Gould, Benjamin Apthorp

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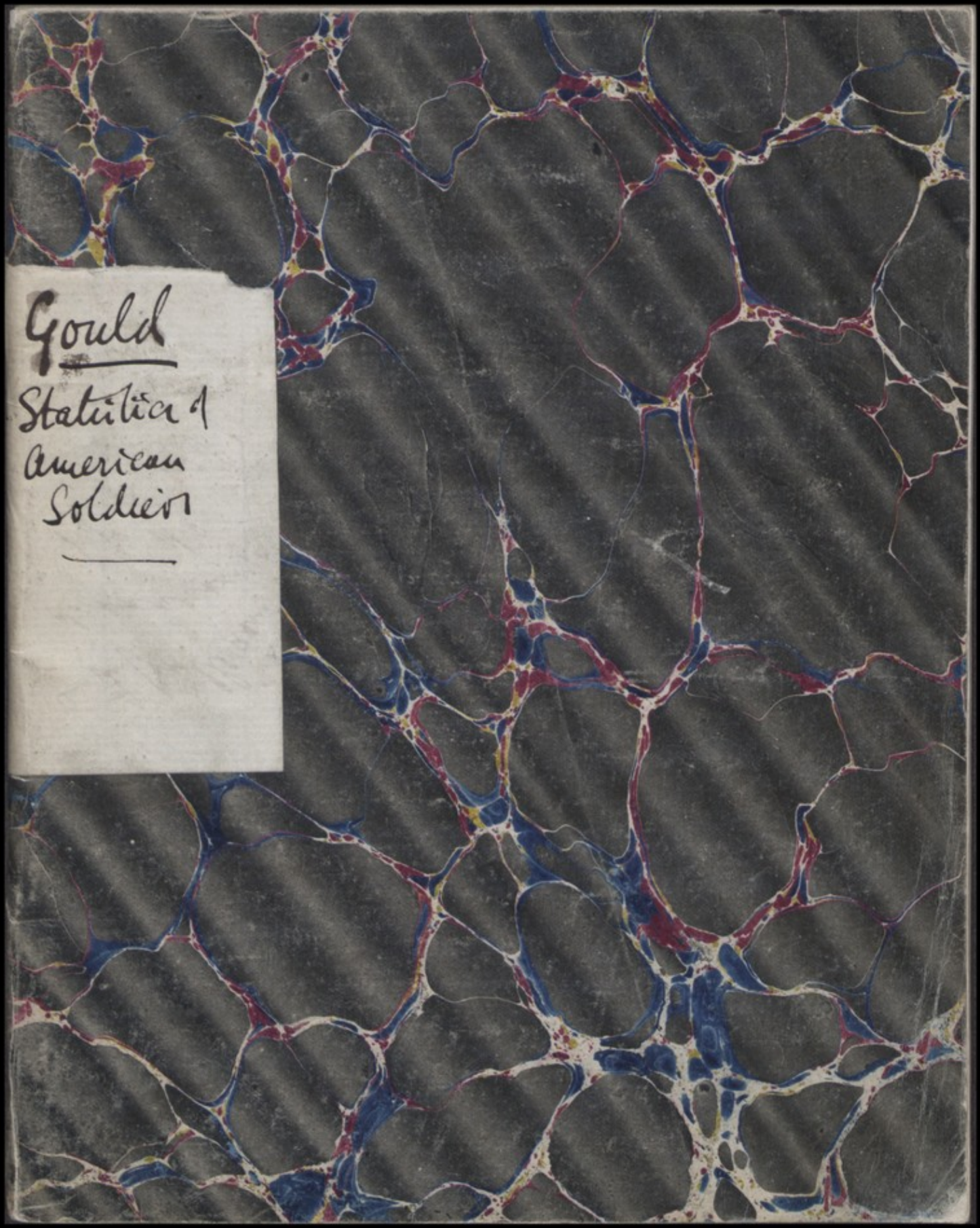

Gould
Statistics of
American
Soldiers

Quetelet Physique Sociale

Table of Stature from men containing Equal Bl. with 281

Anthropometric p. 287 Heights 2 American, 18 France, 18 to 20
18 to 24 Belgium, 15 Italy, Quetelet's Stature
Italy wants reducing to 1000

Circumference of chest p 289. 16 Scotch, 15 Potomac

Thermometric deviations p 295 21

Weight of women at different ages 10 or more 351

Table of drawing from ~~unequal~~ Stature of men contains unequal Bl. with. 353

Weight of newly born 10 or more 355

Force of loins men & women 365 (these are binomials)

Force of 2 hands men & women ~~368~~

Ditto (using the hands separately & adding the results 369 8 binomials

Tendency to crime - total crime & separate 13 398

Accusations 13 404

p25

Sanitary Memoirs of the War of the Rebellion — Statistics of American Soldiers by Benj: Apthorp Gould. Actuary to the U.S. Sanitary Commission New York 1869.

