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Contributors

Guy, William A. 1810-1885.
Squibb, George James
Royal College of Surgeons of England

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Royal College of Surgeons

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THE STATIC LUNG TESTS.

By WILLIAM AUGUSTUS GUY, M. B. Cantab.

Professor of Forensic Medicine, King's College, London, and one of the Physicians to the King's College Hospital.

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THE STATIC LUNG TESTS.

UNDER the title of Static Lung Tests, I propose to examine the absolute weight of the lungs, and their weight as compared with that of the body. Both these tests were proposed by Ploucquet, but the latter is most in use, and most commonly bears the name of its author. It was originally brought forward on the authority of three observations, two on still-born children at full term, the third on a seven months' child which had respired. Though Ploucquet spoke much too confidently of the advantage to be derived from the employment of this test, he was far from supposing his three facts sufficient to establish a true standard of comparison, but urged upon those of his contemporaries who enjoyed favourable opportunities for making such observations, the necessity of confirming or invalidating his conclusions by a more extended induction. Accordingly, it was not long before this appeal was responded to by the publication both of single facts and of small groups of observations; which, whilst they confirmed the general position that the weight of the lungs compared with that of the body differs before and after respiration, proved that that difference had been greatly over-estimated by the original proposer of the test.

The small groups of facts published by Jäger, Mörike, and Haartmann, towards the end of the 18th century, were followed early in the 19th by the larger collection of Schmitt, and this again by Lecieux's tables containing not fewer than 400 observations.

The very considerable number of facts thus brought together by Lecieux, would appear to promise a solution of all the questions which are likely to arise in connection with the static lung tests; but on submitting his tables to a careful scrutiny, a large proportion of his facts are found utterly useless for all purposes of strict comparison. Devergie, after eliminating all those observations which appeared to him objectionable, has succeeded in preserving about 200 facts, from which he has constructed the tables contained in his work. If all these facts were employed in establishing a single proposition, they might justly be regarded as sufficient for the purpose; but when it is recollected that they are used to determine the proportion between the weight of the lungs

and that of the body before and after respiration, at 6, 7, 8, and 9 months, it will be obvious that a larger assortment of facts is still to be desired. To supply this desideratum is the object of the present essay.

As no single individual can hope to make a collection of facts so large as to supply all the data necessary to determine the real value of the static lung tests, I have thought that I might render some service to the science of forensic medicine by bringing together all the facts which I could collect from domestic and foreign authorities. This has been a greater labour than I at first contemplated; for, in addition to the task of reducing the foreign weights to our own standard, the subsequent arrangement of the facts themselves, preparatory to drawing conclusions from them, has occupied at least as much time as the subject is worth.

Although this investigation was at first undertaken merely for my own satisfaction, I have bestowed as much pains upon it as if I had from the first intended making the results which I obtained public. The facts which I have grouped together have been as nearly as possible comparable facts; I have examined them one by one, and excluded such as were in any respect objectionable; and I have stated the average and extreme results in such a way as to enable others to add to the facts which I have collected wherever they appear insufficient. I have also taken the precaution of putting by themselves such maxima and minima as seem to form exceptions to the several rules, or to be much greater or less than the numbers next below or above them. In reducing the foreign weights to the English standard, I have made use of the Avoirdupois weight, as being more convenient. This will account for the weight of the lungs in the tables being greater than it is usually represented to be. In England the weight of the lungs is usually expressed in Troy grains, hence it has been necessary to convert them into Avoirdupois grains, that the same standard might be employed in all the observations. I have taken care in all cases to satisfy myself of the correctness of my calculations.

The total number of facts which are used in one way or another in the formation of the following tables is 652. Of these, 3 are from Ploucquet, 4 from Mörike, 2 from Jäger Senior, and 8 from Jäger Junior.* Haartmann's dissertation has supplied me with 19 observations,† Schmitt's excellent treatise with 100,‡

* The facts supplied by Ploucquet, Mörike, and the two Jägers, father and son, are embodied in the essay entitled "Uber die ausführbar keit des von Herrn Professor Ploucquet gemachten Vorschlags zu einer neuen Lungenprobe, von Herrn Hofmedicus, Dr Jäger in Stuttgardt, 1796." This essay is published in the Salzburg Med. Chir. Zeit. B. iii. p. 56.

† Haartmann's treatise is translated by Rudolphi in the Nordischen Archiv. B. ii. St. ii. No. 3.

‡ "Neue Versuche und Erfahrungen über die Ploucquet's che und hydrostatische lungenprobe. Von Dr Willelm Joseph Schmitt," Vien. 1806. This treatise contains a large collection of well-observed facts and experiments, and abounds in sound and judicious conclusions from them.

and that of Lécieux, with 348.* I have made use of 48 observations contained in an anonymous essay, published at Paris in connection with several treatises on midwifery.† Orfila has contributed 17 observations of his own, and 47 which he published on the authority of Eisenstein and Zébisch, and which were made under the eye of Bernt.‡ From Devergie's work I have obtained 17 facts,§ and from that of Jörg 6 facts.‖ From domestic sources I have not been able to glean any large number of facts. To Mr Taylor's excellent essays,¶ and to his courtesy I am indebted for 8 facts. Five others I have gleaned from a paper by Dr Brady,** and I have added 20 observations of my own.†† I might have added to the number of my facts had the subject appeared of sufficient importance to require a more extended induction. Many single facts are doubtless scattered through the foreign journals, and many small collections of facts might be discovered if the search for them promised to repay the labour which it entails. As it is, the facts now brought together are much more numerous than any single collection which has been hitherto formed, and they are numerous enough to establish the principal data necessary for medico-legal inquiries. By stating the sources from which I have drawn my facts, as well as the number of facts from which each average is obtained, I have given every facility for adding to the collection which I have thus made, any new facts observed by myself or others; and as some of the averages are

* Considerations Medico-légales sur l'Infanticide, par A. Lécieux, à Paris, 1819. The number of facts published by Léceiux, is 400. Of these, I have been able to make use of 348 only, the remainder being so badly reported as to be utterly useless. Devergie has not made more than 200 available for his purposes; but he has limited his inquiries to children who have lived one month or less, whilst I have admitted a considerable number of observations on children above that age. This difference sufficiently accounts for the larger number of facts which I have been able to make use of. I have admitted as still-born, 30 observations on lungs, which, not being putrid or diseased, sank when placed in water, though it is not positively stated that respiration had not taken place. The only source of fallacy here is that extremely imperfect degree of respiration which is compatible with sinking of the lungs; but, as cases of this kind are of very rare occurrence, these observations may be safely embodied with those made on still-born children. I have been obliged to correct a large proportion of Lécieux's calculations.

