ON THE
DURATION OF PHTHISIS PULMONALIS
AND ON
CERTAIN CONDITIONS WHICH INFLUENCE IT.

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It requires no small courage to draw the attention of this Society to such an important subject as the duration of life in phthisis, at a time when the various states of the lung included under that term are undergoing a searching investigation and discussion, and at the threshold of our inquiry we are met with the very natural but nevertheless difficult questions, "What do you mean by phthisis? What morbid states of the lungs do you include under that term? Do you restrict it to cases in which tubercle is present, or do you make it embrace scrofulous pneumonia, chronic catarrhal pneumonia, and other conditions of lung which tend to caseation and excavation?" To these questions I reply, that in this paper the term phthisis is used in a broad comprehensive sense and signifies a consuming pulmonary disease, beginning in consolidation, generally of the upper part of the lungs, which may or may not be tubercular, tending more or less to excavation,

accompanied by the well-known group of symptoms, indicating irritation, decay, and wasting; viz., constant cough with opaque expectoration, progressive loss of flesh, strength, and breath, frequently, night sweats, and occasionally, hæmoptysis and diarrhœa; originating in various causes, such as diseased conditions of the blood, inflammation, catarrhal, croupous, or parenchymatous, and the like.

The object of the present paper is to give some account of a thousand cases of phthisis selected from the private practice of Dr. Williams and myself, and to deduce as far as possible, from the data at command, the amount of influence which the conditions of age, sex, family predisposition and origin, exercise on the duration of the malady.

The patients for the most part, belonged to the upper and middle classes of society, and as statistical information of disease among these classes is rare, it is hoped that the present contribution may prove acceptable, as affording some facts capable of comparison with the results of hospital experience which have been well set forth by the Brompton Hospital Reports and by Dr. Pollock and others.

It will be well when judging of the statistics to bear in mind the advantages which many of these patients enjoyed over the poorer classes, in the avoidance of those ills which arise from poverty, exposure to cold, unhealthy atmospheres and occupations, and in the opportunities of rest, change of climate, better living and exercise.

The cases which form the basis of this paper amount to one thousand, and they have been selected from the records of a far larger number, on the ground of their being one year at least under observation. I hope there will be no misapprehension on this point. They are avowedly *selected* cases, and the ground of their selection was adopted after considerable deliberation, for the following reasons. Our object is not to determine the duration of cases of consumption in which little or no exertion has been made to check the downward progress of the disease; the natural history

of phthisis is, alas, too well known, and a graphic account of it may be found in the pages of Louis and others. We aim at finding out what effect can be produced on the duration by the fair and discriminating use of remedial means, and for this purpose it is obvious that we must select patients who have been under observation for a time sufficient to yield results, and not those who have been seen only once or twice and then lost sight of. A large number of patients who consult a physician come once only; others but two or three times within a short period and then pass out of his field of observation. Such cases, although supplying useful information as to the origin and varieties of the disease, are of no value with reference to its treatment, results, or duration. Yet because these cease to attend is no proof that they derive no benefit; many come only to ascertain the physician's opinion, and are unable, through scanty resources or through distance from town, to repeat their visits. We must not conclude, however, that, because they do not continue to attend they are unfavorable cases and likely to terminate within the year; on the contrary, all the evidence that we can collect points to a different conclusion. Patients frequently reappear on the scene, years later, who after one or two visits had been lost sight of and had been carrying out treatment steadily, but had been prevented by various causes from visiting the physician for a long period. Exceptions should, however, be made of those cases which are known to have proved fatal in one year, and these, which can and have been traced by means of the obituary of the newspapers, are found to be few and may be balanced against the much larger number reported as having much improved after a few months' treatment and as affording promise of permanent recovery.

From having watched the course of the disease in several thousands of cases and from having investigated the records of many thousands more, I have come to the conclusion that comparatively few cases of phthisis die under one year, and I find this conclusion to be shared by physicians who have had the largest experience of the malady.

In order to arrive at an estimate of the proportions which the cases, fatal within the year, bear to those more or less improved, I have carefully examined the records of every case of phthisis occurring during one year, the year being selected at hazard, as a sample, from the period of twenty-two years. Of 433 consumptive patients who consulted Dr. Williams for the first time in 1863, 245 were seen only once, and no more was heard of them; 84 were one year and upwards under observation, and were, therefore, among those selected for our tables. Of 104 patients whose subsequent history was known for periods under one year, 8 died, 13 were at the last visit rather worse, 3 were about the same, 75 were more or less improved, and 5 were quite restored to health. Thus, those improved and cured were ten times more numerous than the deaths. It can hardly be said that in taking the fact of the patient being at least one year under observation as the basis of our selection we increase the balance of favorable results, but we thereby deal with facts more carefully observed and more conclusive in relation to the real efficacy of treatment.

The cases were extracted from the note-books of Dr. Williams and arranged in tables containing twenty-five each, under the headings of—

Age.

Sex.

Family predisposition.

Date of first symptoms.

Origin of disease.

Occurrence of hæmoptysis.

Date of first visit.

State of lungs, as evidenced by physical signs.

Treatment (by medicine and climate).

Result.

Duration, and state of patient at last visit.