Preface. the Statistic: investigations were made under superintendence of Mr. Elliot Mr. Gould discussed them — There seem to have been some check at last from the War Office. — Much regret that the metric system was not used Mr. T. S. O'Connell who died & Mr. Lucian Brown also have superintended all the calculations

p. 4. Secretary of war stated monthly their information at end of war Gould estimates colored troops 120.000
White " 934.000
Old about 1.054.000

p. 8. Sec of war's order Sept 1865 forbidding further accession to the rolls. — see also p 88. — His authorization p 146 — Gen Officers claims without exception 228
Table of Military Pop: & Army p 13 — also All Troops & Navy 14.

Birth place of the soldiers was ultimately required & obtained with much trouble — 17 Letters were sent to 6000 officers where nativities were not in the records.
18. Total Enlistments (some repeated) 2.556.000. of these 1.205.000 of them the nativities were recorded & 293.000 were afterwards collected finally (partly the remainder are subject of inference. Table p. 18. also p. 27 whence also see p 29. out of 2.000.000 white soldiers 1.500.000 were native Americans

C –	12745	11595	10819	10007	9108	8178
O –	13352	11588	10415	9688	9317	7932
C–O	–1107	–00033	+0404	+0319	–0209	+0246
in table (corr)	–0.083	–0.001	+0.040	+0.032	–0.023	+0.030
			0.040			

C –	0	9282	0	6352	5506	4705	3820
O –	0	6950	0	6111	5638	4617	3995
C–O	+	0332	+	0241	–0132	+0088	–0175
in table	+	0.046	+	0.038	–0.024	+0.019	–0.046
				wrong		wrong	

10819	10007	18178	7282
10415	9688	17932	6950
0 0404	0 0319	0.0246	0 0332
0 0040	0 0032	0.0030	0 0046
		wrong	wrong

2751

3170
2757
413

I can't make out that numbers after a few of the + and –
I can't understand the — ones at all.
in other parts of the book they are usually given, thus 1 85, 0 51.

0 13006
C 12533
+473
9427

p. 35 the proportion who enlist out of the total prop^n of the same age (varying to different ages) is strangely uniform throughout all the States. A formula is given p 36 for determining the prop^n at different ages — hence the calculated n^o of volunteers is given & the observed number placed by their side pp. 38-51 most extraordinary agreement — "a general & overruling law" p 39.

p 53. Accounts for Entries being over numerous at 18-21- &c.

the formula is of the form $S_n = a - bn + ch^n$

Officers follow a very different law to the men (p 55)

p. 62 another formula to give the U.S. life-curve

is $S_n = a \sin^n k^n \theta$. where S = sum of all under age n, a = total number, & k, θ are constants characteristic of the special prop^n under consideration — See p 66

A is somewhat larger than 1° & k a little less than 1.

In some time past the value of θ in U.S. has been approaching 1°. it was in 1830. 2° & in 186 1°.7 — so it tends to $N = a \sin n\theta$ in which case the prop^n is extinct when $n\theta = 90°$ (k being 1)

English & French follow same law with different constants

	k	θ (to Table see)
Ohio U.S. 1850 —	0.9941	1°.7307 page 69
Engl^d & Wales 1861	0.9962	1°.4316 " 70
France 1861	1.0000	1°.0473 remarkably small infant mortality (— ? few infant not increasing prop^n) " 71

see charts accompanying the work for life curves.

by Tables the observed & calculated numbers are remarkably close. (but I can make out the truth of the C-O columns — there must be a certain [illegible] in [illegible])

? how far are the early numbers due to infant mortality in U.S. & England & how far to increasing population?

