On normal growth under systematized exercise in the gymnasium / by Henry G. Beyer.

Contributors

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Table of heights in millimeters.

A.

Number.	Age.	First measurement.	Second measurement.	Gain.	Number.	Age.	First measurement.	Second measurement.	Gain.
1	17.4	1,730	1,750	20	23	15.11	1,770	1,806	31
2	20.1	1.728	1,732	4	24	17.8	1,699	1,710	11
3	17.1	1,625	1,660	35	25	18.1	1.840	1,845	5
4	19.10	1,688	1,690	2	26	19.9	1,780	1,800	20
5	19.10	1,794	1,794	0	27	19	1,748	1,755	7
6	15.4	1,674	1,695	21	28	17.5	1,691	1,710	19
7	17	1,632	1,644	12	29	19.8	1,789	1,789	0
8	17.10	1,786	1,800	14	30	17.1	1,700	1,706	6
9	17.8	1,681	1,692	11	31	18.3	1,780	1,790	10
10	17.9	1,700	1,700	0	32	17.3	1,632	1,636	4
11	16	1,740	1,750	10	33	18	1,828	1,830	2
12	16.5	1,698	1,712	14	34	19.10	1,760	1,760	0
13	17.6	1,671	1,720	49	35	16.10	1,785	1,788	3
14	19.1	1,670	1,671	1	36	18.8	1,810	1,814	4
15	17	1,765	1,780	15	37	17.9	1,690	1,700	10
16	17.10	1,676	1,700	24	38	18.1	1,730	1,730	0
17	15.11	1,662	1,690	28	39	17	1,636	1,643	7
18	16.6	1,758	1,765	7	40	18.10	1,708	1,720	12
19	18.11	1,710	1,720	10	41	16.3	1,610	1,650	40
20	18.2	1,852	1,866	14	42	19.7	1,718	1,733	15
21	18.9	1,700	1,700	0					
22	15.5	1,725	1,744	19	Averages..	18	1,723	1,736	13

B.

Number.	Age.	First measurement.	Second measurement.	Gain.	Number.	Age.	First measurement.	Second measurement.	Gain.
43	17	1,650	1,690	40	60	18.10	1,730	1,741	11
44	17.7	1,711	1,755	44	61	18.2	1,699	1,709	10
45	17.11	1,646	1,650	4	62	20.5	1,710	1,710	0
46	19.10	1,740	1,740	0	63	16.4	1,684	1,700	16
47	16.7	1,690	1,700	10	64	19.2	1,654	1,660	6
48	20.6	1,679	1,682	3	65	19.6	1,752	1,760	8
49	17.6	1,672	1,674	2	66	17.3	1,688	1,703	15
50	18.6	1,780	1,792	12	67	18.8	1,640	1,650	10
51	20	1,730	1,734	4	68	16.5	1,772	1,794	22
52	17.9	1,822	1,830	8	69	20	1,668	1,670	2
53	16.11	1,710	1,731	21	70	19.6	1.740	1,761	21
54	18.4	1,756	1,760	4	71	18.7	1,756	1,778	22
55	19.5	1,650	1,654	4	72	18.2	1,663	1,675	12
56	17.6	1,701	1,710	9	73	18.3	1,613	1,624	11
57	15.6	1,562	1,610	48	74	18.4	1,690	1,700	10
58	17.2	1,682	1,690	8					
59	16.10	1,633	1,652	19	Averages...	18	1,696	1,709	13

Weight.—The average weight of the 50 cadets of last year was 60 kilograms at the time of the first measurement and 63.3 kilograms at the time of the second measurement, the semiannual increase amounting to 3.3 kilos, or 7.26 pounds. The average weight of the 74 cadets this year was found to be 58.5 kilos at the beginning and 62.65 at the end of the six months. Although the increase this year was slightly larger than the increase noted last year, both the initial average and the final average are smaller than last year, just as was the case with the height.

Table of weights in kilos.

A.

No.	Age.	Weight.		Gain.	No.	Age.	Weight.		Gain.
		First measurement.	Second measurement.				First measurement.	Second measurement.	
1	17.4	59	79	20	23	15.11	55	63	8
2	20.1	60	62	2	24	17.8	54	58	4
3	17.1	50	55	5	25	18.1	64	69	5
4	19.10	58	60	2	26	19.9	67	74	7
5	19.10	58	57	—1	27	19	61	73	12
6	15.4	51	56	5	28	17.5	48	50	2
7	17	53	58	5	29	19.8	62	67	5
8	17.10	63	64	1	30	17.1	56	59	3
9	17.8	61	66	5	31	18.3	66	73	7
10	17.9	72	78	6	32	17.3	47	50	3
11	16	57	62	5	33	18	70	71	1
12	16.5	57	59	2	34	19.10	72	74	2
13	17.6	48	54	6	35	16.10	64	66	2
14	19.1	53	56	3	36	18.8	58	60	2
15	17	58	62	4	37	17.9	69	72	3
16	17.10	56	62	6	38	18.1	56	59	3
17	15.11	48	55	7	39	17	48	55	7
18	16.6	65	70	5	40	18.10	55	59	4
19	18.11	69	74	5	41	16.3	42	49	7
20	18.2	81	81	0	42	19.7	54	56	2
21	18.9	57	61	4					
22	15.5	59	66	7	Averages	18	58.6	63.2	4.6

