

## JOHN GRAUNT'S 'OBSERVATIONS'

## FOREWORD

THE year 1962 marked the tercentenary of the publication of John Graunt's *Natural and Political Observations made upon the Bills of Mortality*. With this book Graunt is generally regarded as having begun the development of demography as a science in this country. The Royal Society, of which Graunt was elected a Fellow, recognized the tercentenary by holding a special series of scientific meetings to which leading demographers in this and other countries contributed papers (reviewed in *J.I.A.* 88, 367). The Institute of Actuaries is paying its own tribute to Graunt by this republication, in a more modern format but without abridgment or alteration, of the original 'observations'.

John Graunt is rarely considered apart from another scientist of the time, Sir William Petty. Both were of Hampshire stock. Graunt was born in 1620 and Petty in 1623. They became acquainted in or before 1650. It appears that their relationship was of client and patron but that the rôles were reversed after the fire of 1666. Graunt was the son of a city tradesman and became a haberdasher and a man of substance. Petty, who had sampled the Merchant Navy, studied mathematics in France, spent a short time in the Royal Navy, returned to the continent to study anatomy, and spent some time in business in London, went to Oxford in 1649 and became a Doctor of Medicine by dispensation. Later he rose to be Professor of Anatomy and Vice-Principal of Brasenose. He became a candidate for a Gresham Professorship in London and made contact with Graunt. We do not know what interests they shared at that time or whether Graunt (or his father) had any influence in Petty's subsequent appointment as Gresham Professor of Music. Greenwood in his 1943 Fitzpatrick Lectures seems to imply that at this time Graunt was the patron. Soon after, Petty (who seems to have had no professorial duties) went to Ireland and made a fortune. For many years Graunt was a prosperous tradesman and a firm friend of Petty. The fire of 1666 destroyed his business. A little later he became a Roman Catholic convert and apparently less interested in rebuilding his business, for he was soon bankrupt. It was now Petty's turn to be the patron, and Graunt the client, apparently not an easy one. It is no part of this foreword to dwell on Graunt's financial troubles which were with him till he died in 1674. We are concerned only with his work.

Petty's vital statistical work was on a different scale from that of Graunt. Petty had inspiration and brilliance; there were many ideas and a breadth of vision. But he did not worry at his ideas as Graunt did. It was Petty who proposed a central government statistical office, and a system of census-taking. Petty anticipated Farr in estimating the economic

loss due to mortality. Many of his calculations, however, do not stand up to the tests of consistency that Graunt would have applied. We are not concerned to judge who was the greater man but few will doubt that Graunt made immeasurably the greater contribution to demography.

Graunt began, as many scientists have done, by exercising idle curiosity ['Now having (I know not by what accident) engaged my thoughts upon the Bills of Mortality . . .'] and proceeding to 'observations, which I happened to make (for I designed them not) . . .'. But he did not believe that curiosity should remain idle. . . . 'finding some truths and not commonly believed opinions . . . I proceeded further, to consider what benefit the knowledge of the same would bring to the world.'

Two essential elements of the statistical method as applied to new material are (1) *classification* of like with like so as to break the data down into homogeneous groups and (2) the *comparison* of those groups in order to recognize significant differentials. This was Graunt's method. He had, too, another attribute of the statistician; he applied logic to his arithmetic. He never accepted a calculation if it offended against his common sense; nor did he accept it without test if he had the means of testing it.

As to classification we may read in Chapter II his very sound remarks about the identification of causes of death (then dependent on the observation of the 'ancient matron' searchers). Deaths at advanced ages, he argues, can hardly be safely attributed to one specific cause; and about sudden deaths not much worth-while information can be expected beyond the suddenness. As to comparison, we find in the same chapter his observation about the stability of proportionate mortality rates for certain causes, and in Chapter IV his observation that in plague years deaths from causes other than plague were inflated to such an extent as to lead to his conclusion that of deaths from plague one-fifth were attributed to some other cause (in order to avoid the subsequent closure of the dwelling and the virtual incarceration of the surviving members of the household). Again in Chapter III we may see how comparison with possible similar names for the same disease led Graunt to conclude after examining the figures that rickets was a new disease and not a new name for an old disease. (This was probably a wrong conclusion but Graunt was not a physician and would not have known that medical attention was at that time being drawn to the disease.)

Comparison is again the method employed when Graunt estimates the population of London in Chapter XI. He uses three methods and reconciles them. First he says that a fertile woman has a baby every other year, that fertile women are half the married women and that there are seven other members of a family (husband, 3 children, 3 servants), so that the population is 32 times the number of annual births. This gives 384,000. Next that in certain parishes there are annually three deaths from every 11 families and therefore the number of deaths (13,000) multiplied by 11/3 yields 48,000 families or 384,000 persons. Finally he observes 54 families

per 100 square yards within the Walls (12,000 families) and guesses that there are three times as many outside.

The contribution which interests actuaries most is Graunt's rudimentary life table. Again it is not the table itself, which is indeed defective, but the new idea which Graunt had of presenting mortality in terms of survivorship. Graunt had only two observations ' . . . that of 100 quick conceptions about 36 die before they be 6 years old, and that perhaps but one surviveth 76'. He then 'sought 6 mean proportional numbers between 64, the remainder living at 6 years, and the one which survives 76 . . .'. In effect he used a constant multiplier of  $5/8$ ths (adjusting the figures to integers) and ran off the series arbitrarily in the last two decades of life. (His Dutch contemporary, Johann de Witt, got nearer the truth by assuming equal decrements over ranges of ages.) We do not know how Graunt got his multiplier. It ought not to have been constant, but no matter. So much of our professional work is based upon this simple but immensely powerful thought that we are not concerned here with actuarial purism. We are concerned to pay a tribute to a man with an inquiring mind whose ideas laid the foundations of political arithmetic which we now accept as part of good social organization and government (as Graunt indeed intended we should).

B. BENJAMIN

TO THE

RIGHT HONOURABLE JOHN LORD ROBERTS,

Baron of Truro, Lord Privy-Seal, and one of His Majesty's most  
Honourable Privy Council.

My Lord,

As the favours I have received from your Lordship oblige me to present you with some token of my gratitude: so the especial honour I have for your Lordship hath made me solicitous in the choice of the present. For, if I could have given your Lordship any choice excerpts out of the Greek or Latin learning, I should (according to our English proverb) thereby but carry coals to Newcastle, and but give your Lordship puddle-water, who, by your own eminent knowledge in those learned languages, can drink out of the very fountains yourself.

Moreover, to present your Lordship with tedious narrations were but to speak my own ignorance of the value, which His Majesty and the public have of your Lordship's time. And in brief, to offer anything like what is already in other books, were but to derogate from your Lordship's learning, which the world knows to be universal and unacquainted with few useful things contained in any of them.

Now having (I know not by what accident) engaged my thoughts upon the Bills of Mortality, and so far succeeded therein as to have reduced several great confused volumes into a few perspicuous tables, and abridged such observations as naturally flowed from them, into a few succinct paragraphs, without any long series of multiloquious deductions, I have presumed to sacrifice these my small, but first published, labours unto your Lordship, as unto whose benign acceptance of some other of my papers, even the birth of these is due; hoping (if I may without vanity say it) they may be of as much use to persons in your Lordship's place as they are of little or none to me, which is no more than the fairest diamonds are to the journey-man jeweller that works them or the poor labourer that first digged them from the earth. For with all humble submission to your Lordship, I conceive that it doth not ill become a Peer of the Parliament, or member of His Majesty's Council, to consider how few starve of the many that beg: that the irreligious proposals of some, to multiply people by polygamy, is withal irrational and fruitless: that the troublesome seclusions in the Plague-time is not a remedy to be purchased at vast inconveniences: that the greatest Plagues of the City are equally and quickly repaired from the country: that the wasting of males by wars and colonies do not prejudice the due proportion between them and females: that the opinions of Plagues accompanying the entrance of Kings is false and seditious: that London, the Metropolis of England, is perhaps a head too big for the body, and possibly too strong: that this head grows three times

as fast as the body unto which it belongs, that is, it doubles its people in a third part of the time: that our parishes are now grown madly disproportionable: that our temples are not suitable to our religion: that the trade, and very City of London removes westward: that the walled City is but a one fifth of the whole pile: that the old streets are unfit for the present frequency of coaches: that the passage of Ludgate is a throat too straight for the body: that the fighting men about London are able to make three as great armies as can be of use in this Island: that the number of heads is such as hath certainly much deceived some of our Senators in their appointments of Pollmoney, etc. Now, although your Lordship's most excellent discourses have well informed me that your Lordship is no stranger to all these positions; yet because I knew not that your Lordship had ever deduced them from the Bills of Mortality, I hoped it might not be ungrateful to your Lordship, to see unto how much profit that one talent might be improved, besides the many curiosities concerning the waxing and waning of diseases, the relation between healthful and fruitful seasons, the difference between the city and country air, etc. All which, being new, to the best of my knowledge, and the whole pamphlet not two hours reading, I did make bold to trouble your Lordship with a perusal of it, and by this humble dedication of it, let your Lordship and the world see the wisdom of our City, in appointing and keeping these accounts, and with how much affection and success I am

My Lord,

Your Lordship's most obedient, and  
most faithful servant,

Birchen-Lane,  
25 January 166½

JOHN GRAUNT

TO THE HONOURABLE  
SIR ROBERT MORAY, Knight,

One of His Majesty's Privy Council for His Kingdom of Scotland,  
and President of the Royal Society of Philosophers, meeting at  
Gresham College, and to the rest of that Honourable Society.

The observations, which I happened to make (for I designed them not) upon the Bills of Mortality, have fallen out to be both political and natural, some concerning trade and Government, others concerning the air, countries, seasons, fruitfulness, health, diseases, longevity, and the proportions between the sex and ages of mankind. All which (because Sir Francis Bacon reckons his discourses of life and death to be natural history; and because I understand yourselves are also appointing means, how to measure the degrees of heat, wetness and windiness in the several parts of His Majesty's Dominions) I am humbly bold to think natural history also, and consequently, that I am obliged to cast in this small mite into your great treasury of that kind.

His Majesty being not only by ancient right supremely concerned in matters of government and trade, but also by happy accident Prince of Philosophers, and of physico-mathematical learning, not called so by flatterers and parasites, but really so, as well by his own personal abilities, as affection concerning those matters, upon which account I should have humbly dedicated both sorts of my observations unto His Most Sacred Majesty; but to be short, I knew neither my work nor my person fit to bear his name, nor to deserve his patronage. Nevertheless, as I have presumed to present this pamphlet, so far as it relates to government and trade, to one of His Majesty's Peers, and eminent Ministers of State: so I do desire your leave, to present the same unto you also; as it relates to natural history, and as it depends upon the mathematics of my shop-arithmetic. For you are not only His Majesty's Privy Council for Philosophy, but also his Great Council. You are the three estates, viz. the mathematical, mechanical and physical. You are his Parliament of Nature, and it is no less disparagement to the meanest of your number, to say there may be commoners as well as peers in philosophy amongst you. For my own part I count it happiness enough to myself, that there is such a Council of Nature, as your Society is, in being; and I do with as much earnestness enquire after your expeditions against the impediments of science, as to know what armies and navies the several Princes of the world are setting forth. I concern myself as much to know who are curators of this or the other experiments, as to know who are Marcschals of France or Chancellor of Sweden. I am as well pleased to hear you are satisfied in a luciferous experiment, as that a breach hath been made in the enemy's works: and your ingenious arguings immediately from sense and fact, are as pleasant to me as the noise of victorious guns and trumpets.

Moreover, as I contend for the decent rights and ceremonies of the Church, so I also contend against the envious schismatics of your Society (who think you do nothing, unless you presently transmute metals, make butter and cheese without milk; and as their own ballad hath it, make leather without hides) by asserting the usefulness of even all your preparatory and luciferous experiments being not the ceremonies, but the substance and principles of useful arts. For, I find in trade the want of an universal measure and have heard musicians wrangle about the just and uniform keeping of time in their concerts, and therefore cannot with patience hear that your labours about vibrations, eminently conducing to both, should be slighted, nor your pendula called swing-swangs with scorn. Nor can I better endure that your exercitations about air should be termed fit employment only for airy fancies, and not adequate tasks for the most solid and piercing heads. This is my opinion concerning you, and although I am none of your number, nor have the least ambition to be so, otherwise than to become able for your service and worthy of your trust: yet I am covetous to have the right of being represented by you: to which end I desire that this little exhibition of mine may be looked upon as a free-holder's vote for the choosing of Knights and Burgesses to sit in the Parliament of Nature, meaning thereby that as the Parliament owns a free-holder, though he hath but forty shillings a year to be one of them; so in the same manner and degree, I also desire to be owned as one of you, and that no longer than I continue a faithful friend, and servant of your designs and persons,

J. G.

## AN INDEX OF THE POSITIONS, OBSERVATIONS, AND QUESTIONS CONTAINED IN THIS DISCOURSE.

\*

1. The occasion of keeping the account of burials arose first from the Plague, in the year 1592, page 15
2. Seven alterations and augmentations of the published Bills, between the years 1592 and 1662, pp. 16-9
3. Reasons why the accounts of burials and christenings should be kept universally, and now called for and perused by the Magistrate, p. 20
4. A true account of the Plague cannot be kept, without the account of other diseases, p. 20
5. The ignorance of the Searchers no impediment to the keeping of sufficient, and useful accounts, p. 21
6. That about one-third of all that were ever quick die under five years old, and about 36 per centum under six, p. 22
7. That two parts of nine die of acute, and 70 of 229 of chronic diseases, and four of 229 of outward griefs, p. 22
8. A Table of the proportions dying of the most notorious and formidable diseases, or casualties, p. 23
9. That seven per centum die of *Age*, p. 23
10. That some diseases and casualties keep a constant proportion, whereas some other are very irregular, p. 23
11. That not above one in 4000 are *Starved*, p. 24
12. That it were better to maintain all beggars at the public charge, though earning nothing, than to let them beg about the streets; and that employing them without discretion may do more harm than good, p. 24
13. That not one in 2000 are *Murdered* in London, with the reasons thereof, p. 25
14. That not one in 1500 dies *Lunatick*, p. 25
15. That few of those who die of the *French-Pox* are set down, but coloured under the *Consumption*, etc. pp. 26
16. That the *Rickets* is a new disease, both as to name, and thing; that from 14 dying thereof, in the year 1634, it hath gradually increased to above 500 in the year 1660, pp. 26-7
17. That there is another new disease appearing; as a *Stopping of the Stomach*, which hath increased in 20 years, from six to near 300, pp. 27-8
18. That the *Rising of the Lights* (supposed in most cases to be the *Fits of the Mother*) have also increased in 30 years, from 44 to 249, p. 28

\* The page references have been altered to those for the *Journal*.