No. of Case.	Sex & Age.	Family predisposition.	Date of 1st symptoms.	Origin of Disease.	Hæmoptysis.	Date of 1st visit.	State of lungs as evidenced by physical signs.	Treatment.		Result.	Duration and state of patient.
								Medicinal.	Climatic.		
1654	27 M	Mother died of phthisis	3 months ago	...	None	May 7, 1861	Dulness; cavernous sounds upper right, most marked posteriorly; tubular sounds above left scapula	Oil taken previous to visit. Ol. Acid. Phos. Strychn. b.d. Linct. Morph. Liniment. Acet. Canth. Dec. 12th. Magnes. Sulphat. p. and n.	...	Dec. 12, 1861.—Had offensive expectoration, streaked with dark blood, but was better throughout the summer, except some cold and cough; had hæmorrhœa several times; abdomen swollen and tender; tumor in left hypochond. March 12, 1862.—Hæmorrhœa continued till one month ago, but has greatly improved; gained flesh, and walks fourteen miles a day; cough slight; physical signs less; no tumor. October 20, 1863.—Continued better till August; when in Jersey left off oil, and since has lost two stone; cough worse; throat bad, and has piles. Cavernous sounds upper right, tubular upper left. November, 1868, tolerably well. September, 1862.—Hoarse at first, but lost cough at Pau at Christmas; physical signs improved, July, 1864.—Quite stout and strong, and walks several miles; sometimes wheezy; tubular sounds both scapular regions.	Tolerably well. 7 years 9 months
1719	25 F	None	1 year 4 months ago	Bronchitis	None	Oct., 1861	Dulness; slight crepitation left front, less in back	Ol. Acid. Phos. Calumb. Aur. b.d.	Bourne-month 1 winter before visit; Pau 1 winter; Biarritz 1 winter; Rome 1 winter.	Recovered under oil in seven months; when seen in 1862 was tolerably well, with slight cough and slight physical signs. Died in June, 1869.	Well. 4 years 1 month.
1555	51 M	None	3 months ago	...	3 or 4 several times	Mar. 5, 1852	Dulness; tubular sounds upper left, most front	Ol. Acid. Nitric. et Hydrocyan. Lupul. Aurant. b.d. Lin. Crot.	...	Recovered under oil in seven months; when seen in 1862 was tolerably well, with slight cough and slight physical signs. Died in June, 1869.	Dead. 17 years 6 months.

Some of the results of the first 500 cases were published in the 'Lancet' of 1868, but since then 500 more cases have been collected, and no pains have been spared to render the information respecting the whole thousand as complete and accurate as possible.

Where the patients had been lost sight of for several years without having been announced as dead, a correspondence was opened, either with themselves or their friends, to ascertain whether they were alive and in what state of health—a correspondence which when addressed, as it often had to be, to the individual whose life was suspected, sometimes evoked ludicrous answers.

Reference to the various lists, the 'Army and Navy,' 'University,' 'Clergy,' and 'Law,' to the 'Court Guide,' and to the 'Peerage,' has often afforded valuable information; and on this point private practice has great advantages over hospital statistics, for, in respect of the former, by some means or other, patients can be traced through a number of years, whereas, in the latter, they are generally lost sight of when they quit the hospital.

Nevertheless, a certain number of the tabulated cases could not be traced up to the present time, and of these the date when last heard of, with notice of their then state, is registered.

Sex.—Of the 1000 cases 625 were males and 375 females, or 62·5 per cent. of the former, 37·5 per cent. of the latter. This preponderance of males cannot be regarded merely as accidental, for it is closely in accordance with the evidence of the first report of the Brompton Hospital, where the percentage of males was 61; and that of females 39. Among Dr. Pollock's¹ out-patients 60·75 per cent. were males, 39·25 females.

Age.—The ages of the patients have been arranged in the following table.

¹ 'Elements of Prognosis.'

TABLE I.—*Showing Age at Time of Attack of 1000 Patients (802 living, 198 dead).*

	Males.		Females.		No.	Percentage.
	No.	Percentage.	No.	Percentage.		
Under 10 years.....	10	1·60	3	·8	13	1·3
10—20 years.....	86	13·79	96	25·6	182	18·2
20—30 „	245	39·20	173	46·13	418	41·8
30—40 „	183	29·28	66	17·60	249	24·9
40—50 „	70	11·20	24	6·40	94	9·4
50—60 „	22	3·52	8	2·33	30	3·0
60 and upwards	9	1·44	5	1·33	14	1·4
	625		375		1000	

This table differs in one point from many similar records. Instead of the age at first visit the age at first attack is tabulated, and this is arrived at by subtracting the history from the age at first visit. The date thus obtained is of far more consequence in estimating the duration of disease and the conditions which modify it than the age at first visit, which depends upon shifting circumstances, as, for instance, the feeling and opportunities of the patients, who may come under the observation of the physician either at the commencement of their disease, or many years after, near its termination. The record of their age at the time of the first visit would, therefore, afford us but slight information as to the time of attack or its duration. It may be objected that it is difficult always to arrive at accuracy as to the date of first symptoms, but this difficulty is often greater in hospital than in private practice from which these cases are taken, for the upper classes generally remember and narrate, almost too circumstantially for the physician, every symptom of their illness.

The results of this table accord with the commonly

received opinion as to the period of attack. Taking the sexes collectively, 41 per cent. were attacked between 20 and 30, about 24·9 per cent. between 30 and 40, 19·5 per cent. under 20, and 13·8 per cent. above 40. Considerable difference was found to exist between the two sexes as to the time of attack. Between 20 and 30, the most common period of attack for both sexes, about 7 per cent. more females were attacked than males, and again between 10 and 20, 11·8 per cent. more. On the other hand, after 30 the reverse was the case. Between 30 and 40 the males exceeded the females by 11·68 per cent., and above 40 by 6 per cent.

Deductions as to the effect of age on the duration of the disease will be drawn in a later portion of the paper.

The average age when attacked was, for the males, 29·47, and for the females, 26·06.

Family predisposition.—The registry of the absence or presence of this feature has been very carefully attended to, though there are many difficulties in the way of arriving at accurate conclusions, and it is very possible that errors, on the side of omission, have been committed. The term hereditary predisposition is used in various senses by different authorities; some include only parents, as did the first medical report of the Brompton Hospital, which in this way arrived at an average of 25 per cent. of cases in which the predisposition existed.

Dr. Fuller¹ included, in addition, grand parents, uncles, and aunts; and his calculations in this way reached 59 per cent. If we include the same list of relations that Dr. Fuller did, these 1000 cases number 250 hereditary instances or 25 per cent. of the whole; but it was thought advisable to substitute the term *family* predisposition for hereditary, as it admits of a wider meaning, and is intended to include besides the above-mentioned relations those of the same generation, *e. g.* brothers and sisters, and first cousins—the principle being to accept as instances of disease in the

¹ 'Diseases of the Chest.'

family all near blood relations derived from a common stock. The reason of this extension was to arrive at some conclusions about the numerous class of cases in which, although there is no history of hereditary taint in a family, the children on arriving at a certain age are attacked one after another with consumption. The number of cases having only brothers and sisters affected is very large, constituting 22 per cent., a percentage larger than that of any other class, and this alone is a sufficient ground for considering them, whatever be the cause of the prevalence of disease in a family, whether it be derivable from the stock or from endemic causes, damp, and the like. The number of cases of family predisposition was 484 or 48·4 per cent., being 270 among the males and 214 among the females, or 43 per cent. among the former and 57 per cent. among the latter, which shows an excess of 12 per cent. in the females.