B.

No.	Age.	Weight.		Gain.	No.	Age.	Weight.		Gain.
		First measurement.	Second measurement.				First measurement.	Second measurement.	
43	17	49	55	6	60	18.10	54	62	8
44	17.7	57	60	3	61	18.2	53	58	5
45	17.11	57	62	5	62	20.5	56	59	3
46	19.10	69	78	9	63	16.4	53	56	3
47	16.7	67	71	4	64	19.2	63	63	0
48	20.7	66	70	4	65	19.6	58	61	3
49	17.6	60	61	1	66	17.3	53	52	—1
50	18.6	70	70	0	67	18.8	59	63	4
51	20	51	54	3	68	16.5	56	63	7
52	17.9	63	67	4	69	20	60	63	3
53	16.11	56	58	2	70	19.6	63	70	7
54	18.4	73	73	0	71	18.7	68	72	4
55	19.5	48	54	6	72	18.2	65	66	1
56	17.6	66	68	2	73	18.3	58	66	8
57	15.6	52	58	6	74	18.4	47	54	7
58	17.2	55	60	5					
59	16.10	45	50	5	Averages	18	58.4	62.1	3.7

Lung capacity.—The lung capacity of the 50 cadets of last year was 4.038 in the beginning and 4.192 at the end of the six months, the increase being 0.154 kilos. The average lung capacity of the 74 cadets of this year was 3.975 at the beginning, and at the end of six months it was found to be 4.255, the increase amounting to 0.280 kilos. This increase was considerably larger than that attained last year, for at the beginning the average lung capacity was much smaller this year than last year.

Table of lung capacities in kilos.

A.

No.	Age.	Lung capacity. First measure-ment.	Second measure-ment.	Gain.	No.	Age.	Lung capacity. First measure-ment.	Second measure-ment.	Gain.
1	17.4	4.558	5.900	1.312	23	15.11	3.277	3.768	.491
2	20.1	4.177	4.588	.411	24	17.8	3.605	3.605	0
3	17.1	2.949	3.277	.328	25	18.1	4.588	4.752	.164
4	19.10	4.588	4.588	0	26	19.9	5.408	6.063	.655
5	19.10	4.505	4.669	.164	27	19	3.932	3.932	0
6	15.4	4.096	4.341	.245	28	17.5	3.277	3.441	.164
7	17	3.768	3.849	.082	29	19.8	4.260	5.230	.970
8	17.10	4.915	5.078	.163	30	17.1	4.096	4.260	.164
9	17.8	4.260	4.588	.328	31	18.3	4.424	4.424	0
10	17.9	4.096	4.260	.164	32	17.3	2.949	4.260	1.311
11	16	3.605	4.096	.491	33	18	3.441	4.424	.983
12	16.5	2.866	3.277	.411	34	19.10	5.408	5.572	.164
13	17.6	3.113	3.686	.572	35	16.10	4.424	5.571	1.147
14	19.1	4.096	4.260	.164	36	18.8	3.768	4.260	.492
15	17	4.260	4.260	0	37	17.9	3.768	4.588	.820
16	17.10	3.277	3.849	.572	38	18.1	4.096	4.588	.492
17	15.11	2.621	3.030	.409	39	17	3.605	4.096	.491
18	16.6	3.768	4.096	.328	40	18.10	3.277	3.605	.328
19	18.11	4.424	4.752	.328	41	16.3	2.866	3.277	.411
20	18.2	5.900	6.226	.328	42	19.7	3.768	4.096	.328
21	18.9	3.768	3.932	.164					
22	15.5	3.441	4.260	.819	Averages.	18	3.950	4.350	.400

B.

