

## **Material for Three Lectures on Heredity and Nurture**

### **Publication/Creation**

c1887

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It may be <sup>objected</sup> ~~thought~~ by some that the method of science, though they ~~cannot~~ <sup>cannot</sup> express the distribution of <sup>the general</sup> ~~certain~~ measurable faculties, among a population, cannot go far in helping us to what we chiefly want to know us to a knowledge of the general effectiveness of a ~~native~~ man or of a nation as laborers, artisans, soldiers & so forth. They would urge that ~~many~~ more considerations have to be taken into account than any ~~number~~ of measurements in detail however <sup>many</sup> ~~thoughtful~~ <sup>however</sup> designed, ~~can~~ <sup>could</sup> ~~possibly~~ <sup>possibly</sup> do justice to ~~the~~ <sup>that the sum total of these is not measurable</sup> ~~total~~ <sup>first</sup> ~~the~~ <sup>the</sup> ~~answer~~ <sup>the</sup> ~~is~~ <sup>are</sup> as a matter of fact much better versed in forming estimates of general efficiency than of making measurements in detail. The habit of <sup>expressing</sup> ~~reducing~~ the <sup>efficiency</sup> ~~value~~ of ~~all~~ things to a money value powerful conductor towards <sup>the</sup> ~~the~~ <sup>the</sup> ~~exercise~~ <sup>the</sup> ~~perfection~~ <sup>perfection</sup> of this art of doing this. We are continually engaged in estimating relative efficiency. If we have to select a candidate for



a host, claims merits of very different kinds have to be balanced with the result that ~~the decision has to be~~ <sup>the decision has to</sup> ~~there is a~~ <sup>decide</sup> speedily become unanimous as to the general status of the ~~agreed~~ <sup>agreed</sup> applicability ~~that~~ <sup>that</sup> so & so are quite unfit that ~~many~~ <sup>other</sup> others have merits but are ~~not~~ <sup>not</sup> ~~worth further~~ <sup>not</sup> ~~consideration~~ <sup>with fine rank</sup> & that the ~~choice~~ <sup>final</sup> choice ~~is limited~~ <sup>is limited</sup> to some small number of 2 3 or its ~~may be~~ <sup>may be</sup> half a dozen ~~men~~ <sup>men</sup> of the competitors

Secondly, I ~~will~~ <sup>will</sup>

I ~~have not~~ <sup>will</sup> ~~to~~ show that these schemes admit of being applied ~~with~~ <sup>with</sup> to mere estimates of efficiency with the result of obtaining ~~more exact~~ <sup>more exact</sup> ~~values~~ <sup>more definite information</sup> from these than might have been expected.

For the purpose of illustration I will marshall  
the data that are contained in an admirable little  
memoir of only 4 octavo pages by Sir James Paget.  
It is entitled "What becomes of Medical Students" and  
is published in Vol V of St. Bartholemew's Hospital  
Reports. I will quote the first sentences to show  
its purport

"It is said -

Hospital"

96  
 128  
 224  
 1000  
 776

Out of these 1000 pupils, 96 left the profession and 128 died either during pupillage or within a few years after commencing practice. As to the remainder 776 Sir James Parry divides their careers into 5 classes.

Class I consisted of 23 who achieved distinguished success, by gaining & maintaining leading and important practice within 15 years after their entry as pupils, or by holding important public offices, or by becoming medical officers of large hospitals or teachers in great schools.

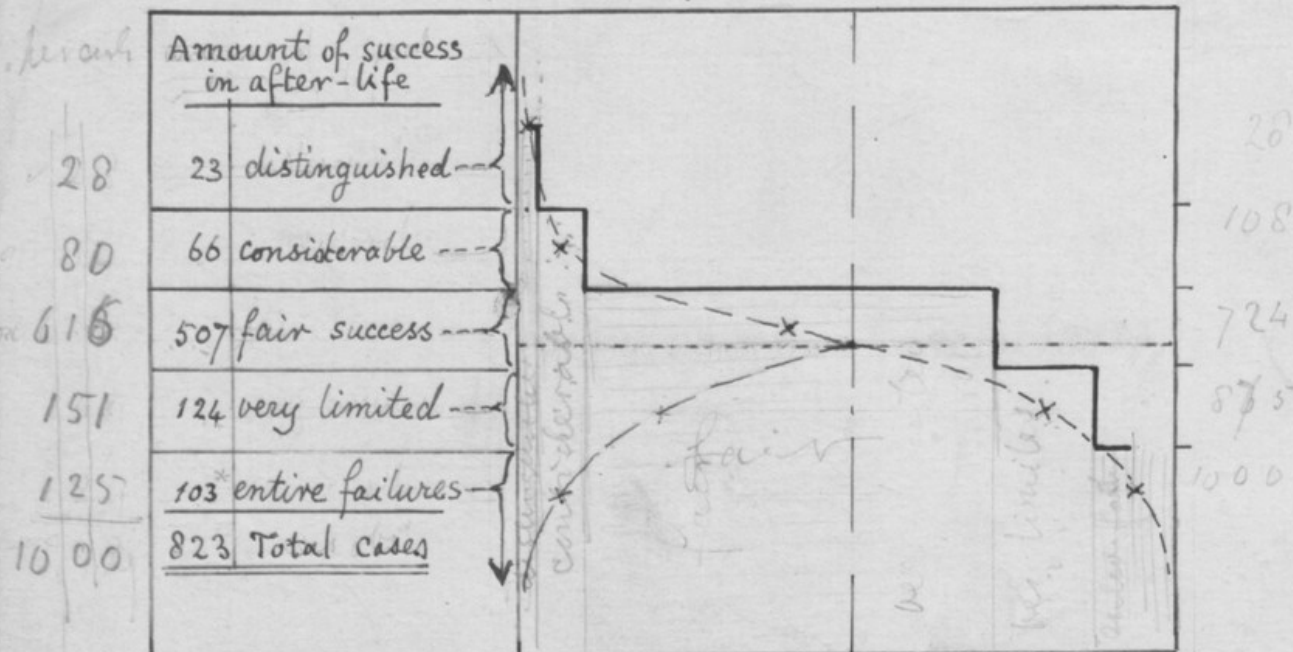
Class II consisted of 66 who achieved considerable success, by gaining high positions in the public services or leading practice in good districts, or by gaining more than ordinary esteem and influence in society.

Class III contained 507 who had fair or moderate success, as shown by having a fair practice, enough to live upon, with a good professional and personal reputation, or by

95r

M

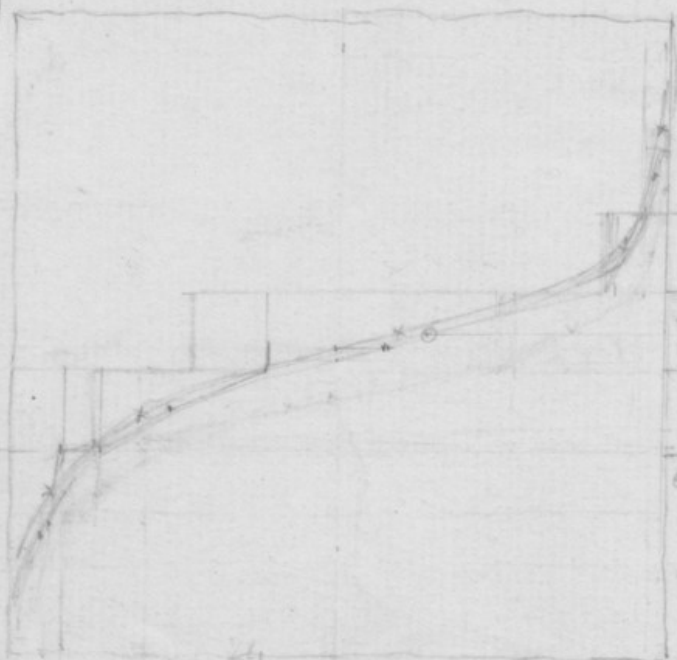
# WHAT BECOMES OF MEDICAL STUDENTS. 823 cases, from Sir J. Paget, Barth: Hosp: Rep. vol V.



$$833 : 1000 = 724 : 833 \quad \therefore \quad 2 = \frac{724}{833}$$



55



| Scene          | 2.16 | mm |
|----------------|------|----|
| dic 15         | 15   |    |
| cons 65        | 50   |    |
| fais 300       | 438  |    |
| ben lin 700    | 200  |    |
| end of fai 823 | 123  |    |
|                | 823  |    |

about 60 places diff.  
 24 : 0.23 : 29 : 100  
 40 : 0.23 : 1 : 100  
 7.5 : 100

f. 5v



holding ordinary appointments in the public service  
or in the colonies, with prospect of gradual promotion.  
Class IV contained 124 who had very limited success,  
that is to say, that in the course of 15 years they were  
not even in moderately good practice, nor ~~apparently~~  
likely to attain it, or who were just living and that not  
well by their work; or were still employed as assistants  
in ordinary practice, or were erratic and never prosperous,  
~~they were~~ or doing much less than <sup>considerably</sup> their opportunities they  
ought to have achieved. Class V contained 56 who  
failed entirely. ~~had however thought it proper to~~  
~~raise the number to 103 by~~  
adding 47 ~~on grounds that it would take too long~~  
~~to state in detail~~ <sup>failures</sup> gathered from the histories of those who  
left the profession or <sup>who</sup> died prematurely, & who <sup>would</sup> ~~numbers~~  
~~prematurely have failed in any case~~ <sup>as</sup> ~~altogether~~ <sup>have had</sup> 224. As for the balance  
of those after these 47 known failures had been



abstracted <sup>I must</sup> suppose them, in pure ignorance of  
 their careers <sup>that they would have</sup> ~~the~~ ranked in <sup>and</sup> the same proportion  
 as the rest <sup>in the different classes</sup> had they remained  
 in the profession. <sup>177 in number</sup> Therefore I drop them out of  
 the account, <sup>I treat them as such</sup> ~~which~~ deals now with 823 cases.

Table

> Next <sup>intended</sup> 5 classes are I presume <sup>defined</sup> ~~made~~ in the  
 supposition that they <sup>are</sup> divided by equal ~~inter-~~  
 grades of success, and ~~the truth of this supposition~~  
 I shall ~~proceed to test~~ by throwing the classes  
 into a scheme. The highest & lowest limits  
 of possible success are of course indefinite.  
 As a matter of fact the 23 distinguished successes  
 included the Professors of Anatomy in Oxford, in Cambridge  
 and in Edinburgh, and the 103 entire failures included  
 two men who committed suicide under circumstances of great  
 disgrace, and Palmer the Ragged murderer, who was hung.

Sir James Paget says of him that  
"he was

use well"  
Before marshalling the results, I should like  
to read the concluding paragraph of this little memoir  
which runs in close accordance with what I  
shall insist upon in my next lectures  
" of course

(to end)

"

Now let us see what we can make out of these estimates by throwing them into a scheme

Fig.

It will be seen in the first place that they form a very fair curve and therefore that the <sup>integrals</sup> selection of classes <sup>are</sup> apparently <sup>equal</sup> fair one. We have a right from much experience to expect, I ~~would~~ <sup>do not</sup> go so far as to say to assert, that if the classes were separated by equal grades the curve of the scheme would be normal. As it <sup>proves to be</sup> fairly normal we <sup>can</sup> reason backwards, and say that the selection of classes appears to be fair.