† Proces-Verbal de la distribution des Prix, &c. 1812. Some of the observations contained in this paper seem to have been reprinted in Lécieux's treatise. In making use of these duplicates, I have not introduced any important fallacy.

‡ Traité de Medecine Legale, Vol. i. p. 404. The observations of Eisenstein and Zébisch are the only ones which I have not been able to procure and examine for myself. The title of the work from which they are taken is not given, and I have not been able to procure that in which they were most likely to be found. I have therefore trusted in this instance to Orfila's high authority.

§ Medecinè Legale. Vol. i. Article Infanticide.

‖ Atelectasis pulmonum. By Dr Edward Joerg of Leipsig.

¶ Guy's Hospital Reports. No. 5. See also London Medical and Physical Journal for 1832 and 1833. One fact has been kindly forwarded to me by Mr Taylor since the publication of his essay in the Guy's Hospital Reports.

** Dublin Journal of Medical Science.

†† For the opportunity of making these observations, I am chiefly indebted to the kindness of my friend and neighbour, Dr Reid.

formed from insufficient materials, it will be easy to correct them at any future time, by increasing the number of observations.

The facts which have been thus brought together supply data for discussing the value of the absolute weight of the lungs, and of their weight compared with that of the body, as tests of respiration. I propose to examine each of these separately, beginning with the *absolute weight of the lungs.*

The following table shows the weight of the lungs in mature still-born children, of either sex, and of both sexes combined, the number of observations being 51 male, 44 female, and 109 of both sexes.

TABLE I.

	Before Respiration.		
	Male.	Female.	Male and Female.
Maximum,	1800	1492	1800
Minimum,	360	340	340
Mean,	986	818	896

In the case of the male, the numbers next below 1800 are 1726, 1661, and 1636, and those next above 360 are 494 and 498. In the female, the numbers next below 1492 are 1226 and 1193, and those next above 340 are 369 and 463. Of the fourteen observations in which the sex is not stated, the highest number is 1534, and the lowest 448.

The following table gives the weight of the lungs, in the two sexes separately, and in both combined, in the 6th, 7th, and 8th months of fœtal life.

It is necessary to premise, that, in all the observations which are made use of in constructing the tables, the lungs are either stated or inferred to be healthy. Where they are not stated to be diseased, they may fairly be assumed to be healthy, as all the authors who have written on the subject have taken pains to describe the condition of the lungs, and, in many instances, the fact of their being diseased is distinctly stated. As, moreover, diseases of the fœtal lungs are of very rare occurrence, no material fallacy is likely to be introduced by this assumption.

The numbers of observations from which the table is formed are as follow; 6th month—male 8, female 8, male and female 16; 7th month—male 11, female 14, male and female 27; 8th month—male 20, female 12, male and female 37; total number 80.

TABLE II.

	6th month.			7th month.			8th month.		
	M.	F.	M. & F.	M.	F.	M. & F.	M.	F.	M. & F.
Max.	710	747	747	1081	1364	1364	1318	1462	1462
Min.	228	149	149	293	232	232	216	309	216
Mean.	393	349	371	626	633	612	714	697	701

This table is one of those which will require correction when a larger number of facts has been brought together. It presents many anomalies, only to be explained on the supposition that the facts are not sufficiently numerous. Thus, the maxima in the female exceed those in the male at each of the periods, whilst the maximum in the female at nine months falls short of the maximum in the male by more than 300 grains. The minima, too, present similar anomalies. This arises partly from the circumstance that, in the several groups of facts, the age has a range of one month, and partly from the difficulty which exists in fixing with certainty the age of the fœtus at the several periods of utero-gestation. In the instance of the female in the 6th month, the minimum 149 is the weight of the lungs of a twin fœtus, $5\frac{1}{4}$ months old; the number next above this is 262. In the female in the 7th month, the number next greater than 232 is 324, and in the male in the 8th month, the number next above 216 is 401. In the case of the maxima, the highest numbers are much greater than those next below them. Thus, in the 6th month, 455 is the number next below 710 in the male, and 340 that next less than 747 in the female. In the 7th month, 1081 is the maximum for the male, and 864 the second number on the list; but in the female, the three greatest numbers are 1364, 1019, and 819. In the 8th month the maxima for the male and female respectively are 1318 and 1462, the next greatest numbers 1081 and 1235.

The observations made on the males and females, taken together, present a greater degree of uniformity. Their results, combined with those already obtained for the 9th month, are seen in the following table.

TABLE III.

	6th month.	7th month.	8th month.	9th month.
Maximum,	747	1364	1462	1800
Minimum,	149	232	216	340
Mean,	371	612	701	896

I now proceed to state the corresponding results of observation made on children who have respired.

The following table presents the weight of the lungs after respiration in mature children who lived one month or less; the lungs being, as before, stated or inferred to be healthy. The number of observations is as follows: male 171; female 130; male and female 322.

TABLE IV.

	After Respiration.		
	Male.	Female.	Male and Female.
Maximum,	2440	1745	2440
Minimum,	432	479	432
Mean,	1121	986	1077

The six greatest weights in the male are, 2440, 2132, 2085, 2046, 1853, 1825; in the female they are, 1745, 1725, 1576 (two), 1561, 1544, (three), 1514, (three). There are also two observations on record which so greatly exceed the maxima in either sex that I have thought it right to omit them altogether. One is recorded by Mörike, the other by Haartmann. The former is 3426, the latter 3410. Jäger Junior considers the first a misprint, the second occurred in a case of suffocation. The minima require no particular remark, except that there is one observation on record, which makes the weight of the lungs in the male as small as 293, the number next above it being 432. This latter number is entered in the table as the minimum.

The following table shows the weight of the lungs after respiration in the 6th, 7th, and 8th months. The number of observations is as follows. 6th month—male 5, female 10, male and female 15. 7th month—male 19, female 16, male and female 39. 8th month—male 21, female 24, male and female 49. Total 103.

TABLE V.

