

2. Natural and Political Observations Mentioned in a Following Index, and Made Upon the Bills of Mortality

JOHN GRAUNT (1964 (1662))

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In extracting from Graunt's observations we have tried to give the reader a feel both for Graunt's imaginativeness and tenacity and for the materials he had to work with. We include both of his estimates for London's population: the first (460,000) he found by attributing to the city one-fourteenth of a national population estimate of 6,440,000 not well derived. The second (384,000), from his more careful knowledge about London, is probably of the correct order of magnitude, and suggests a reasonable total population figure (5 to 5.5 million) (cf. Wrigley 1967, pp. 44—45). Graunt's life table entries and his comments on London's doubling time are not of this quality.

We have mostly avoided Graunt's discussion of specific diseases, and have omitted his remarks on the expansion of London beyond the old city walls, on the healthfulness of the city and countryside, and on the country bills.

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. ...

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 vèhemently, 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. ...

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 forasmuch 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. ...

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 over-plus difference of burials above-mentioned, but likewise to increase its inhabitants, according to the said increase of housing. ...

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 $\frac{1}{7}$ 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 $\frac{1}{4}$ 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 $16\frac{1}{2}$ 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. ...

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. ...

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.

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