In the next place we have means of making a very exact comparison between the success of medical students from any two hospitals. We may do so exactly in the <sup>same</sup> principle on which I showed that

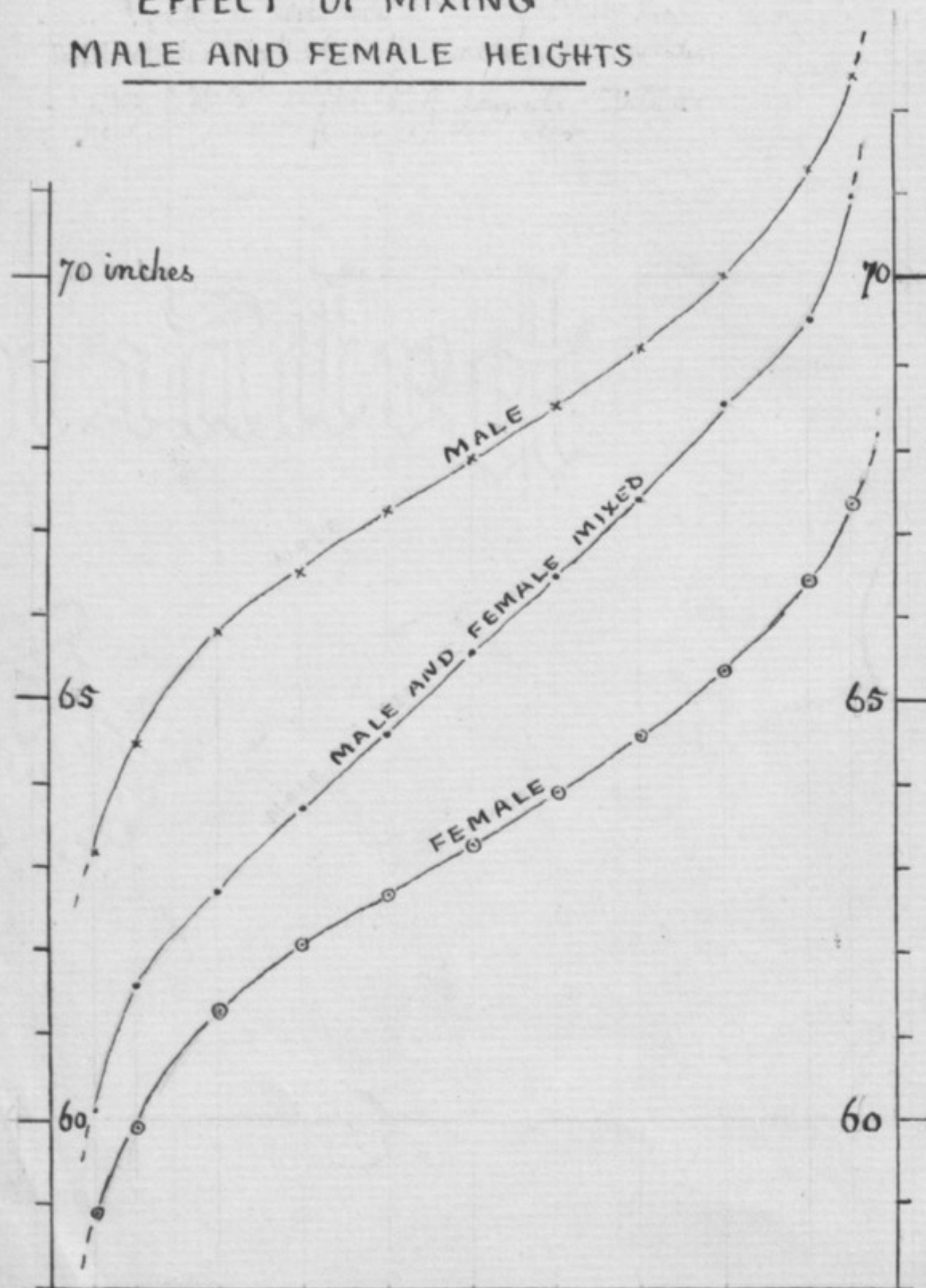
the strength of men & women admitted of being compared upon the former diagram, with a distinct numerical result.

If there be worth while to go ~~forth~~ more minutely into the question, ~~it would be found~~ we might describe in some detail the success in life of the medium man or such case, a better than of a few persons at and about the medium. ~~There would be a~~ <sup>a good idea of average success which could not be arrived at in any other way</sup> ~~under such conditions as these would not be arrived at in any other way~~ <sup>under such conditions as these would not be arrived at in any other way</sup> ~~do not~~ <sup>do not</sup> ~~take~~ <sup>take</sup> much of your time in speaking

of these schemes because they are a necessary part feature in my method of treating heredity and partly when treating of the environment.

I deal with families <sup>exhaustively</sup> in their completeness, and not only with averages <sup>and I avoid picking</sup> ~~not with~~ particular instances. <sup>but exhaustively</sup> ~~Then~~ <sup>the</sup> ~~characteristics~~ <sup>of a family of brothers</sup> can be set forth in a <sup>fraternal</sup> scheme, which I treat as easily as if it were a single figure a whole, and similarly <sup>as regards</sup> ~~the~~ <sup>of the</sup> characteristics of a nation. I cannot properly in these brief lectures go into details but shall be content if I leave the impression that

# EFFECT OF MIXING MALE AND FEMALE HEIGHTS



vast masses of <sup>observations</sup> ~~figures~~ admit of being <sup>marshalled in an orderly way</sup> ~~dealt with~~ in their completeness, by very simple though somewhat subtle processes, and <sup>guards</sup> that there is an unbounded field of unexplored work <sup>on the varieties of</sup> ~~open to the~~ Human Faculty open to ~~the~~ competent statisticians.

Summary

My object of this lecture has been chiefly to show that Human Faculties admit of being measured with ~~ever~~ increasing completeness and accuracy as the years go by and that methods exist whereby we can compare a man in any respect with others of his class, and a nation with <sup>any other</sup> nation. But the art and practice of doing all this is young, and workers are needed to carry it on. ~~But the first thing is to obtain abundance of data~~







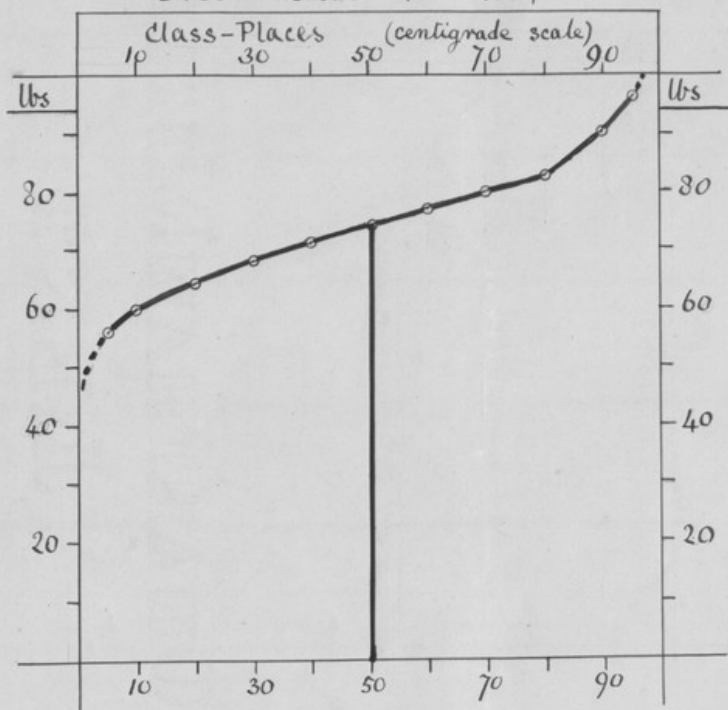
are not necessarily noble in that high sense  
of the word, and may possibly be the very  
reverse of Eugenic

The purport of the two next lectures is to  
set forth the conditions of Eugenism so far  
as we understand them. I shall confine  
myself to pointing out well ascertained facts  
and to insist on the imperfection of our knowledge  
and the urgent need for accurate observation  
and record in a most important and  
interesting branch of modern science.

STRENGTH OF PULL, 'as an archer.

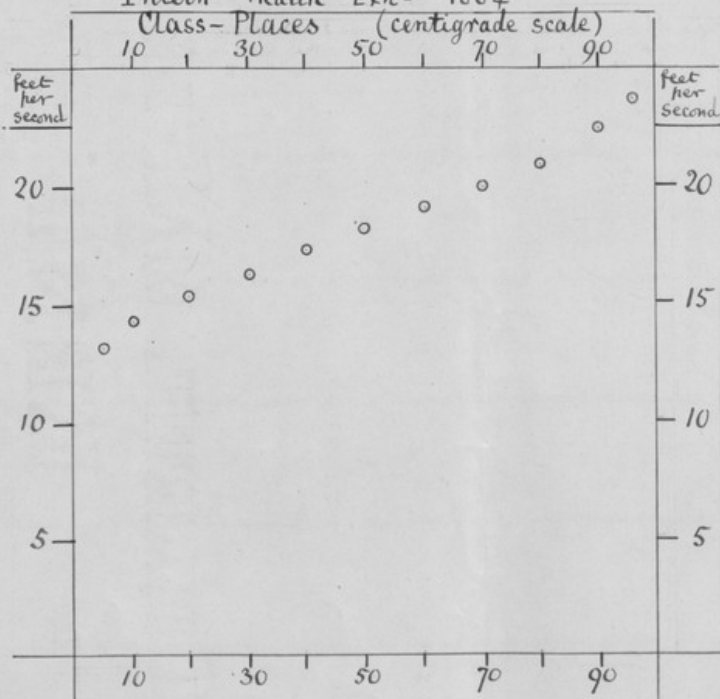
519 males, ages 23-26

Intern: Health Exh: 1884

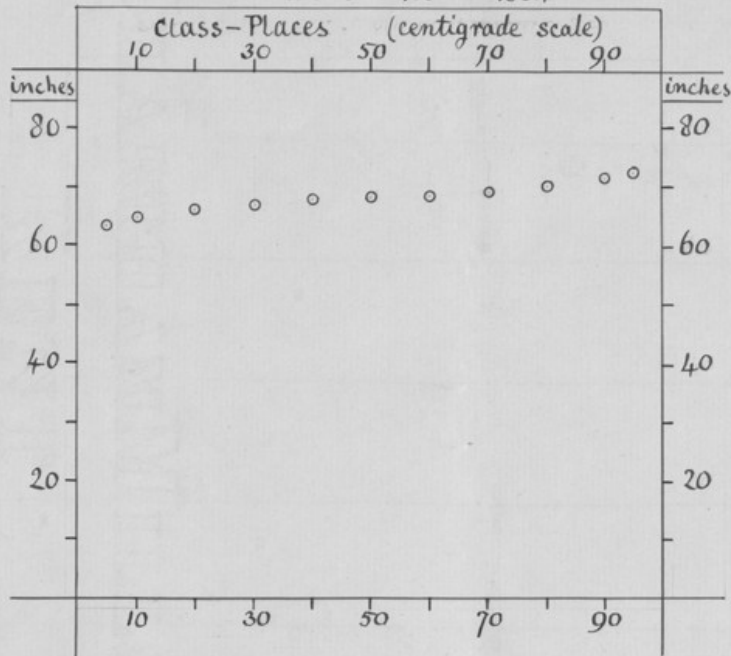


SWIFTNESS OF BLOW OF ARM.