	6th month.			7th month.			8th month.		
	M.	F.	M. & F.	M.	F.	M. & F.	M.	F.	M. & F.
Max. .	499	685	685	1278	1286	1286	1407	1534	1534
Min. .	247	232	232	309	386	309	262	384	262
Mean. .	328	441	404	595	694	641	780	734	762

This table presents the same anomalies as the corresponding table before respiration; these must be attributed partly to the small number of facts, and partly to some cause not easily discovered. The weight of the female lungs exceeds that of the male in more than one period both in the maxima, minima, and mean, and the same circumstance is observable in the table showing the weight of the lungs before respiration. In addition to the five observations on the male lungs at the sixth month, there is one not included in the table in which the weight of the lungs did not exceed 93 grains, and in the case of the female lungs, there is one instance of a twin fœtus at $5\frac{1}{4}$ months, where the weight was only 38 grains Troy. I shall take a future opportunity of detailing the particulars of this curious case, which came under my own observation.

The following table shows the weight of the lungs in the two sexes taken together at the 6th, 7th, 8th, and 9th months.

TABLE VI.

	6 months.	7 months.	8 months.	9 months.
Maximum,	685	1286	1534	2440
Minimum,	232	309	262	432
Mean,	404	641	762	1077

The data furnished by the first of the three foregoing tables are scarcely exact enough for medico-legal purposes. In the majority of cases of infanticide, the crime is committed soon after the birth of the child, and is rarely delayed beyond the first twenty-four hours. Hence it is very important to ascertain the absolute weight of the lungs for different durations of respiration, and especially for the shorter periods. I have accordingly prepared the following tables for children at full term.

TABLE VII.

	Less than 1 hour.			12 hours.			1 day.		
	M.	F.	M. & F.	M.	F.	M. & F.	M.	F.	M.&F.
Max.	1621	1499	1621	1537	1010	1537	1576	1725	1725
Min.	510	384	384	463	556	463	479	548	479
Mean,	934	780	934	955	726	859	1001	1045	1018
No. of obs.	21	11	38	13	9	24	8	8	17

As I have already stated, there is one observation on record which makes the weight of the lung in the male at 9 months so low as 293 grains. This observation belongs to the first column.

The following tables show the average weight of the lungs after different durations of respiration.

TABLE VIII.

	Less than 1 hour.	12 hrs.	1 day.	2 days.	3 days.	4 days.	5 days.	6 days.	7 days.
Male,	934	965	1001	1073	942	1412	1097	1143	955
Female,	780	726	1045	725	980	927	882	1037	1061
M. & F.	934	859	1018	989	1001	1136	1020	1105	1008
No. of Obs.	21.11	13.9	8.8	14.6	9.9	9.16	10.11	10.7	7.7
	38	24	17	23	21	28	22	18	14

TABLE IX.

	1 day & less.	1st week	2d week.	3d week.	4th week.	More than 1 month and less than a year.	more than 1 year.
Male,	958	1037	1231	1258	1385	1285	1699
Female,	838	901	1067	1033	1441	1496	1745
M. & F.	937	914	1170	1196	1417	1446	2051
No. of obs.	42.28	101.84	51.37	9.5	3.4	4.13	4.1
	79	205	92	6	7	17	5

These tables confirm the general observation that respiration is a gradual process, causing the lungs to be more completely filled with blood the longer it lasts. The irregularities observed in the tables are sufficiently explained by the small number of observa-

tions from which some of the averages are deduced. If the increased weight of the lungs be a valid reason for inferring a more perfect respiration, we may expect to find the weight of the lungs greater in those cases where respiration is stated to be perfect, than where it is stated to be imperfect, and in these latter cases greater than when respiration has not taken place. The following table confirms this expectation.

Table X.

	Male.			Female.			Male & Female.		
	Still-Born.	Resp. impt.	Resp. perft.	Still-Born.	Resp. impt.	Resp. perft.	Still-Born.	Resp. impt.	Resp. perft.
Maximum,	1800	2132	2406	1492	1514	1725	1300	2132	2046
Minimum,	360	510	746	340	622	616	340	510	616
Mean,	986	1010	1227	818	947	1139	896	988	1195
No. of obs.	51	23	21	44	6	12	109	30	33

Having thus examined the weight of the lungs before and after respiration, at the several periods of gestation ; after different durations of the respiratory process ; and in its different degrees of perfection ; I now proceed to contrast the results obtained before and after respiration, making use for that purpose of the foregoing tables. The first table, which combines Table I. and Table VII., shows the weight of the lungs before and after respiration, in mature children, the duration of the respiration not exceeding one day. No distinction of sex.

Table XI.

	Before Respiration.	After Respiration.		
		Less than 1 hour.	12 hours.	1 day.
Maximum,	1800	1621	1537	1725
Minimum,	340	384	463	479
Mean,	896	934	859	1018

From this table it appears that the maximum weight of lungs observed in still-born children exceeds the maximum weight in those who have lived one day or less ; that the least weight after respiration exceeds the minimum before respiration by only 44 grains, and that the mean weight is increased by respiration lasting less than an hour only 38 grains, whilst at the end of 12 hours it falls short of the weight in still-born infants by 37 grains. Even when respiration has continued as long as one day, the average weight of the lungs is increased by only 122 grains. The following table, combining Table III. with Table VI., presents a view of the effect of respiration in increasing the weight of the lungs at 6, 7, 8, and 9 months.

TABLE XII.

	6 months.		7 months.		8 months.		9 months.	
	Before resp.	After resp.	Before resp.	After resp.	Before resp.	After resp.	Before resp.	After resp. (1st day.)
Max.	747	685	1364	1286	1462	1534	1800	1725
Min.	149	232	232	309	216	262	340	479
Mean,	371	404	612	641	701	762	896	1018

This table corresponds closely with the former, in exhibiting a very inconsiderable increase effected in the weight of the lungs by the act of respiration ; and both of them yield results very different from the general statements of authors, based on the authority of a small number of facts.

There is only one point connected with the weight of the lungs which requires investigation in addition to those illustrated by the foregoing tables, and that is the comparative weight of the two lungs. Seventeen observations of my own give the following results. (No distinction of sex, fœtal age, or duration of respiration.)

TABLE XIII.

Before respiration (11 observations.)		After respiration (6 observations.)	
Right lung.	Left lung.	Right lung.	Left lung.
313	243	465	353

Before and after respiration (17 observations.)

Right lung.	Left lung.
367	282

These three averages agree in giving about the same proportion between the weight of the right and left lung, viz. 9 to 7. As this proportion is of no material importance, I have contented myself with my own limited number of observations.