The particulars were as follows :—

- 10 had grand parents affected.
- 43 had fathers affected.
- 67 had mothers affected.
- 10 had both parents affected.
- 48 had uncles and aunts affected.
- 72 had fathers' or mothers' family affected (particulars unknown).
- 224 had brothers and sisters affected.
- 10 had cousins affected.

484 Total.

Where more than one relation was affected, as was the case in 60 of these patients, it has not been thought good to make a double entry, but to record the nearest relative of the preceding generation, *e.g.* 'mother and brother' affected is entered under *mother*, 'father and sister' under *father*, and so on. The greater number of the duplicates occur in those of the same generation, as brothers, sisters, and cousins.

Origin and first symptoms.—In 685 cases the disease came on with the ordinary group of symptoms without any antecedent illness, but in a considerable number, viz. in 315, it either originated in, or followed closely after other diseases, as the following table will show. Phthisis was preceded by Pleurisy and pleuro-pneumonia in 149 cases.

„ Bronchitis in	.	.	.	118	„
„ Asthma (spasmodic) in	.	.	.	7	„
„ Scrofulous abscesses in	.	.	.	12	„
„ Fistula in	.	.	.	5	„
„ Hooping-cough in	.	.	.	6	„
„ Croup in	.	.	.	1	„
„ Scarlatina in	.	.	.	4	„
„ Measles in	.	.	.	2	„
„ Continued fevers in	.	.	.	3	„
„ Peritonitis in	.	.	.	1	„
„ Malformation of the chest in	.	.	.	2	„
„ Injuries to the chest and other organs in	.	.	.	5	„

315

The number arising from pleuropneumonia and bronchitis is very large, reaching a total of 267, or more than one quarter of the whole, and deserves attention as showing statistically the influence of these diseases as direct sources of consumption. It is well known to the profession, and especially to those connected with hospitals for diseases of the chest, how often a neglected case of pneumonia or bronchitis becomes, under depressing causes, one of consumption, but statistics proving this frequency are rare, if not wanting. This number, 267, or 26·7 per cent., high as it is, is probably much below a correct estimate for hospital patients, among whom the prevention or rapid cure of these diseases is much more difficult, and therefore less common than among their wealthier brethren.

In the cases of phthisis arising from pleuropneumonia the course of events was generally as follows. After the attack some portions of the lung remained consolidated or compressed by dense pleuritic adhesions, or both these lesions

existed and tended to cripple the lungs for their respiratory work; the breath remained short, the patient seldom or never lost the cough, which a fresh cold or some disordering influence caused to increase, muco-purulent expectoration, and sometimes hæmoptysis accompanying it. Signs of softening were detected in one or both lungs, followed by those of excavation, and the case assumed a consumptive aspect.

Of the cases of phthisis following bronchitis some arose from acute attacks, others from chronic. These last patients generally lost their cough and other symptoms in the summer or in warm weather, but were subject to a return of it every winter, or during inclement weather. A longer or more severe attack than usual greatly prostrated them; the cough now remained persistent, and was also accompanied by permanent feverishness, heat of skin, and wasting. On examination of the chest, in addition to the ordinary bronchitic sounds, patches of consolidation were detected; these did not clear up, and softening and excavation eventually took place, and the patient lapsed into phthisis. The clinical symptoms and changes which take place in the lungs have been well sketched by Dr. Burdon Sanderson in a clinical lecture delivered at the Middlesex Hospital.¹

Of the 149 cases originating in pleuropneumonia, in 85 no family predisposition could be traced, and this was also the case in 57 of the 118 instances arising from bronchitis.

Thus 142 physical patients, or 14·2 per cent., owed their attacks entirely, as far as could be ascertained, to inflammatory attacks of the lungs.

Time will not suffice to notice more fully the list of diseases on which phthisis supervened among these patients, but I would refer the Fellows of this Society to a paper of mine in the fourth volume of the 'St. George's Hospital Reports,' "On the Causes of Pulmonary Consumption," in which this portion of the subject is fully treated of as regards 800 of the present cases.

Hæmoptysis.—This symptom was recorded to have been

¹ 'Biennial Retrospect of Medicine of 1867-8,' Sydenham Society.

present in various degrees, at some period of the patients' history, in 569 cases out of the 1000, *i. e.* about 57 per cent., a percentage lower than that of the first 'Report of Brompton Hospital,' which was 63 per cent., but nearly agreeing with that of Dr. Cotton's¹ 1000 hospital cases, which was 53·6 per cent., and that of Dr. Pollock's 1200 hospital cases, which was 58·4.

State of the lungs as evidenced by physical signs.—I shall now endeavour to describe as briefly and succinctly as possible the state of the lungs of these patients when they came under observation at first, and afterwards to give some report of the changes which had taken place at the date of their last examination. The record of the physical signs has been perhaps more carefully carried out than any other point in these cases, and in perusing it, a fair idea can be easily obtained of the amount of disease present in each case, with its subsequent progress; but the selection of similar cases for the purposes of statistics, and their arrangement into as few classes as possible, has been attended with great difficulty.

The classification of the conditions of the lung, consolidation, softening, and excavation, respectively into first, second, and third stages, is open to objections, because such stages are not always well defined, it being sometimes difficult to distinguish between the end of the second and the beginning of the third, and again, various parts of the same lung may be in different stages. What different amounts of consolidation, too, may not the first stage include! Sometimes only a small portion of the lung, like that underlying the supra-scapular or the inter-scapular, or the infra-clavicular regions is consolidated; in other cases two-thirds or more are involved. However, it has been found difficult to avoid some such classification for the purpose of statistics, and, therefore, that of stages has been adopted, with the understanding that the first stage embraces various amounts of consolidation, and that the second and third are sometimes

¹ 'On Consumption.'

only different degrees of the state of softening and excavation. In none of the present cases is the evidence of physical signs alone accepted; in all it has been amply confirmed by the clinical symptoms and the course of the disease. The results have been embodied in a table (which is now annexed—see Table II) divided into two parts, showing the *state at first visit* and *state at last visit*.