516 males ages 23-26  
Intern Health Exh<sup>n</sup> 1884



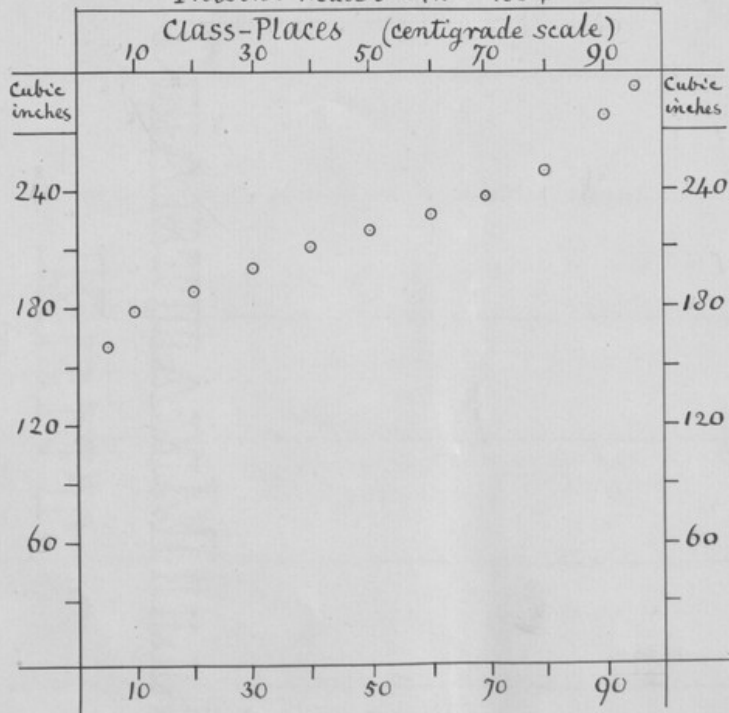
HEIGHT, WITHOUT SHOES.  
 811 males ages 23-51  
 Intern: Health Exh<sup>n</sup> 1884



# BREATHING CAPACITY.

212 males ages 23-26

Intern: Health Exh<sup>2</sup> 1884

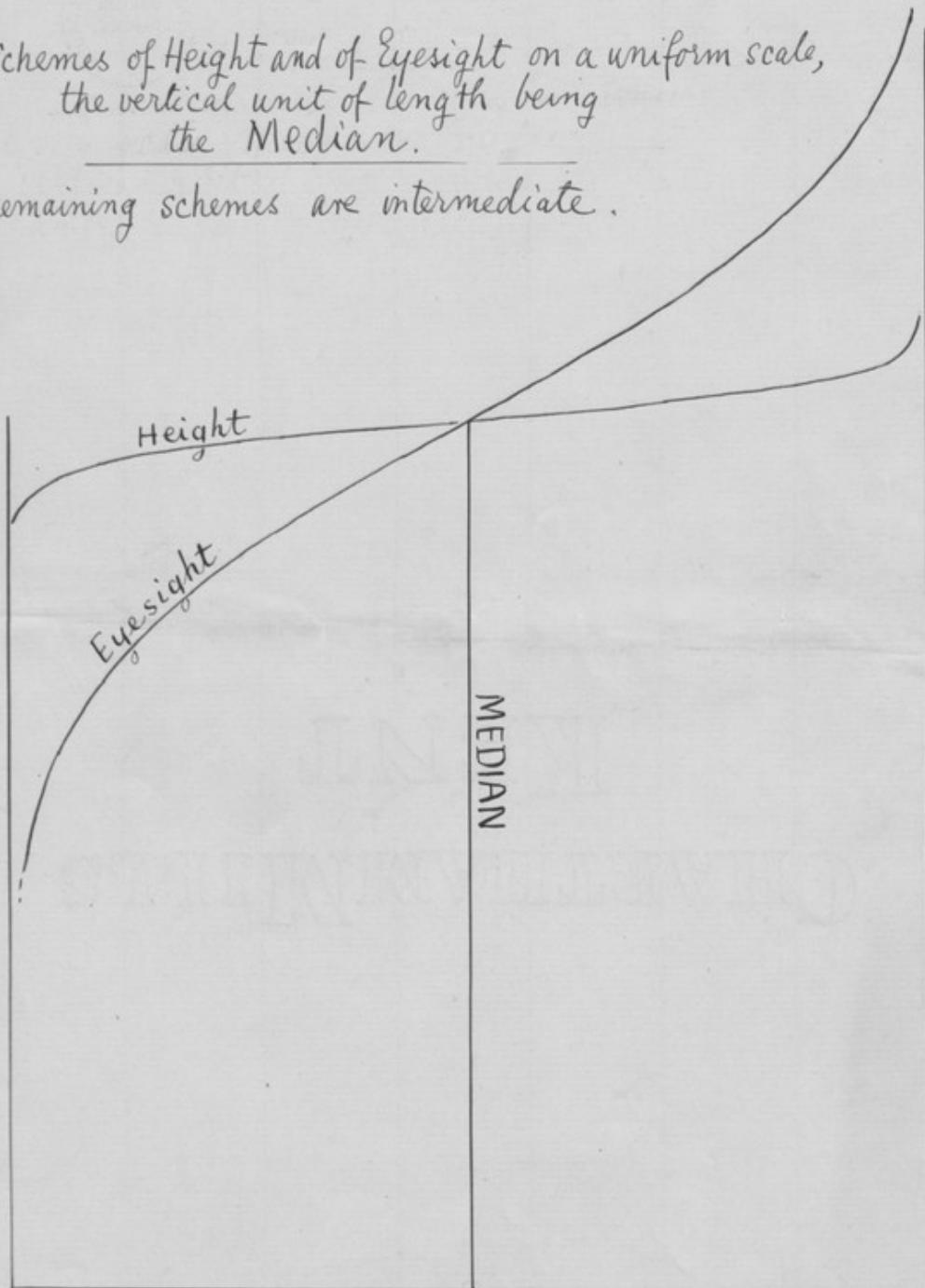


59

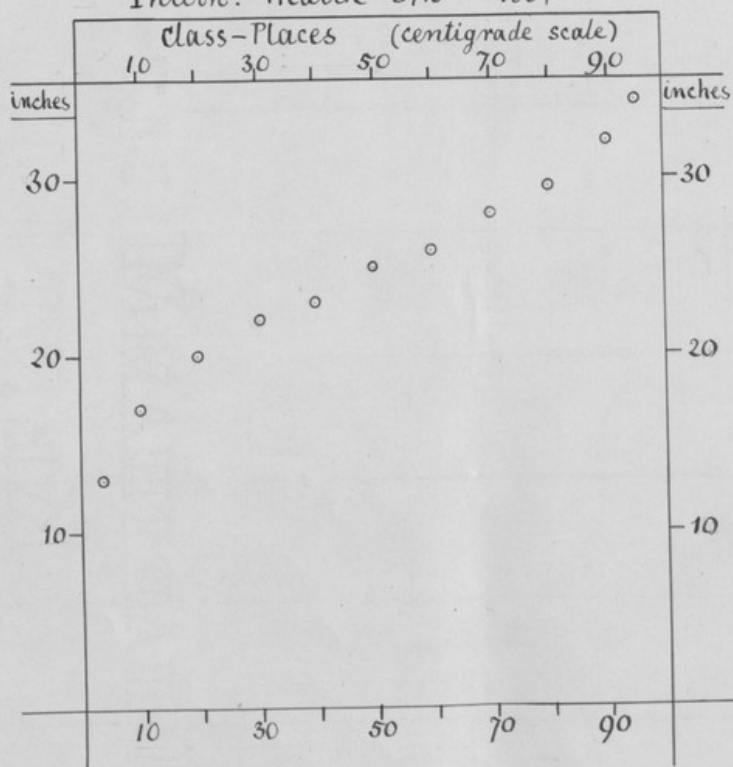
9

Schemes of Height and of Eyesight on a uniform scale,  
the vertical unit of length being  
the Median.

The remaining schemes are intermediate.

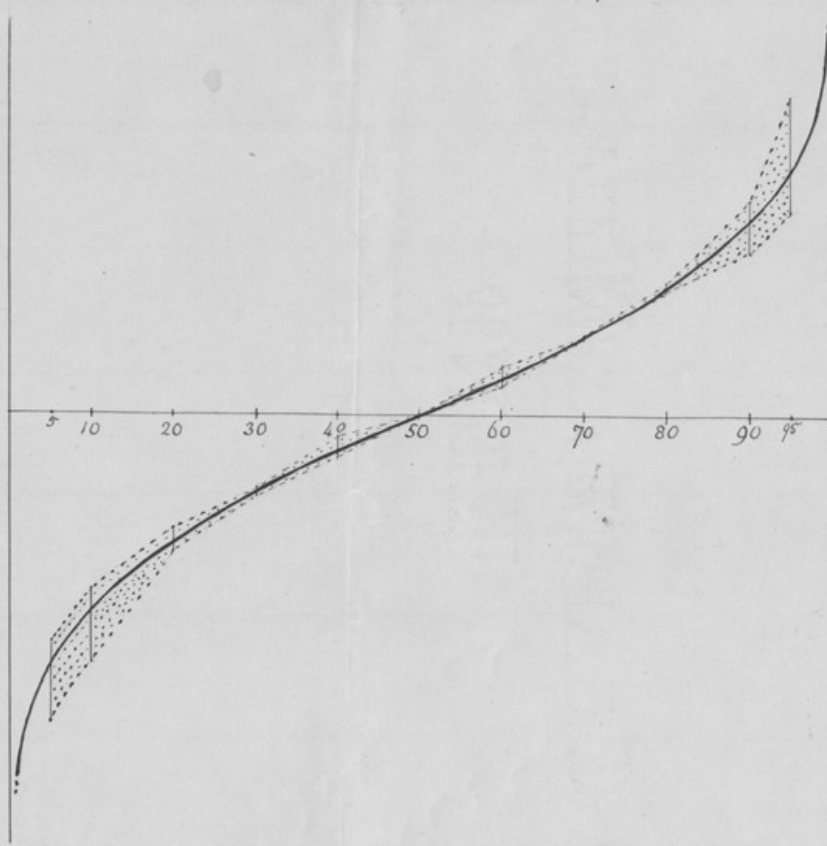


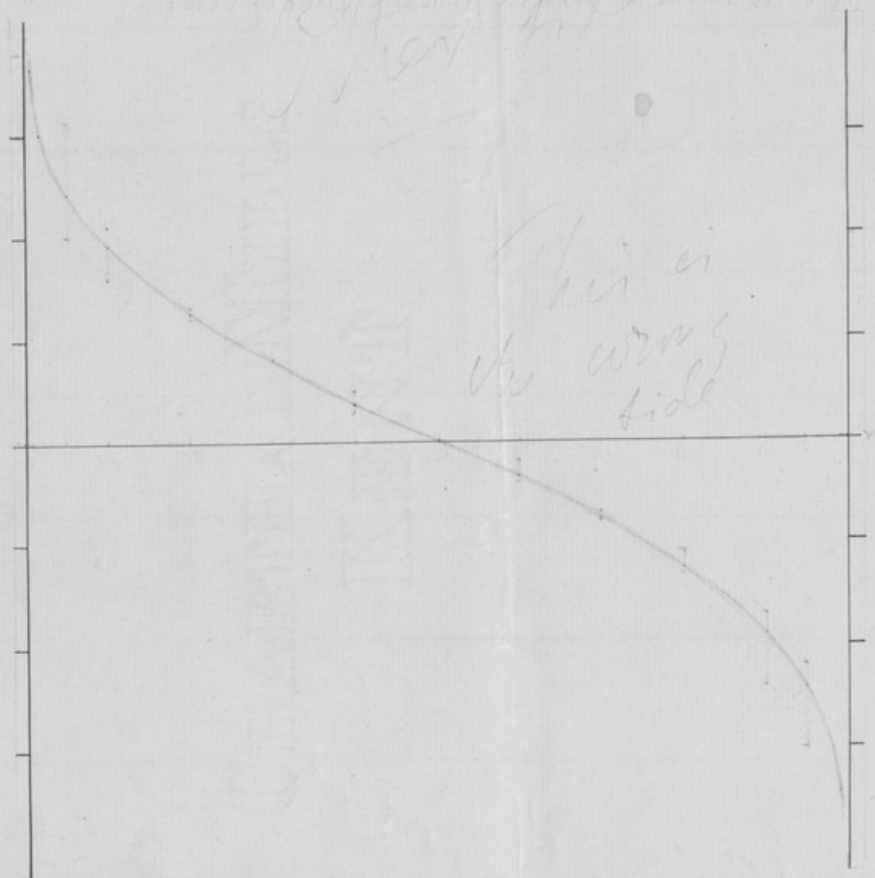
EYESIGHT, distance of reading diamond type  
398 males, ages 23-26  
Intern: Health Exh<sup>n</sup> 1884