An inspection of the tables and a close examination of the facts out of which they have been formed, lead us at once to the conclusion, that the absolute weight of the lungs, as a test of respiration, has been greatly overrated ; for, on comparing the absolute weight of the lungs at full term before respiration, with the absolute weight of the lungs at full term, after respiration has continued one day or less, I find that the maximum before respiration exceeds the highest number after respiration by 75 grains, the numbers being 1800 and 1725, whilst the minimum after respiration exceeds the minimum before respiration by only 139 grains. The average number before respiration also exceeds the average number after respiration has continued twelve hours by 37 grains, though it falls short of the average number when respiration has continued one hour or less by 38 grains, and when it has continued one day by 122 grains. After making all due allowance for the insufficiency of the facts collected, and admitting that the

numbers now stated would be somewhat modified by using a greater number of observations, it will be impossible to deny that the value of this test has been greatly exaggerated. If the maximum after respiration, instead of falling short of the maximum before respiration, had considerably exceeded it, we should have been justified in considering all numbers intervening between the two extremes as affording a high probability that respiration had taken place. On the other hand, if the minimum before respiration had fallen considerably short of the minimum after respiration, we should have had an equally strong probability that all numbers intervening between the two minima belonged to lungs which had not respired. Again, had the average results after respiration uniformly and greatly exceeded the average before respiration, we might have regarded any number nearly approaching the one or the other average as affording a certain degree of probability that respiration had or had not taken place. The results, however, which have been obtained, entirely destroy the confidence which has been hitherto placed in this static lung test, and prove that neither the maxima, minima, nor mean numbers afford any indication which can be relied upon for medico-legal purposes. A comparison of the average and extreme weights of the lungs before and after respiration, confirms the view now taken of the utter uselessness of employing the absolute weight of the lungs as a test of respiration.

The results which have been arrived at, not only destroy our confidence in the value of this lung test, but tend materially to modify the prevailing views of the nature and effect of respiration. Physiologists and writers on forensic medicine have assumed that the lungs, before the establishment of respiration, are almost free from blood, and that, as soon as breathing takes place, blood flows to them in large quantities, so as to cause a considerable increase in their weight. In pursuance of this erroneous opinion, the weight of the lungs before respiration has been greatly under-estimated, and their weight after respiration proportionably exaggerated. Some of the earliest observations which I had an opportunity of making led me to doubt the correctness of the prevailing opinion; for in more than one instance I found the lungs of still-born infants congested with blood, whilst those of children that had breathed contained but a small quantity of that fluid. Of this fact two explanations may perhaps be given;—the one, that the fœtal lungs naturally contain nearly as much blood before as after respiration, the other, that, even where no air enters the lungs, ineffectual efforts to respire are made, which give place for the admission of an unusual quantity of blood into the lungs. Such efforts are probably made by many infants who perish before any air has found its way into the chest.

Though the difference between the weight of the lungs before respiration and after respiration has continued for a short space of time is certainly very considerable, this may, and most probably does, arise from the circumstance, that respiration is gradually established, and remains imperfect for many hours, or even for some days in the great majority of infants who die within that period of their birth. That this explanation is the true one will appear on an examination of Tables VIII. and IX., which represent the weight of the lungs as augmenting with the duration and consequent increasing completeness of the respiration ; and still more strikingly, on inspecting Table X., which exhibits the effect of different degrees of respiration on the weight of the lungs. But even here, the increase of weight is not so considerable as we should expect to find it, if the process of respiration really exercised so important an influence as it is generally assumed to do on the weight of the lungs.

Having thus examined the value of the absolute weight of the lungs as a test of respiration, I now propose to consider the proportion which the weight of the lungs bears to that of the body, or *Ploucquet's test.*

In discussing the value of this test, we have an advantage which Ploucquet did not possess, of reasoning from a considerable number of facts. A larger induction than that hitherto used has already demonstrated the insufficiency of the absolute weight of the lungs as a test of respiration ; by employing the same materials, we shall be able to ascertain the real value of Ploucquet's test. This test was first proposed on very plausible grounds. It was argued that, as the weight of the several organs of the body must vary with the weight of the body itself, it was necessary to take the weight of the body into account in all reasonings founded upon the weight of any of its organs. Nothing could be more natural than to expect, that, if in one case lungs weighing 500 grains belonged to a body weighing 30,000 grains,—a body weighing 60,000 grains would be furnished with lungs of 1000 grains; and nothing would at first sight appear more unreasonable, than to draw any conclusion from the weight of the lungs, without, at the same time, taking into account the development of the body to which they belonged. Had Ploucquet possessed a greater number of facts, he would in all probability have endeavoured to ascertain whether the weight of the lungs really does bear a fixed relation to that of the body, before he proposed his test with so much confidence. Hitherto this question, on the solution of which the value of Ploucquet's test really hinges, has been briefly decided in the affirmative, and the assumption has been carelessly received as a fact. The first step, therefore, to be taken in examining the value of this test is to determine whether or not the weight of the

lungs does increase with the weight of the body, and if so, whether the increase in the one is exactly proportioned to that in the other.

That I might decide this question, I have arranged all the observations which I have collected on children at full term, in the order of the weight of the body, beginning with the greatest weight; and that the facts might be sufficiently numerous, I have made no distinction of sex. The following table, showing the rate of increase of the lungs and body respectively, in still born infants, will go far to decide the point in question.

TABLE XIV.

Number of Observations.	Weight of Body.	Average weight of Body.	Weight of Lungs.	Proportion.
1	20000—30000	27030	541	1 : 50
22	30000—40000	35139	700	1 : 50
26	40000—50000	45004	754	1 : 60
21	50000—60000	55595	1005	1 : 55
19	60000—70000	64453	1068	1 : 60
4	70000—80000	77382	1317	1 : 58
1	80000—90000	87336	1226	1 : 71
2	90000 & upwards	96330	1491	1 : 64

The following table, formed from a larger number of observations on infants after respiration, confirms the conclusions to be drawn from the foregoing table.

TABLE XV.

Number of Observations.	Weight of Body.	Average weight of Body.	Weight of Lungs.	Proportion.
2	10000—20000	18535	533	1 : 34
59	20000—30000	27079	863	1 : 31
141	30000—40000	34614	1061	1 : 32
69	40000—50000	43448	1136	1 : 38
32	50000—60000	54020	1318	1 : 41
15	60000—70000	64581	1603	1 : 4
9	70000—80000	76127	1378	1 : 55
2	80000—90000	88041	2193	1 : 40
3*	90000 & upwards	113783	3273	1 : 34

From these tables it appears, that, though the weight of the lungs increases with the weight of the body, that increase is by no means regular, but that the proportion of the lungs to the body decreases as the weight of the body increases. The irregularity which is seen in both these tables would probably disappear on the addition of a larger number of facts. It appears, then, that we are not jus-

* These high numbers belong to children who had survived their birth a very considerable time.

tified in assuming that the weight of the lungs, either before or after respiration, bears any fixed relation to that of the body.