19. That both the *Stopping of the Stomach*, and *Rising of the Lights*, are probably relics of or depending upon the *Rickets*, p. 28
20. That the *Stone* decreases, and is wearing away, pp. 28-9
21. The *Gowt* stands at a stay, p. 29
22. The *Scurvy* increases, p. 29
23. The deaths by reason of *Agues* are to those caused by *Fevers*, as one to 40, p. 29
24. *Abortives* and *Stillborn*, to those that are Christened are as one to 20, p. 29
25. That since the differences in Religion, the Christenings have been neglected half in half, p. 29
26. That not one woman in 100 dies in *Child-bed*, nor one of two hundred in her *Labour*, p. 30
27. Three reasons why the registering of children hath been neglected, p. 30
28. There was a confusion in the accounts of *Chrysoms*, *Infants*, and *Convulsions*; but rectified in this Discourse, p. 30
29. There hath been in London within this age four times of great mortality, viz. in the years 1592, 1603, 1625 and 1636, whereof that of 1603 was the greatest, p. 31
30. In the years 1603 and 1625, about a fifth part of the whole died, and eight times more than were born, p. 32
31. That a fourth part more die of the *Plague* than are set down, p. 32
32. The *Plague* in 1603 lasted eight years, that in 1636 twelve years, but that in 1625 continued but one single year, p. 32
33. That alterations in the air do incomparably more operate as to the *Plague*, than the contagion of converse, p. 33
34. That *Purples*, *Small-Pox*, and other malignant diseases fore-run the *Plague*, p. 33
35. A disposition in the air towards the *Plague* doth also dispose women to *Abortions*, p. 33
36. That as about 1/5th part of the whole people died in the great *Plague* years, so two other fifth parts fled, which shows the large relation and interest which the Londoners have in the country, p. 33
37. That (be the *Plague* great or small) the City is fully re-peopled within two years, p. 34
38. The years, 1618, 20, 23, 24, 32, 33, 34, 49, 52, 54, 56, 58 and 61, were sickly years, p. 34
39. The more sickly the year is, the less fertile of births, pp. 34-5
40. That *Plagues* always come in with Kings' reigns is most false, p. 35

41. That in London there have been 12 burials for 11 christenings, p. 35
42. The Autumn, or the Fall, is the most unhealthful season, p. 35
43. That in the country there have been, contrary-wise, 63 christenings for 52 burials, p. 36
44. A supposition, that the people in and about London, are a fifteenth part of the people of all England and Wales, p. 36
45. That there are about six millions and an half of people in England and Wales, p. 36
46. That the people in the country double by procreation but in 280 years, and in London in about 70, as hereafter will be shown; the reason whereof is, that many of the breeders leave the country, and that the breeders of London come from all parts of the country, such persons breeding in the country almost only as were born there, but in London multitudes of others, p. 36
47. That about 6,000 per annum come up to London out of the country, p. 36
48. That in London about three die yearly out of 11 families, p. 36
49. There are about 25 millions of acres of land in England and Wales, p. 37
50. Why the proportion of breeders in London to the rest of the people is less than in the country, p. 37
51. That in London are more impediments of breeding than in the country, pp. 37-8
52. That there are 14 males for 13 females in London, and in the country but 15 males for 14 females, p. 38
53. Polygamy useless to the multiplication of mankind, without castrations, p. 39
54. Why sheep and oxen out-breed foxes and other vermin-animals, p. 39
55. There being 14 males to 13 females, and males being prolific 40 years and females but 25, it follows, that in effect there be 560 males to 325 females, p. 39
56. The said inequality is reduced by the later marriage of the males, and their employment in wars, sea voyage, and colonies, p. 39
57. Physicians have two women patients to one man, and yet more men die than women, pp. 39-40
58. The great emission of males into the Wars out of London in the year 1642 was instantly supplied, p. 40
59. Castration is not used only to meliorate the flesh of eat-able animals, but to promote their increase also, p. 40

60. The true *ratio formalis* of the evil of adulteries and fornications, p. 41
61. Where polygamy is allowed, wives can be no other than servants, p. 41
62. That 97, and 16 parishes of London are in 20 years increased from seven to twelve, and in 40 years from 23 to 52, p. 41
63. The 16 parishes have increased farther than the 97, the one having increased but from nine to ten in the said 40 years, pp. 41–2
64. The ten out-parishes have in 54 years increased from one to four, p. 42
65. The 97, 16, and ten parishes have in 54 years increased from two to five, p. 42
66. What great houses within the Walls have been turned into tenements, p. 42
67. Cripplegate parish hath most increased, etc., p. 42
68. The City removes westwards, with the reasons thereof, p. 43
69. Why Ludgate is become too narrow a throat for the City, p. 43
70. That there be some parishes in London two hundred times as big as others, p. 43
71. The natural bigness and figure of a church for the reformed religion, p. 44
72. The City of London, and suburbs, being equally divided, would make 100 parishes, about the largeness of Christchurch, Blackfriars, or Colmanstreet, p. 44
73. There are about 24,000 teeming women in the 97, 16, and ten parishes in and about London, p. 45
74. That about three die yearly out of 11 families containing each eight persons, p. 45
75. There are about 12,000 families within the Walls of London, p. 45
76. The housing of the 16 and ten suburb-parishes is thrice as big as that of the 97 parishes within the Walls, p. 45
77. The number of souls in the 97, 16, and two [*?ten—Eds.*] out-parishes is about 384,000, p. 45
78. Whereof 199,000 are males, and 185,000 females, p. 46
79. A Table shewing of 100 quick conceptions how many die within six years, how many the next decade, and so for every decade till 76, p. 46
80. Tables, whereby may be collected how many there be in London of every age assigned, p. 46
81. That there be in the 97, 16 and ten parishes near 70,000 fighting men, that is, men between the ages of 16 and 56, p. 46

82. That Westminster, Lambeth, Islington, Hackney, Redriff, Stepney, Newington, contain as many people as the 97 parishes within the Walls, and are consequently 1/5th of the whole pile, p. 46
83. So that in and about London are about 81,000 fighting men, and 460,000 in all, p. 46
84. Adam and Eve in 5,610 years might have, by the ordinary proportion of procreation, begotten more people than are now probably upon the face of the earth, p. 47
85. Wherefore the world cannot be older than the scriptures represent it, p. 47
86. That every wedding one with another produces four children, p. 47
87. That in several places the proportion between the males and females differ, p. 47
88. That in ninety years there were just as many males as females buried within a certain great parish in the country, p. 47
89. That a parish, consisting of about 2,700 inhabitants, had in 90 years but 1,059 more christenings than burials, p. 47
90. There come yearly to dwell at London about 6,000 strangers out of the country, which swells the burials about 200 per annum, p. 48
91. In the country there have been five christenings for four burials, p. 48
92. A confirmation, that the most healthful years are also the most fruitful, p. 48
93. The proportion between the greatest and least mortalities in the country are greater than the same in the City, p. 49
94. The country air more capable of good and bad impressions, than that of the City, p. 49
95. The differences also of births are greater in the country, than at London, p. 50
96. In the country but about one of fifty dies yearly, but at London one of thirty, over and above the *Plague*, p. 50
97. London not so healthful now as heretofore, p. 50
98. It is doubted whether increase of people, or the burning of sea-coal were the cause, or both, p. 50
99. The art of making of gold would be neither benefit to the world, or the artist, p. 51
100. The elements of true policy are to understand thoroughly the lands and hands of any country, p. 52
101. Upon what considerations the intrinsic value of lands doth depend, p. 52
102. And in what the accidental, p. 52

103. Some of the few benefits of having a true account of the people, p. 52
104. That but a small part of the whole people are employed upon necessary affairs, p. 52
105. That a true account of people is necessary for the government and trade of them, and for their peace and plenty, pp. 52–3
106. Whether this account ought to be confined to the Chief Governors, p. 53

## THE PREFACE

Having been born and bred in the City of London, and having always observed that most of them who constantly took in the weekly Bills of Mortality made little other use of them, than to look at the foot, how the burials increased or decreased; and, among the casualties, what had happened rare and extraordinary in the week current: so as they might take the same as a text to talk upon in the next company; and withal, in the Plague-time, how the sickness increased or decreased, that so the rich might judge of the necessity of their removal, and tradesmen might conjecture what doings they were like to have in their respective dealings:

2. Now, I thought that the wisdom of our City had certainly designed the laudable practice of taking and distributing these accounts, for other and greater uses than those above-mentioned, or at least, that some other uses might be made of them: and thereupon I casting mine eye upon so many of the General Bills as next came to hand, I found encouragement from them, to look out all the Bills I could, and (to be short) to furnish myself with as much matter of that kind, even as the Hall of the Parish-clerks could afford me; the which, when I had reduced into Tables (the copies whereof are here inserted) so as to have a view of the whole together, in order to the more ready comparing of one year, season, parish, or other division of the City, with another, in respect of all the burials and christenings, and of all the diseases and casualties happening in each of them respectively; I did then begin not only to examine the conceits, opinions and conjectures, which upon view of a few scattered Bills I had taken up; but did also admit new ones, as I found reason and occasion from my Tables.

3. Moreover, finding some truths and not commonly believed opinions, to arise from my meditations upon these neglected papers, I proceeded further, to consider what benefit the knowledge of the same would bring to the world; that I might not engage myself in idle and useless speculations, but like those noble Virtuosi of Gresham College (who reduce their subtle disquisitions upon Nature into downright mechanical uses) present the world with some real fruit from those airy blossoms.

4. How far I have succeeded in the premises, I now offer to the world's censure. Who, I hope, will not expect from me, not professing letters, things demonstrated with the same certainty wherewith learned men determine in their schools; but will take it well, that I should offer at a new thing, and could forbear presuming to meddle where any of the learned pens have ever touched before, and that I have taken the pains, and been at the charge, of setting out those Tables, whereby all men may both correct my positions and raise others of their own: For herein I have, like a silly schoolboy, coming to say my lesson to the world (that peevish and tetchy master) brought a bundle of rods wherewith to be whipped for every mistake I have committed.

## CHAPTER I

## OF THE BILLS OF MORTALITY, THEIR BEGINNING, AND PROGRESS

THE first of the continued weekly Bills of Mortality extant at the Parish-clerks Hall, begins the 29th of December, 1603, being the first year of King James his reign; since when, a weekly account hath been kept there of burials and christenings. It is true, there were Bills before, viz. for the years 1592, -93, -94, but so interrupted since, that I could not depend upon the sufficiency of them, rather relying upon those accounts which have been kept since, in order, as to all the uses I shall make of them.

2. I believe that the rise of keeping these accounts, was taken from the Plague: for the said Bills (for aught appears) first began in the said year 1592, being a time of great mortality; and after some disuse, were resumed again in the year 1603, after the great Plague then happening likewise.

3. These Bills were printed and published, not only every week on Thursdays, but also a general account of the whole year was given in, upon the Thursday before Christmas Day: which said general accounts have been presented in the several manners following, viz. from the year 1603 to the year 1624, inclusive, according to the pattern here inserted.

1623

1624

The general Bill for the whole year, of all the burials and christenings, as well within the City of London and the Liberties thereof, as in the nine out-parishes adjoining to the City, with the pest-house belonging to the same: from Thursday the 18th of December 1623 to Thursday the 16th of December 1624. According to the report made to the King's Most Excellent Majesty, by the Company of the Parish-clerks of London.

Buried this year in the fourscore and seventeen parishes of London within the Walls,	3,386
Whereof, of the <i>Plague</i> ,	1
Buried this year in the sixteen parishes of London, and the pest-house, being within the Liberties, and without the Walls,	5,924
Whereof, of the <i>Plague</i> ,	5
The whole sum of all the burials in London and the Liberties thereof, is this year,	9,310
Whereof, of the <i>Plague</i> ,	6
Buried of the <i>Plague</i> without the Liberties, in Middlesex and Surrey this whole year,	0
Christened in London and the Liberties thereof, this year,	6,368
Buried this year in the nine out-parishes, adjoining to London, and out of the Freedom,	2,900
Whereof, of the <i>Plague</i> ,	5
The total of all the burials in the places aforesaid, is,	12,210
Whereof, of the <i>Plague</i> ,	11
Christened in all the aforesaid places this year,	8,299
Parishes clear of the <i>Plague</i> ,	116
Parishes that have been infected this year,	6

4. In the year 1625, every parish was particularized, as in this following Bill: where note, that this next year of Plague caused the augmentation and correction of the Bills; as the former year of Plague did the very being of them.

1624

1625

A general or great Bill for this year, of the whole number of burials, which have been buried of all diseases, and also of the *Plague* in every parish within the City of London and the Liberties thereof; as also in the nine out-parishes adjoining to the said City; with the pest-house belonging to the same. From Thursday the 16th day of December 1624 to Thursday the 15th day of December 1625. According to the Report, made to the King's Most Excellent Majesty, by the Company of Parish-clerks of London.

LONDON	Bur.	Plag.	LONDON	Bur.	Plag.
Albanes in Woodstreet	188	78	James by Garlickhithe	180	109
Alhallows Barking	397	263	John Baptist	122	79
Alhallows Breadstreet	34	14	John Evangelist	7	0
Alhallows the Great	442	302	John Zacharies	143	97
Alhallows Hony-lane	18	8	James Duks place	310	254
Alhallows the less	259	205	Katherine Coleman	263	175
Alhal. in Lumberdstreet	86	44	Katherine Cree-church	866	373
Alhallows Stainings	183	138	Lawrence in the Jewrie	91	55
Alhallows the Wall	301	155	Lawrence Pountney	206	127
Alphage Cripple-gate	240	190	Leonards Eastcheap	55	26
Andrew-Hubbard	146	101	Leonards Fosterlane	292	209
Andrews Undershaft	219	149	Magnus Parish by Bridge	137	85
Andrews by Wardrobe	373	191	Margarets Lothbury	114	64
Annes at Aldersgate	196	128	Margarets Moses	37	25
Annes Black-Friers	336	215	Margarets new Fishstreet	123	82
Antholins Parish	62	31	Margarets Pattons	77	50
Austins Parish	72	40	Mary Ab-church	98	58
Barthol. at the Exchange	52	24	Mary Aldermanbury	126	79
Bennets Fink	108	57	Mary Aldermary	92	54
Bennets Grace-Church	48	14	Mary le Bow	35	19
Bennets at Pauls Wharf	226	131	Mary Bothaw	22	14
Bennets Sherehog	24	8	Mary Colechurch	26	11
Botolps Billings-gate	99	66	Mary at the Hill	152	84
Christ-Church Parish	611	371	Mary Mounthaw	76	58
Christopher's Parish	48	28	Mary Sommerset	270	192
Clements by Eastcheap	87	72	Mary Stainings	70	44
Dyonis Black-Church	99	59	Mary Woolchurch	58	25
Dunstans in the East	335	225	Mary Woolnoth	82	50
Edmunds Lumberdstreet	78	49	Martins Ironmonger-lane	25	18
Ethelborow in Bishopsgate	205	101	Martins at Ludgate	254	164
St. Faiths	89	45	Martins Orgars	88	47
St. Fosters in Foster-lane	149	102	Martins Outwich	60	30
Gabriel Fen church	71	54	Martins in the Vintry	339	208
George Botolphs-Lane	30	19	Matthew Fridaystreet	24	11
Gregories by Pauls	296	196	Maudlins in Milkstreet	401	23
Hellens in Bishopsgate st.	136	71	Maudlins Oldfish-street	225	142



LONDON	Bur.	Plag.	LONDON	Bur.	Plag.
Michael Bassishaw	199	139	Olaves in the Jewry	43	25
Michael Corn-Hill	159	79	Olaves in Silverstreet	174	103
Michael Crooked-lane	144	91	Pancras by Soperlane	17	8
Michael Queenhithe	215	157	Peter in Cheap	68	44
Michael in the Quern	53	30	Peters in Corn-hill	318	78
Michael in the Ryall	111	61	Peters at Pauls Wharf	97	68
Michael in Woodstreet	189	68	Peters poor in Broadstreet	52	27
Mildreds Breadstreet	60	44	Stevens in Colemanstreet	506	350
Mildreds Poultry	94	45	Stevens in Walbrook	25	13
Nicholas Acons	33	13	Swithins at Londonstone	99	60
Nicholas Cole-Abby	87	67	Thomas Apostles	141	107
Nicholas Olaves	70	43	Trinity Parish	148	87
Olaves in Hartstreet	266	195			

Buried within the 97 parishes within the Walls of all diseases 14,340  
 Whereof, of the *Plague*, 9,197

Andrews in Holborn	2,190	1,636	Georges Southwark	1,608	912
Bartholmew the Great	516	360	Giles Cripplegate	3,988	2,338
Bartholmew the less	111	65	Olaves in Southwark	3,689	2,609
Brides Parish	1,481	1,031	Saviours in Southwark	2,746	1,671
Botolph Algate	2,573	1,653	Sepulchres Parish	3,425	2,420
Bridewel Precinct	213	152	Thomas in Southwark	335	277
Botolph Bishopgate	2,334	714	Trinity in the Minorities	131	87
Botolph Aldersgate	578	307	At the pesthouse	194	189
Dunstanes the West	860	642			

Buried in the 16 parishes without the Walls, standing part within the Liberties,  
 and part without: in Middlesex, and Surrey, and at the pesthouse 26,972  
 Whereof, of the *Plague*, 17,153

## Buried in the nine out-parishes

Clements Templebar	1,284	755	Martins in the Fields	1,470	973
Giles in the Fields	1,333	947	Mary White-chappel	3,305	2,272
James at Clarkenwell	1,191	903	Magdalens Bermondsey	1,127	889
Katherins by the Tower	998	744	Savoy Parish	250	176
Leonards in Shorditch	1,995	1,407			

Buried in the nine out-parishes, in Middlesex, and Surrey 12,953  
 Whereof, of the *Plague*, 9,067

The total of all the burials of all diseases, within the Walls, without the Walls,  
 in the Liberties, in Middlesex and Surrey: with the nine out-parishes and the  
 pesthouse 54,265

Whereof, buried of the *Plague*, this present year, is 35,417  
 christenings this present year, is 6,983  
 parishes clear this year, is 1  
 parishes infected this year, is 121

5. In the year 1626 the City of Westminster in imitation of London, was  
 inserted. The gross account of the burials and christenings, with distinction

of the *Plague* being only taken notice of therein; the fifth, or last canton, or lined-space, of the said Bill, being varied into the form following, viz.

