys, School A	366	Number of girls, School A	357
"    "    B	532	"    "    B	605
"    "    C	1014	"    "    C	1121
"    "    A, B, C	1912	"    "    A, B, C	2083

RESULTS.

*General Physique.*

Tables I and II give the arithmetical average weight, height and stem height of boys and girls at each age in each of the three schools. Table III gives the average weight and height at each age over the three schools combined.

The stem height is given along with the total height (Table II).

Table IV shows the percentage relation of stem height to full height at each age for the three schools combined. As is already known, this percentage falls steadily as age advances.

The figures in brackets in all tables indicate the number of children weighed and measured at each age.

Table I.  
*Average weight in lbs.—Individual Schools.*

(a) <i>Boys.</i>			
Age	A	B	C
5	40.70 (32)	41.25 (36)	38.45 (54)
6	44.33 (35)	44.36 (65)	43.67 (82)
7	48.07 (38)	46.97 (65)	47.56 (133)
8	52.30 (43)	51.97 (73)	49.66 (121)
9	55.62 (29)	56.57 (72)	54.76 (140)
10	64.11 (36)	58.52 (81)	61.00 (126)
11	67.84 (58)	63.87 (61)	64.27 (123)
12	73.13 (43)	65.58 (38)	67.79 (125)
13	80.47 (52)	68.13 (41)	74.60 (110)
(b) <i>Girls.</i>			
5	39.18 (30)	40.10 (46)	37.04 (80)
6	42.77 (38)	43.29 (88)	41.31 (106)
7	46.38 (32)	45.84 (70)	44.30 (147)
8	50.11 (42)	50.72 (81)	48.48 (140)
9	55.02 (43)	55.93 (83)	52.44 (154)
10	59.81 (40)	57.64 (75)	56.42 (130)
11	64.10 (41)	60.25 (75)	60.71 (125)
12	74.04 (37)	66.40 (63)	68.64 (127)
13	82.86 (54)	71.33 (24)	78.90 (112)

Table II.

*Average height and stem height in ins.—Individual schools.*

(a) *Boys.*

Age	A			B			C		
	Total height	Stem height	*	Total height	Stem height	*	Total height	Stem height	*
5	41.99	23.33	(32)	40.78	22.95	(36)	40.32	22.28	(54)
6	44.06	23.81	(35)	42.75	23.42	(65)	42.39	23.31	(82)
7	46.03	24.64	(38)	44.48	24.58	(65)	44.34	24.02	(133)
8	47.85	25.32	(43)	46.67	25.59	(73)	45.38	24.33	(121)
9	48.89	25.80	(29)	48.20	26.19	(72)	47.08	25.03	(140)
10	51.77	26.72	(36)	49.77	26.59	(81)	49.53	25.85	(126)
11	52.84	27.24	(58)	51.80	27.76	(61)	50.89	26.42	(123)
12	54.53	28.16	(43)	52.65	27.73	(38)	52.11	26.68	(125)
13	56.88	29.37	(52)	53.93	28.21	(41)	53.94	27.64	(110)

(b) *Girls.*

5	41.48	23.17	(30)	40.50	23.10	(46)	39.89	22.01	(80)
6	43.16	23.47	(38)	42.04	23.66	(88)	41.11	23.01	(106)
7	45.97	24.23	(32)	44.08	24.08	(70)	43.30	23.62	(147)
8	47.01	24.98	(42)	46.28	25.23	(81)	45.53	23.95	(140)
9	49.45	25.53	(43)	48.51	25.90	(83)	47.14	24.96	(154)
10	50.95	26.21	(40)	50.01	26.72	(75)	48.93	25.53	(130)
11	52.29	27.10	(41)	51.59	27.48	(75)	50.53	26.25	(125)
12	55.27	28.52	(37)	53.93	28.46	(63)	52.98	27.32	(127)
13	57.78	30.29	(54)	54.74	28.99	(24)	55.23	28.35	(112)

\* Indicates number of children whose stem height is stated. Rachitic children discounted in stem height (Table II, (a) and (b)).