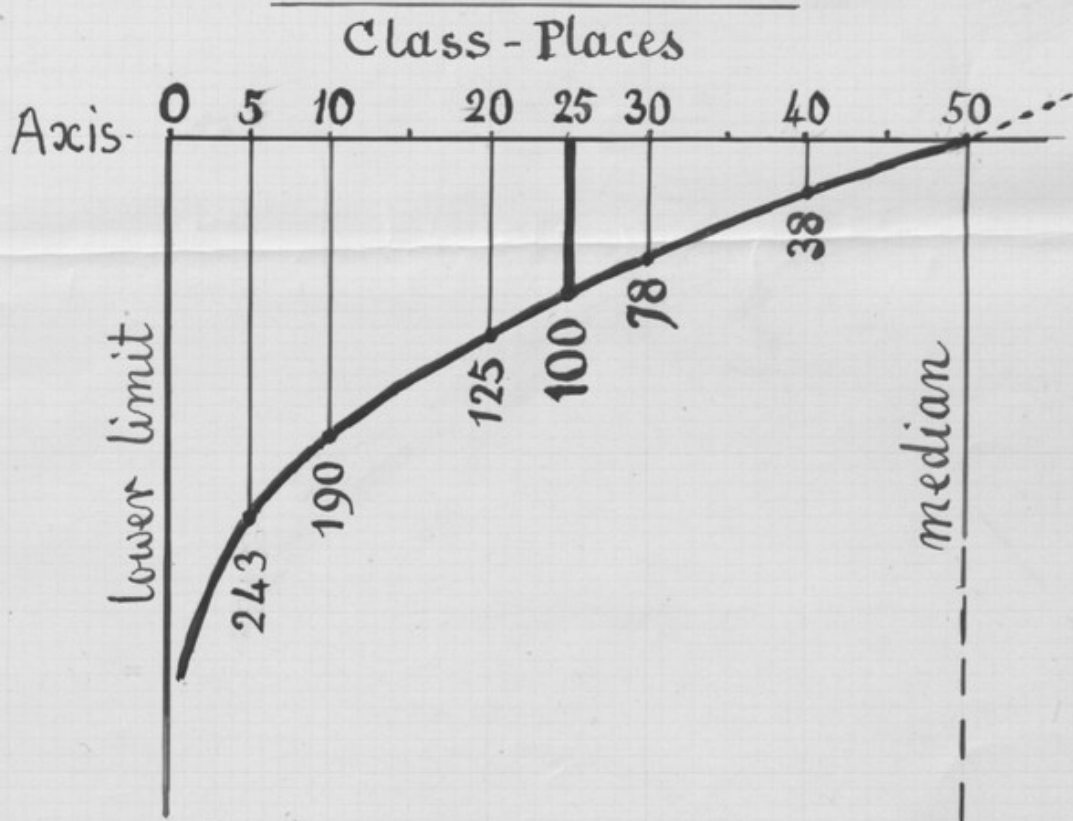
The six curves derived from observations on Males (adults) of Height, Weight, Breathing, Pull, Swiftmess of blow, Eyesight, when drawn on similar gradients, all fall within the shade. The bold curve is derived from the "Law of error"







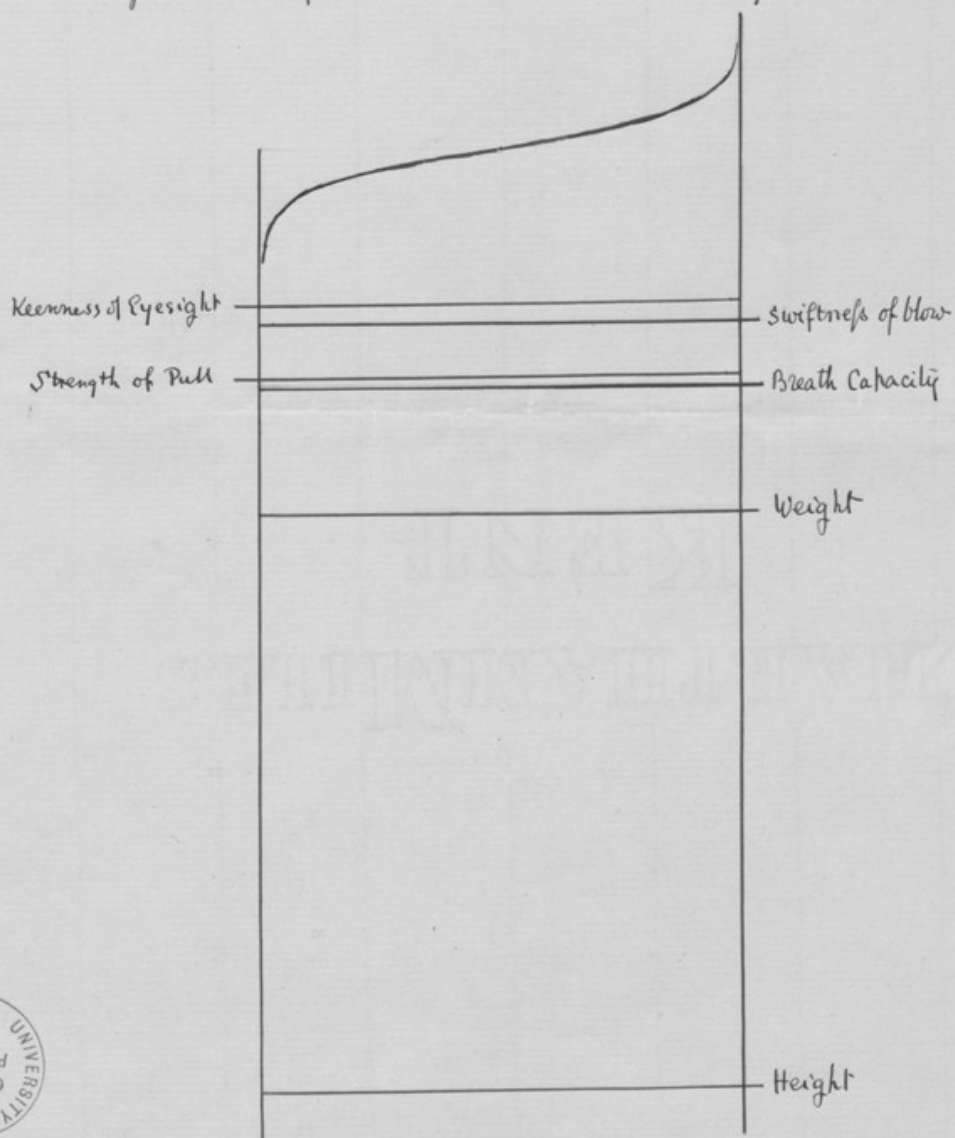
## LOWER HALF OF NORMAL CURVE.



TOMES HALL OF POLYMER CHAIR



six schemes drawn on a uniform scale,  
the vertical unit of length being  
the gradient of the curve between 30 and 70



# NORMAL SCHEME

Values to be subtracted from, or added to  
that of the MEDIAN, at the correspon-  
-ding Class-Places (centigrade).

|      |      |      |      |      |      |     |                  |
|------|------|------|------|------|------|-----|------------------|
| 2.43 | 1.90 | 1.25 | 1.00 | 0.78 | 0.38 | 0.0 | subtract         |
| 5    | 10   | 20   | 25   | 30   | 40   | 50  | CLASS-<br>PLACES |
| 95   | 90   | 80   | 75   | 70   | 60   | 50  |                  |
| 2.43 | 1.90 | 1.25 | 1.00 | 0.78 | 0.38 | 0.0 | add              |

## HEREDITARY CONSUMPTION

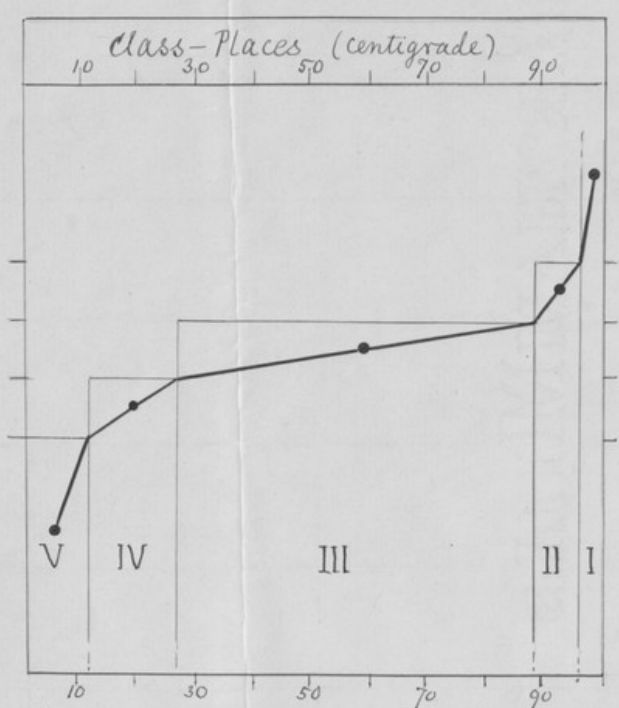
| Cases collected by               | one or both parents consumptive | Total No of their children | of whom          |                |                   | Total affected    |    |                          |
|----------------------------------|---------------------------------|----------------------------|------------------|----------------|-------------------|-------------------|----|--------------------------|
|                                  |                                 |                            | were consumptive | were suspected | died in childhood | estimated by D.T. | FG | according to calculation |
| D <sup>r</sup> Thompson          | one                             | 177                        | 67               | —              | 23                | 90                | 75 | 69                       |
| F. Galton                        | one                             | 169                        | 39               | 30             | 16                | —                 | 67 | 65                       |
| D <sup>r</sup> Thompson          | both                            | 39                         | 21               | —              | 10                | 31                | 27 | 25                       |
| F. Galton                        | both                            | 16                         | 6                | 3              | 4                 | —                 | 10 | 10                       |
| The above reduced to Percentages |                                 |                            |                  |                |                   |                   |    |                          |
| D <sup>r</sup> Thompson          | one                             | 100                        | —                | —              | —                 | 51                | 42 | 38                       |
| F. Galton                        | one                             | 100                        | —                | —              | —                 | —                 | 40 | 38                       |
| D <sup>r</sup> Thompson          | both                            | 100                        | —                | —              | —                 | 79                | 62 | 62                       |
| F. Galton                        | both                            | 100                        | —                | —              | —                 | —                 | 63 | 62                       |



F. Galton Lecture 16



# WHAT BECOMES OF MEDICAL STUDENTS



I. Distinguished, 28 cases.— II. Considerable, 80.  
 III. Fair, 616.— V. Limited, 151.— Failures, 125.  
 TOTAL 1000 cases.

14 Dec.

Physical Lab. <sup>F.1</sup>  
S. K. M.



Dear Sir

I have not made lantern slides for sale before, so I hardly know what to charge for them. I think you said that you would pay the usual price that other makers had charged you, there were 21 or 22 of them, I am not certain which. I enclose the prints & remain yours.

respectfully

R Chapman

Photos of  
Diagrams at my  
S. Wainwright lectures  
in 1887

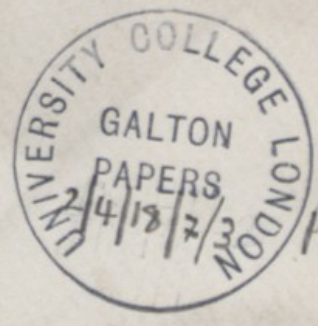
f.3



Francis Galton Esq.

