

Bowditch, Henry Pickering

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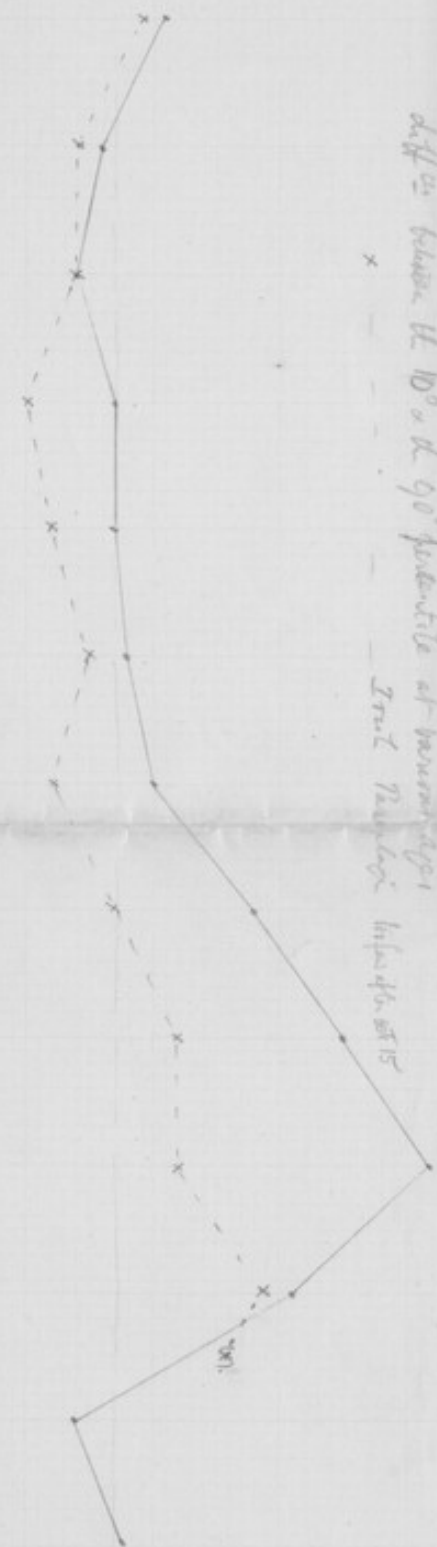
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Height of Bristol Channel
 diff in between the 10° & 90° latitude at present
 True Position of the 15



Recorded Height of Boston School boys American Parentage
 the Percentiles at 5th 10th 90th 95th at various ages.
 x — — — — — boys Irish parentage