Table III.

*Average weight in lbs. and height in ins.—Three schools combined.*

(a) *Boys.*

Age	Weight	No. of observations	Height	No. of observations
5	39.9	(122)	40.9	(122)
6	44.0	(182)	42.8	(182)
7	47.5	(236)	44.7	(236)
8	50.9	(237)	46.2	(237)
9	55.4	(241)	47.6	(241)
10	60.6	(243)	49.9	(243)
11	65.0	(242)	51.6	(242)
12	68.5	(206)	52.7	(206)
13	74.8	(203)	54.7	(203)

Total number of boys = 1912.

(b) *Girls.*

5	38.4	(156)	40.4	(156)
6	42.1	(232)	42.0	(232)
7	45.0	(249)	43.9	(249)
8	49.4	(263)	46.0	(263)
9	53.9	(280)	47.9	(280)
10	57.4	(245)	49.6	(245)
11	61.2	(241)	51.2	(241)
12	68.9	(227)	53.6	(227)
13	79.1	(190)	55.9	(190)

Total number of girls = 2083.

Table IV.

*Average stem height.—Three schools combined and per cent. relation stem height to full height\*.*

Age	Boys		Girls	
	Stem height in ins.	% Relation stem height to full height	Stem height in ins.	% Relation stem height to full height
5	22.76	55.49	22.56	55.54
6	23.45	54.60	23.34	55.53
7	24.23	54.05	23.83	53.90
8	24.92	53.52	24.52	53.19
9	25.49	53.24	25.33	52.77
10	26.23	52.50	26.00	52.37
11	26.96	52.22	26.78	52.35
12	27.18	51.53	27.83	51.84
13	28.21	51.15	28.98	51.56

Total number of boys = 1841. Total number of girls = 2035.

\* Not including rachitic children.

These tables show (1) that the height of the children corresponds with the economic position of the parents; (2) that in weight there is not the same clear distinction, (3) that it is after about nine years of age that the weight of the children in the better class school (A) is generally most markedly superior to that in the other two (B and C), and (4) that in boys after nine and in girls after eleven the children attending school C tend to increase in weight more than those in school B.

Table V.

*Average weight in lbs.—Comparison.*

(a) *Boys.*

Age	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Present investigation	British Association <i>All classes</i>	British Association Artisan class	Glasgow Kay	Glasgow Mackenzie	English children A. Greenwood	Dundee
5	39.87	39.9	40.9	—	38.6	38.7	37.50
6	44.04	44.4	44.6	39.19	41.8	42.2	41.75
7	47.48	49.7	50.7	46.27	45.3	46.4	45.50
8	50.85	54.9	54.3	49.06	49.3	52.0	49.50
9	55.40	60.4	58.3	51.91	53.6	55.9	57.50
10	60.63	67.5	64.0	57.41	58.3	60.4	59.87
11	65.03	72.6	69.0	60.74	63.1	66.4	62.75
12	68.50	76.7	73.0	65.33	68.1	72.7	68.62
13	74.80	82.6	79.0	74.41	73.5	77.4	74.25
No. examined	1912	10200	3070	351	34922	363928	505

(b) *Girls.*

5	38.35	39.2	40.3	—	37.8	37.7	37.00
6	42.05	41.7	43.1	37.84	40.6	41.2	41.00
7	45.00	47.5	46.2	43.72	43.9	44.9	45.62
8	49.43	52.1	51.8	45.66	47.5	49.6	47.25
9	53.87	55.5	55.2	51.86	51.9	54.1	55.50
10	57.35	62.0	60.5	54.87	56.1	58.7	58.25
11	61.17	68.1	66.8	62.28	61.1	65.5	64.50
12	68.90	76.4	74.9	65.55	67.2	73.9	67.50
13	79.07	87.2	84.9	75.78	75.1	80.4	75.00
No. examined	2083	2930	1523	356	34130	347125	517

Cols. (1), (2), (3), (6) and (7) weighed with indoor clothing. Col. (4) weighed without clothing. Col. (5) weighed with clothing.