In Westminster this year,	Buried	471
	<i>Plague</i>	13
	Christenings	361

6. In the year 1629 an account of the diseases and casualties whereof any died, together with the distinction of males and females, making the sixth canton of the Bill, was added in manner following.

The canton of casualties, and of the Bill  
for the year 1632 being of the same form  
with that of 1629.

The diseases, and casualties this year being 1632.

<i>Abortive, and Stilborn</i>	445	<i>Jaundice</i>	43
<i>Affrighted</i>	1	<i>Jawfalln</i>	8
<i>Aged</i>	628	<i>Impostume</i>	74
<i>Ague</i>	43	<i>Killed by several accidents</i>	46
<i>Apoplexy and Meagrom</i>	17	<i>King's Evil</i>	38
<i>Bit with a mad dog</i>	1	<i>Lethargy</i>	2
<i>Bleeding</i>	3	<i>Liver-grown</i>	87
<i>Bloody flux, scowring, and flux</i>	348	<i>Lunatick</i>	5
<i>Bruised, Issues, sores, and ulcers,</i>	28	<i>Made away themselves</i>	15
<i>Burnt, and Scalded</i>	5	<i>Measles</i>	80
<i>Burst, and Rupture</i>	9	<i>Murdered</i>	7
<i>Cancer, and Wolf</i>	10	<i>Over-laid, and starved at nurse</i>	7
<i>Canker</i>	1	<i>Palsy</i>	25
<i>Childbed</i>	171	<i>Piles</i>	1
<i>Chrisoms, and Infants</i>	2268	<i>Plague</i>	8
<i>Cold, and Cough</i>	55	<i>Planet</i>	13
<i>Colick, Stone, and Strangury</i>	56	<i>Pleurisy, and Spleen</i>	36
<i>Consumption</i>	1797	<i>Purples, and Spotted Fever</i>	38
<i>Convulsion</i>	241	<i>Quinsy</i>	7
<i>Cut of the Stone</i>	5	<i>Rising of the Lights</i>	98
<i>Dead in the street, and starved</i>	6	<i>Sciatica</i>	1
<i>Dropsy, and Swelling</i>	267	<i>Scurvy, and Itch</i>	9
<i>Drowned</i>	34	<i>Suddenly</i>	62
<i>Executed, and prest to death</i>	18	<i>Surfet</i>	86
<i>Falling Sickness</i>	7	<i>Swine Pox</i>	6
<i>Fever</i>	1108	<i>Teeth</i>	470
<i>Fistula</i>	13	<i>Thrush, and Sore mouth</i>	40
<i>Flocks, and Small Pox</i>	531	<i>Tympany</i>	13
<i>French Pox</i>	12	<i>Tissick</i>	34
<i>Gangrene</i>	5	<i>Vomiting</i>	1
<i>Gout</i>	4	<i>Worms</i>	27
<i>Grief</i>	11		

Christened	Males	4994	Buried	Males	4932	Whereof, of the <i>Plague</i> 8
	Females	4590		Females	4603	
	In all	9584		In all	9535	

Increased in the burials in the 122 parishes, and at the pesthouse this year 993  
Decreased of the *Plague* in the 122 parishes, and at the pesthouse this year 266

7. In the year 1636, the account of the burials and christenings in the parishes of Islington, Lambeth, Stepney, Newington, Hackney and Redriff, were added in the manner following making a seventh canton, viz.

In Margaret Westminster	{ Christened 440 Buried 890 Plague 0	Newington	{ Christened 99 Buried 181 Plague 0
Islington	{ Christened 36 Buried 113 Plague 0	Hackney	{ Christened 30 Buried 91 Plague 0
Lambeth	{ Christened 132 Buried 220 Plague 0	Redriff	{ Christened 16 Buried 48 Plague 0
Stepney	{ Christened 892 Buried 1486 Plague 0		
The total of all the burials in the seven last parishes this year			2,958
Whereof, of the <i>Plague</i>			0
The total of all the christenings			1,645

8. Covent Garden being made a parish, the nine out-parishes were called the ten out-parishes, the which in former years were but eight.

9. In the year 1660 the last-mentioned ten parishes, with Westminster, Islington, Lambeth, Stepney, Newington, Hackney and Redriff, are entered under two divisions, viz. the one containing the twelve parishes lying in Middlesex and Surrey, and the other the five parishes within the City and Liberties of Westminster, viz. St. Clement-Danes, St. Paul's-Covent-Garden, St. Martin's in the Fields, St. Mary-Savoy and St. Margaret's Westminster.

10. We have hitherto described the several steps, whereby the Bills of Mortality are come up to their present state; we come next to shew how they are made and composed, which is in this manner, viz. when anyone dies, then, either by tolling or ringing of a bell, or by bespeaking of a grave of the Sexton, the same is known to the searchers, corresponding with the said Sexton.

11. The Searchers hereupon (who are ancient matrons, sworn to their Office) repair to the place where the dead corpse lies, and by view of the same, and by other enquiries, they examine by what disease or casualty the corpse died. Hereupon they make their Report to the Parish-clerk and he, every Tuesday night, carries in an account of all the burials and christenings, happening that week, to the clerk of the Hall. On Wednesday the

general account is made up and printed, and on Thursdays published, and dispersed to the several families, who will pay four shillings per annum for them.

12. *Memorandum.* That although the general yearly Bills have been set out in the several varieties afore-mentioned, yet the original entries in the Hall-books were as exact in the very first year as to all particulars, as now; and the specifying of casualties and diseases, was probably more.

## CHAPTER II

### GENERAL OBSERVATIONS UPON THE CASUALTIES

IN my discourses upon these Bills I shall first speak of the casualties, then give my observations with reference to the places and parishes comprehended in the Bills; and next of the years, and seasons.

1. There seems to be good reason why the Magistrate should himself take notice of the numbers of burials and christenings, viz. to see whether the City increase or decrease in people; whether it increase proportionately with the rest of the Nation; whether it be grown big enough, or too big, etc. But why the same should be made known to the People, otherwise than to please them as with a curiosity, I see not.

2. Nor could I ever yet learn (from the many I have asked, and those not of the least sagacity) to what purpose the distinction between males and females is inserted, or at all taken notice of; or why that of marriages was not equally given in? Nor is it obvious to everybody, why the account of casualties (whereof we are now speaking) is made? The reason, which seems most obvious for this latter, is, that the state of health in the City may at all times appear.

3. Now it may be objected that the same depends most upon the accounts of epidemic diseases, and upon the chief of them all, the *Plague*; wherefore the mention of the rest seems only a matter of curiosity.

4. But to this we answer, that the knowledge even of the numbers which die of the *Plague*, is not sufficiently deduced from the mere report of the Searchers, which only the Bills afford; but from other ratiocinations, and comparings of the *Plague* with some other casualties.

5. For we shall make it probable that in years of *Plague* a quarter part more dies of that disease than are set down; the same we shall also prove by the other casualties. Wherefore, if it be necessary to impart to the world a good account of some few casualties, which since it cannot well

be done without giving an account of them all, then is our common practice of so doing very apt, and rational.

6. Now, to make these corrections upon the perhaps, ignorant, and careless Searchers' Reports, I considered first of what authority they were in themselves, that is, whether any credit at all were to be given to their distinguishments: and finding that many of the casualties were but matter of sense, as whether a child were *Abortive*, or *Stillborn*; whether men were *Aged*, that is to say, above sixty years old, or thereabouts, when they died, without any curious determination whether such aged persons died purely of *Age*, as for that the innate heat was quite extinct, or the radical moisture quite dried up (for I have heard some candid physicians complain of the darkness which themselves were in hereupon) I say, that these distinguishments being but matter of sense, I concluded the Searchers' Report might be sufficient in the case.

7. As for *Consumptions*, if the Searchers do but truly report (as they may) whether the dead corpse were very lean and worn away, it matters not to many of our purposes whether the disease were exactly the same as physicians define it in their books. Moreover, in case a man of 75 years old died of a cough (of which had he been free, he might have possibly lived to ninety) I esteem it little error (as to many of our purposes) if this person be in the table of casualties, reckoned among the *Aged* and not placed under the title of *Coughs*.

8. In the matter of Infants I would desire but to know clearly, what the Searchers mean by Infants, as whether children that cannot speak, as the word Infant seems to signify, or children under two or three years old, although I should not be satisfied, whether the Infant died of *Wind*, or of *Teeth*, or of the *Convulsion*, etc. or were choked with *Phelgm*, or else of *Teeth*, *Convulsion*, and *Scowring*, apart, or together, which, they say, do often cause one another: for, I say, it is somewhat, to know how many die usually before they can speak, or how many live past any assigned number of years.

9. I say it is enough if we know from the Searchers but the most predominant symptoms; as that one died of the *Head-Ache*, who was sorely tormented with it, though the physicians were of opinion that the disease was in the stomach. Again, if one died suddenly, the matter is not great, whether it be reported in the Bills, *Suddenly*, *Apoplexy*, or *Planet-strucken*, etc.

10. To conclude, in many of these cases the Searchers are able to report the opinion of the physician who was with the patient, as they receive the same from the friends of the defunct, and in very many cases, such as *Drowning*, *Scalding*, *Bleeding*, *Vomiting*, *Making-away themselves*, *Lunaticks*, *Sores*, *Small-Pox*, etc. their own senses are sufficient, and the generality of the world, are able pretty well to distinguish the *Gowt*, *Stone*, *Dropsy*, *Falling-sickness*, *Palsy*, *Agues*, *Pleurisy*, *Rickets*, etc. one from another.

11. But now as for those casualties which are aptest to be confounded, and mistaken, I shall in the ensuing discourse presume to touch upon them so far as the learning of these Bills hath enabled me.

12. Having premised these general advertisements, our first observation upon the casualties shall be, that in twenty years there dying of all diseases and casualties, 229,250, that 71,124 died of the *Thrush*, *Convulsion*, *Rickets*, *Teeth*, and *Worms*; and as *Abortives*, *Chrysoms*, *Infants*, *Liver-grown*, and *Overlaid*; that is to say, that about one-third of the whole died of those diseases, which we guess did all light upon children under four or five years old.

13. There died also of the *Small-Pox*, *Swine-Pox*, and *Measles*, and of *Worms* without *Convulsions*, 12,210, of which number we suppose likewise, that about one-half might be children under six years old. Now, if we consider that 16 of the said 229 thousand died of that extraordinary and grand casualty the *Plague*, we shall find that about 36 per centum of all quick conceptions died before six years old.

14. The second observation is, that of the said 229,250 dying of all diseases, there died of acute diseases (the *Plague* excepted) but about 50,000 or 2/9 parts. The which proportion doth give a measure of the state and disposition of this climate and air, as to health, these acute and epidemic diseases happening suddenly and vehemently, upon the like corruptions and alterations in the air.

15. The third observation is, that of the said 229 thousand about 70 died of chronic diseases, which shews (as I conceive) the state and disposition of the country (including as well its food, as air) in reference to health, or rather to longevity: for as the proportion of acute and epidemic diseases shews the aptness of the air to sudden and vehement impressions, so the chronic diseases shew the ordinary temper of the place, so that upon the proportion of chronic diseases seems to hang the judgment of the fitness of the country for long life. For, I conceive, that in countries subject to great epidemic sweeps men may live very long, but where the proportion of the chronic distempers is great, it is not likely to be so; because men being long sick, and always sickly, cannot live to any great age, as we see in several sorts of Metal-men, who although they are less subject to acute diseases than others, yet seldom live to be old, that is, not to reach unto those years which David says is the age of man.

16. The fourth observation is, that of the said 229,000 not 4,000 died of outward griefs, as of *Cancers*, *Fistulaes*, *Sores*, *Ulcers*, *Broken and bruised Limbs*, *Impostumes*, *Itch*, *King's evil*, *Leprosy*, *Scald-head*, *Swine-Pox*, *Wens*, etc. viz. not one in 60.

17. In the next place, whereas many persons live in great fear and apprehension of some of the more formidable and notorious diseases following; I shall only set down how many died of each: that the respective numbers, being compared with the total 229,250, those persons may the better understand the hazard they are in.

Table of notorious diseases		Table of casualties	
<i>Apoplexy</i>	1,306	<i>Bleeding</i>	69
<i>Cut of the Stone</i>	38	<i>Burnt, and Scalded</i>	125
<i>Falling Sickness</i>	74	<i>Drowned</i>	829
<i>Dead in the streets</i>	243	<i>Excessive drinking</i>	2
<i>Gowt</i>	134	<i>Frighted</i>	22
<i>Head-Ache</i>	51	<i>Grief</i>	279
<i>Jaundice</i>	998	<i>Hanged themselves</i>	222
<i>Lethargy</i>	67	<i>Killed by several</i>	
<i>Leprosy</i>	6	<i>accidents</i>	1,021
<i>Lunatick</i>	158	<i>Murdered</i>	86
<i>Overlaid, and Starved</i>	529	<i>Poisoned</i>	14
<i>Palsy</i>	423	<i>Smothered</i>	26
<i>Rupture</i>	201	<i>Shot</i>	7
<i>Stone and Strangury,</i>	863	<i>Starved</i>	51
<i>Sciatica</i>	5	<i>Vomiting</i>	136
<i>Sodainly</i>	454		

18. In the foregoing observations we ventured to make a standard of the healthfulness of the air from the proportion of acute and epidemic diseases, and of the wholesomeness of the food from that of the chronic. Yet foras-much as neither of them alone do shew the longevity of the inhabitants, we shall in the next place come to the more absolute standard, and correction of both, which is the proportion of the aged, viz. 15,757 to the total 229,250. That is of about 1 to 15 or 7 per cent. Only the question is, what number of years the Searchers call *Aged*, which I conceive must be the same, that David calls so, viz. 70. For no man can be said to die properly of *Age*, who is much less: it follows from hence, that if in any other country more than seven of the 100 live beyond 70 such country is to be esteemed more healthful than this of our City.