f4

Age	ages of population as deduced from Census returns (69-71) United States 1860	England-Wales 1861	France 1861
0–5	15298	13352	9677
5–10	13117	11588	8767
10–15	11588	10415	8668
15–20	10625	9688	8701
20–25	18242	9317	8237
25–30		7932	7857
30–35	13012	6950	7421
35–40		6111	7098
40–45	8496	5638	6625
45–50		4617	6155
50–55	5214	3995	5382
55–60		3039	4559
60–65	2910	2751	4160
65–70		1862	2941
70–75	1158	1391	1940
75–80		794	1123
80–85	340	394	490
85 & over		146	199
	100 000	100,000	100,000

Statures - by Sq. Height age & nativity from

1.104	841 white soldiers
39	615 colored soldiers
83	800 white sailors
4	000 colored sailors
1.232	256 in all.

no limit of stature appears to have been established to volunteer troops. For the regular army the maximum was 63 inches, but this has no appreciable bearing on the results here found.

There is a prominent tendency to even the numbers in round inches - pointing to age, to round years

The materials were arranged in groups of 40.000 about the regulation and measurements were without clothing

	State of Enlistment	No. of men measured	Mean stature
Extreme cases are (at age 25 years)	New Jersey	1020	66.7
	Kentucky	1026	68.5
	Iowa	1063	68.7
	West Virginia	712	68.7
	Louisiana	135	66.9
Total ages	New Jersey	18.875	66.58
	West Virginia	17563	68.43

Stature of those @ 25 years of age	New York & Penn:	N. Jersey	Kentucky & Tennessee
Enlisted in	67.33		68.53
Born in	67.97		68.95

Both the state where born, (as ascertained) & that where the physical growth has taken place exert marked influence on stature.
2.9 the genealogical stock & the region where reared combine to prescribe the stature. See Table p 126 &c
Growth is not complete even at 25 years though after 23 the change is small. It does not cease like 30, it is suddenly checked at 21
Schools-colleges afford great facilities to authors to collect statistics
See Table VI p 104-5 the heights at each age according to nativities various countries as well as States
also Table VIII pp 113-4 for Ohio.
p 116. The maximum vitality appears during the average stature
Full stature according to many authorities, of different countries p 119
131. Temp. has nothing to do with stature
Nativity (or race) is not everything. Thus statistics of conscriptions in France & Prussia show wide differences in adjacent districts
Abundance of food has not much effect
Elevation of ground, viz. slopes of Alleghanies & prairies of Indiana both tend the tallest of races.
Can't tell what is the chief agent.

p.132 Sailors are a fact with shorter than Soldiers
their development is forthered as well as checked, their
at 17 the diff" is 2.37 (at 25 - 1.28) at 35 & over 1.25. for New York
183. Sea stunts & delays growth. though full stature is
attained earlier by seamen viz at 28 years against 35 & upwards
in landmen.

p.143. The argument that short men have a tendency to
become sailors is exploded.

p.144. Stature of other races of men.

Colored men. found impracticable to class as Negroes &
Mulattoes, to both natives of Free States & Natives of
Slave States. but these came to the same. so they were combined
Soldiers Oct 25. ~~twenty~~ numbers measured 2005 height 67.07
Sailors " " " 243 " 66.39

Indians

24	"	41	"	68.04
Oct 25	"	14	"	68.09
26	"	45	"	67.84

} 67.98

Table of tall men & Giants in the army. p.154 - protests and p.155
after corrected errors in special enquiry. Table p.153 not to be depended on
2 men of 8ft inches 95.47 feet. - in p.165 the names of men above
who are ~~not~~ doubtful,
so inches, are given - It was found that many tall men had been
exaggerated — One man of 82½ without shoes is certain,
he marched well & bore fatigues as well as ordinary men.
"The testimony is overwhelming that very tall men do not bear
"the fatigues of a campaign so well as persons of ordinary
"stature" p.167

p 168 ~~there are~~ short men — Verified calls it Negro old
240 under 5ft 6 inches high. the born ~~Esquimaux~~ Esquimaux worth.
another man over 40 & Otto as to strength.
p. 178. implies that in Statistics of ~~Scotch~~ English students the
boots were included.
p 179. Refers to learned work. by Boudin "Etudes
ethnologiques sur la taille & le poids de l'homme chez
divers peuples." in the "Recueil de memoires de
Medicine, de Chirurgie et de Pharmacie Militaires" for
March & July 1863 forming part of Vols IX & X.
The French enlisted in America were taller than the
conscripts in France just as the Massachusetts men.
enlisted in Indiana were taller than those enlisted at home.