Stature

75

74

73

72

71

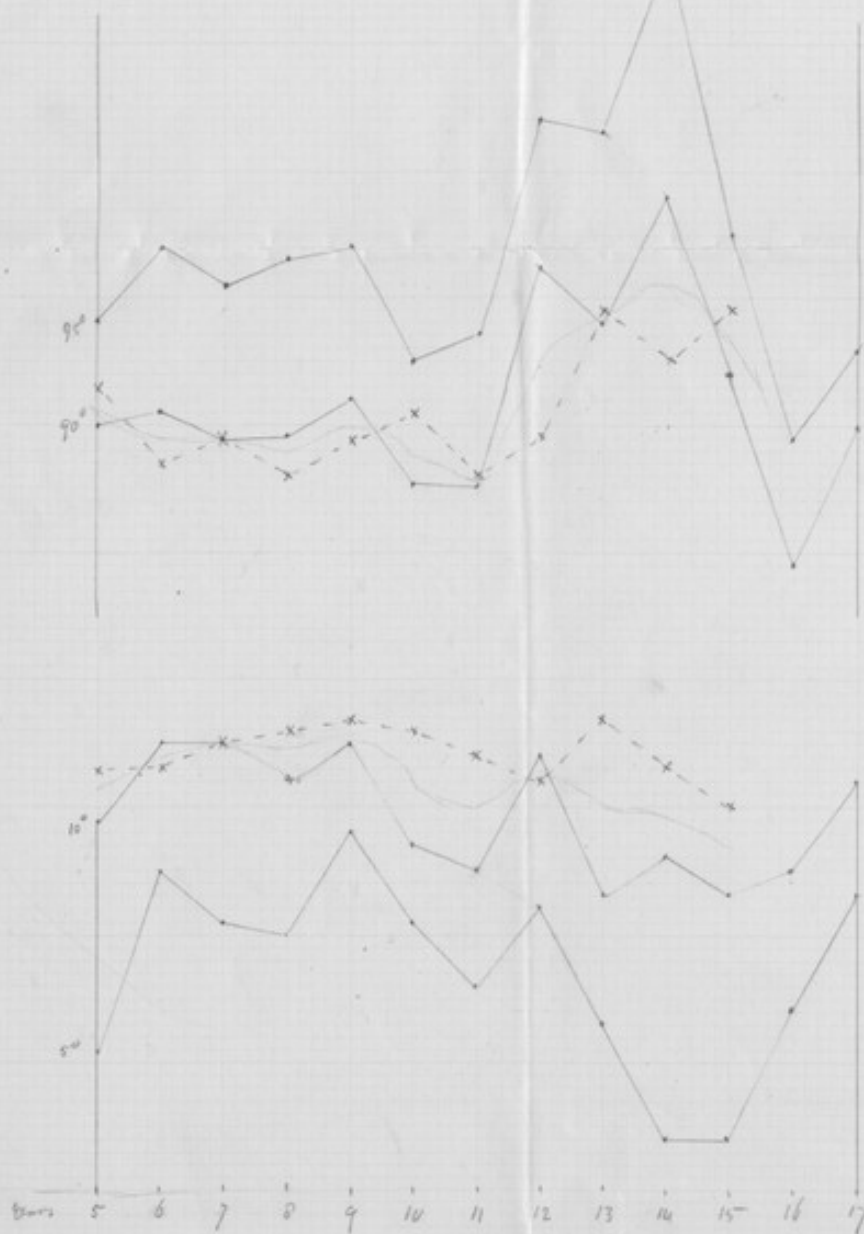
70

63

62

61

60



Bowditch
p. 483. Heights of Boston school boys Amer.: percentage
mean & median = 67 inches (as an average height)

Years	mean	range	x p. 67	5	10	diff	90	95
4	41.84	2.39	1.50	38.2	39.3	8.1	44.4	44.9
5	41.84	2.39	1.50	61.1	62.9	7.6	71.0	71.8
6	44.30	2.29	1.52	41.1	41.8	7.6	71.1	72.4
7	46.80	2.24	1.52	42.1	43.8	7.6	70.9	72.1
8	48.34	2.07	1.39	44.6	45.5	7.7	70.9	72.3
9	50.07	2.00	1.34	46.9	47.4	7.7	71.2	72.4
10	52.24	1.91	1.27	48.9	49.4	7.8	70.5	71.5
11	54.14	1.85	1.23	50.1	50.8	8.0	70.5	71.7
12	55.68	1.80	1.21	51.5	52.4	8.8	72.2	73.4
13	58.14	1.72	1.15	53.3	54.2	9.5	71.8	73.3
14	60.77	1.65	1.11	54.4	56.4	10.2	72.8	74.7
15	63.17	1.58	1.06	57.0	58.8	9.1	71.4	72.5
16	66.03	1.51	1.01	60.4	61.9	7.4	69.9	70.9
17	66.39	1.51	1.01	61.7	62.6	7.8	70.3	71.0

average
1 R. S. Farrell
June



p. 484 N.S. British percentage only about 3% as many as the former

Years	mean	range	x p. 67	5	10	diff	90	95
4	41.70	2.40	1.61	38.7	39.3	7.9	44.2	44.8
5	42.90	2.28	1.53	40.6	41.4	7.4	46.2	47.1
6	45.68	2.19	1.47	42.5	43.2	7.4	48.2	49.1
7	47.80	2.09	1.40	44.8	45.4	7.0	50.4	51.1
8	49.61	2.02	1.35	46.5	47.2	7.2	52.5	53.1
9	51.62	1.94	1.30	47.9	48.9	7.5	54.7	55.7
10	53.17	1.88	1.26	49.4	50.3	7.2	56.0	57.0
11	54.89	1.82	1.22	51.0	51.8	7.7	58.1	59.6
12	56.58	1.77	1.19	52.5	53.5	8.2	60.4	61.7
13	58.21	1.70	1.14	54.4	55.5	8.2	62.7	63.9
14	60.82	1.64	1.10	56.2	57.3	8.9	64.4	66.1
15	62.42	1.55	1.04	58.5	59.4	8.6	67.7	68.8