19. Before we speak of particular casualties, we shall observe, that among the several casualties some bear a constant proportion unto the whole number of burials; such are chronic diseases, and the diseases whereunto the City is most subject; as for example, *Consumptions, Dropsies, Jaundice, Gowt, Stone, Palsy, Scurvy, Rising of the Lights, or Mother, Rickets, Aged, Agues, Fevers, Bloody-Flux, and Scowring*: nay some accidents, as *Grief, Drowning, Men's making away themselves*, and being *Killed by several Accidents*, etc. do the like, whereas epidemic and malignant diseases, as the *Plague, Purples, Spotted-Fever, Small-Pox, and Measles* do not keep that equality, so as in some years, or months, there died ten times as many as in others.

## CHAPTER III

## OF PARTICULAR CASUALTIES

MY first observation is, that few are *Starved*. This appears, for that of the 229,250 which have died, we find not above 51 to have been *Starved*, excepting helpless infants at nurse, which being caused rather by carelessness, ignorance, and infirmity of the milchwomen, is not properly an effect or sign of want of food in the country, or of means to get it.

2. The observation which I shall add hereunto, is, that the vast numbers of beggars, swarming up and down this City, do all live, and seem to be most of them healthy and strong; whereupon I make this question, whether since they do all live by begging, that is, without any kind of labour; it were not better for the state to keep them, even although they earned nothing; that so they might live regularly, and not in that debauchery, as many beggars do; and that they might be cured of their bodily impotences, or taught to work, etc. each according to his condition and capacity; or by being employed in some work (not better undone) might be accustomed and fitted for labour.

3. To this some may object, that beggars are now maintained by voluntary contributions, whereas in the other way the same must be done by a general tax; and consequently, the objects of charity would be removed and taken away.

4. To which we answer, that in Holland, although nowhere fewer beggars appear to charm up commiseration in the credulous, yet nowhere is there greater, or more frequent charity; only indeed the Magistrate is both the beggar, and the disposer of what is gotten by begging; so as all givers have a moral certainty that their charity shall be well applied.

5. Moreover, I question, whether what we give to a wretch that shews us lamentable sores and mutilations, be always out of the purest charity? that is, purely for God's sake; for as much as when we see such objects, we then feel in ourselves a kind of pain and passion by consent; of which we ease ourselves, when we think we have eased them with whom we sympathized: or else we bespeak aforehand the like commiseration in others towards ourselves, when we shall (as we fear we may) fall into the like distress.

6. We have said, 'twere better the public should keep the beggars, though they earned nothing, etc. But most men will laugh to hear us suppose that any able to work (as indeed most beggars are, in one kind of measure, or another) should be kept without earning anything. But we answer, that if there be but a certain proportion of work to be done; and that the same be already done by the not-beggars; then to employ the beggars about it, will but transfer the want from one hand to another; nor can a learner work so cheap as a skilful practised artist can. As for example, a practised spinner shall spin a pound of wool worth two shillings for six pence; but a learner,



undertaking it for three pence, shall make the wool indeed into yarn, but not worth twelve pence.

7. This little hint is the model of the greatest work in the world, which is the making England as considerable for trade as Holland; for there is but a certain proportion of trade in the world, and Holland is prepossessed of the greater part of it, and is thought to have more skill and experience to manage it: wherefore, to bring England into Holland's condition, as to this particular, is the same as to send all the beggars about London into the West Country to spin, where they shall only spoil the clothier's wool, and beggar the present spinners at best; but, at worst, put the whole trade of the country to a stand, until the Hollander, being more ready for it, have snapped that with the rest.

8. My next observation is, that but few are *Murdered*, viz. not above 86 of the 229,250 which have died of other diseases and casualties; whereas in Paris few nights escape without their tragedy.

9. The reasons of this we conceive to be two: one is the government and guard of the City by citizens themselves, and that alternately. No man settling into a trade for that employment. And the other is, the natural and customary abhorrence of that inhuman crime and all bloodshed by most Englishmen: for of all that are executed few are for murder. Besides the great and frequent revolutions and changes of Government since the year 1650, have been with little bloodshed; the usurpers themselves having executed few in comparison, upon the account of disturbing their innovations.

10. In brief, when any dead body is found in England, no algebraist, or uncipherer of letters, can use more subtle suppositions and variety of conjectures to find out the demonstration, or cipher, than every common unconcerned person doth to find out the murderers, and that for ever, until it be done.

11. The *Lunaticks* are also but few, viz. 158 in 229,250, though I fear many more than are set down in our Bills, few being entered for such but those who die at Bedlam; and there all seem to die of their lunacy, who died *Lunaticks*; for there is much difference in computing the number of Lunaticks that die (though of *Fevers*, and all other diseases, unto which Lunacy is no *supersedeas*) and those that die by reason of their madness.

12. So that, this casualty being so uncertain, I shall not force myself to make any inference from the numbers and proportions we find in our Bills concerning it: only I dare ensure any man at this present, well in his wits, for one in the thousand, that he shall not die a Lunatick in Bedlam within these seven years, because I find not above one in about 1,500 have done so.

13. The like use may be made of the accounts of men that *Made away themselves*, who are another sort of madmen, that think to ease themselves of pain by leaping into Hell; or else are yet more mad, so as to think there is no such place; or that men may go to rest by death, though they die in self-murder, the greatest sin.

14. We shall say nothing of the numbers of those that have been *Drowned, Killed by falls from scaffolds, or by Carts running over them*, etc. because the same depends upon the casual trade and employment of men, and upon matters which are but circumstantial to the seasons and regions we live in; and affords little of that science and certainty we aim at.

15. We find one casualty in our Bills of which though there be daily talk, there is little effect, much like our abhorrence of toads and snakes, as most poisonous creatures, whereas few men dare say upon their own knowledge they ever found harm by either; and this casualty is the *French-Pox*, gotten, for the most part, not so much by the intemperate use of Venery (which rather causeth the *Gowt*) as of many common women.

16. I say, the Bills of Mortality would take off these bars, which keep some men within bounds, as to these extravagances: for in the aforementioned 229,250 we find not above 392 to have died of the *Pox*. Now, forasmuch as it is not good to let the world be lulled into a security and belief of impunity by our Bills, which we intend shall not be only as death's-heads to put men in mind of their mortality, but also as mercurial statues to point out the most dangerous ways that lead us into it and misery. We shall therefore shew, that the *Pox* is not as the toads and snakes aforementioned, but of a quite contrary nature, together with the reason why it appears otherwise.

17. Forasmuch as by the ordinary discourse of the world it seems a great part of men have, at one time or other, had some species of this disease, I wondering why so few died of it, especially because I could not take that to be so harmless, whereof so many complained very fiercely; upon inquiry I found that those who died of it out of the hospitals (especially that of King's-Land, and the Lock in Southwark) were returned of *Ulcers*, and *Sores*. And in brief I found, that all mentioned to die of the *French-Pox* were returned by the Clerks of Saint Giles's and Saint Martin's in the Fields only; in which place I understood that most of the vilest and most miserable houses of uncleanness were: from whence I concluded that only hated persons, and such, whose very noses were eaten of, were reported by the Searchers to have died of this too frequent malady.

18. In the next place, it shall be examined under what name or casualty, such as die of these diseases are brought in: I say, under the *Consumption*: forasmuch, as all dying thereof die so emaciated and lean (their *Ulcers* disappearing upon death) that the old-women Searchers after the mist of a cup of ale, and the bribe of a two-groat fee, instead of one, given them, cannot tell whether this emaciation or leanness were from a *Phthisis*, or from an *Hectic Fever*, *Atrophy*, etc. or from an *Infection of the spermatic parts*, which in length of time and in various disguises hath at last vitiated the habit of the body, and by disabling the parts to digest their nourishment brought them to the condition of leanness above-mentioned.

19. My next observation is, that of the *Rickets* we find no mention

among the casualties until the year 1634 and then but of 14 for that whole year.

20. Now the question is, whether that disease did first appear about that time; or whether a disease, which had been long before, did then first receive its name?

21. To clear this difficulty out of the Bills (for I dare venture on no deeper arguments) I enquired what other casualties before the year 1634, named in the Bills, was most like the *Rickets*; and found, not only by pretenders to know it, but also from other Bills, that *Liver-grown* was the nearest. For in some years I find *Liver-grown*, *Spleen*, and *Rickets*, put all together, by reason (as I conceive) of their likeness to each other. Hereupon I added the *Liver-growns* of the year 1634, viz. 77, to the *Rickets* of the same year, viz. 14, making in all 91, which total, as also the number 77 itself, I compared with the *Liver-grown* of the precedent year, 1633, viz. 82. All which shewed me, that the *Rickets* was a new disease over and above.

22. Now, this being but a faint argument, I looked both forwards and backwards, and found that in the year 1629, when no *Rickets* appeared, there was but 94 *Liver-growns*; and in the year 1636 there was 99 *Liver-grown*, although there were also 50 of the *Rickets*: only this is not to be denied, that when the *Rickets* grew very numerous (as in the year 1660, viz. to be 521) then there appeared not above 15 of *Liver-grown*.

23. In the year 1659 were 441 *Rickets* and 8 *Liver-grown*. In the year 1658, were 476 *Rickets* and 51 *Liver-grown*. Now, though it be granted that these diseases were confounded in the judgment of the nurses, yet it is most certain that the *Liver-grown* did never but once, viz. in the year 1630, exceed 100, whereas in the year 1660, *Liver-grown* and *Rickets* were 536.

24. It is also to be observed, that the *Rickets* were never more numerous than now, and that they are still increasing; for in the year 1649, there was but 190, next year 260, next after that 329, and so forwards, with some little starting backwards in some years, until the year 1660, which produced the greatest of all.

25. Now, such backstartings seem to be universal in all things; for we do not only see in the progressive motion of the wheels of watches, and in the rowing of boats, that there is a little starting or jerking backwards between every step forwards, but also (if I am not much deceived) there appeared the like in the motion of the moon, which in the long telescopes at Gresham College one may sensibly discern.

26. There seems also to be another new disease, called by our Bills the *Stopping of the Stomach*, first mentioned in the year 1636, the which malady from that year to 1647, increased but from 6 to 29; in the year 1655 it came to be 145. In 1657, to 277. In 1660, to 214. Now these proportions far exceeding the difference of proportion generally arising from the increase of inhabitants, and from the resort of *advenae* to the City, shews there is some new disease, which appeareth to the vulgar as a *Stopping of the Stomach*.

27. Hereupon I apprehended, that this *Stopping* might be the *Green-sickness*, for as much as I find few, or none, to have been returned upon that account, although many be visibly stained with it. Now whether the same be forborn out of shame, I know not? For since the world believes that marriage cures it, it may seem indeed a shame that any maid should die uncured, when there are more males than females, that is, an overplus of husbands to all that can be wives.

28. In the next place I conjectured, that this *Stopping of the Stomach* might be the *Mother*, for as much as I have heard of many troubled with *Mother-fits* (as they call them) although few returned to have died of them; with conjecture, if it be true, we may then safely say that the *Mother-fits* have also increased.

29. But I was somewhat taken off from thinking this *Stopping of the Stomach* to be the *Mother*, because I guessed rather the *Rising of the Lights* might be it. For I remembered that some women, troubled with the *Mother-fits*, did complain of a choking in their throats. Now as I understand, it is more conceivable that the lights or lungs (which I have heard called the bellows of the body) not blowing, that is, neither venting out nor taking in breath, might rather cause such a choking, than that the *Mother* should rise up thither, and do it. For methinks, when a woman is with child there is a greater rising, and yet no such fits at all.

30. But what I have said of the *Rickets* and *Stopping of the Stomach*, I do in some measure say of the *Rising of the Lights* also, viz. that these *Risings* (be they what they will) have increased much above the general proportion; for in 1629 there was but 44, and in 1660, 249, viz. almost six times as many.

31. Now forasmuch as *Rickets* appear much in the *Over-growing of Children's Livers*, and *Spleens* (as by the Bills may appear) which surely may cause *Stopping of the Stomach* by squeezing and crowding upon that part. And forasmuch as these *Chokings*, or *Risings of the Lights* may proceed from the same stuffings, as make the liver and spleen to overgrow their due proportion. And lastly, forasmuch as the *Rickets*, *Stopping of the Stomach*, and *Rising of the Lights*, have all increased together, and in some kind of correspondent proportions; it seems to me, that they depend one upon another. And that what is the *Rickets* in children may be the other in more grown bodies; for surely children which recover of the *Rickets* may retain somewhat sufficient to cause what I have imagined; but of this let the learned physicians consider, as I presume they have.

32. I had not meddled thus far, but that I have heard the first hints of the circulation of the blood were taken from a common person's wondering what became of all the blood which issued out of the heart, since the heart beats above three thousand times an hour, although but one drop should be pumped out of it at every stroke.

33. The *Stone* seemed to decrease: for in 1632, 33, 34, 35 and 36, there died of the *Stone* and *Strangury*, 254. And in the years 1655, 56, 57, 58, 59 and 1660, but 250, which numbers although indeed they be almost equal,

yet considering the burials of the first named five years were but half those of the latter, it seems to be decreased by about one half.

34. Now the *Stone* and *Strangury* are diseases, which most men know that feel them, unless it be in some few cases, where (as I have heard physicians say) a stone is held up by the films of the bladder, and so kept from grating or offending it.

35. The *Gowt* stands much at a stay, that is, it answers the general proportion of burials; there dies not above one of 1,000 of the *Gowt*, although I believe that more die gowty. The reason is, because those that have the *Gowt* are said to be long-livers, and therefore, when such die, they are returned as *Aged*.

36. The *Scurvy* hath likewise increased, and that gradually from 12 in the year 1629 to 95 in the year 1660.

37. The *Tyssick* seems to be quite worn away, but that it is probable the same is entered as *Cough* or *Consumption*.

38. *Agues* and *Fevers* are entered promiscuously, yet in the few Bills wherein they have been distinguished, it appears that not above one in 40 of the whole are *Agues*.

39. The *Abortives* and *Stillborn* are about the twentieth part of those that are christened, and the numbers seemed the same thirty years ago as now, which shews there were more in proportion in those years than now: or else that in these latter years due accounts have not been kept of the *Abortives*, as having been buried without notice, and perhaps not in churchyards.

40. For that there hath been a neglect in the accounts of the christenings is most certain, because until the year 1642 we find the burials but equal with the christenings, or near thereabouts, but in 1648, when the differences in religion had changed the Government, the christenings were but two-thirds of the burials. And in the year 1659, not half, viz. the burials were 14,720 (of the *Plague* but 36) and the christenings were but 5,690, which great disproportion could be from no other cause than that above-mentioned, forasmuch as the same grew as the confusions and changes grew.

41. Moreover, although the Bills give us in the year 1659 but 5,690 christenings, yet they give us 421 *Abortives* and 226 dying in *Child-bed*, whereas in the year 1631, when the *Abortives* were 410, that is, near the number of the year 1659, the christenings were 8,288. Wherefore by the proportion of *Abortives* in the year 1659, the christenings should have been about 8,500, but if we shall reckon by the women dying in *Child-bed*, of whom a better account is kept than of *Stillborns* and *Abortives*, we shall find in the year 1659 there were 226 *Child-beds*; and in the year 1631, 112, viz. not one-half. Wherefore I conceive that the true number of the christenings in the year 1659 is above double to the 5,690 set down in our Bills; that is about 11,500, and then the christenings will come near the same proportion to the burials, as hath been observed in former times.

42. In regular times, when accounts were well kept, we find that not

above three in 200 died in *Child-bed*, and that the number of *Abortives* was about treble to that of the women dying in *Child-bed*, from whence we may probably collect, that not one woman of an hundred (I might say of two hundred) dies in her labour; for as much as there be other causes of a woman's dying within the month, than the hardness of her labour.