18 Colour of Hair — Black, Dark, Brown, Light, Sandy, Red, Grey.
In about 60,000 men.
19 Colour of Eyes — Blue, Grey, Hazel, Dark, Black.
20 Complexions — Dark — Light. (about 2/3rds are light)
p 206 Inferences — Light complexions overwhelmingly prevalent
in the Western States — and less so in the Eastern
p. 210 Occupations of Volunteers & recruits

over

p 218. Mean dimensions of the body.
1st a form known as "E" with 35 questions – nearly 3000 answers
2nd a subsequent form "EE" p 223 with 58 divisions of queries.
p. 221. 20 inspectors can furnish from 7500 to 8000 of 15-700 answers
these E a month (reliable)
If subsequently gained knowledge had been available at first ~~understood~~ it would have been better. — Regrets that inches and centimetres were used.
p 225 – Instructions to the Examiners – these seem to have all practised under the chief Examiner for some days
p. 230. Endeavour to see whether the distribution of individual values corresponded to the Law of ERROR – in which case not much good in ~~necessary~~ continuing the investigation
An assumed dimension has been successfully reduced to decimals of the stature (the statistics showed that the bone developments were symmetrical so that became known)
p. 231. The instruments are now distributed & numerous blank forms of EE
p 233 The 3000 Examinees, [illegible] measurements, have rather discordant results
Instruments – Anthropometer – Spirometer, dynamometer, facial angle instrument, platform balance, calibers, & measuring tape.
Anthropometer p. 234. first indicated by a Scotch tailor, an

f 9v

improved form was used. It enables a man to be measured & gauged all over. the various readings are taken after he has left the machine. — There are 3 pairs of this machine in L 234

p 233 In measuring the actual costs was to make the man take off shoes coat & waistcoat, the girth of the chest was measured under the shirt. — Some were measured stark naked. — Many measurements were erroneously made in spite of all efforts to the contrary. — Especially in width of shoulders which was not always taken between the acromion but the full width — Also facial angles.

p. 240. Average, types

240 "There is a human type to be sought, though attainable only by the combination of results from many races" (mean I deny this unless you say suppose the earth peopled to its utmost, under one long standing set of conditions) —

He refers p 206 in which language is Quetelet & to the law of Error & Chances

2nd. Average error, probable error, mean error. — Also to find r_0 = the prob: error of the result, by dividing the prob: error of an isolated measurement by the Square root of the n° of measurements

240 Stature Continued. N° of white soldiers measured EE is 10.876 & by 13 persons, according to EE 79014. — The healthy & the sick were considered separately total 15.007 in actual prison & 3773 others. total 18780

f10v

Gen. mean ~~stature~~ 67.240 — r = 1.68 — Height all ages 251

Gen. mean (about) stature 67 — r = 1.5 ± 1.65 — Height by nativities 252 all ages

" mean (about) stature 64.8 — r = 2.5 ± 2.7 and — Height ± times ± time cap 253

" mean (about) stature 57.0 — r = 1.4 ± 1.44 — Height ± stature of 7th vertebra 254

" mean (about) 30.♂ 31.♀ — r = 1.02 ± 1.07 — Height ± Circumference 257
Height ± middle phalanx 257
Circumference ± from 1 phalanx 259
Girth of neck 260
Breadth of Shoulders 261
Circumference of Thorax 262

35.4 inches

? not very good — ⁂ p. 265

Distance between nipples 266
(very good) Circumference round biceps 267
Length of arm 267
Middle b/s of breadbone
± middle b/s of finger 267
Length of upper arm 269
~~Distance between eyes~~
Distance between eyes 272

2.5 inches
pretty constant

There totat 18,780 are ranged table in 251 according to height no sorting have been made according to age. & yet they ranged very fairly according to law of error.

mean height 67.240 ~~correction~~ probable error $r = 1.676$ & r_0 0.012
age 25-76
(correspond to full stature of about 67.33 - by sir James Paterson)