But this question as to the proportion existing between the weight of the lungs and that of the body admits of a much more simple and satisfactory solution; viz. by comparing two observations in which the weight of the body is the same, and noting the difference in the weight of the lungs; or, *vice versa*, by taking the same weight of lungs, and noting the difference in the weight of the body. This comparison is made in the following tables, which are formed from observations on still-born infants at full term.

TABLE XVI.

Male.			Female.			Male & Female compared.		
Body.	Lungs.	Propor.	Body.	Lungs.	Propor.	Body.	Lungs.	Propor.
56631	1364	1 : 41	59018	1093	1 : 57	62769	852	1 : 74
	1280	1 : 44		937	1 : 63		1191	1 : 53
49806	892	1 : 55	57313	1193	1 : 48	55605	1023	1 : 54
	852	1 : 58		814	1 : 70		772	1 : 72
47882	880	1 : 54	44020	633	1 : 70	45364	1193	1 : 38
	710	1 : 68		571	1 : 77		649	1 : 70
40931	896	1 : 46	33981	682	1 : 44	30243	1112	1 : 27
	726	1 : 56		575	1 : 59		633	1 : 48

TABLE XVII.

Male.			Female.			Male & Female compared.		
Lungs.	Body.	Propor.	Lungs.	Body.	Propor.	Lungs.	Body.	Propor.
1193	66525	1 : 55	859	68230	1 : 80	896	49806	1 : 55
	45373	1 : 38		51852	1 : 60		38614	1 : 43
1148	57825	1 : 50	772	55605	1 : 72	860	62769	1 : 73
	42476	1 : 37		33981	1 : 42		51852	1 : 60
860	62769	1 : 74	688	53898	1 : 78	852	49806	1 : 58
	49806	1 : 58		38891	1 : 57		68230	1 : 80
741	45565	1 : 61	633	46735	1 : 74	741	30274	1 : 41
	30274	1 : 41		30243	1 : 48		47110	1 : 63

From these tables we gather the fact, that for the same weight of body the lungs vary within wide limits, and conversely, for the same weight of lungs the body varies within wide limits, the difference in more than one instance amounting to upwards of one-third. These facts, with others which might have been adduced, prove that for the same weight of body the lungs of the male are generally heavier than those of the female, and, on the other hand, that, for the same weight of lungs, the body of the female is often heavier than that of the male. In other terms, the lungs are proportionally smaller in the female than in the male.

The following table exhibits some of the more striking facts of the same kind in children after respiration.

TABLE XVIII.

Male.			Female.			Male & female compared.		
Body.	Lungs.	Propor.	Body.	Lungs.	Propor.	Body.	Lungs.	Propor.
39000	1344	1 : 29	41595	1390	1 : 30	41595	1390	1 : 30
	757	1 : 52		780	1 : 53		788	1 : 53
25485	1235	1 : 21	54585	950	1 : 57	31664	741	1 : 43
	664	1 : 38		695	1 : 78		1544	1 : 21
33981	1390	1 : 24	31664	1544	1 : 21	26258	1151	1 : 23
	880	1 : 39		664	1 : 48		664	1 : 40
36298	1544	1 : 24	30119	1313	1 : 23	25485	1235	1 : 21
	1004	1 : 36		710	1 : 42		541	1 : 47
37070	1853	1 : 20	32436	1544	1 : 21	27802	772	1 : 36
	1142	1 : 32		494	1 : 66		1158	1 : 24

The results of this table are still more striking than those of the preceding one, though they are such as we should naturally expect when, to the original difference of weight of the lungs and body before respiration, is added the variable effect of the process of respiration itself. In more than one of the instances adduced, the weight of the body remaining the same, the weight of the lungs in one child is twice as large as in another, and in one example more than three times as large. Such anomalies as these meeting us at the very threshold of our inquiry into the value of Ploucquet's test, are sufficient of themselves to shake our confidence in it, and there is little reason to expect that a more minute examination will re-establish it in our favour. It is not, therefore, so much in the hope of finding Ploucquet's test more useful than it now promises to be, as with a view of completing the task I have undertaken, that I continue this inquiry.

There is one fact worth observing, partly on its own account, and partly from its connection with the present inquiry, viz. that the weight of the body is considerably greater in still-born children than in children who have respired. This will appear from the following table, in which the weights of the body before respiration, and in children of one day old are compared. The numbers of observations employed in forming the table are as follows :

Male before respiration,	44	After respiration,	31
Female do. .	37	do. .	22
Male and female do.	96	do. .	63

Table XIX.

	Male.		Female.		Male and Female.	
	Before Respiration.	After Respiration.	Before Respiration.	After Respiration.	Before Respiration.	After Respiration.
Max.	95,520	77,000	87,336	57,313	97,140	78,912
Min.	30,243	22,396	30,243	19,307	27,030	19,307
Mean,	52,461	43,527	50,831	38,821	51,685	44,266

The mean weight of the bodies of still-born children exceeds the mean weight of such as have lived one day by from about one-sixth to somewhat less than one-third. The natural inference from this fact is, that large children are most apt to perish in the birth. The bearing of the fact upon the value of Ploucquet's test is obvious; for on the supposition, that the weight of the lungs in the child who has lived one day, is so far increased by the process of respiration as to equal the weight of the lungs in the heavier still-born child,—a supposition which a glance at Table XI. will render highly probable,—then the increased weight of the body of the still-born child will have the effect of exaggerating the disproportion between the weight of the lungs and that of the body, and giving to the test a higher value than it deserves.

Another fact worth observing, in connection with Ploucquet's test is, that the weight of the lungs is subject to much greater variation than that of the body. Thus in still-born male children, at full time, the maximum weight of the body is 95520 grains, the minimum 30243; whilst the maximum weight of the lungs in the same children is 1800, and the minimum 360 grains. The variation in the weight of the lungs as compared with that of the body, is nearly expressed by the proportion 30 : 19. Nearly the same difference is observable in the body and lungs respectively in the female, and in the two sexes taken together. When respiration has continued one day, this proportion becomes for the male 32 : 21, for the female 4 : 3, and for the two sexes jointly, about 3 : 2. The influence of this fact on Ploucquet's test is not very important. By correcting the large variations in the weight of the lungs by the smaller variations in that of the body, it will bring the proportion existing between the two into somewhat narrower limits.