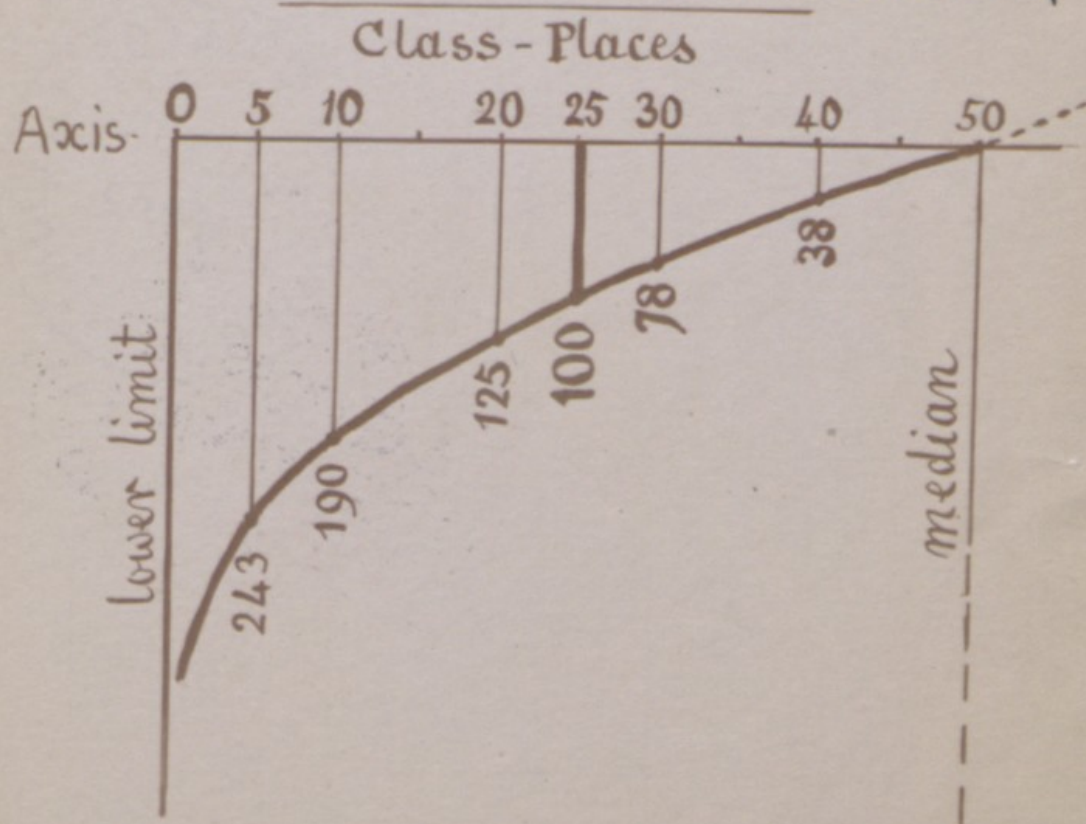
42 Rutland Gate

S.W.

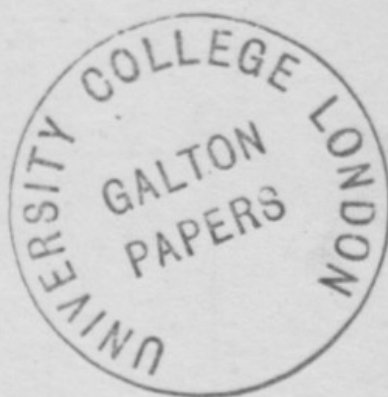


part II

# LOWER HALF OF NORMAL CURVE.

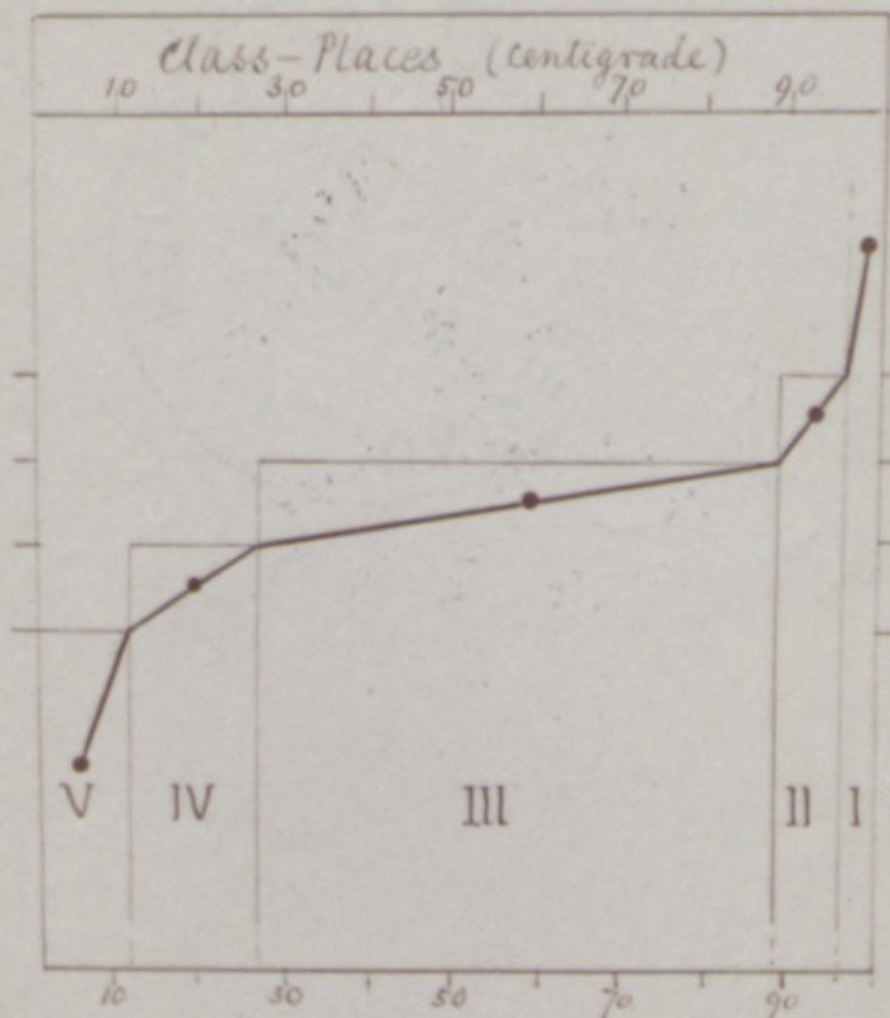


f.4v



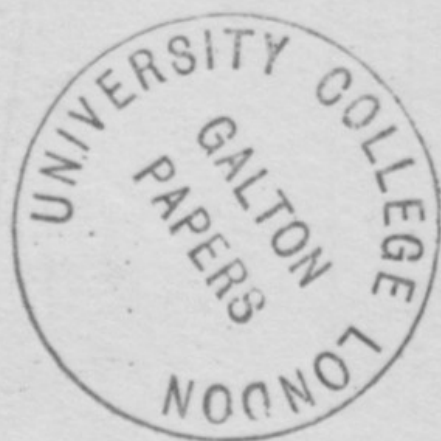


# WHAT BECOMES OF MEDICAL STUDENTS



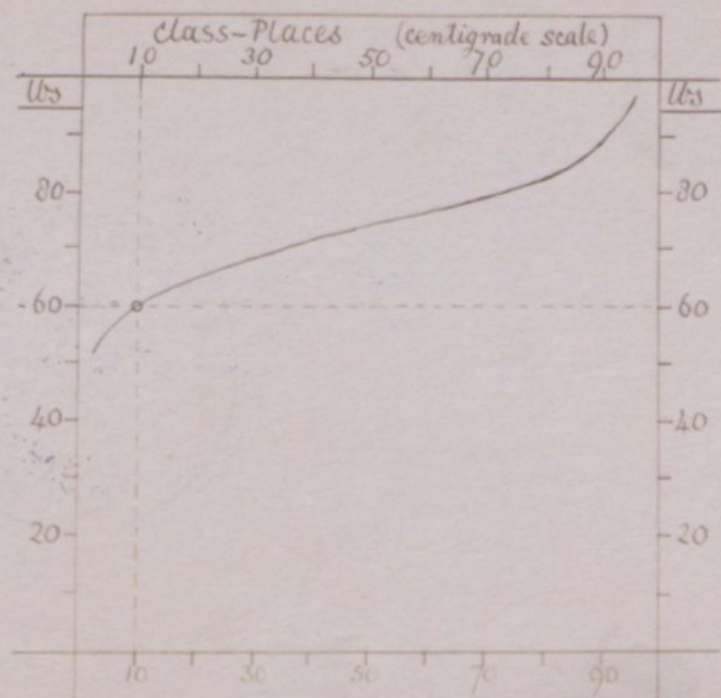
I. Distinguished, 28 cases.— II. Considerable, 30.  
 III. Fair, 616.— V. Limited, 151.— Failures, 125.  
 TOTAL 1000 cases.

f. 5v

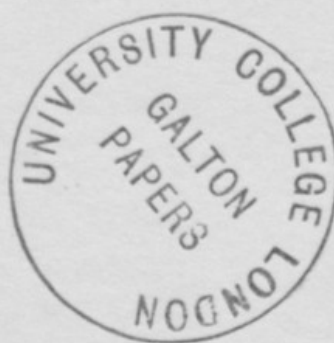




method of determining  
a Class-Place.