43. If this be true in these countries, where women hinder the facility of their child-bearing by affected straightening of their bodies; then certainly in America, where the same is not practised, nature is little more to be taxed as to women than in brutes, among whom not one in some thousands do die of their deliveries: what I have heard of the Irish women confirms me herein.

44. Before we quite leave this matter, we shall insert the causes, why the account of christenings hath been neglected more than that of burials: one, and the chief whereof was a religious opinion against baptizing of infants, either as unlawful or unnecessary. If this were the only reason, we might by our defects of this kind, conclude the growth of this opinion, and pronounce that not half the people of England, between the years 1650 and 1660, were convinced of the need of baptizing.

45. A second reason was, the scruples, which many public Ministers would make of the worthiness of parents to have their children baptized, which forced such questioned parents, who did also not believe the necessity of having their children baptized by such scrupulers, to carry their children unto such other Ministers, as having performed the thing, had not the authority or command of the register to enter the names of the baptized.

46. A third reason was, that a little fee was to be paid for the registry.

47. Upon the whole matter it is most certain that the number of heterodox believers was very great between the said year, 1650, and 1660, and so peevish were they, as not to have the births of their children registered, although thereby the time of their coming of age might be known, in respect of such inheritances as might belong unto them; and withal by such registering it would have appeared unto what parish each child had belonged, in case any of them should happen to want its relief.

48. Of *Convulsions* there appeared very few, viz. but 52 in the year 1629, which in 1636 grew to 709, keeping about that stay till 1659, though sometimes rising to about 1,000.

49. It is to be noted, that from 1629 to 1636, when the *Convulsions* were but few, the number of *Chrysoms* and *Infants* was greater: for in 1629, there was of *Chrysoms* and *Infants* 2,596, and of the *Convulsion* 52, viz. of both, 2,648. And in 1636 there was of *Infants* 1,895, and of the *Convulsions* 709, in both 2,604, by which it appears that this difference is likely to be only a confusion in the accounts.

50. Moreover, we find that for these later years, since 1636, the total of *Convulsions* and *Chrysoms* added together are much less, viz. by about 400 or 500 per annum, than the like totals from 1626 to 36, which makes me think that *Teeth* also were thrust in under the title of *Chrysoms* and *Infants*,

inasmuch as in the said years, from 1629 to 1639, the number of *Worms* and *Teeth* wants by about 400 per annum of what we find in following years.

## CHAPTER IV

## OF THE PLAGUE

BEFORE we leave to discourse of the casualties, we shall add something concerning that greatest disease or casualty of all, the *Plague*.

There have been in London, within this age, four times of great mortality, that is to say, the years 1592 and 1593, 1603, 1625, and 1636.

There died in the year 1592 from March to December,	25,886
Whereof, of the <i>Plague</i>	11,503
In the year 1593	17,844
Whereof, of the <i>Plague</i>	10,662
Christened in the said year	4,021
In the year 1603 within the same space of time, were buried	37,294
Whereof, of the <i>Plague</i>	30,561
In the year 1625, within the same space	51,758
Whereof, of the <i>Plague</i>	35,417
In the year 1636, from April to December	23,359
Whereof, of the <i>Plague</i>	10,400

2. Now it is manifest of itself, in which of these years most died; but in which of them was the greatest mortality of all diseases in general, or of the *Plague* in particular, we discover thus. In the year 1592, and 1636, we find the proportion of those dying of the *Plague* in the whole to be near alike, that is about 10 to 23, or 11 to 25, or as about two to five.

3. In the year 1625, we find the *Plague* to bear unto the whole in proportion as 35 to 51, or 7 to 10, that is almost the triplicate of the former proportion, for the cube of 7 being 343 and the cube of 10 being 1,000, the said 343 is not two-fifths of 1,000.

4. In the year 1603 the proportion of the *Plague* to the whole was as 30 to 37, viz. as 4 to 5, which is yet greater than that last of 7 to 20 [?ten—Eds.] For if the year 1625 had been as great a *Plague*-year as 1603, there must have died not only 7 to 10, but 8 to 10, which in those great numbers makes a vast difference.

5. We must therefore conclude the year 1603 to have been the greatest *Plague*-year of this age.

6. Now to know in which of these 4 was the greatest mortality at large, we reason thus,

In the year 1592	Buried	26,490	} or as {	6 1
	Christened	4,277		
In the year 1603	There died in the whole year of all	38,244	} or as {	8 1
	Christened	4,784		
1 to 8 or 1 $\frac{1}{4}$ to 10	In the year 1625	Died in the whole year	} or as {	8 1
		Christened		
In the year 1636	There died, <i>ut supra</i>	23,359	} or as {	5 2
	Christened	9,522		

7. From whence it appears that in the year 1636, the christenings were about  $\frac{2}{5}$  parts of the burials. In the year 1592, but  $\frac{1}{6}$ , but in the year 1603 and 1625, not above an eighth, so that the said two years were the years of greatest mortality. We said that the year 1603 was the greatest Plague year. And now we say, that the same was not a greater year of mortality than the year 1625. Now to reconcile these two positions, we must allege that in the year 1625 there was error in the accounts, or distinctions of the casualties; that is, more died of the *Plague* than were accounted for under that name. Which allegation we also prove thus, viz.

8. In the said year 1625, there are said to have died of the *Plague* 35,417, and of all other diseases 18,848, whereas in the years, both before and after the same, the ordinary number of burials was between 7 and 8,000, so that if we add about 11,000 (which is the difference between 7 and 18) to our 35 the whole will be 46,000, which bears to the whole 54,000 as about 4 to 5, thereby rendering the said year 1625 to be as great a Plague-year as that of 1603 and no greater, which answers to what we proved before, viz. that the mortality of the two years was equal.

9. From whence we may probably suspect that about  $\frac{1}{4}$  part more died of the *Plague* than are returned for such; which we further prove by noting that in the year 1636 there died 10,400 of the *Plague*, the  $\frac{1}{4}$  whereof is 2,600. Now there are said to have died of all other diseases that year 12,959 out of which number deducting 2,600, there remains 10,359, more than which there died not in several years next before and after the said year 1636.

10. The next observation we shall offer is, that the *Plague* of 1603 lasted eight years. In some whereof there died above 4,000, in others above 2,000, and in but one less than 600: whereas in the year 1624, next preceding, and in the year 1626, next following the said great Plague-year 1625, there died in the former but 11, and in the latter but 134 of the *Plague*. Moreover in the said year 1625, the *Plague* decreased from its utmost number 4,461 a week, to below 1,000 within six weeks.

11. The *Plague* of 1636 lasted twelve years, in eight whereof there died 2,000 per annum one with another, and never under 300. The which shews



that the contagion of the *Plague* depends more upon the disposition of the air than upon the effluvia from the bodies of men.

12. Which also we prove by the sudden jumps which the *Plague* hath made, leaping in one week from 118 to 927: and back again from 993 to 258: and from thence again the very next week to 852. The which effects must surely be rather attributed to change of the air, than of the constitution of men's bodies, otherwise than as this depends upon that.

13. It may be also noted, that many times other pestilential diseases, as *Purple-Fevers*, *Small-Pox*, etc. do forerun the *Plague* a year, two, or three, for in 1622 there died but 8,000; in 1623, 11,000; in 1624, about 12,000; till in 1625 there died of all diseases above 54,000.

## CHAPTER V

### OTHER OBSERVATIONS UPON THE PLAGUE, AND CASUALTIES

THE decrease and increase of people is to be reckoned chiefly by christenings, because few bear children in London but inhabitants, though others die there. The accounts of christenings were well kept, until differences in religion occasioned some neglect therein, although even these neglects we must confess to have been regular and proportionable.

2. By the numbers and proportions of christenings, therefore we observe as followeth, viz.

First, that (when from December, 1602, to March following, there was little or no *Plague*) then the christenings at a medium were between 110 and 130 per week, few weeks being above the one or below the other; but when from thence to July the *Plague* increased, that then the christenings decreased to under 90.

Secondly, the question is, whether teeming-women died, or fled, or miscarried? The latter at this time seems most probable, because even in the said space, between March and July, there died not above twenty per week of the *Plague*, which small number could neither cause the death or flight of so many women, as to alter the proportion  $\frac{1}{4}$  part lower.

3. Moreover, we observe from the 21st July to the 21st October, the *Plague* increasing, reduced the christenings to 70 at a medium, diminishing the above proportion down to two-fifths. Now the cause of this must be flying and death, as well as miscarriages and abortions; for there died within that time about 25,000, whereof many were certainly women with child, besides the fright of so many dying within so small a time might drive away so many others as to cause this effect.

4. From December 1624, to the middle of April 1625, there died not above 5 a week of the *Plague* one with another. In this time, the christenings were one with another 180. The which decreased gradually by 22nd

September to 75, or from the proportion of 12 to 5, which evidently squares with our former observation.

5. The next observation we shall offer is, the time wherein the City hath been re-peopled after a great Plague; which we affirm to be by the second year. For in 1627, the christenings (which are our standard in this case) were 8,408, which in 1624 next preceding the Plague year 1625 (that had swept away above 54,000) were but 8,299, and the christenings of 1626 (which were but 6,701) mounted in one year to the said 8,408.

6. Now the cause hereof, forasmuch as it cannot be a supply by procreations; ergo, it must be by new affluxes to London out of the country.

7. We might fortify this assertion by shewing that before the Plague-year 1603, the christenings were about 6,000, which were in that very year reduced to 4,789, but crept up the next year 1604, to 5,458, recovering their former ordinary proportion in 1605 of 6,504, about which proportion it stood till the year 1610.

8. I say, it followeth that, let the mortality be what it will, the City repairs its loss of inhabitants within two years, which observation lessens the objection made against the value of houses in London, as if they were liable to great prejudice through the loss of inhabitants by the *Plague*.

## CHAPTER VI

### OF THE SICKLINESS, HEALTHFULNESS, AND FRUITFULNESS OF SEASONS

HAVING spoken of casualties, we come next to compare the sickliness, healthfulness, and fruitfulness of the several years and seasons, one with another. And first, having in the Chapters aforegoing mentioned the several years of Plague, we shall next present the several other sickly years; we meaning by a sickly year, such wherein the burials exceed those both of the precedent and subsequent years, and not above 200 dying of the *Plague*, for such we call Plague-years; and this we do, that the World may see by what spaces and intervals we may hereafter expect such times again. Now, we may not call that a more sickly year, wherein more die, because such excess of burials may proceed from increase and access of people to the City only.

2. Such sickly years were 1618, 20, 23, 24, 1632, 33, 34, 1649, 52, 54, 56, 58, 61, as may be seen by the Tables.

3. In reference to this observation, we shall present another, namely, that the more sickly the years are, the less fecund or fruitful of children also they be, which will appear, if the number of children born in the said sickly years be less than that of the years both next preceding and next following; all which, upon view of the tables, will be found true except in

a very few cases, where sometimes the precedent and sometimes the subsequent years vary a little, but never both together. Moreover, for the confirmation of this truth, we present you the year 1660, where the burials were fewer than in either of the two next precedent years by 2000, and fewer than in the subsequent by above 4000. And withal, the number of christenings in the said year 1660 was far greater than in any of the three years next aforegoing.

4. As to this year 1660, although we would not be thought superstitious, yet is it not to be neglected that in the said year was the King's restoration to his Empire over these three Nations, as if God Almighty had caused the healthfulness and fruitfulness thereof to repair the bloodshed and calamities suffered in his absence. I say, this conceit doth abundantly counterpoise the opinion of those who think great Plagues come in with Kings' reigns, because it happened so twice, viz. in the years 1603 and 1625, whereas as well the year 1648, wherein the present King commenced his right to reign, as also the year 1660, wherein he commenced the exercise of the same, were both eminently healthful, which clears both Monarchy and our present King's family from what seditious men have surmised against them.

5. The diseases which beside the *Plague* make years unhealthful in this City, are *Spotted Fevers*, *Small Pox*, *Dysentery*, called by some the *Plague in the Guts*, and the unhealthful season is the Autumn.

## CHAPTER VII

### OF THE DIFFERENCE BETWEEN BURIALS AND CHRISTENINGS

THE next observation is, that in the said Bills there are far more burials than christenings. This is plain, depending only upon arithmetical computation; for, in 40 years, from the year 1603 to the year 1644, exclusive of both years, there have been set down (as happening within the same ground, space, or parishes) although differently numbered, and divided, 363,935 burials, and but 330,747 christenings within the 97, 16, and 10 out-parishes, those of Westminster, Lambeth, Newington, Redriff, Stepney, Hackney, and Islington, not being included.

2. From this single observation it will follow that London should have decreased in its people, the contrary whereof we see by its daily increase of buildings upon new foundations, and by the turning of great palacious houses into small tenements. It is therefore certain that London is supplied with people from out of the country, whereby not only to repair the overplus difference of burials above-mentioned, but likewise to increase its inhabitants, according to the said increase of housing.

3. This supplying of London seems to be the reason why Winchester, Lincoln, and several other cities have decreased in their buildings and consequently in their inhabitants. The same may be suspected of many towns in Cornwall, and other places, which probably, when they were first allowed to send Burgesses to the Parliament, were more populous than now, and bore another proportion to London than now; for several of those Boroughs send two Burgesses, whereas London itself sends but four, although it bears the fifteenth part of the charge of the whole Nation in all public taxes and levies.

4. But, if we consider what I have upon exact enquiry found true, viz. that in the country, within ninety years, there have been 6,339 christenings and but 5,280 burials, the increase of London will be salved without inferring the decrease of the people in the country; and withal, in case all England have but fourteen times more people than London, it will appear, how the said increase of the country may increase the people, both of London and itself; for if there be in the 97, 16, 10, and 7 parishes, usually comprehended within our Bills, but 460,000 souls as hereafter we shall shew, then there are in all England and Wales, 6,440,000 persons, out of which subtract 460,000, for those in and about London, there remains 5,980,000 in the country, the which increasing about  $1/7$  part in 40 years, as we shall hereafter prove doth happen in the country, the whole increase of the country will be about 854,000 in the said time, out of which number, if but about 250,000 be sent up to London in the said 40 years, viz. about 6,000 per annum, the said missions will make good the alterations which we find to have been in and about London, between the years 1603 and 1644 above-mentioned. But that 250,000 will do the same, I prove thus, viz. in the 8 years, from 1603 to 1612, the burials in all the parishes, and of all diseases, the *Plague* included, were at a medium 9,750 per annum. And between 1635 and 1644 were 18,000, the difference whereof is 8,250, which is the total of the increase of the burials in 40 years, that is about 206 per annum. Now, to make the burials increase 206 per annum, there must be added to the City thirty times as many (according to the proportion of 3 dying out of 11 families) viz. 6,180 *advenae*, the which number multiplied again by the 40 years, makes the product 247,200, which is less than the 250,000 above propounded; so as there remains above 600,000 of increase in the country within the said 40 years, either to render it more populous, or send forth into other colonies, or wars. But that England hath fourteen times more people is not improbable, for the reasons following.

1. London is observed to bear about the fifteenth proportion of the whole tax.
2. There is in England and Wales about 39,000 square miles of land, and we have computed that in one of the greatest parishes in Hampshire, being also a market town and containing twelve square miles, there are 220 souls in every square mile, out of which I abate  $1/4$  for

the overplus of people more in that parish, than in other wild counties. So as the  $\frac{3}{4}$  parts of the said 220, multiplied by the total of square miles, produces 6,400,000 souls in all, London included.

3. There are about 10,000 parishes in England and Wales, the which, although they should not contain the  $\frac{1}{3}$  part of the land nor the  $\frac{1}{4}$  of the people of that country parish which we have examined, yet may be supposed to contain about 600 people, one with another, according to which account there will be six millions of people in the Nation. I might add, that there are in England and Wales about five and twenty millions of acres at  $16\frac{1}{4}$  foot to the perch; and if there be six millions of people, then there is about four acres for every head, which how well it agrees to the rules of plantation, I leave unto others, not only as a means to examine my assertion, but as an hint to their enquiry concerning the fundamental trade, which is husbandry and plantation.
4. Upon the whole matter we may therefore conclude that the people of the whole Nation do increase, and consequently the decrease of Winchester, Lincoln, and other like places, must be attributed to other reasons than that of refurnishing London only.

