

CHAPTER XXVI.

Of the Law of Mortality, modified relatively to the Five classes before described; distinguishing the Male from the Female; and qualifying each class, of those respective sexes, by the measure of life's Absolute intensity represented under the corresponding modifications.

237. It has been observed, in the 68th and in the 149th paragraphs, that the measure of life's Absolute intensity, ultimately rendered apparent by any Law of Mortality, should be determined previously to attempting the construction of such a law; which may then be proceeded with, according to the principles and method set forth in chapters XVIII and XIX. The general law which it is the present purpose to establish, relatively to entire populations without distinction of particular classes, and though exemplified by a class rated the *fourth* in successive order, demands a prior consideration to that of any one amongst its eligible modifications. With this understanding, it is further to be premised, that a Law of Mortality would be likely to fail answering the purpose of an enlarged application, if such law were constructed on the exclusive grounds of data referable altogether to any special locality and to a state of things there existing at an exclusive period. It has been seen that the facts on public record in France, during a long series of years, are the only source whence data indisputably correct could be obtained, towards discovering the law's leading features; whilst any analogous experience, afforded by returns

concerning all movements of the British population, has, — from an incomplete system of public records, and from the inconsistency of their announced results, — proved utterly incapable of supplying data on which a reliance could be placed. At the same time it is apparent, on the grounds explained in the chapters III and XI, that the Absolute intensity of life in England is in some degree inferior to its measure in France, ascertained by indubitable experience. It appears on the other hand, and by statements in the 79th paragraph, that such intensity in France had not progressed by increase beyond the first half of the observed period, after which it continued vacillating by inconsiderable differences; denoting, on the whole, that the intensity of life in that country had probably attained its *maximum*, with indications of subsequent decline; whilst the progressive increase, during a first part of the recorded experience, should be ascribed to many successively favourable crops, together with improved circumstances of the population, consequently to a protracted state of peace and total absence of calamitous events.

238. Premising those considerations; and observing that it could not consist with the present object, to set forth, for general application, a Law of Mortality constructed from data referable to an extreme case; as also in order to meet the concomitant circumstances, — of a rather inferior standard of life's intensity in England compared with that manifested in France, and of a commenced reduction there, from the maximum of such intensity extending to full 36 years referably to an average of the *five* commencing with 1821; — it has been conceived preferable to adjust the Law of Mortality, intended for construction, with a standard of life's Absolute intensity represented by the population of each sex in France, on an average of the four year's experience 1817 to 1820, both inclusive. By the statements in paragraph 94th, the averages corresponding

with that period are found to be 33.41621 years for the Male, as also 37.09767 years for the Female sex; and by a very near accordance with those quantities, the constructed Law of Mortality represents on one part 33.4583 and on the other part 36.9583 year's Absolute intensity, or average duration of life; establishing precisely a difference of *three years and a half*, in excess of the Female's over the Male's. If it were at any time desirable to modify the law thus constructed, either elevating or reducing to any other standard the resulting intensities of male and of female life, the process of computation to that effect would not be very difficult; consisting only of raising or lowering each term of the series q_x in equal and adequate proportions, which is to be accomplished by either adding or subtracting equal quantities, to or from each of the corresponding λq_x ; the application of which method may however require a few successive trials for completing the adjustment. In all transactions between individuals, the valuation of contingent sums depending on lives or on survivorships, — when no sufficient motive arises for entering into any distinction of classes, — may with great equity be computed from the Law of Mortality thus constructed; which is hereafter detailed under the *fourth* class, and modified according to a due discrimination of the sexes.

259. Regarding the *inferior class* of lives; which, in its generality, appears to obtain a fair representation through jointly considering several tables constructed, — by Dr. Price with reference to the town of Northampton, — by the late Mr. Davillard, and applicable to the towns in France, — as also by Mr. Mourgue, from his observations on the population of Montpellier with discrimination of the sexes; — those modifications of the law, which are adapted to the lives comprised in a *fifth* class, have the result of expressing an Absolute intensity, or average duration, respectively of *twenty-six years and a half* for the Male sex and of *thirty*

years and a half for the Female; thus admitting, between the one and the other, a difference of *four* years, which Mr. Mourgue in particular has ascertained to exist in an analogous case. Those results have been determined after numerous attempts at reconciling the discrepancies observable in the tables above alluded to, with due attention to maintain the requisite harmony in respect to all other admitted modifications of the Law of Mortality, and to all corresponding expressions of life's Specific intensity at each year of age. Hence the tables accordingly introduced, and referred to that *fifth* class, may be considered especially applicable to all pecuniary transactions between public institutions and the individuals it comprises; when contingent sums, the receipt of which should depend on the endurance of such lives, are intended for reduction to a present value.