Tables V and VI compare the weight and height of the children in the present investigation with the statistics for weight and height given by the British Association—Anthropometric Committee, 1883, all classes and artisan class, with Dr Kay’s Tables of Height and Weight, etc. of Glasgow School Children, 1904, with “The Report on the Physical Conditions of Children attending the Public Schools of the School-Board of Glasgow” (Mackenzie), 1905–1907, with Mr Arthur Greenwood’s Report on English School Children 1908–11; and with the Report of Dundee Social Union (1904–5).

Table VI.

*Average height in inches\*.—Comparison.*

(a) Boys.

Age	Present investigation	British Association <i>All classes</i>	British Association Artisan class	Glasgow Kay	Glasgow Mackenzie	English children A. Greenwood	Dundee
5	40·90	41·03	39·72	—	40·0	40·7	39·37
6	42·84	44·00	41·90	41·63	41·9	42·8	41·78
7	44·65	45·97	44·60	45·40	43·7	45·0	44·19
8	46·22	47·05	46·46	47·27	45·8	47·4	46·06
9	47·63	49·70	48·88	49·34	47·7	49·2	48·82
10	49·94	51·84	50·72	50·59	49·6	50·8	49·90
11	51·58	53·50	52·68	52·15	51·3	53·0	51·38
12	52·72	54·99	53·72	53·27	53·0	54·9	52·90
13	54·70	56·91	55·81	55·67	54·6	56·1	54·53
No. examined	1912	12617	7863	351	34922	367043	508

(b) Girls.

5	40·38	40·55	39·77	—	39·9	40·4	39·58
6	41·95	42·88	41·84	41·97	41·6	42·5	41·34
7	43·86	44·45	43·56	44·78	43·4	44·8	44·19
8	46·00	46·60	45·55	46·64	45·2	46·9	45·47
9	47·90	48·73	47·36	48·56	47·2	48·7	48·23
10	49·59	51·05	48·96	49·52	49·0	50·6	49·41
11	51·16	53·10	51·54	51·80	50·8	53·0	52·56
12	53·62	55·66	53·98	54·11	52·9	55·5	53·25
13	55·89	57·77	56·22	55·86	55·1	56·8	55·32
No. examined	2083	2802	1544	356	34130	352952	515

\* All measurements are without boots.

The ratio  $\frac{\text{weight in lbs.}}{\text{height in inches}}$  was calculated but it is at best an unreliable index of nutrition since a child backward in growth and under-nourished may yield the same quotient as one of normal stature and nutrition.

The only reliable method of using this index is to determine its standard for the normal child of each age and to compare the quotient in the case of each child with the standard quotient for its age.

Till we have more definite knowledge of what is to be considered the “normal” height and weight for each age this procedure is impossible.

1. *Children with Rachitic Deformities.*

Among the children studied a certain number showed marked rachitic deformities, curving of the leg bones, cranial bossing and pigeon chests.

192 *Physique of Glasgow School Children (1921-22)*

There were 71 boys and 48 girls distributed among the schools as follows:

	Boys		Girls	
	Total	Per cent.	Total	Per cent.
School A	2	0.55	0	0
„ B	13	2.44	16	2.64
„ C	56	5.52	32	2.85

The following Table (VII), shows the average weight, height and stem of the rachitic boys and girls at each age in the three schools combined.