5. We come to shew, why although in the country the christenings exceed the burials, yet in London they do not. The general reason of this must be that in London the proportion of those subject to die unto those capable of breeding is greater than in the country; that is, let there be an hundred persons in London, and as many in the country; we say, that if there be 60 of them breeders in London, there are more than 60 in the country, or else we must say that London is more unhealthful, or that it inclines men and women more to barrenness, than the country, which by comparing the burials and christenings of Hackney, Newington, and the other country parishes, with the most smoky and stinking parts of the City, is scarce discernible in any considerable degree.

6. Now that the breeders in London are proportionally fewer than those in the country arises from these reasons, viz.

1. All that have business to the Court of the King or to the Courts of Justice, and all countrymen coming up to bring provisions to the City or to buy foreign commodities, manufactures, and rarities, do for the most part leave their wives in the country.
2. Persons coming to live in London out of curiosity and pleasure, as also such as would retire and live privately, do the same, if they have any.
3. Such as come up to be cured of diseases, do scarce use their wives *pro tempore*.
4. That many apprentices of London, who are bound seven or nine years from marriage, do often stay longer voluntarily.

5. That many seamen of London leave their wives behind them, who are more subject to die in the absence of their husbands than to breed either without men or with the use of many promiscuously.
6. As for unhealthiness it may well be supposed that although seasoned bodies may and do live near as long in London, as elsewhere, yet new-comers and children do not, for the smoke, stinks, and close air are less healthful than that of the country; otherwise why do sickly persons remove into the country air? And why are there more old men in the country than in London, *pro rata*? And although the difference in Hackney and Newington, above-mentioned, be not very notorious, yet the reason may be their vicinity to London, and that the inhabitants are most such whose bodies have first been impaired with the London air, before they withdraw thither.

7. As to the causes of barrenness in London, I say, that although there should be none extraordinary in the native air of the place, yet the intemperance in feeding, and especially the adulteries and fornications, supposed more frequent in London than elsewhere, do certainly hinder breeding. For a woman, admitting 10 men, is so far from having ten times as many children that she hath none at all.

8. Add to this, that the minds of men in London are more thoughtful and full of business than in the country, where their work is corporal labour and exercises. All which promote breedings, whereas anxieties of the mind hinder it.

## CHAPTER VIII

### OF THE DIFFERENCE BETWEEN THE NUMBERS OF MALES AND FEMALES

THE next observation is, that there be more males than females.

There have been buried from the year 1628 to the year 1662, exclusive, 209,436 males and but 190,474 females: but it will be objected, that in London it may indeed be so, though otherwise elsewhere; because London is the great stage and shop of business, wherein the masculine sex bears the greatest part. But we answer, that there have been also christened within the same time, 139,782 males and but 130,866 females, and that the country accounts are consonant enough to those of London upon this matter.

2. What the causes hereof are, we shall not trouble ourselves to conjecture, as in other cases, only we shall desire that travellers would enquire whether it be the same in other countries.

3. We should have given an account, how in every age these proportions change here, but that we have Bills of distinction but for 32 years, so that we shall pass from hence to some inferences from this conclusion; as first,

- I. That Christian religion, prohibiting polygamy, is more agreeable to the Law of Nature, that is, the Law of God, than Mahometism and others, that allow it; for one man his having many women, or wives by Law, signifies nothing, unless there were many women to one man in Nature also.
- II. The obvious objection hereunto is, that one horse, bull, or ram, having each of them many females, do promote increase. To which I answer, that although perhaps there be naturally, even of these species, more males than females, yet artificially, that is, by making geldings, oxen and wethers, there are fewer. From whence it will follow that when by experience it is found how many ewes (suppose twenty) one ram will serve, we may know what proportion of male lambs to castrate, or geld, viz. nineteen, or thereabouts: for if you emasculate fewer, viz. but ten, you shall by promiscuous copulation of each of those ten with two females hinder the increase so far as the admittance of two males will do it: but, if you castrate none at all, it is highly probable that every of the twenty males copulating with every of the twenty females, there will be little or no conception in any of them all.
- III. And this I take to be the truest reason why foxes, wolves, and other vermin animals that are not gelt, increase not faster than sheep, when as so many thousands of these are daily butchered, and very few of the other die otherwise than of themselves.

4. We have hitherto said there are more males than females; we say next, that the one exceed the other by about a thirteenth part; so that although more men die violent deaths than women, that is, more are slain in wars, killed by mischance, drowned at sea, and die by the hand of Justice. Moreover, more men go to colonies and travel into foreign parts, than women. And lastly, more remain unmarried, than of women, as Fellows of Colleges, and apprentices above eighteen, etc. Yet the said thirteenth part difference bringeth the business but to such a pass, that every woman may have an husband, without the allowance of polygamy.

5. Moreover, although a man be prolific forty years, and a woman but five and twenty, which makes the males to be as 560 to 325 females, yet the causes above-named, and the later marriage of the men, reduce all to an equality.

6. It appearing that there were fourteen men to thirteen women, and that they die in the same proportion also, yet I have heard physicians say that they have two women patients to one man, which assertion seems very likely; for that women have either the Green-sickness, or other like

distempers, are sick of Breedings, Abortions, Child-bearing, Sore-breasts, Whites, Obstructions, Fits of the Mother, and the like.

7. Now, from this it should follow that more women should die than men, if the number of burials answered in proportion to that of sicknesses: but this must be salved, either by the alleging that the physicians cure those sicknesses, so as few more die than if none were sick, or else that men, being more intemperate than women, die as much by reason of their vices, as the women do by the infirmity of their sex, and consequently, more males being born than females, more also die.

8. In the year 1642 many males went out of London into the wars then beginning, in so much as I expected in the succeeding year, 1643, to have found the burials of females to have exceeded those of males, but no alteration appeared; for as much, as I suppose, trading continuing the same in London, all those who lost their apprentices had others out of the country; and if any left their trades or shops, that others forthwith succeeded them: for if employment for hands remain the same, no doubt but the number of them could not long continue in disproportion.

9. Another pregnant argument to the same purpose (which hath already been touched on) is, that although in the very year of the Plague, the christenings decreased by the dying and fleeing of teeming-women, yet the very next year after, they increased somewhat, but the second after, to as full a number as in the second year before the said Plague: for I say again, if there be encouragement for an hundred in London, that is, a way how an hundred may live better than in the country, and if there be void housing there to receive them, the evacuating of a  $\frac{1}{4}$ th, or  $\frac{1}{3}$  part of that number, must soon be supplied out of the country; so as the great Plague doth not lessen the inhabitants of the City, but of the country, who in a short time remove themselves from hence thither, so long, until the City for want of receipt and encouragement, regurgitates and sends them back.

10. From the difference between males and females, we see the reason of making eunuchs in those places where polygamy is allowed, the latter being useless as to multiplication without the former, as was said before in the case of sheep and other animals, usually gelt in these countries.

11. By consequence, this practice of castration serves as well to promote increase as to meliorate the flesh of those beasts that suffer it. For that operation is equally practised upon horses which are not used for food, as upon those that are.

12. In Popish countries where polygamy is forbidden, if a greater number of males oblige themselves to celibate than the natural overplus or difference between them and females amounts unto; then multiplication is hindered; for if there be eight men to ten women, all of which eight men are married to eight of the ten women, then the other two bear no children, as either admitting no man at all or else admitting men as whores (that is more than one) which commonly procreates no more than if none at all had been used: or else such unlawful copulations beget conceptions



but to frustrate them by procured abortions or secret murders all which returns to the same reckoning. Now, if the same proportion of women oblige themselves to a single life likewise, then such obligation makes no change in this matter of increase.

13. From what hath been said, appears the reason why the Law is and ought to be so strict against fornications and adulteries, for if there were universal liberty, the increase of mankind would be but like that of foxes at best.

14. Now forasmuch as Princes are not only powerful but rich, according to the number of their people (hands being the father, as lands are the mother and womb of wealth) it is no wonder why states by encouraging marriage, and hindering licentiousness, advance their own interest, as well as preserve the Laws of God from contempt and violation.

15. It is a blessing to mankind, that by this overplus of males there is this natural bar to polygamy: for in such a state women could not live in that parity and equality of expense with their husbands, as now and here they do.

16. The reason whereof is, not that the husband cannot maintain as splendidly three, as one; for he might, having three wives, live himself upon a quarter of his income, that is in a parity with all three, as well as, having but one, live in the same parity at half with her alone: but rather, because that to keep them all quiet with each other, and himself, he must keep them all in greater awe and less splendor, which power he having will probably use it to keep them all as low as he pleases, and at no more cost than makes for his own pleasure; the poorest subjects (such as this plurality of wives must be) being most easily governed.

## CHAPTER IX

### OF THE GROWTH OF THE CITY

IN the year 1593 there died in the 97 parishes within the Walls, and the 16 without the Walls (besides 421 of the *Plague*) 3,508. And the next year 3,478, besides 29 of the *Plague*: in both years 6,986. Twenty years after, there died in the same 97, and 16 parishes, 12,110, viz. in the year 1614, 5,873; and in the year 1615, 6,237: so as the said parishes are increased, in the said time, from seven to twelve, or very near thereabouts.

2. Moreover, the burials within the like space of the next twenty years, viz. in the years 1634 and 1635, were 15,625, viz. as about 24 to 31: the which last of the three numbers, 15,625, is much more than double to the first 6,986, viz. the said parishes have in forty years increased from 23 to 52.

3. Where is to be noted, that although we were necessitated to compound the said 97 with the 16 parishes, yet the 16 parishes have increased faster

than the 97. For, in the year 1620, there died within the walls 2,726, and in 1660 there died but 3,098 (both years being clear of the Plague) so as in this forty years the said 97 parishes have increased but from nine to ten, or thereabouts, because the housing of the said 97 parishes could be no otherwise increased than by turning great houses into tenements and building upon a few gardens.

4. In the year 1604, there died in the 97 parishes 1,518, and of the *Plague* 280. And in the year 1660, 3,098, and none of the *Plague*, so as in 56 years the said parishes have doubled: where note, that forasmuch as the said year 1604 was the very next year after the great *Plague*, 1603 (when the City was not yet re-peopled) we shall rather make the comparison between 2,014, which died in the year 1605, and 3,431 in the year 1659, choosing rather from hence to assert, that the said 97, and 16 parishes increased from twenty to 34, or from ten to seventeen in 54 years, than from one to two in 56, as in the last foregoing paragraph is set down.

5. In the year 1605, there died in the 16 out-parishes 2,974, and in the year 1659, 6,988, so as in the 54 years, the said parishes have increased from three to seven.

6. In the year 1605 there died in the eight out-parishes, 960, in the year 1659, there died in the same scope of ground, although called now ten parishes (the Savoy and Covent-Garden being added) 4,301, so as the said parishes have increased within the said 54 years, more than from one to four.

7. Moreover, there was buried in all, in the year 1605, 5,948, and in the year 1659, 14,720, viz. about two to five.

8. Having set down the proportions wherein we find the said three great divisions of the whole pile, called London, to have increased; we come next to shew what particular parishes have had the most remarkable share in these augmentations, viz. of the 97 parishes within the Walls the increase is not very discernible, but where great houses formerly belonging to noblemen before they built others near Whitehall, have been turned into tenements, upon which account Alhallows on the Wall is increased, by the conversion of the Marquess of Winchester's house, lately the Spanish Ambassador's, into a New street, the like of Alderman Freeman, and La Motte near the Exchange, the like of the Earl of Arundell's in Loathbury, the like of the Bishop of London's Palace, the Dean of Paul's, and the Lord River's house, now in hand, as also of the Dukes-Place, and others heretofore.

9. Of the 16 parishes next without the Walls, Saint Gile's Cripple-gate hath been most enlarged, next to that, Saint Olave's Southwark, then Saint Andrew's Holborn, then White-Chappel, the difference in the rest not being considerable.

10. Of the out-parishes now called ten, formerly nine, and before that eight, Saint Giles, and Saint Martins in the fields, are most increased, notwithstanding Saint Pauls Covent-Garden was taken out of them both.

11. The general observation which arises from hence is, that the City of London gradually removes westwards, and did not the Royal Exchange, and London-Bridge stay the trade, it would remove much faster, for Leaden-Hall Street, Bishops-gate and part of Fan-Church-street, have lost their ancient trade, Grace-Church-street indeed keeping itself yet entire, by reason of its conjunction with and relation to London-Bridge.

12. Again, Canning-street, and Watlin-street have lost their trade of Woollen-Drapery to Paul's Church-Yard, Ludgate-hill, and Fleet-street; the Mercery is gone from out of Lombard-street, and Cheapside, into Pater-Noster-Row and Fleet-street.

13. The reasons whereof are, that the King's Court (in old times frequently kept in the City) is now always at Westminster. Secondly, the use of coaches, whereunto the narrow streets of the old City are unfit, hath caused the building of those broader streets in Covent-Garden, etc.

14. Thirdly, where the consumption of commodity is, viz. among the gentry, the vendors of the same must seat themselves.

15. Fourthly, the cramming up of the void spaces and gardens within the Walls, with houses, to the prejudice of light and air, have made men build new ones, where they less fear those inconveniences.

16. Conformity in building to other civil nations hath disposed us to let our old wooden dark houses fall to decay, and to build new ones, whereby to answer all the ends above-mentioned.

17. Where note, that when Lud-gate was the only western Gate of the City, little building was westward thereof. But when Holborn began to increase New-gate was made. But now both these Gates are not sufficient for the communication between the Walled City and its enlarged western suburbs, as daily appears by the intolerable stops and embaresses of coaches near both these Gates, especially Lud-gate.

## CHAPTER X

### OF THE INEQUALITY OF PARISHES

BEFORE we pass from hence, we shall offer to consideration the inequality of parishes in and about London, evident in the proportion of their respective burials; for in the same year were buried in Cripple-gate-parish 1,191, that but twelve died in Trinity-Minories, St. Saviour's Southwark, and Botolph's Bishops-gate, being of the middle size, as burying five and 600 per annum; so that Cripple-gate is an hundred times as big as St. John the Evangelist's, Mary-Cole-church, Bennet's Grace-church, Matthew-Friday-street, and some others within the City.

2. Hence may arise this question, wherefore should this inequality be continued? If it be answered, because that Pastors of all sorts and sizes of

abilities may have Benefices, each man according to his merit: we answer, that a two hundredth part of the best Parson's learning is scarce enough for a sexton. But besides, there seems no reason of any differences at all, it being as much science to save one single soul as one thousand.

3. We incline therefore to think the parishes should be equal, or near, because in the reformed religions the principal use of churches is to preach in: now the bigness of such a church ought to be no greater than that unto which the voice of a preacher of middling lungs will easily extend; I say, easily, because they speak an hour or more together.

4. The use of such large churches, as Paul's, is now wholly lost, we having no need of saying perhaps fifty Masses all at one time, nor of making those grand processions frequent in the Romish church; nor is the shape of our cathedral proper at all for our preaching auditories, but rather the figure of an amphitheatre with galleries, gradually over-looking each other; for unto this condition the parish churches of London are driving apace, as appears by the many galleries every day built in them.

5. Moreover, if parishes were brought to the size of Colman-street, Alhallows-Barking, Christ-church, Black-Friars, etc. in each whereof die between 100 and 150 per annum, then a hundred parishes would be a fit and equal division of this great charge, and all the Ministers (some whereof have now scarce forty pounds per annum) might obtain a subsistence.