From this it will be seen that 660 patients, or two thirds, were in the first stage at the first visit; 181, or 18 per cent., in the second; 145, or 14·5 per cent., in the third, and 14 patients presented the physical signs of other lung diseases, viz. bronchitis, pneumonia, pleurisy, and asthma, on which shortly afterwards supervened signs of consumption. Those in the second and third stages hardly constituted a third of the total, which shows how large a proportion came in the stage of consolidation, of which the prognosis was likely to be more favorable. Of those in the first stage both lungs were affected in 205, the right alone in 287, and the left alone in 168. Of those in the second stage 55 had the right lung alone affected; 69 the left alone; 57 had both lungs involved, and in many instances both in the second stage. Of the 145 in the third stage, 43 had the right lung alone affected, 53 the left, and 49 both; but in only 4 were cavities detected in both lungs. This indicates a greater liability of the right lung to consolidation, but of the left to softening and excavation; a conclusion confirmed by the evidence of the Second Report of the Brompton Hospital.

Having briefly considered the state of the patients at first visit, let us turn our attention to their state at last visit.

Of the 1000 patients, 198 (about $\frac{1}{5}$ th) were ascertained to have died, the deaths being distributed as follows—

15·75	per cent.	of those who came in the first stage.
26·51	„	„ „ second stage.
30·34	„	„ „ third stage.

Thus we see that the percentage of mortality of the

TABLE II.—*State of Lungs as*

Stage.	No.	Per centage.	Particulars of state at first visit.	State at		
				Dead.	Healthy.	Im- proved.
1st	660	66·0	287 had the right lung alone affected	39	15	75
			168 had the left lung alone affected	25	9	45
			205 had both lungs affected	40	6	61
			660		30	184
2nd	181	18·1	55 had the right lung alone affected	15	1	13
			11 had the right lung in the 2nd stage, and the left in the 1st	5	...	4
			69 had the left lung alone affected	20	1	18
			35 had the left lung in the 2nd, and the right in the 1st ...	5	...	16
			11 had both lungs in the 2nd stage	3	...	2
			181		2	53
3rd	145	14·5	43 had the right lung alone affected	11	...	16
			5 had the right lung in the 3rd stage, and the left in the 2nd	2	...	2
			23 had the right lung in the 3rd and the left in the 1st ...	9	...	6
			53 had the left lung alone affected	14	1	13
			1 had the left lung in the 3rd and the right in the 2nd ...	...	...	1
			16 had the left lung in the 3rd, and the right in the 1st ...	8	...	3
			4 had both lungs in the 3rd stage	...	1	2
			145		2	43
	14	1·4	Presented physical signs of other lung diseases at 1st visit—			
			4 had signs of bronchitis,			
			4 had signs of pleurisy,			
			3 had signs of pleuro-pneumonia, }	2	...	...
			1 had signs of asthma,			
			2 had doubtful physical signs, }			
			14			
			1000	198*	34	280

Extension of Disease.

Out of 675 who had 1 lung diseased at first visit, the other lung was ascertained to be attacked in 131 (96 living, 35 dead).

Of those in the 1st stage the other was attacked in 85 instances; in 45 disease spread from right to left; in 40 from left to right.

Of those in the 2nd—Disease of right spread to left in 11 }
 Disease of left spread to right in 13 } 24.

Of those in the 3rd—Disease of right spread to left in 4 }
 Disease of left spread to right in 11 } 15.

Evidenced by Physical Signs.

last visit.				Particulars of state at last visit.
✓ About the same	Worse.	Un-known.		
19	110	29	=248	{ In 77, or 15·18 per cent., cavities are recorded to have formed; in 10, double cavities. In 24 the lungs went into 2nd stage, viz. 9, right lung being affected; 11, left; 4, both.
16	64	6	=143	
25	59	14	=165	
60	233	49	=556	Cavities are recorded to have formed in 32, or 28·8 per cent.
5	20	1	=40	
1	1	...	=6	
4	23	3	=49	
3	9	2	=30	
...	3	3	=8	
13	56	9	=133	
9	3	4	=32	
...	...	1	=3	
3	4	1	=14	
10	14	1	=39	{ At last visit 2 had 1 lung in 1st stage, 1 left in 2nd and right in 1st, and 1 had cavities in left and right in 1st. At last visit 1 had both lungs in 1st, 1 had right in 1st, 1 left in 3rd (1 died). At last visit 1 had right in 1st, 1 had right in 2nd and left in 1st, 1 had both in 2nd. At last visit 1 had both in 2nd. At last visit 1 had right in 1st (1 died).
...	...	...	=1	
2	3	...	=8	
1	...	...	=4	
25	24	7	=101	
4	8	...	=12	
102	321	65	=802	

Ratio of Deaths to Stages.

Of 660 in 1st stage 104, or 15·75 per cent., were ascertained to have died.

Of 181 in 2nd stage 48, or 26·51 " " "

Of 145 in 3rd stage 44, or 30·34 " " "

Of 14 (see above), 2 " " "

* *Deaths.*—In 80 patients, in whom cavities were absent at first visit, they were ascertained to have formed before death, i.e., in 52 per cent.

second and third stage, as far as we know it, was very much higher than that of the first, the third showing actually a double proportion of deaths and the fact must not be overlooked, as demonstrating that although cavities may be tolerated for years, yet the danger from blood infection, after their formation, is considerably increased. In 80 out of the 150 in the first and second stages, cavities were ascertained to have formed before death.

The state at last visit of the *living* patients is arranged under five headings. 1st, *Healthy*, (when the physical signs of the disease have entirely disappeared). 2nd. *Improved*. 3rd. *About the same*.—This latter term is used to include, not only the cases in which no change has taken place, but also those which after various fluctuations towards better or worse, presented at the last visit about the same amount of disease as at first. 4th. *Worse*.—This heading is intended to signify extension of the disease, either in the same lung or in the opposite one, as well as progress in the way of softening and excavation. 5th. *Unknown*.—This term refers only to the state of the patient's lungs, not to his general health, which is not considered in this table. The table shows that, among 802 living patients, the last recorded state of the lungs was "healthy" in 34, "improved" in 280, "about the same" in 112, "worse" in 321, and "unknown" in 65. Excluding the "unknown" ones, the relative percentages are roughly, "healthy" $4\frac{1}{2}$ per cent., "improved" 38 per cent., "worse" $43\frac{1}{2}$ per cent., and "about the same" $13\frac{1}{2}$ per cent. If we take the cases in stages, and compare the numbers under "healthy" and "improved" with those under "worse," we find that whereas in the first stage the "worse" somewhat outnumbered the "improved," in the second they are nearly equal, and in the third the ratio is entirely changed, the number of the "healthy" and "improved" being nearly double that of the "worse."