The facts which have just been adduced,—the great variation in the weight of the lungs, that of the body remaining the same; and the equal variation in the weight of the body, that of the lungs remaining the same; the disproportion in the weight of the body in still-born children, and in those who have survived their birth one day; and the great variations observed in the weight of the lungs both before and after respiration,—these facts would lead us to expect such variations in the proportion which the lungs bear

to the body, as must effectually destroy all hope of any practical advantage to be derived from Ploucquet's test. The inferences drawn from these data are abundantly confirmed by the more careful examination, into which I am now about to enter. The several questions are discussed in the same order which has already been observed in examining the absolute weight of the lungs.

The first question is, what is the proportion existing between the weight of the lungs and that of the body in still-born infants at full term? For the solution of this question the numbers of facts employed are as follow: male, 44; female, 37; male and female, 96.

TABLE XX.

	Before Respiration.		
	Male.	Female.	Male and Female.
Maximum,	1 : 24	1 : 36	1 : 24
Minimum,	1 : 176	1 : 119	1 : 176
Mean,	1 : 52	1 : 62	1 : 56

In one case mentioned by Lécieux, the proportion was as low as 1 : 200; but in this instance, the lungs are stated to have been compressed. The proportion of 1 : 176 occurred in a case related by Devergie, in which artificial respiration had been employed. The proportion next greater than this is 1 : 81, so that 1 : 176 may be justly regarded as an exception to the rule. In the female the proportion next greater than 1 : 119, is 1 : 94. In those cases where the sex is not stated, there is one proportion as low as 1 : 99. The maxima and mean numbers confirm the statement already made, that the lungs are less developed as compared with the body in the female than in the male. The following table, corresponding with Table II. gives the proportion between the lungs and body at 6, 7, and 8, months of fœtal life. The number of observations employed is as follows: 6th month, male 7, female 6, male and female 13: 7th month, male 10, female 12, male and female 24: 8th month, male 17, female 12, male and female 34.

TABLE XXI.

	6th Month.			7th Month.			8th Month.		
	M.	F.	M. & F.	M.	F.	M. & F.	M.	F.	M. & F.
Max.	1 : 35	1 : 19	1 : 19	1 : 27	1 . 25	1 : 25	1 : 27	1 : 27	1 :27
Min.	1 : 58	1 : 56	1 : 58	1 : 62	1 : 56	1 : 78	1 : 132	1 : 98	1 : 132
Mean,	1 : 39	1 : 40	1 : 39	1 : 40	1 . 38	1 : 41	1 : 46	1 : 44	1 : 45

From this table it appears that the proportion which the lungs bear to the body at 6, 7, and 8 months, is greater than at 9 months; in other words, that the lungs are proportionably more developed at the earlier periods of gestation than at the full term. The

numbers in the table are merely approximations, as the facts are not sufficiently numerous to establish a true average.

The following table corresponds with Table III., and presents the maxima, minima, and mean results for the two sexes taken together at 6, 7, 8, and 9 months, and before respiration.

TABLE XXII.

	6th Month.	7th Month.	8th Month.	9th Month.
Maximum,	1 : 19	1 : 25	1 : 27	1 : 24
Minimum,	1 : 58	1 : 78	1 : 132	1 : 176
Mean, .	1 : 39	1 : 41	1 : 45	1 : 56

Having now examined Ploucquet's test in the still-born, I proceed to construct similar tables for children that have respired; and, in the first place, in respect of children that have lived one month or less. The number of observations employed in constructing this table is as follows: male 162; female 124; male and female 314.

TABLE XXIII.

	After respiration.		
	Male.	Female.	Male and Female.
Maximum, .	1 : 19	1 : 19	1 : 19
Minimum, .	1 : 132	1 : 96	1 : 132
Mean, .	1 : 35	1 : 43	1 : 38

In the males the proportion next greater than 1 : 132 is 1 : 119; and the next in order, 1 : 80. In the case of the females, the proportion next above 1 : 96 is 1 : 85. On the other hand, the proportion next less than 1 : 19 is 1 : 20 for the male, and 1 : 21 for the female.

The following table corresponds with Table V., and exhibits the proportion between the weight of the lungs and that of the body at 6, 7, and 8 months respectively.

Number of observations: 6 months, male 5, female 10, male and female 15: 7 months, male 17, female 14, male and female 36: 8 months, male 19, female 18, male and female 40.

TABLE XXIV.

	6th Month.			7th Month.			8th Month.		
	M.	F.	M. & F.	M.	F.	M. & F.	M.	F.	M.&F.
Max.	1 : 18	1 : 17	1 : 17	1 : 18	1 : 23	1 : 18	1 : 24	1 : 20	1 : 20
Min.	1 : 108	1 : 65	1 : 108	1 : 69	1 : 59	1 : 69	1 : 80	1 : 104	1 : 104
Mean,	1 : 30	1 : 34	1 : 33	1 : 41	1 : 35	1 : 38	1 : 36	1 : 36	1 : 36

The want of uniformity in this table may be attributed probably to the small number of observations employed in constructing it. The proportions 1 : 108 and 1 : 104, may be considered,

perhaps, as exceptions to the rule, for the proportion next greater than 1 : 108 is 1 : 44; and the proportion next greater than 104 is 1 : 53.

Table XXV. exhibits the proportion between the weight of the lungs and that of the body, for the two sexes taken together, at 6, 7, 8, and 9 months.

TABLE XXV.

	6 months.	7 months.	8 months.	9 months.
Maximum, .	1 : 17	1 : 18	1 : 20	1 : 19
Minimum, .	1 : 108	1 : 69	1 : 104	1 : 132
Mean, . .	1 : 33	1 : 38	1 : 36	1 : 38

For the reasons already stated, when speaking of the absolute weight of the lungs; the numbers contained in Table XXIII. are insufficient for medico-legal purposes. To insure the accuracy required for such investigations, it is necessary to ascertain the proportion which the weight of the lungs bears to that of the body, when respiration has continued a larger or a shorter period. With this view I have made the following table, which corresponds with Table VII.

No of observations.	1 hour and less;	male 9, female 8, male and female 27.
Do.	More than 1 hour, and less than 12.	male 9, female 8, male and female 19.
Do.	More than 12 hours, and less than 1 day.	male 8, female 7, male and female 16.

TABLE XXVI.