252 Table of results - for naturities A B C D L

252 Table. from tip of middle finger to upper margin of patella in attitude of soldier. for 4 nationalities

254 Height to spine of 7th vertebra

256. Height to perineum - by the followed

257. Height to middle of patella. by the followed

26 girth of neck smallest in New Englanders largest in Germans

261. Breadth of shoulders - precautions in measuring

262 Circum of thorax under clothing across nipples
both before & after a full & halatoria & inhalation
The distribution is very symmetrical. μ 262
34.5 each 37.2 each

272 Distance between eyes, & between pubis, abhorrently red very good.

f 11 v

Dimensions of foot 273
Length
Thickness [Height] of instep 274
at
round heel 275

f. 316. Distance between eyes

1000 Sailors	†	2.473
Students		2.484
10.8) Polish Soldiers	1st Series	2.606 †
	2d Series	2.492
Mixed races		2.670
Indians		2.716
Full blacks		2.714

† see f. 293 The measurement in the last 3 lines are wild conjecture

Stature of Indians 309

† These were taken carefully; meaning with a rule between the pupils. In the 2d series they measured (A) between outer angles of eyes and by between inner $\frac{a+b}{2}$ gave distance of pupils

Mean perforation of body between f. 325 & 335 numerous Cases

27 Length of heel very constant

Their varies ½ inch.

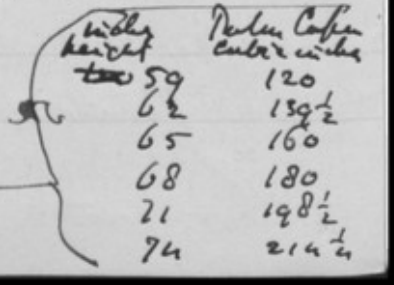
These above are all tabulated in p. 246 as means
p. 286. Sailors — Their means are different from
those from that of the soldiers & their height is less
by 1.4 inch — Their legs (absolutely & perimeter) are longer than soldiers
p. 294. Students
p. 297 Colored soldiers — Table full dimension p. 303
p. 304. Indians 507 in number. Table full dimension 311
311. Table comparing all the races. All measurements.
319 The Mulattoes occupy frequently a place outside of
rather than intermediate between the races whence they spring
Their mentality is superior
Sailors are short bodied. Students long in skin
The professors received simple numerical values
except in coarse abnormalities
are inferior to that the height = than of extended arms.
Mean proportions of body 325
358 Table of proportional dimensions soldiers sailors Blacks Indians Students increases as stupidity increases, smallest
in Students — next Sailors, 3 Soldiers, Indians, Mulattoes & negroes
In play of chest, the sailors far ahead of the colored races.

f12v

bolt by good weight – 404
later between weight & stature 406

475. Mean Pulmonary Capacity of mean 64.5 – 67.5 inches in height
Mean 185.36
Prob. Var 24.92

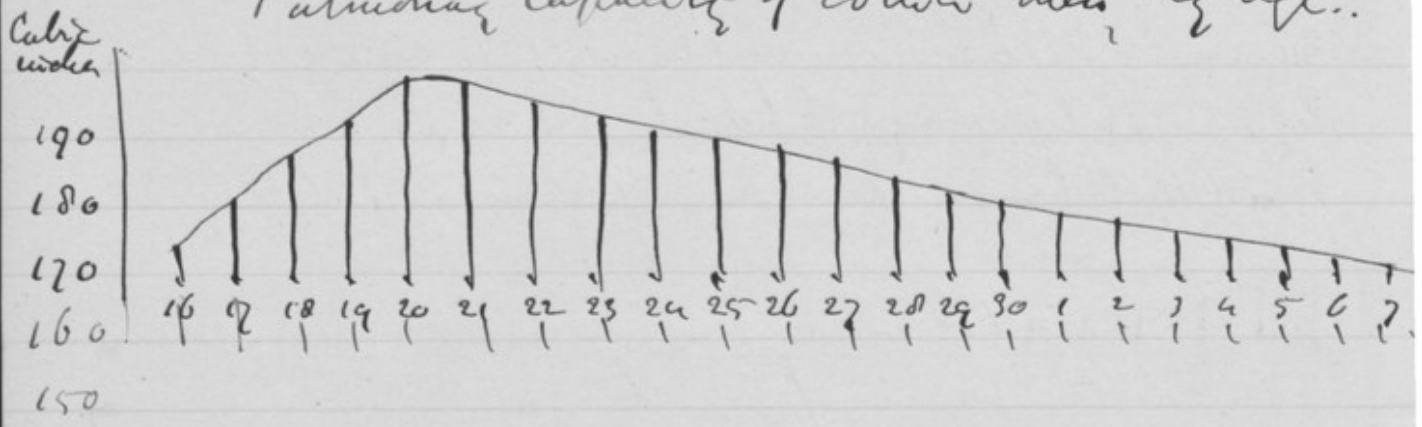
479 increase of Pulm: Capac: is closely proportional to increase in height