Some further particulars about the changes that took place in the lungs may not prove unacceptable. Where registered as "healthy" or "improved," the improvement

in the physical signs of the patients in the *first* stage consisted of dulness diminishing either in extent or degree, or in both; of the breath and voice sounds becoming less tubular and more vesicular, and in some few instances of the signs disappearing altogether, the percussion and breath sounds becoming normal. In those of the *second* stage the crepitation diminished, and was replaced by breathing having generally some roughness or tubular character, which in some instances eventually gave way to healthy sounds. The favorable change in the physical signs of the *third* stage was shown by the dulness decreasing, the moist cavernous sounds becoming croaking and drier, the pectoriloquy being less marked, and audible over a smaller portion of the lungs, sometimes being replaced by the dry whiffing crackling sounds of emphysema, but generally by tubular breathing and bronchophony. These last signs have in some instances disappeared, except above and within the scapulæ, where, with slight remaining dulness, they could generally be detected after they had vanished from other parts of the chest.

The cases of restoration to complete health number 34, and include 30 recoveries from the first stage, 2 from the second, in each of which only one lung was involved, and 2 from the third stage, in 1 of which, wonderful to relate, were cavities in both lungs; but they were small, and the long duration of the case, viz. 22 years, afforded time for their contraction and obliteration. In 16 cases out of the 1000, calcareous expectoration is noted; in 20, contraction of cavities; in 2 contraction of the lung, without the formation of a cavity, and in 16 emphysema of the lungs were recorded. So much for the "improved" and "healthy" classes.

Under the heading of "worse," we find that among cases of the first stage, in 77, or 15 per cent., cavities were formed in one lung; in 10 in both lungs; and that softening took place in 24 others. Of those in the second stage at first visit, cavities are recorded to have formed in 32, or 28·8 per cent.

In order to arrive at satisfactory data, as regards extension of disease from one lung to the other, the results of the deaths are included, and thus the whole number of cases is brought into use. We find that, excluding 325 patients which had disease of both lungs, and 80 of whom the results at last visit are unknown, 585 had one lung only attacked at first visit; of these the disease spread to the other lung in 131 instances, or in 32 per cent. Of those in the first stage, the disease extended to the other lung in 85 cases; of those in the second, in 24; of those in the third, in 81. These numbers indicate that, after a certain period, the disease has less tendency to spread, and is likely to remain limited to one lung. As regards the relative tendency of the two lungs, the right seems rather more liable to extension than the left, and this greater liability exists in whatever stage of disease the left lung may be.

The results of the changes in the lungs may be summed up as follows:

A cure was effected in $4\frac{1}{2}$ per cent. of the cases; great improvement in 38 per cent.; the disease did not increase in $13\frac{1}{2}$ per cent., but in $43\frac{1}{2}$ per cent. there was more or less increase.

The right lung was attacked more frequently than the left, but the left, when attacked, was more prone to softening and excavation.

Where the disease extended from one lung to the other, the right lung was more liable than the left to such extension.

Duration of life.—We have now reached the most important part of our subject. What did these patients die of? How long did they live? What effect had the various conditions under which they lived on their span of years? One hundred and ninety-eight patients are recorded to have died, and the greater part of these succumbed to the gradual waste and decay of phthisis; 15 died from phthisical complications, viz. 4 of profuse hæmoptysis; 3 of pneumo-

thorax ; 1 of empyema ; 1 of ulceration of the intestine ; 2 of diarrhœa ; 1 of diarrhœa and hæmoptysis ; 1 of diarrhœa and dropsy ; 2 of dropsy arising from contraction of the lungs ; 12 were carried off by other diseases, viz.—

- 1 by disease of the stomach ;
- 3 by disease of the brain ;
- 2 by heart disease ;
- 1 by kidney disease ;
- 4 by pneumonia ;
- 1 by throat disease (not phthisical).

The *average* duration of life from the commencement of the disease in the patients who have died was 7 years 8·72 months, and was thus composed :

8 lived 1 year and under 2	} 71 lived from 1 to 5 years.
22 „ 2 „ „ 3	
18 „ 3 „ „ 4	
23 „ 4 „ „ 5	
75 „ 5 „ „ 10	
31 „ 10 „ „ 15	
12 „ 15 „ „ 20	
9 „ 20 „ to 30	

198

Of 21 patients who survived their first attack from 15 to 28 years—

2 lived 15 years.	3 lived 21 years.
2 „ 16 „	1 „ 22 „
6 „ 17 „	2 „ 24 „
1 „ 18 „	1 „ 26 „
1 „ 19 „	2 „ 28 „

The chronicity of these cases is very remarkable, and it may be noted that 64 per cent. lived 5 years and upwards, while only 36 per cent. lived less than that period. In the

above list the greatest number is included under "5 to 10 years." Taking the duration of life by stages, in 106 of the first stage the average duration was 7 years 11·8 months (nearly 8 years).

In 49 of the second stage, 8 years 0·4 months.

In 43 of the third stage, 6 years 8·3 months.

What results do we obtain from the 802 patients who were alive when last heard of? The *average* duration of life in these has been 8 years 2·19 months, a somewhat higher duration than among the deaths (which were probably the worst cases), and one which, considering the still favorable state of many of the patients, bids fair to increase further.

The average was thus composed :

71	have lived	1 year and less than 2		
97	"	2 years	"	3
96	"	3 "	"	4
68	"	4 "	"	5
224	from	5 "	to	10
124	"	10 "	"	15
54	"	15 "	"	20
65	"	20 "	"	30
3	"	30 and upwards.		

332 lived 1 to 5 years.