Table VII.  
*Rachitic children.—Three schools combined.*

Age	Boys				Girls			
	Weight	Height	Stem height	No. of observations	Weight	Height	Stem height	No. of observations
5	35.00	37.25	21.69	(4)	35.06	36.44	21.57	(9)
6	41.40	40.85	22.80	(10)	40.33	40.42	23.04	(12)
7	44.15	41.56	23.40	(13)	41.90	39.85	23.33	(10)
8	45.11	42.11	23.94	(18)	44.00	41.58	24.00	(6)
9	48.07	43.68	24.63	(14)	46.67	43.33	23.08	(6)
10	57.75	49.00	25.75	(4)	43.50	42.88	23.38	(2)
11	60.50	46.63	25.38	(2)	78.50	51.50	28.50	(1)
12	61.50	46.50	25.50	(1)	52.00	47.50	26.25	(1)
13	60.20	47.70	26.45	(5)	85.50	53.25	30.50	(1)

Total number of boys = 71. Total number of girls = 48.

The deficiency in weight in these children who have suffered from rickets is large. The apparent exceptions in girls of 11 and 13, are not significant as there was only one individual in each group.

The comparatively small proportion of children with rachitic deformities is interesting in face of the very great prevalence of the disease in an acute form in children of the same community at an early age. It indicates either the high mortality among infants who develop the condition or the extent to which recovery from the disease takes place.

The proportion of stem height to total height is much greater in these rachitic cases as is shown by the following table (VIII).

Table VIII.  
*Stem height to total height.—Per cent.*

Age	Boys		Girls	
	Non-rachitic	Rachitic	Non-rachitic	Rachitic
5	55.5	58.2	55.5	59.2
6	54.6	55.8	55.5	57.0
7	54.1	56.3	53.9	58.5
8	53.5	56.9	53.2	57.7
9	53.2	56.4	52.8	53.3
10	52.5	52.6	52.4	54.5
11	52.2	54.4	52.4	55.3
12	51.5	54.8	51.8	55.3
13	51.2	55.5	51.6	57.3

The age at which there is the largest number of rachitic children, viz. boys 11, was selected and the following correlations worked out on the rachitic and non-rachitic children.

Table IX.

Correlation	Non-rachitic (219)	Rachitic (18)
Weight to height	+·695±·024	+·712±·078
Weight to stem height	+·592±·030	+·801±·057
Height to stem height	+·583±·030	+·759±·067

Thanks are due to Dr McKinlay for working out the correlations on the non-rachitic children.

2. *Effect of recent illness.*

To ascertain whether recent illness tended to affect weight and height information was sought regarding any illness during the past year sufficiently serious to prevent attendance at school.

In Tables X and XI the children who had been ill during the year are tabulated with those who had had no illness. It will be seen from these tables that the results of this combination show no significant difference; at one age children who have been ill being taller and heavier than those who have not been ill and at the following age *vice versa*.

Many of the "illnesses" were of a very minor nature and judging by outward appearances some of the children who had been ill looked more robust than those who had not been off school. Recent illness except in those

Table X.

*Illness and no illness. Weight in lbs.*

Age	A		B		C	
	(a)*	(b)†	(a)	(b)	(a)	(b)
5	39·3 (18)	42·6 (14)	44·8 (3)	40·9 (33)	38·0 (12)	38·6 (42)
6	44·2 (11)	44·4 (24)	44·7 (26)	44·2 (39)	44·3 (29)	43·3 (53)
7	48·4 (11)	47·9 (27)	47·9 (25)	46·4 (40)	47·8 (42)	47·5 (91)
8	52·9 (10)	52·1 (33)	53·3 (25)	51·2 (48)	50·3 (37)	49·4 (84)
9	58·2 (9)	54·5 (20)	56·9 (28)	56·4 (44)	55·1 (44)	54·6 (96)
10	65·8 (15)	63·0 (21)	57·8 (29)	59·0 (52)	61·2 (40)	60·9 (86)
11	66·9 (22)	68·4 (36)	64·2 (24)	63·7 (37)	65·6 (35)	63·8 (88)
12	71·6 (11)	72·7 (32)	66·3 (16)	65·6 (22)	66·5 (42)	68·5 (83)
13	78·3 (19)	81·7 (33)	68·6 (17)	67·8 (24)	72·2 (32)	75·6 (78)
Number	126	240	193	339	313	701