f. 6v

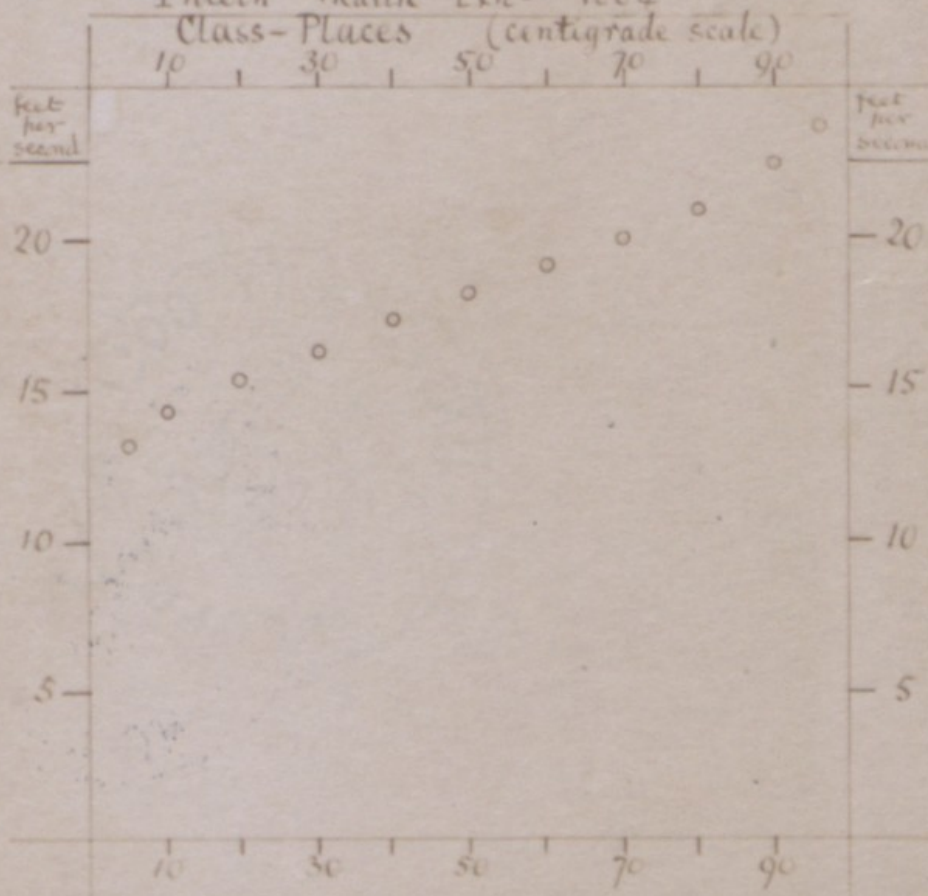


# SWIFTNESS OF BLOW OF ARM

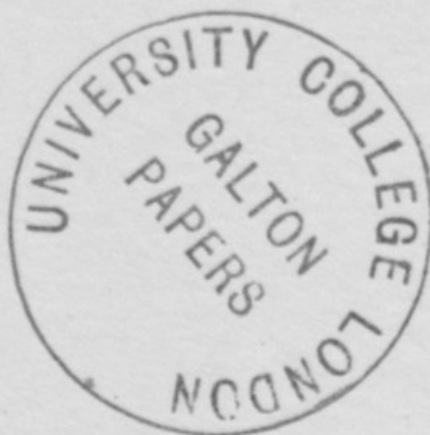
516 males ages 23-26

Intern Health Exh<sup>n</sup> 1224

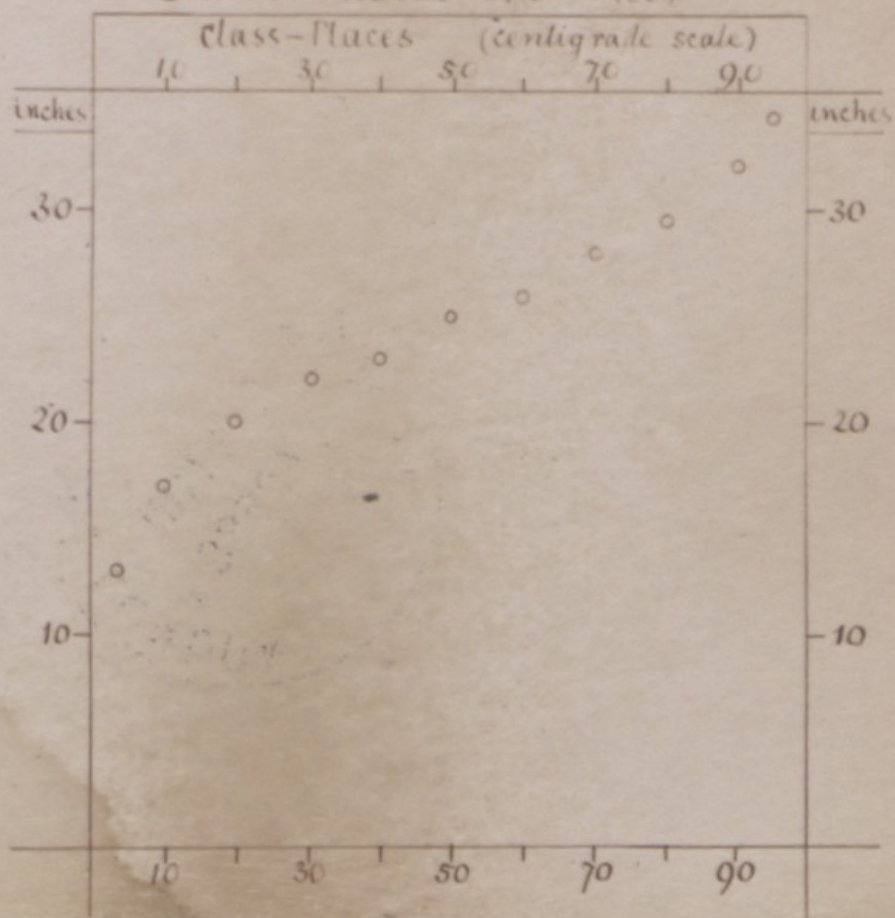
Class-Places (centigrade scale)



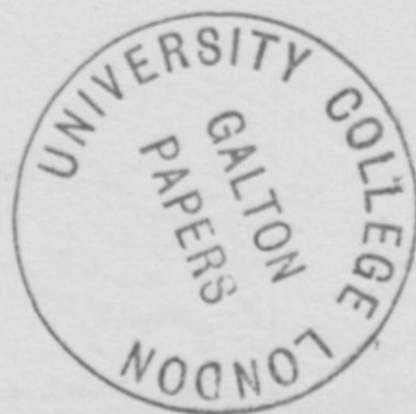
f. 7v



EYESIGHT, distances of reading diamond type  
 308 males, ages 23-26  
 Intern: Health Exh<sup>n</sup> 1224

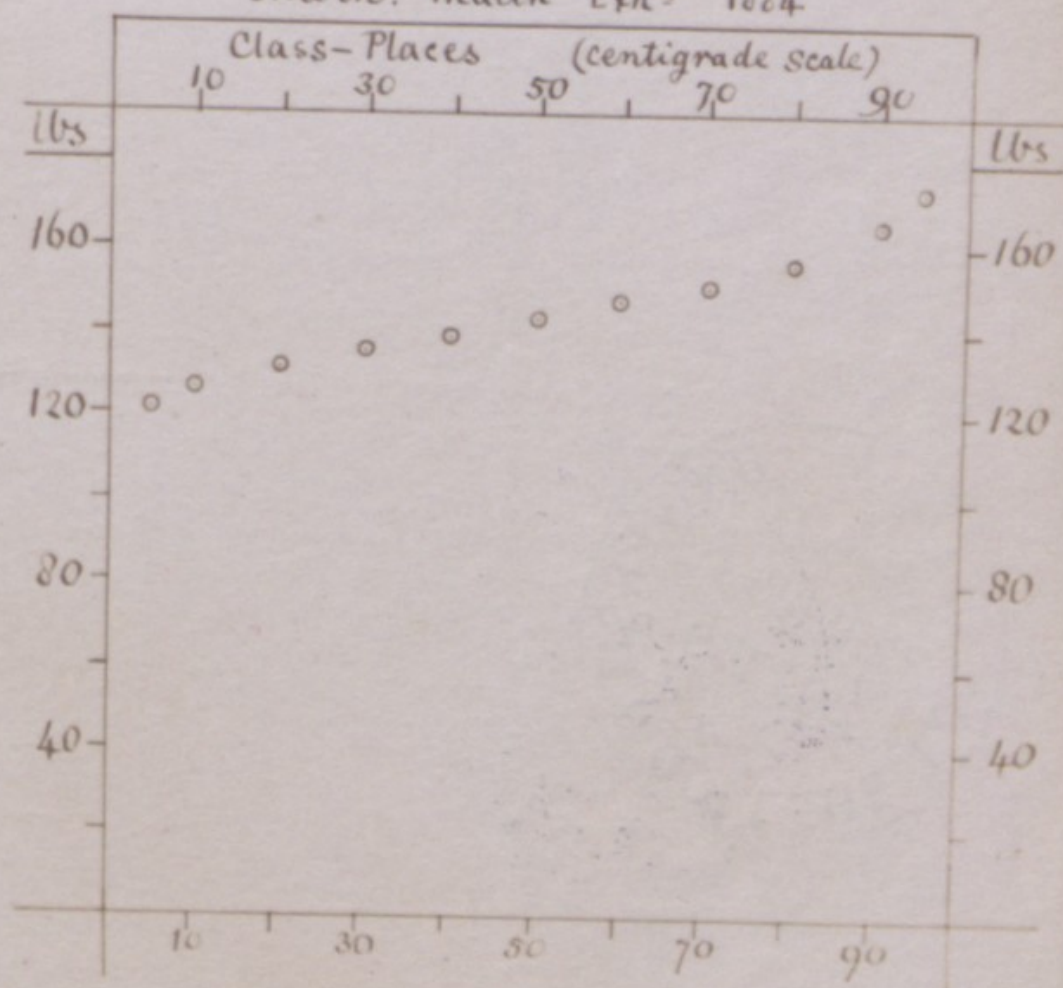


f. 8v





WEIGHT in ordinary indoor clothing  
520 males, ages 23-26  
Intern: Health Exh<sup>s</sup> 1884





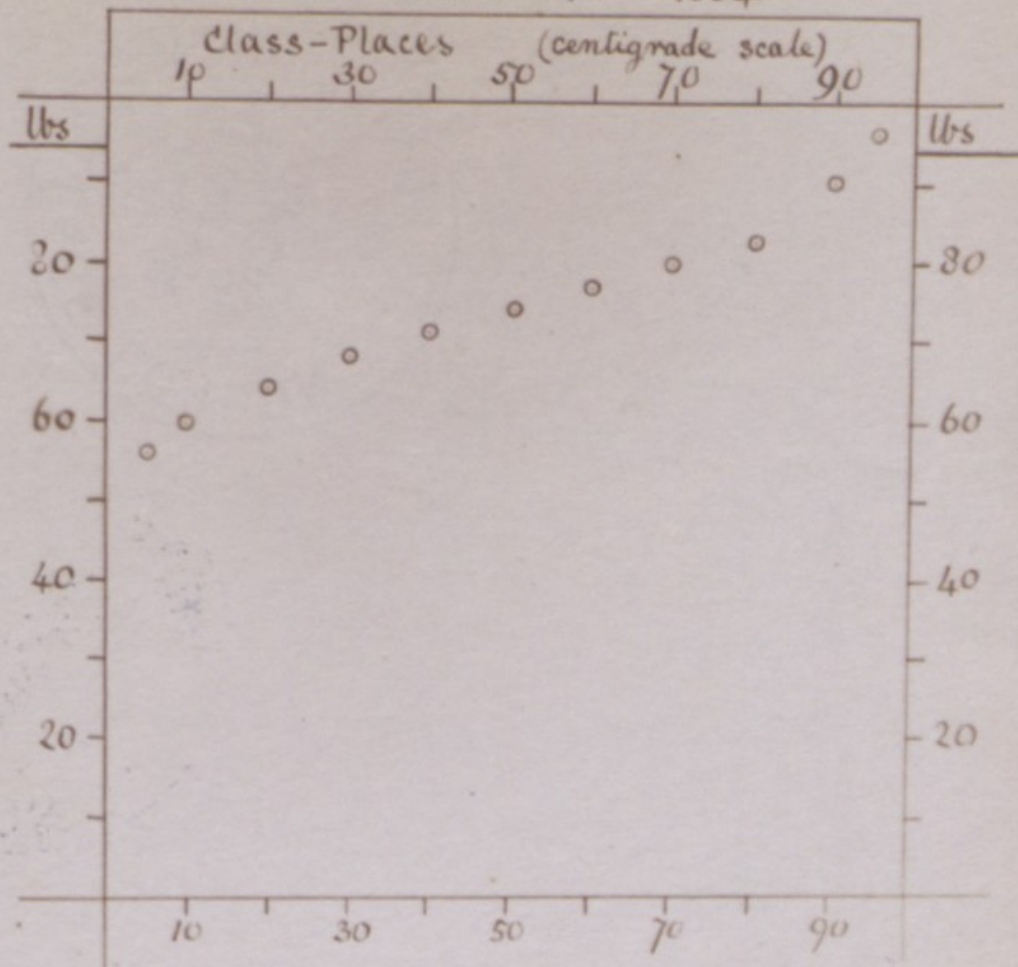
f. 9v



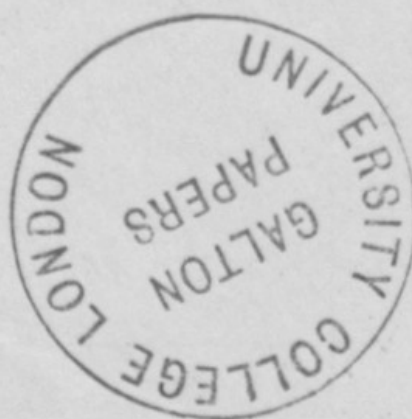
# STRENGTH OF PULL, as an archer.