This table shows that 332, or 41·4 per cent., have lived from 1 to 5 years, and that 470, or 58·6 per cent., have already lived 5 years and upwards. The class of 10 to 30 years' duration is a large one, forming 30 per cent. of the whole, and affords remarkable evidence of the chronicity of the disease. Still more remarkable is the fact of as many as 68 patients having lived 20 years and upwards, of whom 2 have lived more than 30 and one 47 years, and the distribution of these it is worth our while to note further.

11	have lived	20 years.	10	have lived	24 years.
7	"	21 "	3	"	25 "
13	"	22 "	2	"	26 "
12	"	23 "	3	"	27 "

3 have lived 28 years.	1 has lived 33 years.
1 has lived 29 „	1 „ 36 „
	1 „ 47 „

Total 68

The question naturally arises as to the state of the 812 living patients at last report. Were they complete invalids, lingering out a miserable existence? Or was their health sufficiently good to permit of their returning to the duties, if not to the pleasures, of life? Observation on this point leads us to divide the patients into three classes.

1st. Those who have apparently quite recovered their general health, and are able to follow their occupations without any recurrence of their former symptoms. These we describe as *well*.

2ndly. Those who are able to follow their occupations more or less actively, but, owing to their being subject to a return of their symptoms, are obliged to use precautions. These we designate *tolerably well*.

3rdly. Those who are obliged to devote themselves entirely to the care of their health are described as *invalid*.

The "well" class numbered 285, or 35·53 per cent.; the "tolerably well," 293, or 36·53; and the "worse," 224, or 28 per cent. The first two classes, therefore, comprise 72 per cent. of the whole, and show a great preponderance over the "invalid" class, which is only 28 per cent. This is noteworthy, and proves what reparative power nature puts forth, if only the time is allowed for her to do so. In considering the patients we must remember that, though their social status exempted them from absolute want, it by no means exempted them from exposure to other injurious influences. Among these patients were men of every profession—members of parliament, officers in the army and navy, clergymen, practitioners of law and medicine, men of business, &c., and they were, therefore, liable to the dangers consequent on each calling—exposure to great varieties of temperature, from which military and naval men

suffer; or close confinement in hot rooms and occasional pressure of work, the lot of many professional and business men; or, again, the strain on the lungs which public speaking entails on members of parliament, clergymen, barristers, public lecturers, and the like. When we remember these facts it must be considered highly satisfactory that so large a majority are found in the "well" and "tolerably well" classes.

The greater part of the "well" class could not be distinguished in ordinary life from healthy persons, and many are sufficiently strong to undertake exertion of an arduous kind, whether physical, like long walks and mountain ascents, or mental, like close application to study or business.

Having duly described the duration of life in these cases, it will be well to advert to the estimates formed by different authorities of the duration of phthisis. Laennec gives twenty-four months as the mean duration; Andral the same, Louis and Bayle twenty-three months, founded on the examination of 314 cases.

The first Brompton Hospital Report, in 215 fatal cases, found that 41·14 per cent. died less than one year after attack, 45·82 per cent. between one and four years after, and 6·5 per cent. had a duration of more than four years, the rest being of doubtful duration.

Dr. Fuller,¹ in 118 cases investigated by himself at St. George's Hospital, found that by far the greater number died from three to eighteen months after first attack, whereas in 46 cases in his private practice he found the usual duration varied from one and a half to seven years; and he remarks that this discrepancy cannot be wholly explained by the social position of the sufferers and the advantages the latter enjoyed with respect to medical treatment, change of air, and proper regimen. He accounts for it by the greater care with which the upper and more educated classes are wont to watch their health and note the earliest inroads of disease.

¹ Op. cit.

Dr. Pollock,¹ in his valuable work, which has contributed more than any other to our knowledge of the prognostics of consumption, gives from two and three quarters to three years as the average duration of 129 cases ending in death. These occurred among 3566 hospital patients, the rest of whom at the end of two and a half years were living and in a state of health favorable to the expectation of life for a considerable term.

It will be seen that there is a very great difference of estimate among these authors, which can only be explained by a difference either in the nature of the cases or in the mode of life and method of treatment adopted.

Louis's and Laennec's cases seem to have been chiefly of an acute form, treated either in the old way by bleeding, antimony, &c., or on the expectant method. It has been urged that a more acute form of disease is prevalent in France, but there is no proof of this; and from what I saw of French consumptive patients when residing in the south of France, I should say that there was no material difference in the nature of the cases, but a very great difference in their hygienic and medicinal treatment, which went far to explain to my mind the rather large mortality noted among them. The estimate of the first Brompton Hospital Report refers to deaths occurring amongst the in-patients, and these, owing to their having to wait so long before admission, are exceptionally bad cases. Some died within a week after admission.

Dr. Pollock's statistics are taken from the broader and very extensive set of cases which the out-patient department at Brompton furnishes. These may be said to embrace all classes below the wealthy one, and, what is more to the purpose, all varieties and degrees of the disease; the fortnightly visit to Brompton not, as a rule, interfering with the necessities of occupations or home cares, and thus securing the attendance of a large number who could not afford to become in-patients, while at the same time information as to the state of those who are not able to

¹ Op. cit.

attend is given through a form of note supplied to the patients at the hospital, or else by a letter from the relatives. When viewed in relation to the few deaths and the expectation of life for the survivors, Dr. Pollock's statistics give the most favorable results for the lower classes ever published.

The results of Dr. Fuller's 46 private cases are of great interest as bearing on our own. The patients belonged to the same class of society, and only included 3 deaths under one year's duration. The average, too, viz. $1\frac{1}{2}$ years to 7 years, is higher than any of the hospital results above mentioned, and more in accordance with those given in these pages.

The average duration of life of the 1000 cases treated of in this paper far exceeds any estimate yet formed, but we must remember that, owing to the limitations mentioned at the commencement, it is the average of *chronic* consumption. The restriction of being *one year at least under observation*, though satisfactory for accuracy, practically excludes acute cases terminating fatally; such cases are comparatively rare, and acute cases recovering are not excluded.

The long duration may be attributed to—

1st. The early detection of the disease, two thirds of the patients being in the first stage when they came under observation.

2ndly. The perseverance with which they carried out the various healing measures at their disposal, whether medicinal, hygienic, or climatic.