Number.	Age.	Lung capacity. First examina-tion.	Second examina-tion.	Gain.	Number.	Age.	Lung capacity. First examina-tion.	Second examina-tion.	Gain.
43	17	3.277	3.605	0.328	60	18.10	4.096	4.260	0.164
44	17.7	3.768	3.932	.164	61	18.2	4.260	4.915	.655
45	17.11	4.424	4.424	0	62	20.5	4.260	4.260	0
46	19.10	4.260	4.505	.244	63	16.4	3.686	4.260	.574
47	16.7	4.915	4.833	—.081	64	19.2	4.424	4.424	0
48	20.7	3.768	3.686	—.081	65	19.6	4.260	4.341	.081
49	17.6	4.505	4.505	0	66	17.3	5.408	6.063	.655
50	18.6	5.244	5.489	.244	67	18.8	3.605	4.096	.492
51	20	3.113	3.113	0	68	16.5	4.260	4.752	.492
52	17.9	4.588	4.752	.164	69	20	3.932	4.096	.164
53	16.11	4.096	4.341	.244	70	19.6	3.441	3.605	.164
54	18.4	4.096	4.341	.244	71	18.7	4.013	4.177	.164
55	19.5	2.785	3.277	.492	72	18.2	3.768	3.277	—.491
56	17.6	4.588	4.505	—.082	73	18.3	3.768	3.768	0
57	15.6	2.785	3.441	.655	74	18.4	3.113	3.277	.164
58	17.2	3.768	3.768	0					
59	16.10	2.785	2.866	.082	Averages.	18	4	4.160	.160

Total strength.—On examining the two total-strength tables of last year we find that the 50 cadets on their entrance examination developed an average total strength of 385 kilos, and at their second examination, or six months later, this average total strength was 508½ kilos, showing a gain of 123½ kilos, which was the largest gain ever noted at the Academy. This year the 74 cadets developed at the first examination an average total strength of 422 kilos and at the second examination 528, showing a semiannual increase of 108 kilos.

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Table of total strength, in kilos.

A.

Number.	Age.	Total strength.		Gain.	Number.	Age.	Total strength.		Gain.
		First measurement.	Second measurement.				First measurement.	Second measurement.	
1	17.4	284	583	299	23	15.11	299	488	189
2	20.1	480	584	104	24	17.8	377	584	207
3	17.1	370	491	121	25	18.1	447	581	134
4	19.10	364	501	137	26	19.9	490	733	243
5	19.10	468	601	133	27	19	474	620	146
6	15.4	260	406	146	28	17.5	298	449	171
7	17	403	558	155	29	19.8	598	718	120
8	17.10	442	564	122	30	17.1	567	688	121
9	17.8	423	565	142	31	18.3	404	547	143
10	17.9	514	629	115	32	17.3	356	485	129
11	16	457	622	165	33	18	543	667	124
12	16.5	367	544	177	34	19.10	476	579	103
13	17.6	324	449	125	35	16.10	410	542	132
14	19.1	302	405	103	36	18.8	315	415	100
15	17	346	447	101	37	17.9	499	614	115
16	17.10	418	552	134	38	18.1	434	684	250
17	15.11	279	390	111	39	17	313	462	149
18	16.6	482	663	181	40	18.10	305	503	198
19	18.11	516	730	214	41	16.3	210	444	234
20	18.2	406	571	165	42	19.7	419	646	226
21	18.9	381	537	156					
22	15.5	364	534	170	Averages .	18	402	557	155

B.

Number.	Age.	First measurement.	Second measurement.	Gain.	Number.	Age.	First measurement.	Second measurement.	Gain.
43	17	384	451	67	60	18.10	316	410	94
44	17.7	436	508	72	61	18.2	501	523	22
45	17.11	448	445	—3	62	20.5	456	500	44
46	19.10	525	560	35	63	16.4	414	430	16
47	16.7	510	525	15	64	19.2	523	514	— 9
48	20.7	501	445	—56	65	19.6	447	489	42
49	17.6	474	500	26	66	17.3	450	444	— 6
50	18.6	476	571	95	67	18.8	339	420	81
51	20	382	392	10	68	16.5	469	559	90
52	17.9	439	530	91	69	20	472	571	99
53	16.11	379	453	74	70	19.6	629	676	47
54	18.4	463	545	82	71	18.7	515	605	90
55	19.5	348	442	94	72	18.2	605	567	—32
56	17.6	642	733	91	73	18.3	369	450	81
57	15.6	350	398	48	74	18.4	261	336	75
58	17.2	387	464	77					
59	16.10	272	365	93	Averages.	18	443	560	57

The following " indices," derived and computed from the foregoing items, are of great importance. If calculated every year, their accumulation will form valuable material for further work intended to serve as guides for the members of examining boards. The number of those that have so far been calculated is yet too small to permit the working out of safe averages, but in a very few years this difficulty will be overcome, while their significance must become more and more apparent.

Table of weight-height index.

A.