Growth of Children - Bowditch

p45

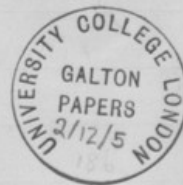
22^d Annual Report - State Board of Health - Massachusetts

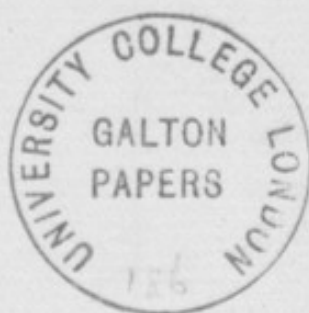
I Heights Boston School boys - inspection of nationality
II American percentage
III Irish

IV weights Ditto

VI

VII - IX Heights - early
X XII weights - late





From

Growth of Children Bowditch

1. Values at the per centiles reduced to
 median = 50 in each case ^{which}
 = height of a boy 9 years 7 months above
2. Common means & individual deviations
3. The deviations written fair to a Tall.
4. Protraction of the Dev³ on Nat scale
5. ^{Regulation} Variability at different ages

Weight Boston School boys Bowditch

Age

Per Centile

Height

5 20° 37.00 lbs
80° 45.15
8.15 .22

40.15
43.36
3.21 0.080

6 20° 40.94
80° 49.46
8.52 .21

42.31
45.54
3.23 0.076

10 20° 59.61
80° 73.12
13.51 .23

49.77
53.76
3.99 0.080

11 20° 65.36
80° 79.45
14.09 .214

51.30
55.50
4.20 0.082

16 20° 110.05
80° 136.65
26.57 .24

62.80
67.247
4.67 0.074

17 20° 115.53
80° 140.85
25.32 .22

63.85
68.74
4.89 0.077

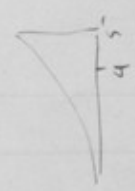
8.16
3

6.469
78

Average 0.23

Average 0.078

between 20° & 80°



Hence $\frac{Q}{M}$ is constant during growth both to weight & height
how is the balance preserved between individual variability
during growth and to tendency to rectify it?



Table I Bowditch

f8 2

5	5	10	20	30
46.5	4 61 -1 63 +1 63 +1 65 +3 66 +4 65 +3 63 +1 63 +1 61 -1 58 -4 54 -8 57 -5 64 +2	4 7.0 -1 72 +1 72 +1 72 +1 74 +3 73 +2 71 0 72 +1 70 -1 67 -4 66 -5 68 -3 73 +2	48.2 +1 82 +1 82 +1 81 0 82 +1 81 0 80 -1 82 +1 81 0 79 -2 77 -4 80 +1 82 +1	48.8 0 89 +1 88 0 88 0 89 +1 88 0 88 0 88 0 88 0 87 -1 84 -4 88 0 91 +3
13/104 -2, 10 -8, 7, 11, 12 -5, 13 -14 -16 -15	13/23 46.2	10 47.1	11 48.1	48.8

40	60	70	80	90	95
494 0 95 +1 94 0 94 0 95 +1 94 0 94 0 94 0 95 +1 93 -1 92 -2 94 0 95 +1	506 0 06 0 06 0 05 -1 05 -1 05 -1 05 -1 06 0 07 +1 08 +2 08 +2 06 0 06 0	512 0 12 0 11 -1 10 -2 11 -1 11 -1 12 0 12 0 16 +4 16 +4 16 +4 10 -2 13 +1	521 +1 19 -1 18 -2 17 -3 18 -2 20 0 19 -1 21 +1 24 +3 27 +7 25 +5 16 -4 19 -1	530 -1 30 -1 29 -2 28 -3 28 -3 30 -1 29 -2 33 +2 39 +8 42 +1.1 37 +6 26 -5 29 -2	538 -2 37 -3 37 -3 36 -4 37 -3 39 -1 38 -2 43 +3 50 +1.0 53 +1.3 45 +1.5 35 -5 35 -5
49.4	50.6	51.2	52.0	53.1	54.0



Table I Bowditch

Showing deviation from average of the means of the various growth ordinates after growth series has been reduced in proportion to its median taking as 50.0 is about the mean height of children who were 9 at their last birthday