  

<i>Girls.</i>						
Age	(a)*	(b)†	(a)	(b)	(a)	(b)
5	38·4 (7)	39·4 (23)	41·0 (15)	39·7 (31)	36·6 (12)	37·1 (68)
6	43·3 (11)	42·6 (27)	42·6 (39)	43·8 (49)	41·0 (45)	40·5 (61)
7	45·9 (8)	46·5 (24)	45·4 (28)	46·1 (42)	44·4 (52)	44·3 (95)
8	49·1 (16)	50·7 (26)	50·5 (37)	50·9 (44)	48·8 (49)	48·3 (91)
9	57·0 (17)	53·7 (26)	54·6 (44)	57·4 (39)	52·4 (53)	52·4(101)
10	62·2 (12)	58·8 (28)	57·3 (31)	57·9 (44)	56·4 (47)	56·4 (83)
11	64·4 (12)	64·2 (29)	59·7 (23)	60·5 (52)	59·3 (41)	61·5 (84)
12	76·8 (11)	74·1 (26)	65·4 (26)	67·1 (37)	68·2 (39)	68·8 (88)
13	82·7 (22)	83·0 (32)	70·2 (13)	72·7 (11)	77·6 (40)	79·6 (72)
Number	116	241	256	349	378	743

\* (a) = Been ill.

† (b) = No illness.



cases where there were complications did not seem materially to affect the physique of the child. It may even be that illness, if not too severe, entailing rest and special care at home, may in some cases be beneficial to the health of the child.

Table XI.  
*Illness and no illness. Height in inches.*

Age	Boys.					
	A		B		C	
	(a)*	(b)†	(a)*	(b)†	(a)*	(b)†
5	41.2 (18)	43.0 (14)	42.5 (3)	40.6 (33)	41.2 (12)	40.1 (42)
6	43.3 (11)	44.4 (24)	43.0 (26)	42.6 (39)	43.0 (29)	42.3 (53)
7	46.1 (11)	46.0 (27)	45.3 (25)	44.0 (40)	44.7 (42)	44.3 (91)
8	48.4 (10)	47.7 (33)	47.0 (25)	46.5 (48)	45.8 (37)	45.3 (84)
9	49.4 (9)	48.6 (20)	48.5 (28)	48.0 (44)	47.1 (44)	47.1 (96)
10	52.5 (15)	51.2 (21)	50.0 (29)	49.7 (52)	49.8 (40)	49.5 (86)
11	53.0 (22)	52.8 (36)	54.7 (24)	51.3 (37)	51.4 (35)	50.7 (88)
12	54.2 (11)	54.7 (32)	52.9 (16)	52.5 (22)	51.7 (42)	52.2 (83)
13	56.6 (19)	57.1 (33)	54.5 (17)	53.5 (24)	53.6 (32)	54.1 (78)
Number	126	240	193	339	313	701

  

Girls.						
Age	(a)*	(b)†	(a)*	(b)†	(a)*	(b)†
5	41.5 (7)	41.5 (23)	41.0 (15)	40.2 (31)	41.1 (12)	39.7 (68)
6	41.4 (11)	43.9 (27)	42.1 (39)	42.0 (49)	42.3 (45)	40.8 (61)
7	46.1 (8)	45.9 (24)	44.1 (28)	44.1 (42)	43.7 (52)	43.2 (95)
8	46.6 (16)	47.3 (26)	46.6 (37)	46.0 (44)	45.5 (49)	45.6 (91)
9	50.8 (17)	48.6 (26)	48.3 (44)	48.7 (39)	47.3 (53)	47.1 (101)
10	51.8 (12)	50.6 (28)	49.4 (31)	50.5 (44)	49.2 (47)	48.7 (83)
11	52.7 (12)	52.2 (29)	51.1 (23)	51.8 (52)	50.4 (41)	50.6 (84)
12	55.2 (11)	55.3 (26)	53.4 (26)	54.3 (37)	52.9 (39)	53.0 (88)
13	58.2 (22)	57.5 (32)	53.9 (13)	55.7 (11)	55.0 (40)	55.4 (72)
Number	117	241	256	349	378	743

\* (a) = Been ill.                      † (b) = No illness.