Number.	Age.	$\frac{W.}{H.}$ First examination.	Second examination.	Gain.	Number.	Age.	$\frac{W.}{H.}$ First examination.	Second examination.	Gain.
1	17.4	0.341	0.400	0.059	23	15.11	0.310	0.350	0.040
2	20.1	.350	.360	.010	24	17.8	.320	.339	.019
3	17.1	.308	.331	.023	25	18.1	.348	.375	.027
4	19.10	.345	.355	.010	26	19.9	.380	.411	.031
5	19.10	.324	.320	—.004	27	19	.350	.417	.067
6	15.04	.305	.331	.026	28	17.5	.285	.300	.015
7	17	.321	.354	.033	29	19.8	.348	.376	.028
8	17.10	.354	.356	.002	30	17.1	.330	.348	.018
9	17.8	.363	.390	.027	31	18.3	.371	.408	.027
10	17.9	.424	.460	.036	32	17.3	.288	.306	.018
11	16	.348	.354	.006	33	18	.385	.388	.003
12	16.05	.338	.345	.007	34	19.10	.409	.420	.011
13	17.06	.290	.314	.024	35	16.10	.360	.371	.011
14	19.1	.317	.335	.018	36	18.08	.320	.331	.011
15	17	.318	.348	.030	37	17.9	.408	.423	.015
16	17.10	.335	.365	.030	38	18.1	.324	.341	.017
17	15.11	.289	.325	.036	39	17	.294	.340	.046
18	16.6	.371	.397	.016	40	18.10	.323	.343	.020
19	18.11	.403	.430	.027	41	16.3	.261	.296	.035
20	18.2	.440	.435	—.005	42	19.7	.315	.323	.008
21	18.9	.335	.353	.018					
22	15,5	.343	.380	.037	Average.	18	.340	.363	.023

B.

Number.	Age.	$\frac{W.}{H.}$ First examination.	Second examination.	Gain.	Number.	Age.	$\frac{W.}{H.}$ First examination.	Second examination.	Gain.
43	17	0.297	0.325	.028	60	18.10	0.347	0.356	0.019
44	17.7	.333	.343	.010	61	18.2	.313	.341	.028
45	17.11	.360	.375	.015	62	20.5	.327	.345	.018
46	19.10	.356	.450	.094	63	16.4	.315	.330	.015
47	16.7	.400	.418	.018	64	19.2	.390	.380	—.010
48	20.7	.395	.417	.022	65	19.6	.331	.347	.016
49	17.6	.360	.365	.005	66	17.3	.315	.309	—.006
50	18.6	.393	.393	....	67	18.8	.359	.382	.023
51	20	.295	.312	.017	68	16.5	.316	.351	.035
52	17.9	.346	.367	.021	69	20	.361	.380	.019
53	16.11	.327	.335	.008	70	19.6	.362	.400	.038
54	18.4	.417	.415	.002	71	18.7	.388	.400	.012
55	19.5	.291	.328	.037	72	18.2	.391	.400	.009
56	17.6	.388	.398	.010	73	18.3	.360	.408	.048
57	15.6	.333	.360	.027	74	18.4	.281	.318	.037
58	17.2	.327	.355	.028					
59	16.10	.275	.300	.025	Averages.	18	.345	.366	.021

Table of vital indices $\frac{L.\,C.}{W.}$

A.

Number.	Age.	Vital indices. $\frac{L.\,C.}{W.}$		Gain.	Loss.	Number.	Age.	Vital indices. $\frac{L.\,C.}{W.}$		Gain.	Loss.
		First measurement.	Second measurement.					First measurement.	Second measurement.		
1	17.4	0.077	0.075	......	0.002	23	15.11	0.060	0.060	......	......
2	20.1	.070	.074	0.004	......	24	17.8	.066	.064	......	0.002
3	17.1	.055	.059	.004	......	25	18.1	.072	.070	......	.002
4	19.10	.079	.076	......	.003	26	19.9	.081	.082	0.001	......
5	19.10	.078	.082	.004	......	27	19	.064	.054	......	.010
6	15.4	.080	.080	......	......	28	17.5	.068	.069	.001	......
7	17	.071	.066	......	.005	29	19.8	.070	.078	.008	......
8	17.10	.078	.079	.001	......	30	17.1	.073	.072	......	.001
9	17.8	.070	.072	.002	......	31	18.3	.067	.061	......	.006
10	17.9	.057	.055	......	.002	32	17.3	.063	.085	.022	......
11	16	.063	.064	.001	......	33	18	.049	.062	.013	......
12	16.5	.050	.056	.006	......	34	19.10	.075	.075	......	......
13	17.6	.065	.070	.005	......	35	16.10	.070	.084	.014	......
14	19.1	.077	.076	......	.001	36	18.8	.065	.071	.006	......
15	17	.073	.070	......	.003	37	17.9	.055	.064	.009	......
16	17.10	.058	.062	.004	......	38	18.1	.073	.078	.005	......
17	15.11	.040	.043	.003	......	39	17	.075	.071	......	.004
18	16.6	.058	.059	.001	......	40	18.10	.060	.061	.001	......
19	18.11	.064	.064	......	......	41	16.3	.068	.067	......	.001
20	18.2	.073	.077	.004	......	42	19.7	.070	.072	.002	......
21	18.9	.066	.064	......	.002						
22	15.5	.058	.065	.007	......	Averages	18	.067	.069	.002	......