240. The results in the same manner brought out by the adopted modifications of a general Law, in their reference to the *three* classes described as select, may not require — after what has already been explained concerning those comparative classes — any further elucidation, than merely to state the following leading features of that law, under those of its modifications regarding the different sexes of each class.

241 To the *first* select class, or that of lives making a near approach to physical perfection — on considering the present state of civilized countries, — an Absolute intensity, expressing the average duration of life, has been extended to 45.1 years for the Male sex, and to 47.9 years for the Female; the difference, in favour of the latter, being thus limited to 2.8 years. And it is presumable that complete security, through an application of the modified Law of Mortality yielding those results, would in all cases be afforded, either to Governments or to Public institutions

whatsoever, on their granting life-annuities, or contracting for any other contingent sums made to depend on select of lives, and receiving in exchange a present value of those contingencies.

242. To the class standing *second* in the order of selection, namely the class of Life-annuitants and Tontine-nominees, — all lives otherwise susceptible of assimilation with them being included, — the resulting Absolute intensity considered in the greatest generality of such lives, is 41.9764 years for the Male and 44.9130 years for the Female sex. And all transactions of a contingent description, between private individuals, — when the contingent sums, reducible to a present value, are depending on the continuance of lives that obviously fall under the present description, — may with great equity be regulated by applying a corresponding modification of the Law of Mortality, distinctly referred to the one and to the other sex of that *second* class.

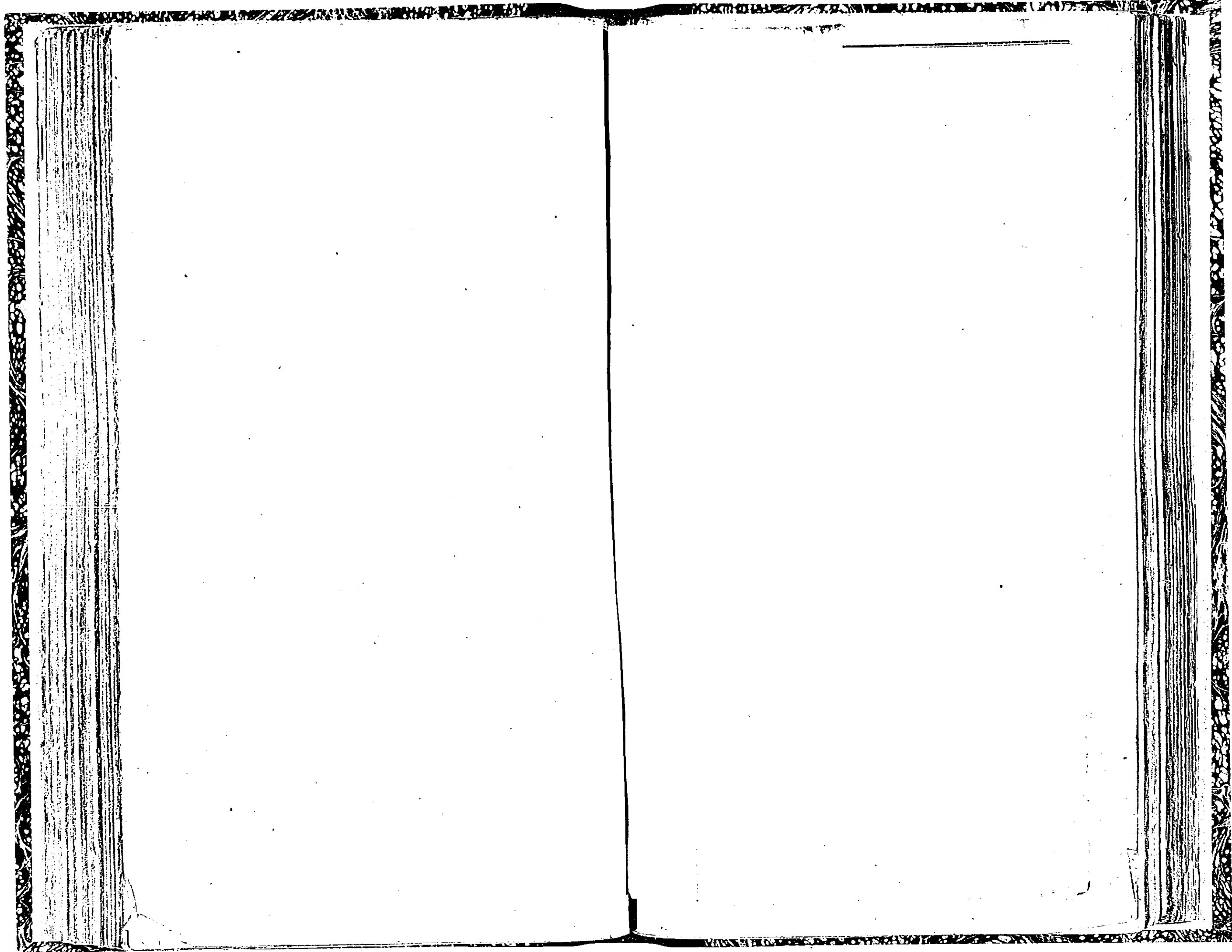
243. The leading results brought out by those modifications, of a general Law, which distinctly refer to males and to females of the *third* select class, or that of lives who fulfil only the requisite conditions for being admitted to life-insurance, are 37.4781 years as regards the Males, and 40.6259 years as regards the Females; respectively expressing, with every correctness a careful investigation of the supplied data could admit, the Absolute intensity of life or its average duration amongst that *third* class.