519 males: ages 23-26

Intern: Health Exh: 1884



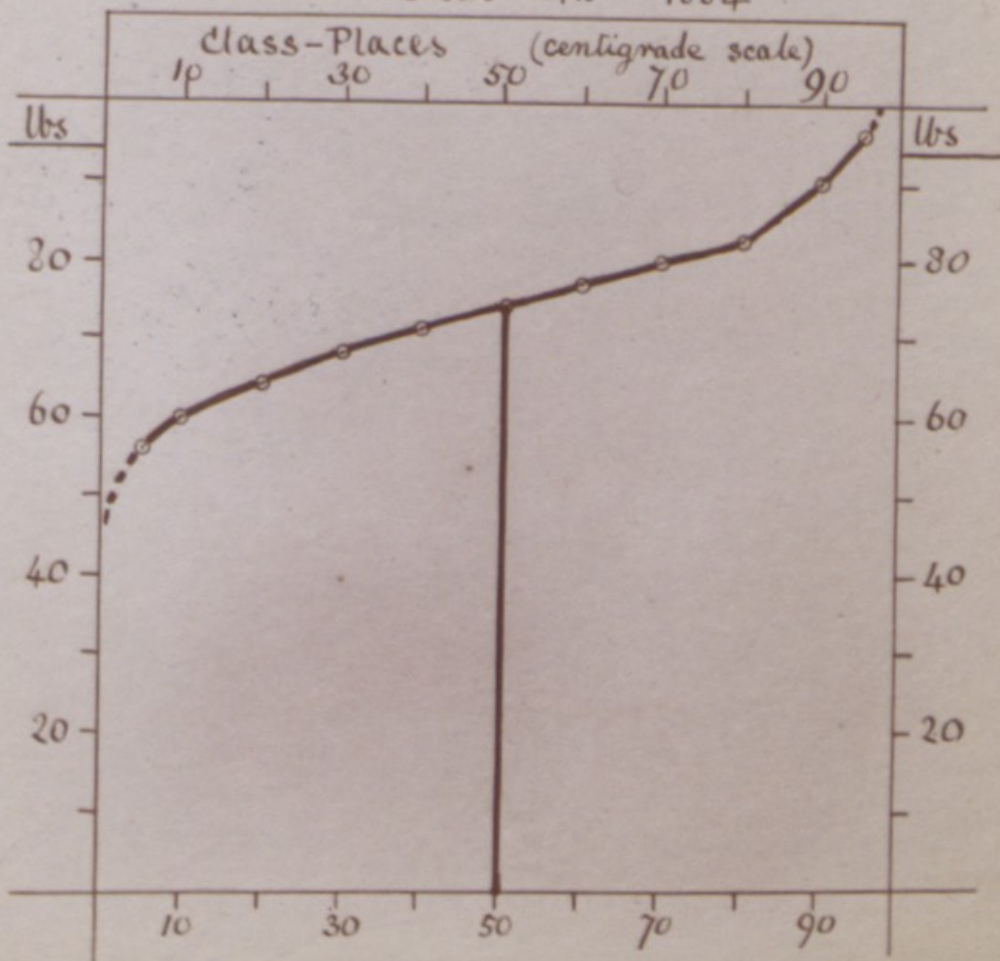
f. 10v



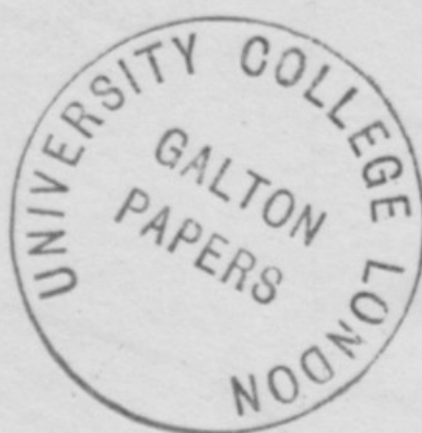
# STRENGTH OF PULL, as an archer.

519 males, ages 23-26

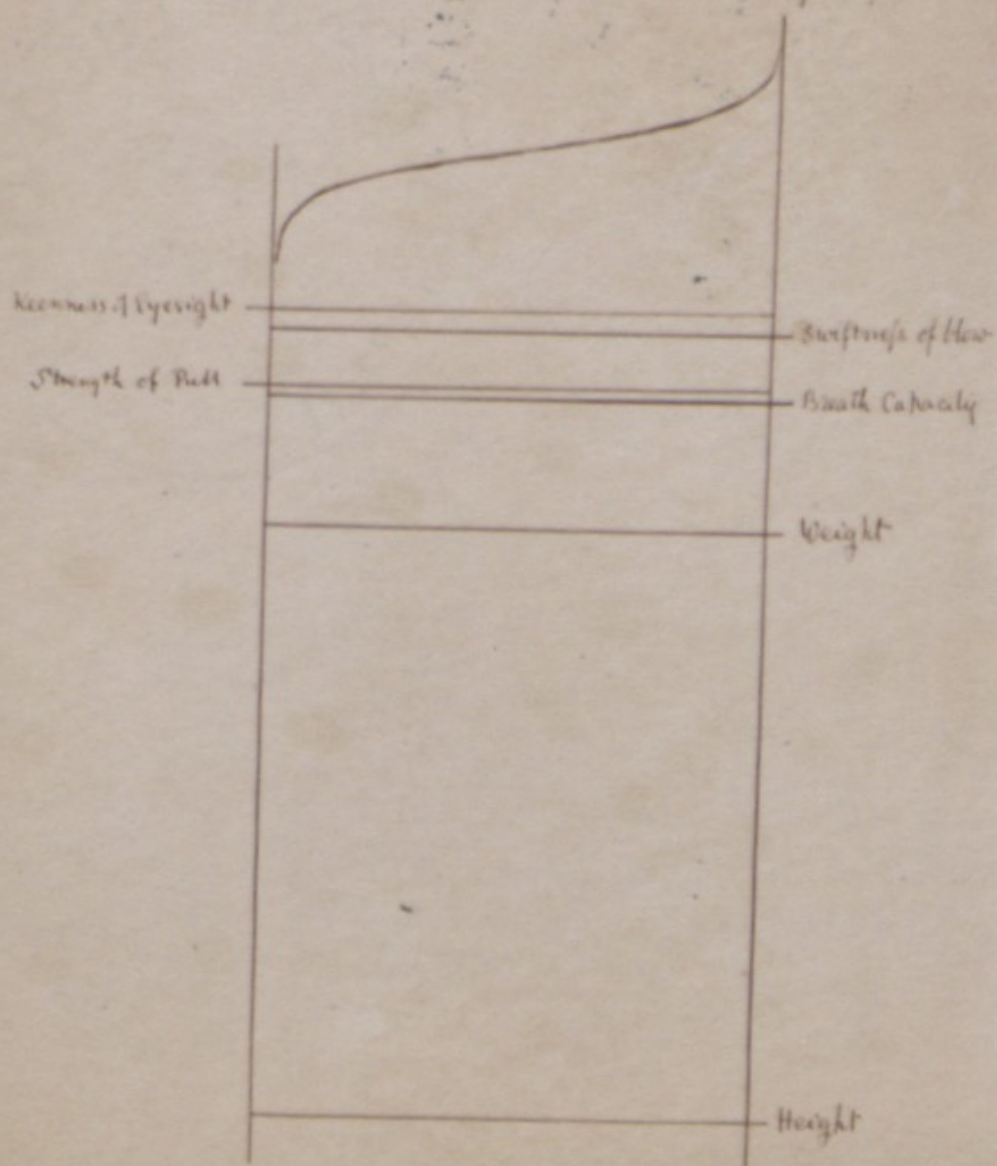
Intern: Health Exh: 1884



f. 11v

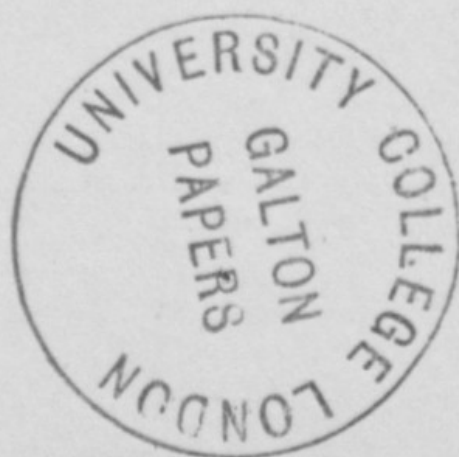


Six schemes drawn on a uniform scale,  
 the vertical unit of length being  
 the gradient of the curve between 30 and 70





f. 12v

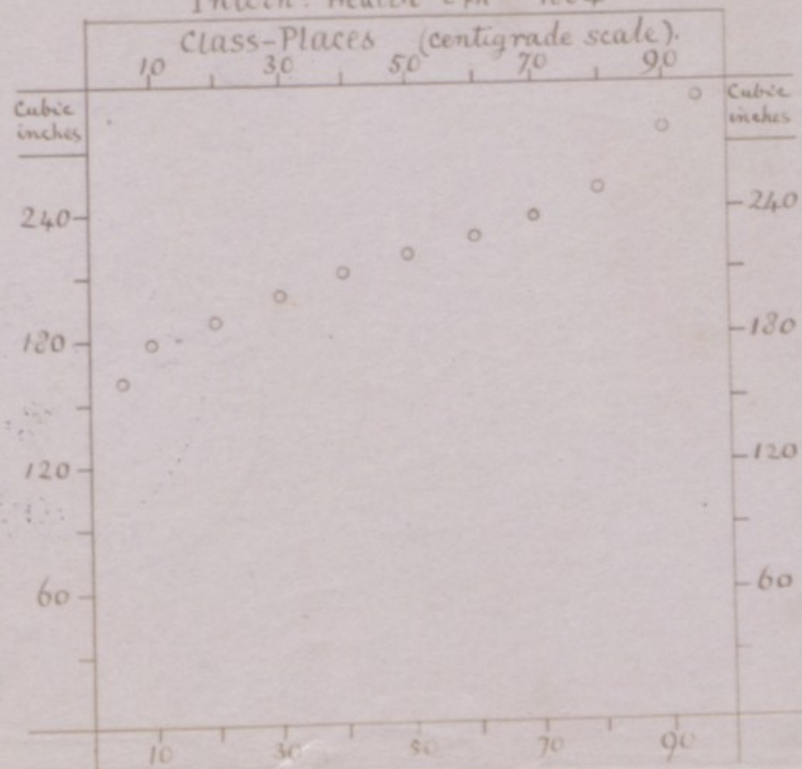




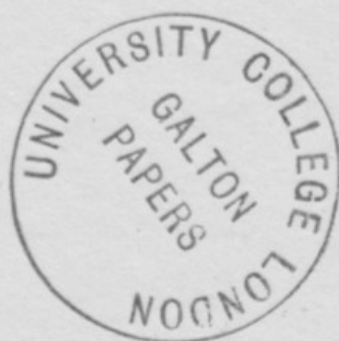
# BREATHING CAPACITY.