An attempt has been made to arrive at the relative duration of some of the forms of phthisis, as of those arising from bronchitis and pneumonia, but it has not been thought advisable to make many divisions of the cases until the opinion of the profession is more decided as to the advisability of further divisions. Every day's observation among the in-patients and the far more numerous out-patients of the Brompton Hospital convinces me that the varieties of consumption merge imperceptibly into one another, and that it is impossible to draw a hard and fast line between them. How can we lay down a strict rule as to what cases are tubercular and what are not?—or, again, as to the time when

a case of chronic catarrhal pneumonia becomes tubercular? Niemeyer admits that "the development of tuberculosis in lungs which are already consumptive, as a result of inflammatory action, sometimes takes place in a manner so latent as to make it extremely difficult, if not impossible, to recognise the fact with certainty." In truth, the word "tubercle," though it may be said to mean something pathological, cannot at present lay claim to have much clinical value, and it is to be hoped that its use will be restricted to a very limited class of patients.

Influence of sex and age on duration.—Let us now direct our attention to the influence of sex and age on the duration of life, and to demonstrate these points tables are drawn up (Tables III, IV, and V), the results of which will be now stated.

TABLE III.—*Showing Influence of Age of Attack on Duration in 198 Deaths.*

Age when attacked.	Males.	Duration.	Females.	Duration.	Total.	Duration.
		yrs. m.		yrs. m.		yrs. m.
Under 10 years ...	2	16—11	1	7— 0	3	*13— 7.
10 to 20 „ ...	15	6— 6	19	6— 6	34	6— 6
20 to 30 „ ...	40	8— 9	35	6— 6	75	7— 4
30 to 40 „ ...	36	8—11	15	6—10	51	8— 3
40 to 50 „ ...	15	8— 2	3	6—10	18	*7—11
50 to 60 „ ...	8	8— 0	2	6— 4	10	*7— 8
60 and upwards	3	2—11	4	8— 5	7	*6— 1
	119		79		198	

* Number too small to yield fair average.

Average Age of Attack in 198 Deaths.

Males 31·54 years.
Females 27·75 „

Average Duration.

Males 8 years 4·72 months.
Females 6 „ 8·67 „

TABLE IV.—*Showing Age at Death of 198 Patients.*

Age at death.	Males.	Females.	Total.
Under 10 years	0	0	0
10 to 20 „	6	7	13
20 to 30 „	19	32	51
30 to 40 „	38	17	55
40 to 50 „	28	14	42
50 to 60 „	19	4	23
60 to 70 „	8	1	9
70 to 80 „	1	4	5

Average of Age at Death in 198 Cases.

Males 39·93 years.

Females 34·48 „

TABLE V.—*Showing Ages at latest Report of 802 Living Patients.*

	Males.	Females.	Total.
Under 10 years	1	0	1
10 to 20 „	18	18	36
20 to 30 „	120	110	230
30 to 40 „	165	91	256
40 to 50 „	116	53	169
50 to 60 „	65	18	83
60 to 70 „	17	4	21
70 to 80 „	3	2	5
80 to 90 „	1	0	1
	506	296	802

	Years.	No. of cases.
Average age of attack in living males	29·08	506
" dead	31·54	119
Total number of males	29·47	625
Average age of attack in living females	25·61	296
" " dead " 	27·75	79
Total number of females.....	26·06	375
	Yrs. Mo.	
Average duration in living males	8—6·85	506
" " females	7—7·97	296
	Years.	
Average age at last report in living males	37·55	506
" " " females	33·27	296

According to these, *sex* exercises a very decided influence on duration. Among the deaths the average duration of the males was 8 years 4·72 months; of the females, 6 years 8·67 months; showing a difference of more than $1\frac{1}{2}$ year in favour of the former. We see, therefore, that the females survived the disease, on an average, for a shorter period than the males, and it has been already shown that they were attacked earlier, so we naturally expect that they died at a less advanced age. The results of the table accord with this expectation, for we find that the average age reached by males was 39·93, *i. e.* about 40 years, and that by females 34·48, or $34\frac{1}{2}$ years, showing the females to be shorter lived than the males by $5\frac{1}{2}$ years. It should be remarked that the age of attack among the 198 deaths is slightly more advanced than among those living, being in the ratio of 31·54 to 29·98 among the males, and of 27·75 to 26 among the females, but no deduction can be drawn from this beyond that it shows how difficult it is to deal in statistics with the deaths and the living indiscriminately. Taking the deaths alone, we find that the age at the time of attack, exercises some influence on the duration of the disease, and that there was a greater tendency in both sexes towards longer duration the later in life they were attacked. This feature was more marked in the males

than in the females, *e.g.* of those attacked in the decade from 10 to 20, the duration is the same for both sexes, but of those attacked between 20 and 30 the duration for the males is 8 years 9 months, and for the females 6 years 7 months, a difference of more than two years, and the result is much the same in the decade from 30 to 40. The numbers in the other decades are too small to warrant us in drawing conclusions concerning them. The ages reached by some of the patients were remarkable. About half the males and 29 per cent. of the females survived 40 years. Eight males and five females survived 60, and one male and four females 70, the majority of the males dying between 30 and 40, and of the females between 20 and 30.

The ages of the living patients present less interest, as the average is, and must be, a changing quantity, becoming greater as the years roll on and as the deaths increase in number; still it may be as well to mention it. Among the males it was 37·55 years, among the females 33·27 years. The particulars show that 21 per cent. were between 40 and 50, 13 per cent. between 50 and 60, 21 per cent. between 60 and 70, 5 per cent. between 70 and 80, and 1 over 80.

The results of the influence of age and sex on the duration of these cases may be thus summed up:

The later the time of attack, the longer was the duration, the retarding influence of age being more conspicuous among the males than among the females, and especially so between the ages of 20 and 50.

Among the females the time of attack was, on an average—

1stly. Four years earlier than among the males.

2ndly. The duration of the disease was $1\frac{1}{2}$ years shorter.

3rdly. The age reached was $5\frac{1}{2}$ years less.

Influence of family predisposition on duration.—Family predisposition is so common among cases of phthisis that its connection with the disease has often been regarded as that of cause and effect, and it has been rather a custom than otherwise to hunt out the hereditary predisposition and

to trace the disease to that source. As every day shows that many instances of consumption originate in inflammatory and other attacks, where no hereditary predisposition can be traced, the value of this influence as a cause of phthisis diminishes as other influences rise in importance. In this paper we are not concerned with the connection of predisposition with the origin of phthisis, but rather with its influence on the duration; it being highly desirable to ascertain whether or not patients in whom predisposition exists, have a worse chance of life than others in whom it is absent. For this purpose an attempt has been made to answer the following questions:

1st. Does family predisposition shorten the duration of phthisis?