244. From duly considering all difficulties attendant on the analysis of data that involve — as to the *third* class — many omissions, and exclude the distinction of sexes, it has been a principal object, in providing that distinction, to maintain harmonious proportions with those established

relatively to other classes, regarding the Specific intensities of life referred to successive years of age and to each sex respectively.

245. THE following tables exhibit the LAW OF MORTALITY, under its modifications referred to the FIVE classes of each sex; such as those classes have been defined, in the present and in the preceding chapter.

246. Consequently to limitations at present unavoidable, those tables are much curtailed; reduced indeed to mere skeletons, consisting only of *two* principal series. These are: First, the DECREMENT OF LIFE, as defined in chapter V; observing that, in the original, the respective quantities are extended to *nine* places of decimals, which here are contracted into *seven*: Secondly, the SPECIFIC INTENSITIES OF LIFE, as defined in *chapter XVI* and essentially constituting the LAW OF MORTALITY. All the developments of — and deductions from — that law, are omitted; but those two principal series are strictly sufficient for enabling to obtain any others; and all deductions may, for the present, be supplied by any Actuary willing to take the requisite trouble.



THE LAW OF MORTALITY,

UNDER ITS MODIFICATIONS REFERRED TO THE DISCRIMINATED SEXES OF FIVE CLASSES;

ADMITTING, IN THOSE MODIFICATIONS, EQUAL QUANTITIES OF BIRTHS;

AND STATING, IN EACH CASE,

THE DECREMENT OF LIFE, OR PROPORTIONS OF INDIVIDUALS WHO ATTAIN THE SUCCESSIVELY INDICATED YEARS OF AGE,

WITH THE SPECIFIC INTENSITIES OF LIFE, OR RATES OF MORTALITY DURING EACH YEARLY INTERVAL.

COMPLETED YEARS OF AGE.	MALES.										FEMALES.											
	FIRST CLASS, OF PERFECT LIVES.		SECOND CLASS, OF LIFE-ANNUITANTS.		THIRD CLASS, OF ASSURABLE LIVES.		FOURTH CLASS, OF INDISCRIMINATE POPULATION.		FIFTH CLASS, OF INFERIOR LIVES.		FIRST CLASS, OF PERFECT LIVES.		SECOND CLASS, OF LIFE-ANNUITANTS.		THIRD CLASS, OF ASSURABLE LIVES.		FOURTH CLASS, OF INDISCRIMINATE POPULATION.		FIFTH CLASS, OF INFERIOR LIVES.			
	Decrement.	Intensities.	Decrement.	Intensities.	Decrement.	Intensities.	Decrement.	Intensities.	Decrement.	Intensities.	Decrement.	Intensities.	Decrement.	Intensities.	Decrement.	Intensities.	Decrement.	Intensities.	Decrement.	Intensities.		
	0	1000000	7.975	1000000	6700	1000000	5.779	1000000	4.870	1000000	3.977	0	1000000	8.623	1000000	7.768	1000000	6.681	1000000	5.680	1000000	4.675
	1	858254	11.2407	832733	12.1101	820955	11.2355	808683	9.8271	796411	8.4187	856254	16.2129	831789	14.3219	810268	12.4183	800029	10.6023	784508	8.4351	769923
2	808223	15.2137	784836	25.3183	755599	20.0181	723500	18.1591	691401	16.3000	806254	24.0272	784836	21.4205	763804	21.5024	741283	19.5857	720769	15.3157	706254	13.1898
3	778829	25.3183	723500	38.3371	682091	29.8816	635273	26.8858	601152	24.8858	778829	32.0272	741283	28.0272	710268	28.0272	681283	25.0272	651283	18.3157	631283	15.1898
4	760450	40.0181	670000	48.0181	635273	39.0181	590181	35.0181	560181	31.0181	760450	42.0272	710268	37.0272	660272	33.0272	630272	30.0272	600272	22.3157	580272	19.1898
5	749191	55.0181	620000	55.0181	590181	48.0181	560181	42.0181	39.0181	749191	57.0272	640272	52.0272	590272	47.0272	44.0272	41.0272	38.0272	35.0272	27.3157	25.1898	22.1898