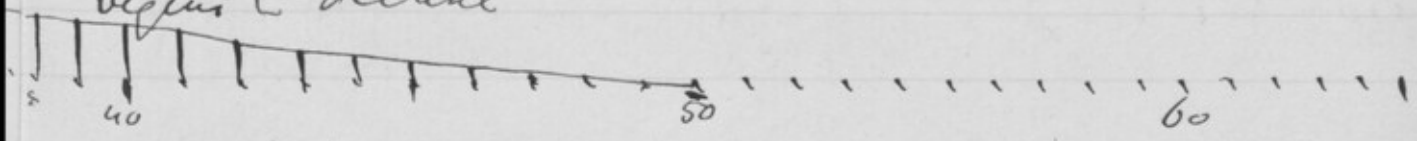
368 To measure the head the author regrets he had not Calipers with parallel arms
370 Measurement of head of Australians & natives
372 ditto Tasmanians
381. General table various races (6 divisions)
383 ditto various Australians
Whence the students head is broad at back & narrow at angle of jaws — but ? away [illegible] see note p 382
384. Facial angles — instrument used.
p 393 great bother about the personal equation of the measurer
402 weight & weight of under clothing
409 Ratio of weight to stature it varies with the age.
440 Relation of weight to circumference of chest.
448 Determination of muscular strength. Dynamometer.
467 466 Table Pulmonary Capacity. Spirometer. just a common bellows gas meter
470 3 successive exhalations were made in each case
471 table general
472. Hutchinson's conclusions abstracted from the Med Chirurg Trans XXIX p 248 — Compare table on p 476 with that on 470 & there excess of pulmonary capacity of whites over blacks 183 inches against 164
488. Pulmonary capacity does not follow circumference of chest closely. Hutchinson thought it did not do so at all. — see Lee p 497 on the play of the chest: It

f13v

Pulmonary Capacity of White men by age..



seems the diaphragm has most to do with it
Maximum Pulmonary Capacity. Best at best at 20½
years (Hutchinson said 30) & then it rapidly
begins to decline



504. Respiration — very wide range from under 17
to about 35 per minute.
(? One ought to compare the product of pulmonary capacity
& no. of respirations per minute to find the total
activity)

525 Vision. Tests the maximum distance at which
double-leaded small pica type could be distinctly read
& requires in colour blindness — the paper seen
of a bluish tinge ~~& the~~ The value of this test to be ascertained
to be nearly No 11 of Jäger's scale & between
5 & 6 of Snellen — the writer regrets he had not
Snellen's table. Where possible a rod & a
measuring tape was stretched ~~over~~ above the main head
& was easily read off by the examinee — Head of bicycle
was always given — About 10,000 men were tried
the results soon left.

Mean Stature of Negro in Annual Report

White Soldiers	67.8
Sailors	66.6
Students	62.3
Full Blacks	65.3
Mulattoes	67.2
Indians	61.8

p. 530. Accounts for small distinctness of Negro among sailors

543 Color Blindness 1 in 50 men had it.

Proportion of color blindness according to color of eyes

	No. Cases	Proportion
Blue	75	42
Gray	35	19
Hazel	33	18
Dark	32	18
Black	6	2
	181	100