212 males ages 23-26

Intern: Health Exh<sup>s</sup> 1884



f. 13v

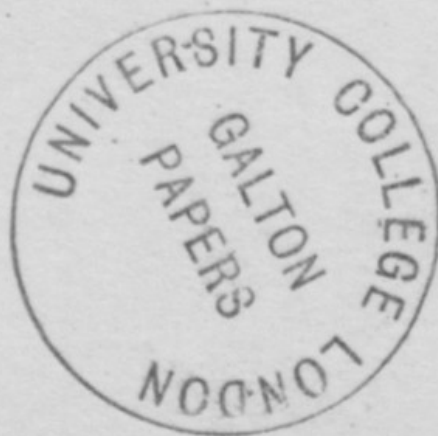


# NORMAL SCHEME

Values to be subtracted from, or added to that of the MEDIAN, at the corresponding Class-Places (centigrade).

|      |      |      |      |      |      |     |              |
|------|------|------|------|------|------|-----|--------------|
| 2.43 | 1.90 | 1.25 | 1.00 | 0.78 | 0.38 | 0.0 | subtract     |
| 5    | 10   | 20   | 25   | 30   | 40   | 50  | CLASS-PLACES |
| 95   | 90   | 80   | 75   | 70   | 60   | 50  |              |
| 2.43 | 1.90 | 1.25 | 1.00 | 0.78 | 0.38 | 0.0 | add          |

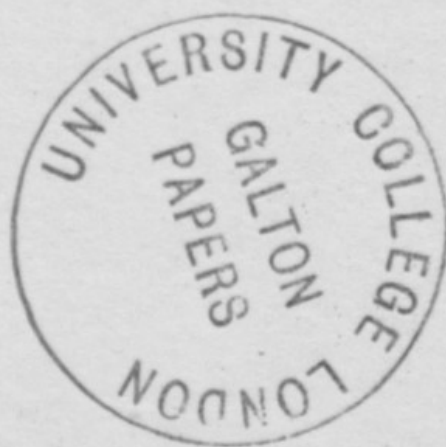
f. 14v



The six series derived from observations on Mules, adults  
of Height, Weight, Breathing, Tull, Swiftness of Blow, Eyesight  
when taken on similar gradients, all fall within the shade.  
The total curve is derived from the "Law of error"



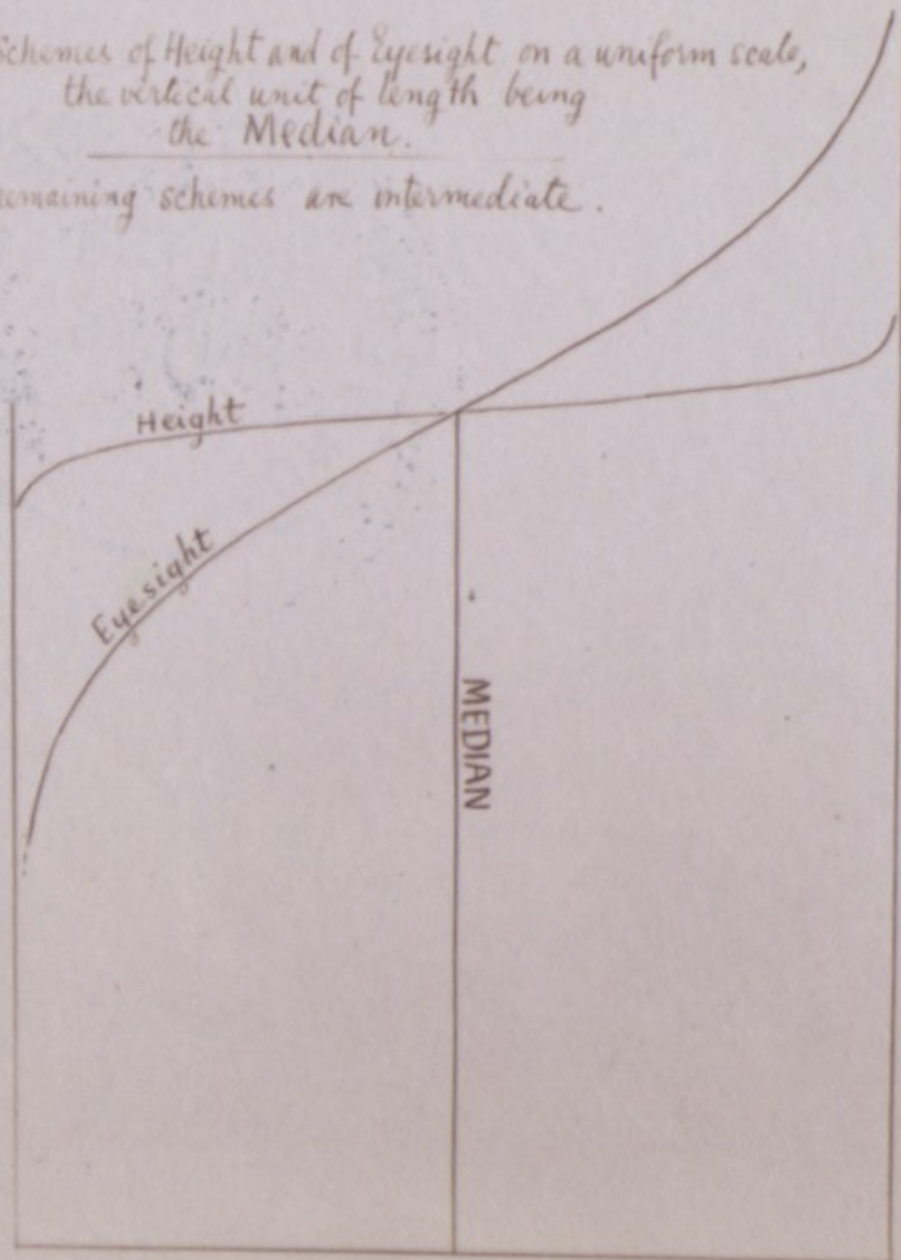
f. 15v





Schemes of Height and of Eyesight on a uniform scale,  
the vertical unit of length being  
the Median.

The remaining schemes are intermediate.





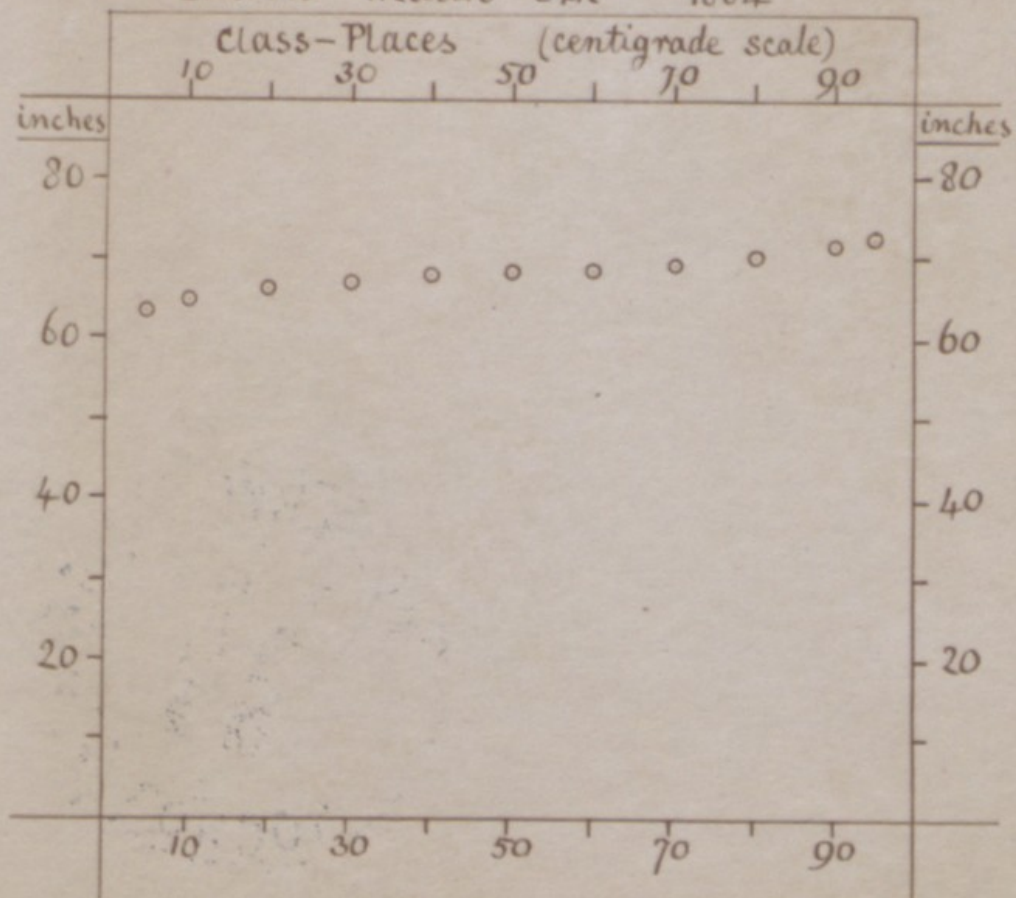
f. 16v



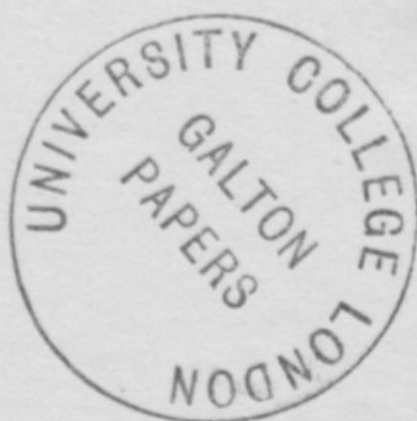
# HEIGHT, WITHOUT SHOES.

811 males ages 23-51

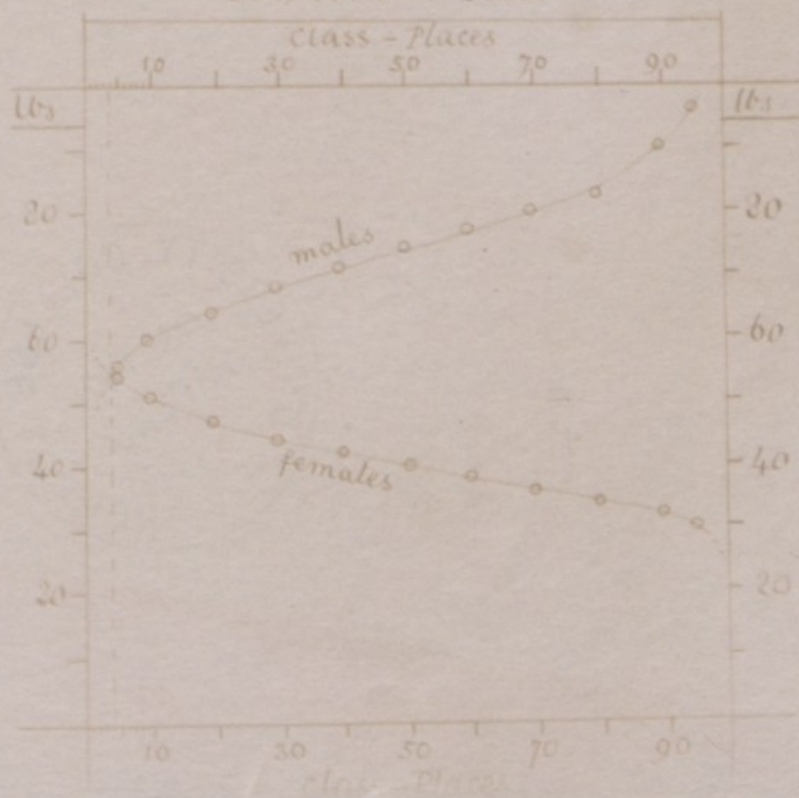
Intern: Health Exh<sup>n</sup> 1884



f. 17v



# COMPARISON OF MALE AND FEMALE STRENGTH OF PULL.



f. 18v