The uniformity in the percentage of those who have been ill and those who have not been ill in the different schools is interesting.

School	Boys		Girls	
	Been ill	No illness	Been ill	No illness
	%	%	%	%
School A	34.4	65.6	32.5	67.5
" B	36.3	63.7	42.3	57.7
" C	30.9	69.1	33.7	66.3

3. *Correlation of classification of children by general appearance and by weighing and measuring.*

In what is known as the Dunfermline system an attempt is made to classify the state of nutrition of children by observation of the general appearance—the condition of skin, muscular tone and development, vigour, facial expression, voice and interest are the chief factors considered in forming this estimate. The children are classified into four groups as:

- (1) Excellent, *i.e.* nutrition of a healthy child of "good social standing."
- (2) Good, *i.e.* nutrition just falls short of this "excellent" standard (1).

(3) Requiring Supervision, *i.e.* nutrition on the border-line of serious impairment.

(4) Requiring medical treatment, *i.e.* nutrition seriously impaired.

The percentage number of children in each group is thus calculated.

An adaptation of this method, as described in the following paragraph, was used by us.

Before the weight and height of each child were known, its general appearance was examined by an experienced observer and recorded on the card as

- (a) Markedly healthy.
- (b) Fairly healthy.
- (c) Not healthy.

In thus classifying the children attention was paid to (a) colour of skin, (b) general vivacity and behaviour of child when not conscious of observation, and (c) the general build of the child. With regard to classification according to build, it was found that many children were naturally slight and wiry. Of this class a particularly noticeable feature in the case of the girls in school A, was that although they were vivacious and had had no illness, they appeared to be below the normal standard both in weight and height.

On the other hand, there were children who seemed to be above the

Table XII.

*Three schools combined. General appearance\*. Weight in lbs.*

(a) Boys.			
Age	(a)	(b)	(c)
5	40.9 (48)	39.9 (29)	37.0 (12)
6	44.4 (72)	43.3 (30)	42.2 (14)
7	48.3 (82)	46.2 (36)	46.3 (40)
8	52.6 (73)	49.1 (44)	48.4 (48)
9	57.4 (74)	53.1 (50)	52.3 (36)
10	62.1 (74)	59.2 (46)	58.5 (39)
11	67.9 (82)	62.4 (39)	60.9 (40)
12	74.0 (64)	64.9 (42)	63.6 (31)
13	80.9 (71)	70.9 (39)	68.6 (25)
(b) Girls.			
5	39.0 (75)	37.8 (30)	35.6 (17)
6	43.1 (86)	40.9 (25)	40.0 (26)
7	45.9 (82)	45.1 (39)	43.4 (40)
8	51.5 (88)	46.6 (42)	45.7 (31)
9	55.7 (95)	53.1 (42)	48.5 (29)
10	59.3 (92)	55.4 (42)	51.9 (21)
11	64.9 (96)	58.1 (45)	55.1 (24)
12	71.4 (96)	67.5 (34)	62.4 (21)
13	84.0 (78)	71.1 (26)	71.4 (11)

(a)=Markedly healthy. (b)=Fairly healthy. (c)=Not healthy.

\* To test the homogeneity of the material, the correlation ratio ( $\eta$ ) of General Appearance upon Age was computed separately for each school, for boys the values were  $0.13 \pm .04$ ,  $0.07 \pm .04$ ,  $0.19 \pm .03$ ; for girls,  $0.20 \pm .04$ ,  $0.13 \pm .04$ ,  $0.18 \pm .02$ . The values were corrected for grouping and the probable errors are those for uncorrelated material. It will be seen that there is no consistent difference.