B.

Number.	Age.	First measurement.	Second measurement.	Gain.	Loss.	Number.	Age.	First measurement.	Second measurement.	Gain.	Loss.
43	17	0.067	0.065	......	0.002	60	18.10	0.076	0.070	......	0.006
44	17.7	.066	.066	......	......	61	18.2	.080	.084	0.004	......
45	17.11	.078	.071	......	.007	62	20.5	.076	.072	......	.004
46	19.10	.071	.062	......	.009	63	16.4	.070	.076	.006	......
47	16.7	.063	.070	0.007	......	64	19.2	.070	.070	......	......
48	20.7	.057	.053	......	.004	65	19.6	.074	.071	......	.003
49	17.6	.075	.074	......	.001	66	17.3	.102	.117	.015	......
50	18.6	.075	.078	.003	......	67	18.8	.061	.065	.004	......
51	20	.061	.060	......	.001	68	16.5	.076	.070	......	.006
52	17.9	.073	.071	......	.002	69	20	.066	.065	......	.001
53	16.11	.073	.074	.001	......	70	19.6	.055	.051	......	.004
54	18.4	.056	.060	.004	......	71	18.7	.051	.058	.007	......
55	19.5	.058	.061	.003	......	72	18.2	.058	.050	......	.008
56	17.6	.070	.066	......	.004	73	18.3	.065	.057	......	.008
57	15.6	.053	.060	.007	......	74	18.4	.066	.060	......	.006
58	17.2	.068	.063	......	.005						
59	16.10	.062	.057	......	.005	Averages	18	.068	.067	......	.001

Table of power indices $Po := T.\,S.\dfrac{L.\,C.}{W.}$

A.

Number.	Age.	Po:= T.S. L.C./W. First measurement.	Second measurement.	Gain.	Number.	Age.	Po:= T.S. L.C./W. First measurement.	Second measurement.	Gain.
1	17.4	21.868	43.715	21.847	23	15.11	17.740	29.280	11.340
2	20.1	33.600	43.216	9.616	24	17.8	24.882	37.376	12.494
3	17.1	20.350	28.969	8.619	25	18.1	32.184	40.670	8.486
4	19.10	28.756	38.076	9.320	26	19.9	39.690	60.106	20.416
5	19.10	36.904	49.282	12.378	27	19	30.336	33.480	3.144
6	15.4	20.800	32.480	11.680	28	17.5	20.264	30.981	10.717
7	17	28.210	40.176	11.966	29	19.8	41.860	56.004	14.144
8	17.10	34.476	44.556	10.080	30	17.1	41.391	49.536	8.145
9	17.8	29.510	40.680	11.170	31	18.3	27.068	33.367	6.299
10	17.9	29.298	34.584	5.286	32	17.3	22.428	41.225	18.797
11	16	28.791	39.808	11.017	33	18	26.607	41.354	14.747
12	16.5	18.350	30.464	12.114	34	19.10	35.700	43.425	7.725
13	17.6	21.060	31.430	10.370	35	16.10	28.700	45.428	16.728
14	19.1	23.254	30.780	7.526	36	18.8	20.475	29.465	8.990
15	17	25.258	31.290	6.032	37	17.9	27.445	39.296	11.851
16	17.10	24.244	34.224	9.980	38	18.1	31.582	53.352	21.770
17	15.11	11.160	16.770	5.610	39	17	23.475	32.802	9.327
18	16.6	27.956	39.117	11.161	40	18.10	18.300	30.683	12.383
19	18.11	34.056	46.720	12.664	41	16.3	14.280	29.748	15.468
20	18.2	29.638	43.967	14.329	42	19.7	29.330	46.512	17.182
21	18.9	25.146	34.368	9.222					
22	15.5	21.170	34.710	13.540	Averages.	18	26.852	38.180	11.328

B.