Full blacks & Indians only ½ as color blind as White Mulattoes still better

549 Condition of teeth

562 Baldness

569 Education & Parentage

576 Military Service — the particulars of Enlistments, Sick, &

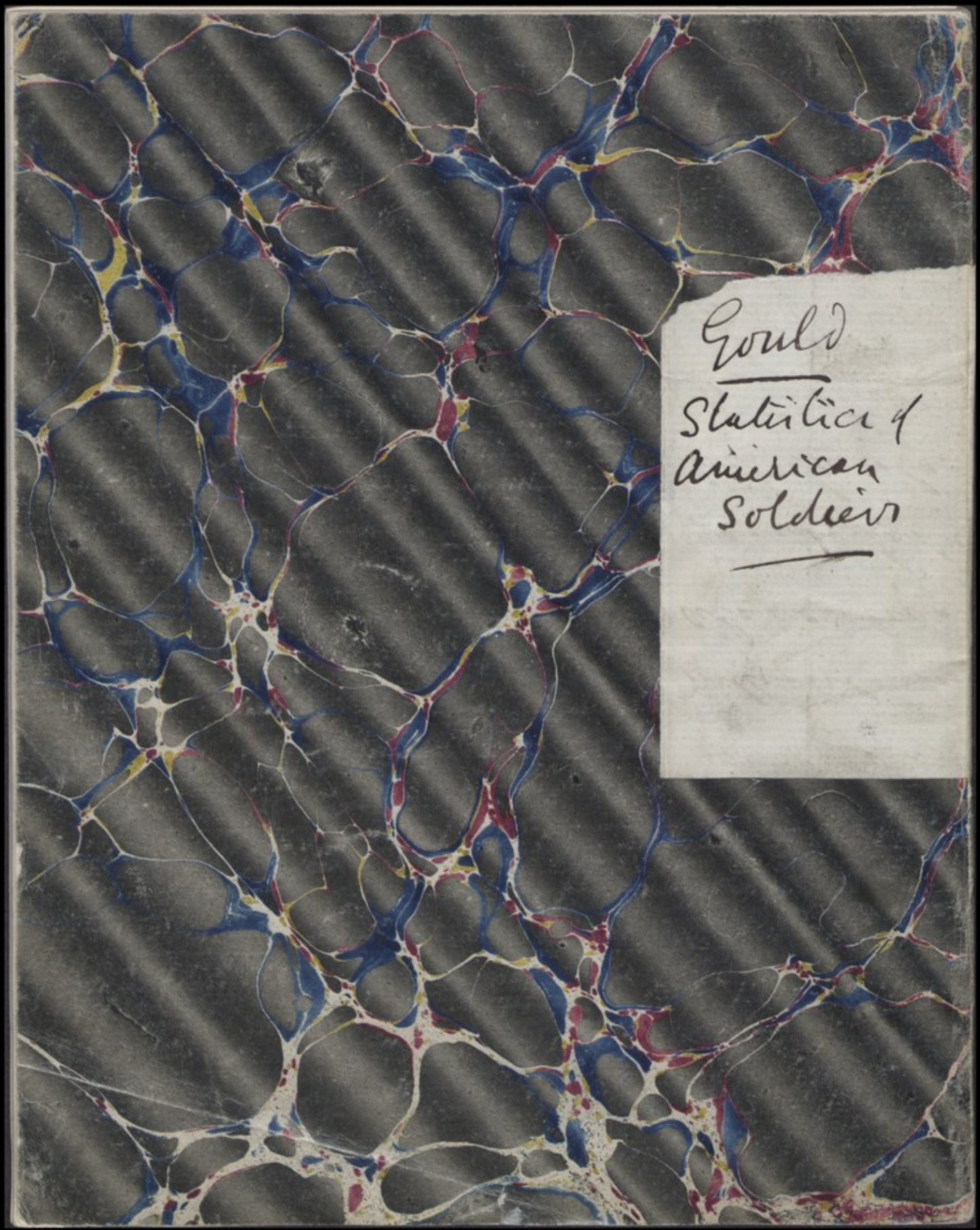
Notes Fig.

p. 252 the law of error holds equally well for different nativities with their correlative mean peculiarities. — the type centre thereby.

Nativity	Mean height	Probable variation in an individual
New England	67.202	
Mich: Wisc: Ill	67.223	
New Jersey & Penn	67.097	
Ohio & Indiana	67.687	

Nativity	Mean full stature	Prob var: in an indiv
Ireland	66.74 inches	1.492
N. York N Jersey Penn:	67.29	1.648
Ohio & Indiana	67.98	1.566

Could the mean pulmonary capacity variates be obtained from W. Could the mean heights 67.99 & 69.89 later series numbers 612 & 721 men respectively. — Then could be mean height 66.94 (about 2213 men)


Gould
Statistics of
American
Soldiers