	Less than 1 hour.			12 hours.			1 day.		
	M.	F.	M. & F.	M.	F.	M.&F.	M.	F.	M.&F.
Max.	1 : 30	1 : 26	1 : 26	1 : 20	1 : 30	1 : 20	1 : 27	1 : 30	1 : 27
Min.	1 : 119	1 : 78	1 : 119	1 : 132	1 : 96	1 : 132	1 : 55	1 : 78	1 : 78
Mean.	1 : 50	1 : 42	1 : 51	1 : 51	1 : 56	1 : 53	1 : 38	1 : 44	1 : 39

The average values in this table agree with the averages in Table VII. They show that the weight of the lungs, as compared with the body, is somewhat greater where respiration has continued less than one hour, than where it has lasted twelve hours; but that when it has continued more than twelve hours and less than one day, it is considerably increased.

The following table, which is the counterpart of Tables VIII. and IX., shows the proportion which the weight of the lung bears to that of the body for the several periods mentioned in the table :—

TABLE XXVII.

Age.	No. of Obs.			Male.			Female.			Male and Female.		
	M	F.	M.& F.	Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.
1 day,	32	23	65	1 : 25	1 : 132	1 : 49	1 : 26	1 : 96	1 : 44	1 : 20	1 : 132	1 : 48
2 days,	14	5	21	1 : 30	1 : 60	1 : 41	1 : 49	1 : 85	1 : 56	1 : 30	1 : 85	1 : 44
3 days,	9	9	23	1 : 23	1 : 48	1 : 35	1 : 25	1 : 62	1 : 36	1 : 20	1 : 62	1 : 33
4 days,	17	14	34	1 : 20	1 : 48	1 : 33	1 : 21	1 : 60	1 : 37	1 : 20	1 : 60	1 : 34
5 days,	9	11	20	1 : 23	1 : 45	1 : 33	1 : 25	1 : 56	1 : 38	1 : 23	1 : 56	1 : 35
6 days,	9	7	18	1 : 25	1 : 52	1 : 32	1 : 29	1 : 44	1 : 35	1 : 25	1 : 52	1 : 35
7 days,	6	7	13	1 : 28	1 : 44	1 : 37	1 : 21	1 : 43	1 : 30	1 : 21	1 : 44	1 : 33
1 week,	97	77	202	1 : 20	1 : 132	1 : 38	1 : 21	1 : 96	1 : 40	1 : 20	1 : 132	1 : 39
2 weeks,	51	37	88	1 : 19	1 : 55	1 : 32	1 : 19	1 : 66	1 : 31	1 : 19	1 : 66	1 : 32
3 weeks,	9	4	14	1 : 20	1 : 35	1 : 28	1 : 24	1 : 37	1 : 32	1 : 20	1 : 49	1 : 31
4 weeks,	4	7	11	1 : 19	1 : 44	1 : 26	1 : 22	1 : 43	1 : 30	1 : 19	1 : 44	1 : 27

This table confirms the results deduced from Tables VIII. and IX., and shows that the weight of the lungs, as compared with that of the body, increases with the duration of respiration, and the consequent perfection of the respiratory process. The irregularities observable in the first part of the table may be fairly attributed to the small number of observations. These irregularities almost entirely disappear in the second part, where the observations are more numerous, and the periods of time and the intervals between them greater.

Having thus examined Ploucquet's test, both before and after respiration, I now proceed to compare the results obtained before respiration with those obtained after respiration. For this purpose I have arranged the following table, which is the counterpart of Table XI.

TABLE XXVIII.

	Before respiration.	After respiration.			
		Less than 1 hour.	12 hours.	1 day.	1 day and less.
Max.	1 : 24	1 : 26	1 : 20	1 : 27	1 : 20
Min.	1 : 176	1 : 119	1 : 132	1 : 78	1 : 132
Mean,	1 : 56	1 : 56	1 : 53	1 : 39	1 : 48

This table places in a very forcible light the real value of Ploucquet's test. It shows how greatly its advantages have been exaggerated, and adds another example to the many already on record of the futility of theories grounded upon one or two facts. Instead of Ploucquet's proportion of 1 : 70 before respiration, and 1 : 35 after respiration, we have 1 : 56 before respiration, and 1 : 51 after respiration has continued one hour or less, and 1 : 53 when it has lasted twelve hours. Now it is precisely at this early period after birth that the crime of infanticide is most commonly committed; and to decide the question whether or not the child has breathed, we must make use of averages which differ so little

as 1 : 56 and 1 : 53 or 51. Even in a case in which a child has been proved to have lived one day, we have no greater difference than 1 : 56 and 1 : 39, and this an average difference, with a wide interval between the extreme proportions. A glance at the table will show how little advantage can be gained by an employment of the extreme values as standards of comparison.

There now only remains to contrast the proportion existing between the weight of the lungs and that of the body at six, seven, eight, and nine months. This contrast will be formed by combining Tables XXII. and XXV.

TABLE XXIX.

	6th month.		7th month.		8th month.		9th month.	
	Before resp.	After resp.	Before resp.	After resp.	Before resp.	After resp.	Before resp.	After resp. 1 day.
Max.	1 : 19	1 : 17	1 : 25	1 : 18	1 : 27	1 : 20	1 : 24	1 : 20
Min.	1 : 58	1 : 108	1 : 78	1 : 69	1 : 132	1 : 104	1 : 176	1 : 132
Mean,	1 : 39	1 : 33	1 : 41	1 : 38	1 : 45	1 : 36	1 : 56	1 : 48

This table appears at first sight to confirm an observation already made by Devergie as the result of his own tables, viz. that the process of respiration is more completely established in the immature than in the mature fœtus. There can be no doubt that, both before and after respiration, the lungs of the immature fœtus bear a larger proportion to the body than they do at full term; but there is some room to doubt whether the process of respiration is more complete in the earlier periods. It is difficult, indeed, to make any comparison sufficiently exact to determine this question, for the duration of respiration in the immature children varies greatly, some having lived some hours, others some days, and the observations are not sufficiently numerous to allow of minute subdivision. On comparing, however, the results for 6, 7, and 8 months, with those obtained for children at full term, who have lived one month or less, we find that the averages are 1 : 33, 1 : 38, 1 : 36, and 1 : 38, respectively. Hence there is some slight ground for believing with Devergie, that the process of respiration (as far as the increased weight of the lungs may be considered a test of more perfect respiration) is more complete in the early periods of gestation, but, as the difference in the proportion before and after respiration is nearly the same for 6, 7, 8, and 9 months, we may consider this observation of Devergie to stand in need of further confirmation.