Number.	Age.	First measurement.	Second measurement.	Gain.	Number.	Age.	First measurement.	Second measurement.	Gain.
43	17	25.728	29.315	3.587	60	18.10	24.016	28.700	4.684
44	17.7	28.776	33.528	4.752	61	18.2	40.080	43.932	3.852
45	17.11	34.944	31.595	—3.349	62	20.5	34.656	36.000	1.344
46	19.10	37.275	34.720	—2.555	63	16.4	28.980	32.680	3.700
47	16.7	32.130	36.750	4.620	64	19.2	36.610	35.980	—0.630
48	20.7	28.557	23.585	—4.972	65	19.6	33.078	34.519	1.441
49	17.6	35.550	37.000	1.450	66	17.3	45.900	51.948	6.048
50	18.6	35.500	44.538	9.038	67	18.8	20.679	27.300	6.621
51	20	27.886	27.832	—0.054	68	16.5	35.644	39.130	3.486
52	17.9	35.989	37.630	1.641	69	20	31.152	37.115	5.963
53	16.11	27.667	33.522	5.855	70	19.6	34.595	34.476	—0.119
54	18.4	25.928	32.700	6.772	71	18.7	26.265	35.090	8.825
55	19.5	20.184	26.962	6.778	72	18.2	35.090	28.350	—6.740
56	17.6	44.940	48.378	3.438	73	18.3	23.985	25.650	1.665
57	15.6	18.550	23.880	5.330	74	18.4	23.826	20.160	3.666
58	17.2	26.316	29.232	2.916					
59	16.10	16.864	20.805	3.941	Averages.	18	30.542	33.216	2.674

Table of strength weight indices $=\dfrac{T.S.}{W.}$

A.

Number.	Age.	T.S./W. First examination.	T.S./W. Second examination.	Gain.	Loss.	Number.	Age.	T.S./W. First examination.	T.S./W. Second examination.	Gain.	Loss.
1.........	17.4	4.83	7.38	2.55	....	23........	15.11	5.44	7.75	2.31	....
2.........	20.1	8	9.42	1.42	....	24........	17.8	7	10	3	....
3.........	17.1	7.40	8.92	1.52	....	25........	18.1	7	8.42	1.42	....
4.........	19.10	6.30	8.35	2.05	....	26........	19.9	7.10	10	2.90	....
5.........	19.10	8.06	10.54	2.48	....	27........	19	7.77	8.80	1.03	....
6.........	15.4	5.10	7.25	2.15	....	28........	17.5	6.21	9	2.79	....
7.........	17	7.60	9.62	2.02	....	29........	19.8	9.64	10.71	1.07	....
8.........	17.10	7	9	2	....	30........	17.1	10.13	11.66	1.53	....
9.........	17.8	7	8.56	1.56	....	31........	18.3	6.12	7.50	1.38	....
10........	17.9	7.14	8.06	0.92	....	32........	17.3	7.57	9.70	2.13	....
11........	16	8.02	10.03	2.01	....	33........	18	7.76	9.40	1.64	....
12........	16.5	6.44	9.22	2.78	....	34........	19.10	6.62	7.85	1.23	....
13........	17.6	6.75	8.31	1.56	....	35........	16.10	6.40	8.21	1.81	....
14........	19.1	5.70	7.20	1.50	....	36........	18.8	5.43	6.92	1.49	....
15........	17	6	7.20	1.20	....	37........	17.9	7.23	8.54	1.31	....
16........	17.10	7.46	9	1.54	....	38........	18.1	7.74	11.60	3.86	....
17........	15.11	5.81	7.08	1.27	....	39........	17	6.50	8.40	1.90	....
18........	16.6	7.42	9.77	2.35	....	40........	18.10	5.55	8.53	2.98	....
19........	18.11	7.47	9.86	2.39	....	41........	16.3	5	9.06	4.06	....
20........	18.2	5	7.05	2.05	....	42........	19.7	8	11.53	3.53	....
21........	18.9	6.68	8.80	2.12	....						
22........	15.5	6.17	8.09	1.92	....	Averages	18	6.85	8.86	2.01	....

B.