6. And lastly, the Church-wardens and Overseers of the Poor might find it possible to discharge their duties, whereas now in the greater out-parishes many of the poorer parishioners through neglect do perish, and many vicious persons get liberty to live as they please, for want of some heedful eye to overlook them.

## CHAPTER XI

### OF THE NUMBER OF INHABITANTS

I HAVE been several times in company with men of great experience in this City, and have heard them talk seldom under millions of people to be in London, all which I was apt enough to believe until, on a certain day, one of eminent reputation was upon occasion asserting that there was in the year 1661 two millions of people more than in the year 1625, before the great *Plague*; I must confess that, until this provocation, I had been frightened with that misunderstood example of David, from attempting any computation of the people of this populous place; but hereupon I both examined the lawfulness of making such enquiries and, being satisfied thereof, went about the work itself in this manner: viz.

2. First, I imagined that, if the conjecture of the worthy person aforementioned had any truth in it, there must needs be about six or seven

millions of people in London now; but repairing to my Bills I found that not above 15,000 per annum were buried, and consequently, that not above one in four hundred must die per annum if the total were but six millions.

3. Next considering, that it is esteemed an even lay whether any man lives ten years longer, I supposed it was the same, that one of any 10 might die within one year. But when I considered, that of the 15,000 aforementioned about 5,000 were *Abortive*, and *Stillborn*, or died of *Teeth*, *Convulsion*, *Rickets*, or as *Infants*, and *Chrysoms*, and *Aged*. I concluded that of men and women, between ten and sixty, there scarce died 10,000 per annum in London, which number being multiplied by 10, there must be 100,000 in all, that is not the one-sixtieth part of what the Alderman imagined. These were but sudden thoughts on both sides, and both far from truth, I thereupon endeavoured to get a little nearer, thus: viz.

4. I considered, that the number of child-bearing women might be double to the births: forasmuch as such women, one with another, have scarce more than one child in two years. The number of births I found, by those years wherein the registries were well kept, to have been somewhat less than the burials. The burials in these late years at a medium are about 13,000 and consequently the christenings not above 12,000. I therefore esteemed the number of teeming women to be 24,000: then I imagined, that there might be twice as many families as of such women; for that there might be twice as many women aged between 16 and 76, as between 16 and 40, or between 20 and 44; and that there were about eight persons in a family, one with another, viz. the man and his wife, three children and three servants, or lodgers: now 8 times 48,000 makes 384,000.

5. Secondly, I find by telling the number of families in some parishes within the Walls, that 3 out of 11 families per annum have died: wherefore, 13,000 having died in the whole, it should follow there were 48,000 families according to the last mentioned account.

6. Thirdly, the account which I made of the trained bands and auxiliary soldiers, doth enough justify this account.

7. And lastly I took the map of London set out in the year 1658 by Richard Newcourt, drawn by a scale of yards. Now I guessed that in 100 yards square there might be about 54 families, supposing every house to be 20 foot in the front: for on two sides of the said square there will be 100 yards of housing in each, and in the two other sides 80 each; in all 360 yards: that is 54 families in each square, of which there are 220 within the Walls, making in all 11,880 families within the Walls. But forasmuch as there die within the walls about 3,200 per annum, and in the whole about 13,000; it follows that the housing within the Walls is  $\frac{1}{4}$  part of the whole, and consequently, that there are 47,520 families in and about London, which agrees well enough with all my former computations: the worst whereof doth sufficiently demonstrate that there are no millions of people in London, which nevertheless most men do believe, as they do, that there

be three women for one man, whereas there are fourteen men for thirteen women, as elsewhere hath been said.

8. We have (though perhaps too much at random) determined the number of the inhabitants of London to be about 384,000: the which being granted, we assert that 199,112 are males and 184,886 females.

9. Whereas we have found that of 100 quick conceptions about 36 of them die before they be six years old, and that perhaps but one surviveth 76, we, having seven decades between six and 76, we sought six mean proportional numbers between 64, the remainder living at six years, and the one which survives 76, and find that the numbers following are practically near enough to the truth; for men do not die in exact proportions, nor in fractions: from whence arises this Table following:

Viz. of 100 there dies		The fourth	6
within the first six years	36	The next	4
The next ten years, or		The next	3
decade	24	The next	2
The second decade	15	The next	1
The third decade	9		

10. From whence it follows, that of the said 100 conceived there remains alive at six years end 64.

At sixteen years end	40	At fifty-six	6
At twenty-six	25	At sixty-six	3
At thirty-six	16	At seventy-six	1
At forty-six	10	At eighty	0

11. It follows also, that of all which have been conceived, there are now alive 40 per cent above sixteen years old, 25 above twenty-six years old, & *sic deniceps*, as in the above Table: there are therefore of aged between 16 and 56, the number of 40, less by six, viz. 34; of between 26 and 66, the number of 25 less by three, viz. 22: & *sic deniceps*.

Wherefore, supposing there be 199,112 males, and the number between 16 and 56 being 34. It follows, there are 34 per cent of all those males fighting men in London, that is 67,694, viz. near 70,000: the truth whereof I leave to examination, only the  $\frac{1}{5}$  of 67,694, viz. 13,539, is to be added for Westminster, Stepney, Lambeth, and the other distant parishes, making in all 81,233 fighting men.

12. The next enquiry shall be, in how long time the City of London shall, by the ordinary proportion of breeding and dying, double its breeding people. I answer in about seven years, and (Plagues considered) eight. Wherefore since there be 24,000 pair of breeders, that is one-eighth of the whole, it follows that in eight times eight years the whole people of the City shall double without the access of foreigners: the which contradicts

not our account of its growing from two to five in 56 years with such accesses.

13. According to this proportion, one couple viz. Adam and Eve, doubling themselves every 64 years of the 5,610 years, which is the age of the world according to the Scriptures, shall produce far more people than are now in it. Wherefore the world is not above 100 thousand years old as some vainly imagine, nor above what the Scripture makes it.

## CHAPTER XII

### OF THE COUNTRY BILLS

WE have, for the present, done with our observations upon the accounts of burials and christenings, in and about London; we shall next present the accounts of both burials, christenings, and also of weddings in the country, having to that purpose inserted Tables of 90 years for a certain parish in Hampshire, being a place neither famous for longevity and healthfulness, nor for the contrary. Upon which Tables we observe,

1. That every wedding, one with another, produces four children, and consequently, that that is the proportion of children which any marriageable man or woman may be presumed shall have. For, though a man may be married more than once, yet, being once married, he may die without any issue at all.

2. That in this parish there were born 15 females for 16 males, whereas in London there were 13 for 14, which shews that London is somewhat more apt to produce males than the country. And it is possible, that in some other places there are more females born than males, which, upon this variation of proportion, I again recommend to the examination of the curious.

3. That in the said whole 90 years the burials of the males and females were exactly equal, and that in several decades they differed not 1/100 part, that in one of the two decades, wherein the difference was very notorious, there were buried of males 337 and of females but 284, viz. 53 difference, and in the other there died contrariwise 338 males and 386 females, differing 46.

4. There are also decades, where the birth of males and females differ very much, viz. about 60.

5. That in the said 90 years there have been born more than buried in the said parish, (the which both 90 years ago, and also now, consisted of about 2,700 souls) but 1,059, viz. not 12 per annum, one year with another.

6. That these 1,059 have in all probability contributed to the increase of London; since, as was said even now, it neither appears by the burials, christenings, or by the built of new-housing, that the said parish is more

populous now than 90 years ago, by above two or 300 souls. Now, if all other places send about  $\frac{1}{3}$  of their increase, viz. about one out of 900 of their inhabitants annually to London, and that there be 14 times as many people in England as there be in London, (for which we have given some reasons) then London increases by such *advenae* every year above 6,000: the which will make the account of burials to swell about 200 per annum, and will answer the increases. We observe it is clear, that the said parish is increased about 300, and it is probable that three or four hundred more went to London, and it is known that about 400 went to New-England, the Caribe-Islands, and New-found-land, within these last forty years.

7. According to the medium of the said whole 90 years, there have been five christenings for four burials, although in some single years, and decades, there have been three to two, although sometimes (though more rarely) the burials have exceeded the births, as in the case of epidemical diseases.

8. Our former observation, that healthful years are also the most fruitful, is much confirmed by our country accounts; for, 70 being our standard for births, and 58 for burials, you shall find that where fewer than 58 died, more than 70 were born. Having given you a few instances thereof, I shall remit you to the Tables for the general proof of this assertion. Viz. in the year 1633 when 103 were born, there died but 29. Now, in none of the whole 90 years more were born than 103, and but in one, fewer than 29 died, viz. 28 in the year 1658. Again in the year 1568, when 93 were born, but 42 died. In the year 1584, when 90 were born, but 41 died. In the year 1650, when 86 were born, but 52 died. So that by how much more are born, by so much (as it were) the fewer die. For when 103 were born, but 29 died: but when but 86 were born, then 52 died.

On the other side in the year 1638, when 156 died per annum, which was the greatest year of mortality, then less than the mere standard 70, viz. but 66 were born. Again in the year 1644, when 137 died, but 59 were born. In the year 1597, when 117 died, but 48 were born. And in the year 1583, when 87 died, but 59 were born.

A little irregularity may be found herein, as that in the year 1612, when 116 died (viz. a number double to our standard 58) yet 87 (viz. 17 about the standard 70) were born. And that when 89 died 75 were born: but these differences are not so great, nor so often, as to evert our rule, which besides the authority of these accounts is probable in itself.

9. Of all the said 90 years the year 1638 was the most mortal, I therefore enquired whether the *Plague* was then in that parish, and having received good satisfaction that it was not (which I the rather believe because that the *Plague* was not then considerable at London) but that it was a malignant fever raging so fiercely about harvest, that there appeared scarce hands enough to take in the corn: which argues, considering there were 2,700 parishioners, that seven might be sick for one that died: whereas of the *Plague* more die than recover. Lastly, these people lay longer sick than is



usual in the *Plague*, nor was there any mention of *Sores*, *Swellings*, *blew-Tokens*, etc. among them. It follows that the proportion between the greatest and the least mortalities in the country are far greater than at London. Forasmuch as the greatest 156 is above quintuple unto 28 the least, whereas in London (the *Plague* excepted, as here it hath been) the number of burials upon other accounts within no decade of years hath been double, whereas in the country it hath been quintuple not only within the whole 90 years, but also within the same decade: for in the year 1633 there died but 29, and in the year 1638 the above-mentioned number of 156. Moreover, as in London, in no decade, the burials of one year are double to those of another: so in the country they are seldom not more than so. As by this Table appears,

Decade	Number of burials	
	greatest	least
1	66	34
2	87	39
3	117	38
4	53	30
5	116	51
6	89	50
7	156	35
8	137	46
9	80	28

Which shews that the opener and freer airs are most subject both to the good and bad impressions, and that the fumes, steams, and stench of London do so medicate and impregnate the air about it, that it becomes capable of little more, as if the said fumes rising out of London met with, opposed, and jostled backwards the influences falling from above, or resisted the incursion of the country airs.

10. In the last paragraph we said that the burials in the country were sometimes quintuple to one another, but of the christenings we affirm, that within the same decade they are seldom double, as appears by this Table, viz.

Decade	Number of burials [ <i>?christenings</i> —Eds.]	
	greatest	least
1	70	50
2	90	45
3	71	52
4	93	60
5	87	61
6	85	63
7	103	66
8	87	62
9	86	52

Now, although the disproportions of births be not so great as that of burials, yet these disproportions are far greater than at London: for let it be shewn in any of the London Bills, that within two years the christenings have decreased one half or increased double, as they did in the year 1584 when 90 were born, and in the year 1586, wherein were but 45: or to rise from 52, as in the year 1593, to 71, as in the next year 1594. Now, these disproportions both in births and burials, confirm what hath been before asserted, that healthfulness and fruitfulness go together, as they would not, were there not disproportions in both, although proportional.

11. By the standard of burials in this parish, I thought to have computed the number of inhabitants in it, viz. by multiplying 58 by 4, which made the product 232, the number of families. Hereupon I wondered, that a parish containing a large market town, and 12 miles compass, should have but 232 houses, I then multiplied 232 by 8, the product whereof was 1,856, thereby hoping to have had the number of the inhabitants, as I had for London; but when upon enquiry I found there had been 2,100 communicants in that parish in the time of a Minister who forced too many into that ordinance, and that 1,500 was the ordinary number of communicants in all times, I found also that for as much as there were near as many under 16 years old as there are above, viz. communicants, I concluded that there must be about 27, or 2800 souls in that parish: from whence it follows, that little more than one of 50 dies in the country, whereas in London, it seems manifest that about one in 32 dies, over and above what dies of the *Plague*.

12. It follows therefore from hence, what I more faintly asserted in the former chapter, that the country is more healthful than the City, that is to say, although men die more regularly, and less *per saltum* in London, than in the country, yet, upon the whole matter, there die fewer *per rata*; so as the fumes, steams, and stench above-mentioned, although they make the air of London more equal, yet not more healthful.

13. When I consider that in the country 70 are born for 58 buried, and that before the year 1600 the like happened in London, I considered whether a City, as it becomes more populous, doth not, for that very cause, become more unhealthful, I inclined to believe that London now is more unhealthful than heretofore, partly for that it is more populous, but chiefly because I have heard that 60 years ago few sea coals were burnt in London, which now are universally used. For I have heard that Newcastle is more unhealthful than other places, and that many people cannot at all endure the smoke of London, not only for its unpleasantness, but for the suffocations which it causes.

14. Suppose, that in the year 1569 there were 2400 souls in that parish, and that they increased by the births 70, exceeding the burials 58, it will follow that the said 2400 cannot double under 200. Now, if London be less healthful than the country, as certainly it is, the *Plague* being reckoned in, it follows that London must be doubling itself by generation in much

above 200: but if it hath increased from 2 to 5 in 54 as aforesaid, the same must be by reason of transplantation out of the country.

## THE CONCLUSION

IT may be now asked, to what purpose tends all this laborious buzzing and groping? To know,

1. The number of the people?
2. How many males and females?
3. How many married and single?
4. How many teeming women?
5. How many of every septenary, or decade of years in age?
6. How many fighting men?
7. How much London is, and by what steps it hath increased?
8. In what time the housing is replenished after a Plague?
9. What proportion die of each general and particular casualties?
10. What years are fruitful, and mortal, and in what spaces, and intervals, they follow each other?
11. In what proportion men neglect the orders of the Church, and sects have increased?
12. The disproportion of parishes?
13. Why the burials in London exceed the christenings, when the contrary is visible in the country?

To this I might answer in general by saying that those who cannot apprehend the reason of these enquiries are unfit to trouble themselves to ask them.

2. I might answer by asking, why so many have spent their times and estates about the art of making gold? which, if it were much known, would only exalt silver into the place which gold now possesseth; and if it were known but to some one person, the same single *adeptus* could not, nay, durst not enjoy it, but must be either a prisoner to some Prince, and slave to some voluptuary, or else skulk obscurely up and down for his privacy and concealment.

3. I might answer, that there is much pleasure in deducing so many abstruse and unexpected inferences out of these poor despised Bills of Mortality; and in building upon that ground, which hath lain waste these eighty years. And there is pleasure in doing something new, though never so little, without pestering the world with voluminous transcriptions.

4. But, I answer more seriously, by complaining, that whereas the art of governing, and the true politics, is how to preserve the subject in peace and plenty, that men study only that part of it, which teacheth how to supplant

and over-reach one another, and how, not by fair out-running, but by tripping up each other's heels, to win the prize.