196 *Physique of Glasgow School Children (1921-22)*

standard in weight and height who had grey pasty complexions and their faces exhibited impetiginous or other superficial suppurative rashes. Such children were seen among the boys in school C and could not under any circumstances be said to be healthy.

In spite of the fact that the former were classed as healthy and the latter as not healthy, there is on the whole, with reference to build, a distinct difference in the various groups into which they were divided.

In the following tables (XII and XIII) the recorded appearance of the children without history of recent illness is compared with the weight and height at each age.

They show clearly that the general appearance of a child gives a fair indication of its growth and nutrition.

Table XIII.

*Three schools combined. General appearance. Height in ins.*

*Boys.*

Age	(a)	(b)	(c)
5	41.2 (48)	40.7 (29)	39.0 (12)
6	43.0 (72)	42.5 (30)	41.5 (14)
7	45.0 (82)	44.1 (36)	43.9 (40)
8	47.2 (73)	45.4 (44)	44.8 (48)
9	48.4 (74)	47.1 (50)	46.3 (36)
10	50.4 (74)	49.4 (46)	48.9 (39)
11	52.2 (82)	50.8 (39)	49.9 (40)
12	54.0 (64)	52.2 (42)	51.5 (31)
13	56.0 (71)	53.6 (39)	52.6 (25)

*Girls.*

5	40.5 (75)	40.0 (30)	38.8 (17)
6	42.7 (86)	41.8 (25)	41.2 (26)
7	44.2 (82)	43.6 (39)	43.5 (40)
8	46.6 (88)	45.5 (42)	44.8 (31)
9	48.3 (95)	47.6 (42)	45.8 (29)
10	50.1 (92)	49.3 (42)	47.8 (21)
11	52.1 (96)	50.6 (45)	49.3 (24)
12	54.4 (96)	53.1 (34)	51.9 (21)
13	56.7 (78)	54.7 (26)	54.2 (11)

(a) = Markedly healthy. (b) = Fairly healthy. (c) = Not healthy.

The proportion of children classified in these three groups in the three schools is of interest, showing on the whole the greater proportion of the "markedly healthy" in school A and the distinctly higher proportion of those with a less healthy appearance in the poorer class school.

Percentage of children classed from their appearance (a) markedly healthy, (b) fairly healthy and (c) not healthy.

	Boys			Girls		
	A	B	C	A	B	C
(a)	60.8	55.8	43.5	63.5	66.5	54.2
(b)	23.8	32.1	27.0	22.8	24.3	24.9
(c)	15.4	12.1	29.5	13.7	9.2	20.9

The following table (XIV) shows the average weights and heights in the three groups for all children between 5 and 13. Here again with the larger number a difference is perceptible in the various groups.

Table XIV.  
*General appearance. Age 5-13.*

	(a)	(b)	(c)
Boys. Weight in lbs.	59.12 (640)	55.15 (355)	54.35 (285)
Girls. „	57.51 (788)	52.89 (325)	48.71 (220)
Boys. Height in ins.	48.81 (640)	47.70 (355)	47.14 (285)
Girls. „	48.57 (788)	47.48 (325)	45.72 (220)

#### CONCLUSIONS.

1. Our results confirm the conclusion of Miss Elderton and show that in 1921-22 the children of what may be called the Artisan Class in Glasgow represented by School A, are, in weight and height, up to the standard of the Anthropometric Committee for the Artisan Class of the country generally.

2. On an average the children of the poorer labouring classes represented by School C are somewhat below this standard especially in height.

3. Children who have suffered from rickets and recovered with deformities are shorter and lighter than those who show no sign of the disease. The small percentage of children with rachitic deformity shows either (1) that the mortality of rachitic children is high, or (2) that the deformities may be largely recovered from.

4. There is no indication that the ordinary ailments of childhood involve any serious retardation of growth and nutrition.

5. The classification of children by their general appearance in the hands of an experienced observer gives a good indication of the state of their growth as indicated by the height and their nutrition as indicated by their weight.

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