Number.	Age.	T.S./W. First examination.	T.S./W. Second examination.	Gain.	Loss.	Number.	Age.	T.S./W. First examination.	T.S./W. Second examination.	Gain.	Loss.
43........	17	7.83	8.20	0.37	....	60........	18.10	5.85	6.61	0.76	....
44........	17.7	7.65	8.47	.82	....	61........	18.2	9.45	9.02	....	0.43
45........	17.11	7.86	7.19	....	0.67	62........	20.5	8.14	8.47	.33	....
46........	19.10	7.60	7.20	....	.40	63........	16.4	7.81	7.67	....	.14
47........	16.7	7.61	7.40	....	.21	64........	19.2	8.30	8.16	....	.14
48........	20.7	7.58	6.36	....	1.22	65........	19.6	7.71	8.01	....	.30
49........	17.6	8	8.20	.20	....	66........	17.3	8.50	8.54	.04	....
50........	18.6	6.80	8.16	1.36	....	67........	18.8	5.74	6.66	.92	....
51........	20	7.50	7.30	....	.20	68........	16.5	8.37	8.87	.50	....
52........	17.9	7	7.90	.90	....	69........	20	8	9.07	1.07	....
53........	16.11	6.77	7.81	1.04	....	70........	19.6	10	9.66	....	.34
54........	18.4	6.30	7.46	1.16	....	71........	18.7	7.57	8.40	.83	....
55........	19.5	7.25	8.18	.93	....	72........	18.2	9.31	8.51	....	.80
56........	17.6	9.72	10.72	1.00	....	73........	18.3	6.36	6.82	.46	....
7.........	15.6	6.73	6.86	.15	....	74........	18.4	5.55	6.22	.67	....
58........	17.2	7.04	7.73	.69	....						
59........	16.10	6.04	7.32	1.28	....	Averages	18	7.56	7.94	.38	....

Table of vital strength weight indices $= Vi. \dfrac{T.S.}{W.}$

A.

Number.	Age.	Vi. T.S./W. First measurement.	Second measurement.	Gain.	Loss.	Number.	Age.	Vi. T.S./W. First measurement.	Second measurement.	Gain.	Loss.
1	17.4	0.3719	0.5535	0.1816	....	23	15.11	0.3264	0.4530	0.1266	....
2	20.1	.5600	.6970	.1370	....	24	17.8	.4620	.6400	.1780	....
3	17.1	.4070	.5262	.1192	....	25	18.1	.5040	.5894	.0854	....
4	19.10	.4977	.6366	.1289	....	26	19.9	.5751	.8200	.2449	....
5	19.10	.6286	.8642	.2356	....	27	19	.4972	.4752	....	0.0220
6	15.4	.4080	.5800	.1720	....	28	17.5	.4222	.6210	.1988	....
7	17	.5396	.6349	.0953	....	29	19.8	.6748	.8353	.1605	....
8	17.10	.5460	.7110	.1650	....	30	17.1	.7395	.8395	.1000	....
9	17.8	.4900	.5963	.1063	....	31	18.3	.4100	.4375	.0275	....
10	17.9	.4069	.4433	.0364	....	32	17.3	.4769	.8245	.3476	....
11	16	.5052	.6419	.1367	....	33	18	.3802	.5828	.2026	....
12	16.5	.3220	.5185	.1965	....	34	19.10	.4965	.5887	.0922	....
13	17.6	.4387	.5817	.1430	....	35	16.10	.4480	.6896	.2416	....
14	19.1	.4389	.5472	.1083	....	36	18.8	.3529	.4913	.1384	....
15	17	.4380	.5040	.0660	....	37	17.9	.3976	.5465	.1489	....
16	17.10	.4326	.5580	.1254	....	38	18.1	.5660	.9048	.3388	....
17	15.11	.2324	.3044	.0720	....	39	17	.4873	.5964	.1091	....
18	16.6	.4199	.5764	.1565	....	40	18.10	.3330	.5203	.1873	....
19	18.11	.4780	.6310	.1530	....	41	16.3	.3400	.6070	.2670	....
20	18.2	.3650	.5420	.1778	....	42	19.7	.5600	.8301	.2701	....
21	18.9	.4408	.5632	.1224	....						
22	15.5	.3578	.5258	.1680	....	Averages	18	.4565	.6150	.1585	....

B.

Number.	Age.	Vi. T.S./W. First measurement.	Second measurement.	Gain.	Loss.	Number.	Age.	Vi. T.S./W. First measurement.	Second measurement.	Gain.	Loss.
43	17	0.5246	0.5330	0.0084	....	60	18.10	0.4680	0.5552	0.0872	....
44	17.7	.5049	.5590	.0541	....	61	18.2	.7560	.7977	.0410	....
45	17.11	.6130	.5033	....	0.1097	62	20.5	.6186	.6098	....	0.0088
46	19.10	.5396	.4644	....	.0752	63	16.4	.5467	.5829	.0362	....
47	16.7	.4794	.5180	.0386	....	64	19.2	.5810	.5712	....	.0098
48	20.7	.4320	.3370	....	.0950	65	19.6	.5703	.5687	....	.0018
49	17.6	.6000	.6068	.0068	....	66	17.3	.8670	.9992	.1322	....
50	18.6	.5100	.6364	.1264	....	67	18.8	.3507	.4329	.0828	....
51	20	.4575	.4380	....	.0195	68	16.5	7961	.6209	....	.1752
52	17.9	.5110	.5530	.0420	....	69	20	.5280	.5895	.0615	....
53	16.11	.4924	.5779	.0855	....	70	19.6	.5500	.4926	....	.0574
54	18.4	.3558	.4476	.0918	....	71	18.7	.3861	.4872	.1011	....
55	19.5	.4205	.4989	.0784	....	72	18.2	.5400	.4255	....	.1145
56	17.6	.6804	.6975	.0171	....	73	18.3	.4134	.3887	....	.0247
57	15.6	.3567	.4116	.0549	....	74	18.4	.3663	.3732	.0069	....
58	17.2	.4787	.4870	.0083	....						
59	16.10	.3745	.4174	.0429	....	Average	18	.5178	.5370	.0192	....