2nd. Does it quicken the onset of the disease?

3rd. Which sex is most affected by it?

4th. What degrees of relationship exercise the greatest influence on the disease?

The number of cases in which family predisposition was traced was, as stated above, 484, or 48·4, including 397 living and 87 dead. The annexed table shows that the average duration among the 87 deaths was 7 years 5·8 months, an average

TABLE VI.—*Comparison of Duration of Life of those affected and those not affected with Family Predisposition.*

		No. of deaths.
	Yrs. Mos.	
Average of cases affected with family predisposition...	7— 5·8	87
„ „ unaffected „ „	7—10·9	111
„ total number of cases.....	7— 8·7	198

not greatly differing from that of the cases free from this influence, or from that of the total deaths. This shows only a difference of a few months, and certainly does not indicate that family predisposition exercised any decided

influence in shortening the duration of the disease. The evidence of the 397 living cases supports the same conclusion, for among these the average already reached was 7 years 11 months, that of the cases free from predisposing taint being 8 years 7.25 months, and that of the total living being 8 years 2 months. It would seem, therefore, that family predisposition exercises but a slight influence over the duration.

Does it quicken the onset of the disease? What influence has it on the age of attack? Our results on this question are seen below.

Influence of Family Predisposition on Age of Attack.

		No. of patients.
Average age of attack of total number of males	29.47	625
" " of males affected with family		
predisposition.....	27.07	270
" " of total number of females ...	26.06	375
" " of females affected with family		
predisposition.....	21.51	214

Here family predisposition would seem to exercise a great influence in precipitating the onset of the disease, for the males thus predisposed were attacked two years earlier than the others, and the females four and a half years earlier, and thus family predisposition, though it does not materially shorten the duration of the disease, may tend to shorten the duration of life, for these patients, being attacked earlier, and the duration about the same in both cases, they will naturally die at an earlier age than those who are attacked somewhat later in life.

Which sex is most affected by family predisposition? It is decidedly more common among females than males, existing in 57 per cent. of the former, and only in 43 per cent. of the latter.

TABLE VII.—*Relative Duration of Life of Sexes in Family Predisposition.*

	No.	Dead.	No.	Living.
		yrs. mo.		yrs. mo.
Males	54	8—2	216	8—2·7
Females	33	6—7·3	181	7—6·7
Total	87		397	

The sexes are equally influenced as to duration, but as to the age of attack the females are more decidedly influenced than the males.

What degrees of relationship exercise the greatest influence on the disease? It must be confessed the numbers at our disposal, and especially the number of deaths, are too small to admit of a satisfactory answer to this question. For this reason, the evidence furnished by the exhibited table is of a negative kind, and can only be relied on as proving that some forms of predisposition do not curtail the duration of the disease, and not as showing what influence other forms may have on it.

TABLE VIII.—*Influence of different degrees of Family Predisposition on Duration of Life.*

	Dead.	No.	Living.	No.	Total.
	Average. yrs. mo.		Average. yrs. mo.		
Grandparents affected ...	*16—7·00	2	*10—6·62	8	10
Father	*7—5·28	7	7—9·25	36	43
Mother	8—3·54	11	7—10·75	56	67
Both parents	...	1	*6—9·11	9	10
Brothers and sisters ...	7—6·02	44	8—2·24	180	224
Uncles and aunts	*12—6·00	4	7—6·18	44	48

* Numbers too small to yield fair average.

We see that in 11 deaths where the mothers were consumptive the duration was 8 years $3\frac{1}{2}$ months, and that 56 living patients similarly situated had lived 7 years 10·75 months. Among these few cases maternal influence had no effect in curtailing the duration, but, indeed, among the 11 deaths the average was slightly higher than ordinarily. In the case of brothers and sisters, where the numbers warrant our speaking more decidedly, what do we find? In 44 deaths the average duration was 7 years 6 months, slightly below the whole average of deaths, while of 108 living cases in this category the mean duration was 8 years 2·24 months, about the same as the common average. Here, again, the family predisposition seems to have exercised little or no influence. The other numbers are too small to admit of even negative evidence.

Our conclusions as to the effect of family predisposition on duration are—

1st. That it does not directly limit the duration of the disease.

2ndly. That it precipitates the onset of the disease, and thus shortens the duration of life.

3rdly. That it affects females more than males.

Influence of origin on duration.—It has been stated that 149 of the cases originated in attacks of pleuro-pneumonia, from which the patients recovered with lungs more or less crippled by adhesions, by consolidations, or by both. Did these patients live a longer or a shorter time than the average? Among 29 who have died the mean duration was 9 years $6\frac{3}{4}$ months, and 120 who still survive have on an average lived $9\frac{1}{4}$ years, thus exhibiting an extension of life beyond the ordinary of nearly two years for cases having an inflammatory origin. In 64 of these cases hereditary taint was traced, but it is not worth while to consider the duration of these separately, as the number of deaths is small, and it has been already demonstrated that family predisposition exercises no curtailing influence over the duration of the disease.

To further investigate the influence of the inflammatory origin on the duration of consumption, at Dr. Burdon Sanderson's suggestion I selected a small number of cases which exhibited the inflammatory origin most strongly, and were entirely free from any suspicion of family predisposition. Not only was the disease directly traceable to the pneumonic or pleuro-pneumonic attack, but in every case lesions, more or less extensive, the results of such attacks, remained behind, and were easily detected by the physical signs.

The duration of these cases confirms still more strongly the conclusion that inflammatory origin has a prolonging influence over the duration of phthisis.

Among 10 patients who have died, the average duration was 12 years 10 months.

Among 20 who still survive it is 11 years $8\frac{1}{2}$ months.

Our conclusion, therefore, is, that phthisis originating from pneumonic or pleuro-pneumonic attacks of the lungs has a longer duration than when originating from other causes.

With regard to the influence of the origin from bronchitis on the duration of phthisis, our cases, and especially the fatal ones, are at present too few to warrant our drawing decided conclusions.