The observations which have been already made when speaking of the absolute weight of the lungs, are fully borne out by the facts just adduced in illustration of Ploucquet's test. Both orders of facts have an important bearing on a physiological and medico-legal question, which are closely connected, and are commonly discussed together. The physiological question virtually involves

the practical one, but both may be decided by the same facts. The physiological question is this,—What effect has respiration on the supply of blood to the lungs? To what extent does it affect the weight of these organs? is the practical question.

A few observations on each of these questions in the order in which they are proposed, will bring this essay to a conclusion.

And, *first*, with regard to the physiological question—What effect has respiration on the supply of blood to the lungs? Few facts in physiology are better established than the intimate connection existing between the functions which an organ performs, and the quantity of blood which it receives, and, as a general rule, it may be stated that the more important these functions, the larger the supply of blood. It is but natural, therefore, to expect that, where an organ has no functions to perform, it will receive no more blood than is necessary to keep it alive, and preserve it as a part of the system to which it belongs. Now this is precisely the case with the fœtal lungs. Until respiration is established they have no function to perform, and it has been, therefore, somewhat hastily assumed that they receive a very limited supply of blood. This reasoning is specious but not sound; for there is no real analogy between the lungs and those organs of the body which are dependent upon their supply of blood for the due performance of their functions. The rule which applies to secreting organs, does not hold good when it is extended to viscera, which merely serve as reservoirs of blood. Now, the peculiar function of the lungs is that of exposing a large quantity of blood to the atmospheric air. Regarded in this light, there seems no sufficient reason for assuming that the lungs contain much less blood before respiration than after respiration. If a free flow of blood through the lungs be necessary to the support of life when respiration is once established, a full supply of blood seems equally necessary when that important function is about to be called into play. Nor does the peculiar character of the fœtal circulation place any great difficulty in the way of the supposition that the lungs, even before respiration, contain a considerable quantity of blood; for though the blood be not circulated through the lungs so rapidly before as it is after respiration, there is no physical obstacle to an accumulation of blood in the lungs preparatory to the establishment of the respiratory process. But it is not by *à priori* reasonings that such questions as this can be satisfactorily decided. In this, as in all other cases, an appeal to facts is the only means of coming to a decision. Now the facts contained in the tables prove beyond a doubt that the process of respiration does in some degree increase the weight of the lungs. But this increase of weight is so inconsiderable, as to militate strongly against the general opinion, that the fœtal lungs are nearly desti-

tute of blood. It follows, therefore, that though the process of respiration does cause the lungs to receive an increased quantity of blood, it finds them already amply supplied with it; for there can be no doubt that the weight of the lungs before respiration very greatly exceeds the weight of their structure alone; a fact which can be accounted for only on the supposition that their vessels contain a very large quantity of blood.

This fact being established beyond the reach of doubt on the authority of the tables, a question arises, whether this large quantity of blood is always contained in the lungs, or merely enters them during the birth? There are no precise data for solving this question; but it seems highly probable, that, during or immediately after the birth of still-born children, the lungs may be gorged with blood. On the supposition that ineffectual efforts to respire are made by many still-born infants, it will not be difficult to explain the gorged state in which their lungs are sometimes found. These efforts consist in a raising of the ribs, and depression of the diaphragm, which tend to leave a vacuum in the chest,—a vacuum which must be continually prevented by the enlargement of some of the contents of the chest. Now the lungs are organs peculiarly susceptible of this increase of size, and will admit of easy expansion by the blood, which the heart is continually throwing out. It is not unreasonable, therefore, to suppose that, when these efforts to respire prove ineffectual in consequence of some impediment to the entrance of the air by the mouth or glottis, the blood should find its way into the lungs, instead of the air, which is excluded. This supposition derives strong confirmation from facts, which must have fallen under the observation of all those who have been in the habit of inspecting the bodies of infants. Thus in one case which I had an opportunity of examining, the lungs, though in a fœtal state, throughout, with the exception of three or four small points on the upper lobe of the right lung, were gorged with blood, and weighed no less than 1178 grains Troy. Here the child had given three distinct gasps merely, and the air had scarcely found its way into the lungs at all; but, nevertheless, they were found full of blood. I have observed a similar turgescence of the lungs in cases of still-birth. There is a close analogy, indeed, between the effect of abortive efforts at respiration in the infant, and similar abortive efforts in the adult. Thus in cases of suffocation, the efforts at inspiration have the effect of gorging the lungs with blood, though the air is prevented from entering, and some of the heaviest lungs of infants on record are those which have perished by suffocation. One instance of this sort has already been cited. But though it cannot be doubted, that the lungs do receive blood in considerable quantity before respiration takes place, yet the facts collected prove that the quan-

tity is increased by the act of respiration, at first but slightly, after some hours or days more considerably. The tendency of respiration, therefore, is to add to the weight of the lungs; but, as respiration often continues for hours or days, nay, even for weeks, in a very imperfect manner, the full effect of respiration is not produced in the early periods of life; and comparatively few cases occur in which the lungs are found completely and universally permeated with air. On a future occasion I propose discussing this subject by the aid of single facts,—I content myself at present with more general results, and the conclusions which my reading or experience has forced upon me. The following general proposition seems to be warranted by the results of the tables and by experience of individual facts.

The fœtal lungs contain a considerable quantity of blood, and that quantity is not greatly increased by the process of respiration.

One other fact established by the tables is too interesting to be passed over in silence; viz. that, whereas the weight of the lungs is increased on the first establishment of the respiration, it is diminished when respiration has continued more than one hour, and less than twelve, and again increased when the child has lived more than twelve hours, and less than one day. This, though it appear paradoxical, may really admit of explanation, if it be allowed that the first efforts to respire, whether successful or not, are of necessity accompanied by an engorgement of the lungs, which passes off as the process becomes more completely established; and that, when the respiration has continued for a still longer period, the lungs receive a still larger quantity of blood, and a still further increase of weight.

These observations are open to the obvious objection, that the facts from which the tables are formed are not strictly comparable, nor sufficiently numerous. This objection, of which I am far from denying the force, may be met by a further appeal to individual facts, which I reserve for a future occasion.

If the facts are allowed to be sufficiently numerous, the practical question with regard to the value of the absolute weight of the lungs, and their weight as compared with that of the body, (Ploucquet's test), as tests of respiration, is already decided; and the following proposition will present a summary of the results obtained. *The static lung tests are utterly useless for all practical purposes, and ought not to be relied on in medico-legal inquiries.*

In a future essay I propose to examine the hydrostatic lung test, and to detail one or two cases of some interest which have come under my own observation.

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