Now, the foundation, or elements of this honest harmless policy is to understand the land, and the hands of the territory to be governed, according to all their intrinsic and accidental differences: as for example, it were good to know the geometrical content, figure and situation of all the lands of a kingdom, especially, according to its most natural, permanent, and conspicuous bounds. It were good to know, how much hay an acre of every sort of meadow will bear? how many cattle the same weight of each sort of hay will feed and fatten? what quantity of grain and other commodities the same acre will bear in one, three or seven years *communibus annis*? unto what use each soil is most proper? All which particulars I call the intrinsic value: for there is also another value merely accidental, or extrinsic, consisting of the causes, why a parcel of land, lying near a good market, may be worth double to another parcel, though but of the same intrinsic goodness; which answers the queries, why lands in the north of England are worth but sixteen years purchase, and those of the west above eight and twenty. It is no less necessary to know how many people there be of each sex, state, age, religion, trade, rank, or degree, etc. by the knowledge whereof trade and Government may be made more certain and regular; for, if men knew the people as aforesaid, they might know the consumption they would make, so as trade might not be hoped for where it is impossible. As for instance, I have heard much complaint, that trade is not set up in some of the south-western and north-western parts of Ireland, there being so many excellent harbours for that purpose, whereas in several of those places I have also heard that there are few other inhabitants, but such as live *ex sponte creatis*, and are unfit subjects of trade, as neither employing others nor working themselves.

Moreover, if all these things were clearly and truly known (which I have but guessed at) it would appear, how small a part of the people work upon necessary labours and callings, viz. how many women and children do just nothing, only learning to spend what others get? how many are mere voluptuaries, and as it were mere gamesters by trade? how many live by puzzling poor people with unintelligible notions in divinity and philosophy? how many by persuading credulous, delicate, and litigious persons, that their bodies or estates are out of tune, and in danger? how many by fighting as soldiers? how many by ministeries of vice and sin? how many by trades or mere pleasure or ornaments? and how many in a way of lazy attendance, etc. upon others? And on the other side, how few are employed in raising and working necessary food and covering? and of the speculative men, how few do truly study nature, and things? The more ingenious not advancing much further than to write and speak wittily about these matters.

I conclude, that a clear knowledge of all these particulars, and many more, whereat I have shot but at rovers, is necessary in order to good,

The Table of Casualties

The Years of our Lord																											1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	1630	1631	1632	1633	1634	1635	1636	1629	...</
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certain and easy government, and even to balance parties and factions both in Church and state. But whether the knowledge thereof be necessary to many, or fit for others than the Sovereign and his chief Ministers, I leave to consideration.

The Table of Burials and Christenings in London

Years	97 Parishes	16 Parishes	Out- Parishes	Buried in all	Besides of the <i>Plague</i>	Christened
1604	1518	2097	708	4323	896	5458
1605	2014	2974	960	5948	444	6504
1606	1941	2920	935	5796	2124	6614
1607	1879	2772	1019	5670	2352	6582
1608	2391	3218	1149	6758	2262	6845
1609	2494	3610	1441	7545	4240	6388
1610	2326	3791	1369	7486	1803	6785
1611	2152	3398	1166	6716	627	7014
	16715	24780	8747	50242	14752	52190
1612	2473	3843	1462	7778	64	6986
1613	2406	3679	1418	7503	16	6846
1614	2369	3504	1494	7367	22	7208
1615	2446	3791	1613	7850	37	7682
1616	2490	3876	1697	8063	9	7985
1617	2397	4109	1774	8280	6	7747
1618	2815	4715	2066	9596	18	7735
1619	2339	3857	1804	7999	9	8127
	19735	31374	13328	64436	171	60316
1620	2726	4819	2146	9691	21	7845
1621	2438	3759	1915	8112	11	8039
1622	2811	4217	2392	8943	16	7894
1623	3591	4721	2783	11095	17	7945
1624	3385	5919	2895	12199	11	8299
1625	5143	9819	3886	18848	35417	6983
1626	2150	3286	1965	7401	134	6701
1627	2325	3400	1988	7711	4	8408
	24569	39940	19970	84000	35631	62114
1628	2412	3311	2017	7740	3	8564
1629	2536	3992	2243	8771	0	9901
1630	2506	4201	2521	9237	1317	9315
1631	2459	3697	2132	8288	274	8524
1632	2704	4412	2411	9527	8	9584
1633	2378	3936	2078	8392	0	9997
1634	2937	4980	2982	10899	1	9855
1635	2742	4966	2943	10651	0	10034
	20694	33495	19327	73505	1603	75774

The Table of Burials and Christenings in London (*cont.*)

Years	97 Parishes	16 Parishes	Out- Parishes	Buried in all	Besides of the <i>Plague</i>	Christened
1636	2825	6924	3210	12959	10400	9522
1637	2288	4265	2128	8681	3082	9160
1638	3584	5926	3751	13261	363	10311
1639	2592	4344	2612	9548	314	10150
1640	2919	5156	3246	11321	1450	10850
1641	3248	5092	3427	11767	1375	10670
1642	3176	5245	3578	11999	1274	10370
1643	3395	5552	3269	12216	996	9410
	23987	42544	25221	91752	19244	80443
1644	2593	4274	2574	9441	1492	8104
1645	2524	4639	2445	9608	1871	7966
1646	2746	4872	2797	10415	2365	7163
1647	2672	4749	3041	10462	3597	7332
1648	2480	4288	2515	9283	611	6544
1649	2865	4714	2920	10499	67	5825
1650	2301	4138	2310	8749	15	5612
1651	2845	5002	2597	10804	23	6071
	21026	36676	21199	78896	10041	54617
1652	3293	5719	3546	12553	16	6128
1653	2527	4635	2919	10081	6	6155
1654	3323	6063	3845	13231	16	6620
1655	2761	5148	3439	11348	9	7004
1656	3327	6573	4015	13915	6	7050
1657	3014	5646	3770	12430	4	6685
1658	3613	6923	4443	14979	14	6170
1659	3431	6988	4301	14720	36	5690
	25288	47695	30278	103261	107	51502
1660	3098	5644	3926	12668	13	6971
1661	3804	7309	5532	16645	20	8855

The Table following contains the number of burials and christenings in the seven parishes here under-mentioned, from the year 1636 unto the year 1659 inclusive; all which time the burials, and christenings were jointly mentioned: the two last years the christenings were omitted in the yearly Bills. This Table consists of seventeen Columns, the Total of all the burials being contained in the sixteen Columns: which number being added to the Total in the precedent Table of burials and christenings, makes the Total of every yearly, or general Bill.

*Note*, where there follows a second Number under any year, it denotes those who died that year of the *Plague*.





## The Table of Males and Females for London

Years	Buried		Christened	
	Males	Females	Males	Females
1629	4668	4103	5218	4683
1630	5660	4894	4858	4457
1631	4549	4013	4422	4102
1632	4932	4603	4994	4590
1633	4369	4023	5158	4839
1634	5676	5224	5035	4820
1635	5548	5103	5106	4928
1636	12377	10982	4917	4605
	47779	43945	39708	37024
1637	6392	5371	4703	4457
1638	7168	6456	5359	4952
1639	5351	4511	5366	4784
1640	6761	6010	5518	5332
Total	73451	65293	60664	56549
1641	6872	6270	5470	5200
1642	7049	6224	5460	4910
1643	6842	6360	4793	4617
1644	5659	5274	4107	3997
1645	6014	5465	4047	3919
1646	6683	6097	3768	3395
1647	7313	6746	3796	3536
1648	5145	4749	3363	3181
	51577	47185	34804	32755
1649	5454	5112	3079	2746
1650	4548	4216	2890	2722
1651	5680	5147	3231	2840
1652	6543	6026	3220	2908
1653	5416	4671	3196	2959
1654	6972	6275	3441	3179
1655	6027	5330	3655	3349
1656	7365	6556	3668	3382
	44005	41333	26380	24085
1657	6578	5856	3396	3289
1658	7936	7057	3157	3013
1659	7451	7305	9209[?2909]	2781
1660	7960	7158	3724	3247
	29925	27376	13186	12330
Total	198952	181187	135034	126750

The Table by Decades of years for the Country-Parish

Decades of years	Married	Males	Christened Females	Both	Males	Buried Females	Both
15 { 69	190	312	302	614	214	221	435
78							
15 { 79	185	328	309	637	287	302	589
88							
15 { 89	175	342	274	616	337	284	621
98							
1 { 599	181	366	377	743	249	219	468
608							
16 { 09	197	417	358	775	338	386	724
18							
16 { 19	168	368	373	741	305	306	611
28							
16 { 29	153	418	413	831	317	319	636
38							
16 { 39	137	351	357	708	375	383	758
48							
16 { 49	182	354	320	674	218	220	438
58							
	1568	3256	3083	6339	2640	2640	5280

The Table of Males and Females for the Country-Parish

Years	Communi- cants	Wed- dings	M.	Christened F.	Both	M.	Buried F.	Both
1569		14	38	30	68	23	21	44
1570		19	29	32	61	21	25	46
1571		18	28	26	54	23	27	50
1572		23	32	32	54	20	14	34
1573		21	34	36	70	24	13	37
1574		16	21	29	50	28	38	66
1575		24	37	29	66	15	19	34
1576		22	33	37	70	16	18	34
1577		13	29	26	55	19	21	40
1578		20	31	35	66	25	25	50
		190	312	302	614	214	221	435
1579		15	35	36	71	27	27	54
1580		21	43	31	74	38	41	79
1581		29	29	33	62	34	24	58
1582		22	28	29	57	18	21	39
1583		22	32	27	59	35	52	87
1584		15	46	44	90	22	19	41
1585		15	26	21	47	15	27	42
1586		18	22	23	45	24	37	61
1587		13	34	31	65	43	36	79
1588		15	33	34	67	31	18	49
		185	328	309	637	287	302	589

The Table of Males and Females for the Country-Parish (*cont.*)

Years	Communi- cants	Wed- dings	Christened			Buried		
			M.	F.	Both	M.	F.	Both
1589		20	31	27	58	28	16	44
1590		16	40	29	69	36	21	57
1591		12	37	28	65	35	30	65
1592		14	40	25	65	28	19	47
1593		20	32	20	52	33	32	65
1594		24	34	37	71	16	22	38
1595		16	32	28	60	33	28	61
1596		9	36	26	62	42	29	71
1597		23	23	25	48	53	64	117
1598		21	37	29	66	33	23	66
		175	342	274	616	337	284	631
1599		19	45	31	76	21	22	43
1600		16	26	34	60	20	26	46
1601		16	39	32	71	18	12	30
1602		14	31	32	63	29	18	47
1603		12	31	38	69	32	39	71
1604		21	42	35	77	26	27	53
1605		19	47	34	81	21	12	33
1606		19	29	41	70	28	23	51
1607		27	36	47	83	33	19	52
1608		17	40	53	93	21	21	42
		181	366	377	743	249	219	468
1609		23	30	31	61	24	41	65
1610		19	46	30	76	33	40	73
1611		25	40	41	81	41	32	73
1612		20	55	32	87	53	63	116
1613		24	41	33	74	47	41	88
1614		25	50	35	85	27	36	63
1615		22	35	48	83	28	36	64
1616		14	38	36	74	27	41	68
1617		17	45	31	76	35	28	63
1618		8	37	41	78	23	28	51
		197	417	358	775	338	386	724
1619		21	37	43	80	26	28	54
1620		20	34	51	85	18	30	48
1621		21	31	37	68	28	36	64
1622		23	45	38	83	20	26	46
1623		14	40	36	76	56	31	87
1624		19	30	33	63	29	35	64
1625		7	37	41	78	36	20	56
1626		9	30	35	65	21	29	50
1627		18	45	23	68	24	29	53
1628		16	39	36	75	47	42	89
		168	368	373	741	305	306	611

The Table of Males and Females for the Country-Parish (*cont.*)

Years	Wed- dings	Christened			Buried		
		M.	F.	Both	M.	F.	Both
1629	22	53	38	91	46	28	74
1630	8	58	45	103	26	27	53
1631	20	42	29	71	26	33	59
1632	16	43	50	93	15	21	36
1633	12	38	65	103	18	11	29
1634	23	30	45	75	18	26	44
1635	11	39	32	71	18	17	35
1636	15	50	37	87	42	48	90
1637	13	35	36	71	25	35	60
1638	13	30	36	66	83	73	156
	153	418	413	831	317	319	636
1639	18	24	31	55	48	66	114
1640	11	44	41	85	35	39	74
1641	21	34	29	63	34	36	70
1642	21	48	39	87	32	29	61
1643	8	30	42	72	59	28	87
1644	16	33	26	59	65	72	137
1645	10	43	41	84	28	29	57
1646	11	32	35	67	24	32	56
1647	12	28	46	74	25	21	46
1648	9	35	27	62	25	31	56
	137	351	357	708	375	383	758
1649	9	22	37	59	46	34	80
1650	9	55	31	86	25	27	52
1651	7	25	27	52	11	21	32
1652	14	34	28	62	20	25	45
1653	9	47	24	71	21	14	35
1654	15	34	37	71	14	25	39
1655	38	35	34	69	28	19	47
1656	28	40	30	70	18	15	33
1657	37	23	43	66	22	25	47
1658	16	39	29	68	13	15	28
	182	354	320	674	218	220	438

ADVERTISEMENTS FOR THE BETTER UNDERSTANDING  
OF THE SEVERAL TABLES: *videlicet*,

CONCERNING THE TABLE OF CASUALTIES  
CONSISTING OF THIRTY COLUMNS.

The first column contains all the casualties happening within the 22 single years mentioned in this Bill.

The 14 next columns contain two of the last septenaries of years, which being the latest are first set down.

The 8 next columns represent the 8 first years, wherein the casualties were taken notice of.

MEMORANDUM, that the 10 years between 1636 and 1647 are omitted as containing nothing extraordinary, and as not consistent with the incapacity of a sheet.

The 5 next columns are the 8 years from 1629 to 1636 brought into 2 quaternions, and the 12 of the 14 last years brought into three more; that comparison might be made between each 4 years taken together, as well as each single year apart.

The next column contains 3 years together, taken at 10 years distance from each other; that the distant years, as well as consequent, might be compared with the whole 20, each of the 5 quaternions, and each of the 22 single years.

The last column contains the total of the 5 quaternions, or 20 years.

The number 229,250 is the total of all the burials in the said 20 years, as 34,190 is of the burials in the said 3 distant years. Where note that the  $\frac{1}{3}$  of the latter total is 11,396 and the  $\frac{1}{20}$  of the former is 11,462; differing but 66 from each other in so great a sum, *videlicet* scarce  $\frac{1}{200}$  part.

THE TABLE OF BURIALS AND CHRISTENINGS,  
CONSISTING OF 7 COLUMNS.

It is to be noted, that in all the several columns of the burials those dying of the *Plague* are left out, being reckoned all together in the sixth column. Whereas in the original Bills the *Plague* and all other diseases are reckoned together, with mention how many of the respective totals are of the *Plague*.

Secondly, from the year 1642 forwards the account of the christenings is not to be trusted, the neglects of the same beginning about that year: for in 1642 there are set down 10,370, and about the same number several years before, after which time the said christenings decreased to between 5,000 and 6,000 by omission of the greater part.

Thirdly, the several numbers are cast up into octonaries, that comparison may be made of them as well as of single years.

THE TABLE OF MALES AND FEMALES,  
CONTAINING 5 COLUMNS.

First, the numbers are cast up for 12 years; *videlicet* from 1629, when the distinction between males and females first began, until 1640 inclusive when the exactness in that account ceased.

Secondly, from 1640 to 1660 the numbers are cast up into another total, which seems as good for comparing the number of males with females, the neglect being in both sexes alike, and proportionable.

The Tables concerning the country parish, the former of decades beginning at 1569, and continuing until 1658, and the latter being for single years, being for the same time, are so plain that they require no further explanation than the bare reading the chapter relating to them, etc.

FINIS