Age	5	10	20	30	40	50	60	70	80	90	95
5	-1	-1	+1	0	0	-	0	0	+1	-1	-2
6	+1	+1	+1	+1	+1	-	0	0	-1	-1	-3
7	+1	+1	+1	0	0	-	0	-1	-2	-2	-3
8	+3	+1	0	0	0	-	-1	-2	-3	-3	-4
9	+4	+3	+1	+1	+1	-	-1	-1	-2	-3	-3
10	+3	+2	0	0	0	-	-1	-1	0	-1	-1
11	+1	0	-1	0	0	-	-1	0	-1	-2	-2
12	+1	+1	+1	0	0	-	0	0	+1	+2	+3
13	-1	-1	0	0	+1	-	+1	+4	+3	+8	+10
14	-4	-4	-2	-1	-1	-	+2	+4	+7	+10	+13
15	-8	-5	-4	-4	-2	-	+2	+4	+5	+6	+5
16	-5	-3	+1	0	0	-	0	-2	-4	-5	-5
17	+2	+2	+1	+3	+1	-	0	+1	-1	-2	-5
Average of Means	46.2	47.1	48.1	48.8	49.4	50.0	50.6	51.2	52.0	53.1	54.0
Diff. of av.	-3.8	-2.9	-1.9	-1.2	-0.6	-	+0.6	+1.2	+2.0	+3.1	+4.0
Normal Dev.	-2.44	-1.90	-1.25	-0.78	-0.38	-	+0.38	+0.78	+1.25	+1.90	+2.44
Normal Dev. $\sigma=1$	3.85	3.0	1.97	1.23	0.6	-	0.6	1.23	1.97	3.0	3.85

Normal Dev. of 10 = 3.0
of 15 = 1.58

(PC = 1.58)

3

43



Mean
medians

46.2

47.1

48.1

48.8

49.4

50.0

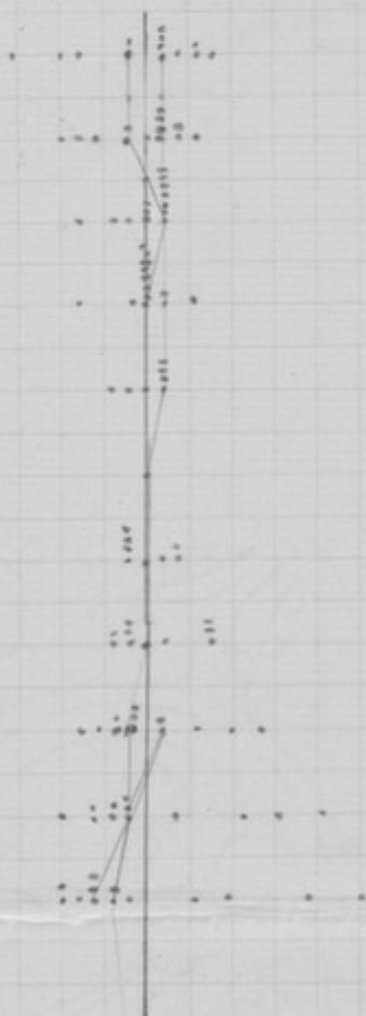
50.6

51.2

52.0

53.1

54.0



Percentiles at the 100th grade, 100th
individual (reduced) median from the mean of 100th

"Reduced" proportional to median = 50 units, 100 units
which is about the stature of a child aged 9 years
The scale of the diagram is true to nature - no reduction of it



Boston School boys inspection of Kalmianitis

5

fillr

Difference between Height at 20th & 70th Percentile Grade

age reduced Height diff^a
 5 at 20th 48.2 3.0
 70th 51.2

14 47.9 3.7
 51.6

6 48.2 } 3.0
 51.2

15 47.7 } 3.9
 51.6

7 48.2 } 2.9
 51.1

16 48.0 } 3.0
 51.0

8 48.1 } 2.9
 51.0

17 48.2 } 3.1
 51.3

9 48.2 } 2.9
 51.1

10 48.1 } 3.0
 51.1

11 48.0 } 3.2
 51.2

12 48.2 } 3.0
 51.2

13 48.1 } 3.5
 51.6

p11v

Growth of
Children
Browitch