STRICTURE OF THE MALE URETHRA.

By M. H. CRAWFORD, *Surgeon, U. S. Navy.*

Stricture is that condition where there is an abnormal diminution of the caliber of the canal, induced by pathological changes in the mucous or submucous muscular walls of the urethra.

Strictures may be divided into inflammatory, true, or organic stricture, and false, or spasmodic stricture; and divided according to their form into linear, annular, indurated, irregular, or tortuous strictures. Some surgical authorities make another division according to the condition that exists; for instance, when the stricture bleeds easily by use of instruments or becomes inflamed it is called an irritable stricture. Then, again, they may be divided into small caliber, which will admit only of the smallest size sounds, less in circumference than 15 millimeters, and of a large caliber, or strictures that will take instruments from that size upward.

A spasmodic stricture is that condition where there is muscular spasm and the normal caliber of the urethra is diminished.

It is a question which all surgical authorities have not fully agreed upon, whether spasm of the urethra takes place without the presence of some organic constriction of prior existence. Sir B. Brodie says: "That a spasmodic stricture may exist independently of any actual organic disease. At the same time it must be acknowledged that the existence of a purely spasmodic stricture is of rare occurrence."

John Hunter states: "There are often spasmodic contractions of these muscular fibers in different parts of the canal, shutting up the passage and obstructing the course of the canal, and often not allowing a drop to pass.

I think it has been proved beyond a doubt that the whole urethra has contractile action, and with a sphincteric muscle which acts especially on one part of it may cause temporary constriction. I will briefly mention the chief causes of spasmodic stricture. Where an organic stricture already exists, this spasmodic constriction may be caused by extreme acidity and irritating effects of the urine. Turpentine, cantharides, spices have the same effects. Hemorrhoids, rectal fistulæ, and operations about the anus are frequently followed by retention from spasmodic contractions of the muscle. Strong mental emotions will interfere sometimes with micturition.

ETIOLOGY OF STRICTURE OF THE MALE URETHRA.

I believe that the majority of surgeons agree with Sir Astley Cooper, who says: "That in ninety-nine cases out of every hundred it was the result of an attack of gonorrhœa."

Civiale says : "That gonorrhœa might be placed in the first rank of the list of causes of stricture. He then asserts that this affection may never have been acute, but chronic at its commencement, and not necessarily following impure or even indeed any sexual connection."

He enumerates other and less obvious causes, such as abuse of instruments employed in affections of the urethra, perineal section, and abuse of coitus and prolonged erections.

Sir Henry Thompson gives the analysis of 202 cases of the stricture of the urethra. Of this number 81 per cent was caused by gonorrheal inflammation, 14 per cent due to injuries of the perineum, 4 cases due to cicatrization of chancres, and 6 cases to congenital origin.

Dr. Otis gives the record of 85 cases of stricture, representing 147 distinct strictures of the urethra :

Seventy-five, or 88.23 per cent, were due to gonorrhea; 5, or 5.88 per cent, were due to masturbation; 3, or 3.53 per cent, were due to lithiasis; 2, or 2.35 per cent, were due to traumatism.

My experience is where an attack of gonorrhea has existed for some time, it is more apt to cause stricture than a slight attack of but brief duration.

Any injuries to the perineum from a fall or a blow may cause stricture.

The use of strong injections, a sudden rupture of the walls of the urethra during an attack of chordee might result in causing a stricture, or rough and awkward use of sounds and catheters. The location of a stricture of the urethra varies extensively, but I think most authorities agree in finding it most frequently in the subpubic curvature, which occupies an inch of the urethra before and three-quarters of an inch posteriorly, which includes all of the membranous portion. The next place in frequency is about two inches and a half of the first portion of the urethra. The seat of the third most frequent location is about two inches and a half to three inches of the center of the spongy portion of the urethra, or within two inches and a half of the external meatus.